VAHU

VERTICAL AIR HANDLING UNITS

- ErP 2018
- Height and minimum ground dimensions
- Air flows from 3.000 to 27.500 m³/h
- EC fans adjustable with 0… 10V signal

The air handling units in the VAHU range complete the CTA series of air handling units.
The VAHUs are designed for those applications where modest ground surface dimensions are an essential condition for the construction of the air conditioning system.
They are made in accordance with the requirements of the 2009/125/EC Ecodesign Directive and Regulation 1253/2014 (ErP).
This series, produced in 8 models from 3.000 to 27.500 m³/h, is suitable for use in civil, commercial and industrial settings.

Publication: Technical bulletin Air vertical handling unit (VAHU)

Regulatory Compliance

All VAHU air handling units are tested before shipment. The Company's Quality System has been certified UNI EN ISO 9001 since 1996. In 2014 the Company was awarded UNI EN ISO 14001 Environmental Management certification. Over the years numerous certifications have been obtained for the various Roccheggiani product ranges from the most important European bodies (TÜV, EUROVENT, Istituto Giordano, VKF-AEAI, GOST, Achilles JQS, etc.). More specifically, the VAHU air handling units are designed and manufactured in accordance with the following reference provisions:

- Directive 2006/42/EU - Machinery
- Directive 2014/30/EU - Electromagnetic Compatibility (EMC);
- Directive 2014/35/EU Low Voltage Directive (LVD)
- Directive 2014/68/EU - PED
- Directive 2009/125/EU - EcoDesign
- Regulation (EU) No. 1253/2014 (ErP)

Application fields

The Air Handling Units from the VAHU range have been designed to respond in a specific manner to a wide spectrum of applications and are particularly suitable for civil, commercial and industrial applications:

- Industrial
- Tertiary
- Sports facilities
- Supermarkets
- Medium-to-large sized shopping centres

Description of the unit and its main components

Casing

The Anticorodal UNI 9006/1-ASTM 6060 aluminium profiles of the structure are specially shaped to improve safety and the corner couplings are made of fibreglass-reinforced nylon.

The panels, with a thickness of 25 mm or 54 mm, are of the sandwich type with pre-coated galvanised sheet metal on the outside and galvanised sheet metal on the inside; the insulation is made with expanded high density polyurethane foam (about 40 kg/m³).
The internal panel surface is manufactured with a special shaping, which in coupling with the profile creates a single flush surface, improving the air-handling efficiency characteristics and making cleaning and maintenance operations far easier and safer.
Inspection doors supplied with handles allow easy access to all unit components.

Fan section

The fans are of the centrifugal type with free impeller and reverse blades, equipped with EC electronically-controlled motors. The impellers made with composite material are dynamically and statically balanced. The fan suction inlet is made of galvanised steel and fitted with a pressure gauge for air flow rate measurement tools.
The IE4 efficiency class motors with built-in electronics allow continuous variations in air flow rates via 0-10 V modulating signals. The fans are chosen to ensure optimum performance and reduced noise levels.
Access to all fan sections is always protected with wire-mesh security doors. The motors comply with IEC - VDE - DIN standards, are CE marked in accordance with No. 73/23/EEC low voltage regulations and have IP55 level of standard protection.

Filtering section

The filters used are pleated and in class G4 - EN 779.

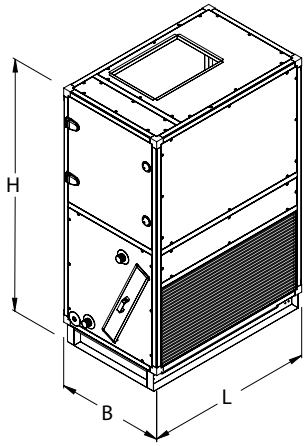
All filters can be removed from the side.

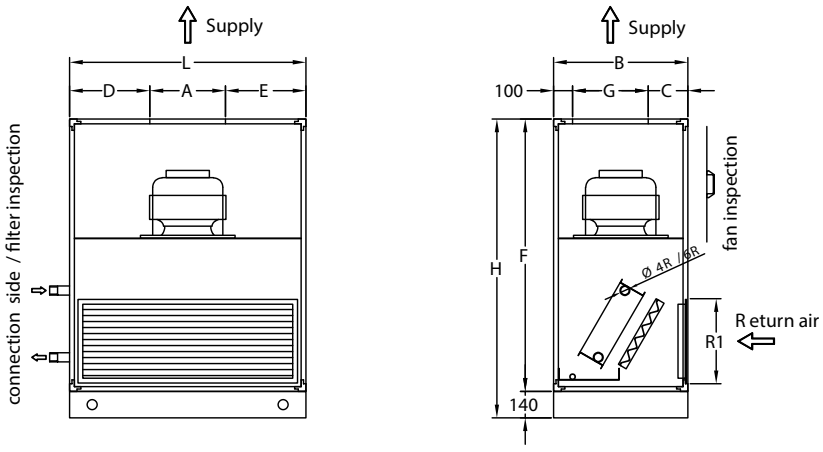
Dimensions and weights

VAHU 30-100

Air vertical handling unit VAHU Series 30 – 100						
VAHU Size		30	40	55	75	100
B	mm	650 (710)*	710 (770)*	780 (840)*	850 (910)*	850 (910)*
H	mm	1490 (1540)*	1580 (1640)*	1810 (1870)*	1990 (2050)*	2120 (2180)*
L	mm	1060 (1120)*	1250 (1310)*	1250 (1310)*	1400 (1460)*	1870 (1930)*
F	mm	1350 (1410)*	1440 (1500)*	1670 (1730)*	1850 (1910)*	1980 (2040)*
D	mm	330 (360)*	375 (405)*	325 (355)*	300 (330)*	435 (465)*
A	mm	400	500	600	800	1000
E	mm	330 (360)*	375 (405)*	325 (355)*	300 (330)*	435 (465)*
G	mm	400	400	400	500	500
C	mm	150 (180)*	210 (240)*	280 (310)*	250 (280)*	250 (280)*
R1	mm	450	450	620	645	645
6R	Φ	1-¼"	1-½"	2"	2"	3"
4R	Φ	1"	1-¼"	1-¼"	1-¼"	2"
Weight	kg	210 (240*)	250 (285*)	265 (305*)	315 (360*)	410 (470*)

*Dimensions with 54 mm panel

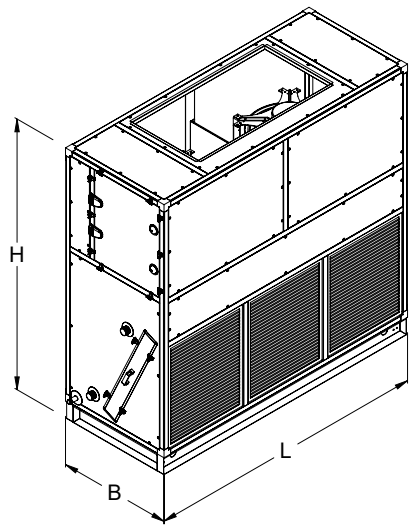


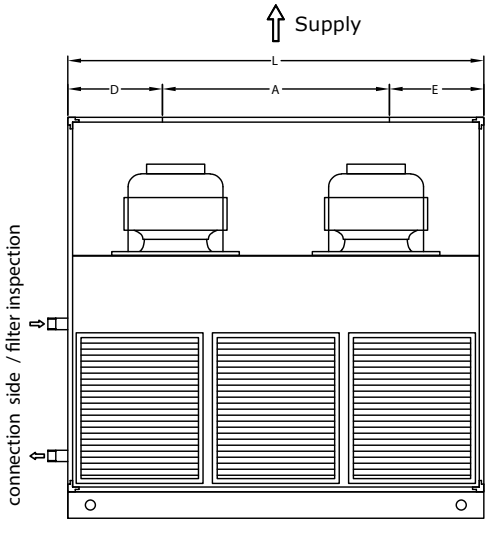


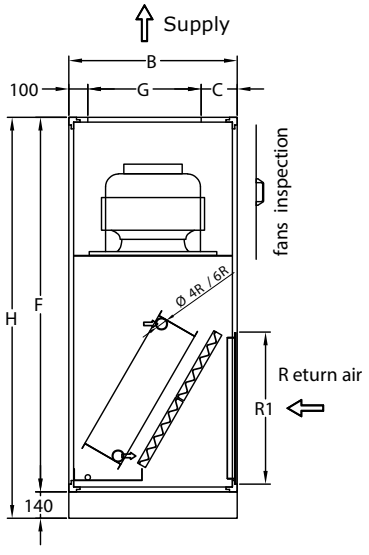
VAHU 140-250

Air vertical handling unit VAHU series 140-250				
VAHU Size		140	190	250
B	mm	890 (950)*	980 (1040)*	1070 (1110)*
H	mm	2120 (2180)*	2330 (2390)*	2530 (2590)*
L	mm	2200 (2260)*	2620 (2680)*	3190 (3250)*
F	mm	1980 (2040)*	2190 (2250)*	2390 (2450)*
D	mm	500 (530)*	510 (540)*	595 (655)*
A	mm	1200	1600	2000
E	mm	500 (530)*	510 (540)*	595 (655)*
G	mm	600	600	600
C	mm	190 (220)*	300 (330)*	370 (400)*
R1	mm	805	805	890
6R	Φ	2"	2-½"	3"
4R	Φ	2"	2"	2-½"
Weight	kg	605 (675*)	710 (785*)	965 (1100*)

*Dimensions with 54 mm panel







General technical data

VAHU Model		30	40	55	75	100	140	190	250
Nominal air flow	m^3/h	3000	4000	5500	7500	10000	14000	19000	25000
External Static Pressure	Pa	850	850	700	700	550	800	500	350
Performance									
Total Heating Capacity with 4-row coil (1)	kW	16.6	21.5	29.4	40.7	52.9	74.2	100.1	127.1
Total Heating Capacity with 6-row coil (1)	kW	19.7	25.8	35.3	48.7	66.7	89.4	124.3	157.5
Total Cooling Capacity with 4-row coil (2)	kW	15.7	18.7	25.7	37.0	40.0	57.6	83.3	99.2
Sensible Cooling Capacity with 4-row coil (2)	kW	10.7	13.7	18.7	26.0	33.3	49.5	69.9	87.3
Total Cooling Capacity with 6-row coil (2)	kW	18.5	22.3	30.4	44.3	66.5	79.6	112.0	130.8
Sensible Cooling Capacity with 6-row coil (2)	kW	13.3	17.3	23.5	32.7	45.5	62.1	85.1	106.0
Fans									
Supply Fan Motor Rating	kW	2.50	2.40	2.40	3.50	3.50	7.00	6.80	7.60
Supply Fan Nominal Current	A	4.0	3.9	3.3	5.6	5.4	11.2	10.8	12.4
Power supply	V/Ph/Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Airflow Control		YES- optional							
Filtration									
Filtration class		ISO Coarse 55% (ISO 16890) / G4 (EN 779)							
Compliance EN 1253/2014 (3)		-							
Unit type		UVU							
Ventilation Control		Variable turns							
Absorbed power (4)	kW	0.67	0.90	1.40	1.80	2.32	3.42	4.62	6.60
Specific Fan Power	$W/m^3/s$	74	112	101	128	120	102	120	139
Nominal Supply Airspeed	m / s	1.32	1.76	1.67	1.90	1.90	1.80	2.10	2.20
Maximum External Leakage	%	1.2	1.1	0.9	0.8	0.8	0.7	0.6	0.6
Fan Static Efficiency	%	61.1	63.6	60.7	61.8	64.4	61.9	64.4	60.3
Airborne Sound Power Level	dB (A)	60.0	61.5	66.6	67.1	66.0	69.1	68.7	73.1

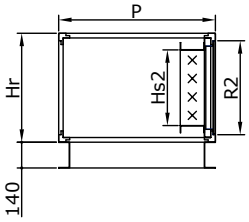
(1) Performance related to conditions: incoming air 20°C / 50% RH - water temperature entry-exit 45°-40° C;
(2) Performance related to conditions: incoming air 27°C / 50% RH - water temperature entry-exit 7°-12° C;
(3) Compliance with the Ecodesign Directive entails the presence of differential pressure switches to alert for soiled filters: if not expressly indicated, these accessories must be paid for by the customer;
(4) Values referring to the base configuration, with available static pressure of 250 Pa.

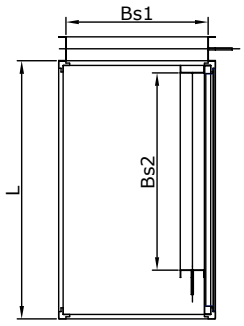
Description and dimensions of accessories

Water coil

The coils used are of the water type and are mounted on rails for easy removal.
The construction materials used are: copper pipes, aluminium fins, coated steel manifolds, frame in galvanised steel. The inner part of the handling section contains a condensate collection pan, made of AISI 304/316L stainless steel and fitted with a drainage system.

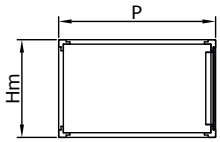
Mixing box for fresh air intake and recirculation

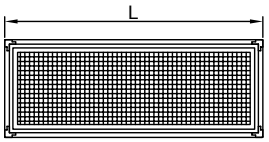


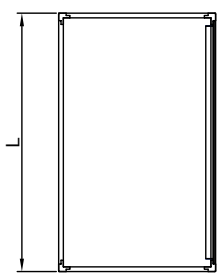


Mixing box for Fresh Air intake and Return Air									
Dimension		30	40	55	75	100	140	190	250
L	mm	1060	1250	1250	1400	1870	2200	2620	3190
P	mm	650	710	780	850	850	890	980	1070
Hr	mm	490	490	590	590	590	590	690	790
Hs1	mm	410	410	510	510	510	510	610	710
Bs1	mm	570	630	700	770	770	810	900	990
Hs2	mm	310	310	410	410	410	410	510	610
Bs2	mm	755	945	945	1095	1565	1895	2315	2885
R2	mm	410	410	510	510	510	510	610	710

Supply plenum with grilles with double row of horizontal/vertical fins, which are individually adjustable.







Supply plenum with grilles with double row of horizontal/vertical fins, which are individually adjustable.									
Dimension		30	40	55	75	100	140	190	250
L	mm	1060	1250	1250	1400	1870	2200	2620	3190
P	mm	650	710	780	850	850	890	980	1070
Hm	mm	390	390	490	490	620	620	710	710

Electronic control

The VAHU unit can be fitted with two different regulation systems.

The first one (**RIR** "Roccheggiani integrated regulation") is more complete and consists of an on-board control panel with a touch screen plus an optional remote location touch screen terminal.
The second one (**RAC1** "accompanying room regulator") consists of a room regulator fitted with quick access keys for the most common functions.

RIR Regulation

This type of built-in regulation system on the unit enables full control over all possible VAHU configurations.
A kit consisting of probes/actuators/pressure switch is linked to the control panel on board the unit, according to the various configurations. As an option, a touch screen terminal can be installed in the relevant area. This element is provided with a temperature and relative humidity probe.
The probes/actuators are mounted on the respective sections and cabled to the electric panel. According to the chosen configurations, certain probes are supplied together and installation is the customer's responsibility.

The following can be fitted as regulation accessories:
- bracelet-type water temperature probe for installation on pipe;
- CO_2 return probe;
- the relative humidity return/room probe;
- supply pressure probe;

The main features are as follows:
- Constant/variable speed: manual and automatic speed can be selected. Automatic speed is available when there are handling coils or a CO_2 probe or a relative humidity probe. These three modes are alternatives to each other.
- Steady air flow.
- Variable air flow based on the return air CO_2.
- Variable air flow based on return or room relative humidity.
- Variable air flow based on the heating/cooling requirement.
- Steady pressure.
- Possibility to regulate based on the room, return or supply temperature.
- Winter heating/summer cooling (H_2O valve) (2-pipe system).
- Only winter heating (H_2O valve) (2-pipe system).
- Only summer cooling (H_2O valve) (2-pipe system).
- Programming time periods
- Modulating control of the dual-damper mixing box to adjust the percentage of fresh air / recirculated air. The control can be manual by setting the percentage of opening, or automatic based on the room/return humidity probe and freecooling/freeheating or on the return air CO_2 probe and freecooling/freeheating or solely based on freecooling/freeheating;

The RIR regulation is provided with the following external connections.

- Ethernet: Bacnet IP, Modbus TCP Master/Slave, Webserver, Ftp Client/Server, SNTP.
- CANBus: CANopen.
- RS485: Available for connecting the room touch screen terminal.
- There is a slot for an SD micro memory card that can be used to record data or for storing on Webserver.
- USB programming portals.
- Plug-in RS-232: ASCII (optional).
- Plug-in RS-485: Modbus RTU (optional).
- Plug-in RS-485: Modbus RTU - BACnet MSTP (optional).
- Plug-in LONWORKS: LON (optional).
- Plug-in CANBus: CANopen (optional).

Regulation RAC1

The RAC1 regulation consists of a room regulator to which all utilities are connected: fans, actuators, pressure switches and probes.

Therefore, the regulator and the various accessories are supplied together with the VAHU unit according to the chosen configuration.

The following accessories go together with the room regulator:
- temperature probes in the duct/wall versions;
- humidity probes in the duct/wall versions;
- the CO_2 probe in the duct/wall versions;
- supply pressure probe;
- differential pressure switches to detect soiled filters;
- fresh air damper ON/OFF actuator in the 24V AC or 230V AC versions;
- modulating mixing box damper actuators;
- damper manual control;
- 230/24V transformer required to supply power to the auxiliary circuit when CO_2, relative humidity and accessory pressure probes are used or modulating valve actuators;

The regulator also has a relative humidity probe in addition to the room temperature probe.
RAC1 regulation is provided with Modbus RTU (slave) connectivity, according to the selected regulator model.

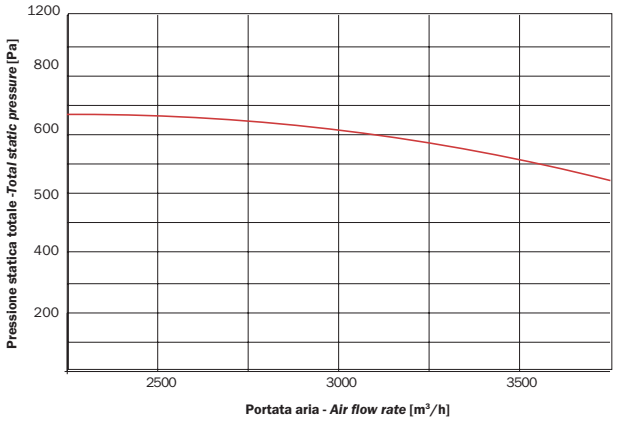
			REGULATION RAC1								
		REGULATOR CODE	REG-AMB-V0 / REG-AMB-V0-M					REG-AMB-V1 / REG-AMB-V1-M			
	I/O	REGULATOR MODEL	AHU-0xCSH1(1)					AHU-1xCSH1(3)			
CONTEMPORARY FUNCTIONS	AO	CONTROL 0-10V VENTILATION	•	•	•	•	•	•	•	•	•
	AO	CONTROL 0-10V VALVE	•	•	•	•	•	•	•	•	•
	AO	CONTROL 0-10V MIXING BOX	•	•	•	•	•				
	AI	SUPPLY TEMPERATURE PROBE	•	•	•	•	•	•	•	•	•
	AI	RETURN TEMPERATURE PROBE	•					• (3)	• (3)	• (3)	• (3)
		ROOM TEMPERATURE PROBE (INSIDE THE REGULATOR)	•	•	•	•	•	•	•	•	•
		ROOM HUMIDITY PROBE (INSIDE THE REGULATOR)	•	•	•	•	•	•	•	•	•
	AI	FRESH AIR TEMPERATURE PROBE	•	•	•	•	•				
	AI	ACTIVE CO2 PROBE (0-10V)		•				•			
	AI	ACTIVE HUMIDITY PROBE (0-10V)			•				•		
	AI	PRESSURE PROBE (0-10V) (2)				•				•	
	AI	HEATING COIL ANTIFREEZE TEMPERATURE PROBE					•				•
	DO	SELECTABLE BETWEEN: fan alarm, relay for EC fan switch on, heating coil antifreeze alarm	•	•	•	•	•	•	•	•	•
	DO	SELECTABLE BETWEEN: fan alarm, relay for EC fan switch on, heating coil antifreeze alarm						•	•	•	•
	DI	SELECTABLE BETWEEN: season change, economy function, regulation stop, ON/OFF, motor alarm, motor speed control									
	DI	SELECTABLE BETWEEN: season change, economy function, regulation stop, ON/OFF, motor alarm, motor speed control									
	DI	SELECTABLE BETWEEN: season change, economy function, regulation stop, ON/OFF, motor alarm, motor speed control									
	DI	SELECTABLE BETWEEN: remote season change, remote ON/OFF, presence contact, economy/boost contact, force presence contact, coil antifreeze contact, generic alarm, condensate contact, generic filter contact, supply filter contact, return filter contact, total shut down alarm contact, fan alarm contact, recovery unit antifreeze contact	•	•	•	•		•	•	•	•
	DI	SELECTABLE BETWEEN: remote season change, remote ON/OFF, presence contact, economy/boost contact, force presence contact, coil antifreeze contact, generic alarm, condensate contact, generic filter contact, supply filter contact, return filter contact, total shut down alarm contact, fan alarm contact, recovery unit antifreeze contact	•	•	•	•		•	•	•	•

(1) Both the supply and return air fans are controlled by the same analogue output. For separate control, you need 2 analogue outputs
(2) If there are two dampers, they must be controlled via the same digital output.
(3) x = S without Modbus; x = M with Modbus;
(4) The electric coil safety thermostat contact must be brought to the analogue input and the digital input must be set as the total shut down alarm contact.

NB. The REG-AMB models which have a cooling coil + heating coil configuration can perform cooling/heating/dehumidification + post-heating. In post-heating mode, the supply regulation probe is followed

Performance

VAHU 30



Pressure drops of components			
Flow capacity (m³/h)	2500	3000	3500
Intake grille	12	15	19
G4 class pleated filter	47	60	77
Return air/Fresh air damper	8	10	13
4R cooling coil	84	107	137
6R cooling coil	132	168	216
Supply plenum with grilles	51	65	84

Thermal capacity of a 4-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	30	27.5	25.9	16.6
	Supply temperature	° C	19.9	22.4	25.8	36.5
	Waterflow	m³h	5.2	4.8	4.52	2.9
	Water pressure drop	kPa	45.6	39.2	35.3	16.2
Water 70°C - 60°C	Total Capacity	kW	54.8	51.4	47.9	33.6
	Supply temperature	° C	44.6	46.1	47.7	53.4
	Waterflow	m³h	4.82	4.52	4.22	2.96
	Water pressure drop	kPa	36	32.2	28.4	15.3

Thermal capacity of a 4-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	30.4	24.4	20.8	15.7
	Sensitive capacity	kW	15	13.4	12.3	10.7
	Supply temperature	° C	20.1	18.7	17.8	16.3
	Waterflow	m³h	5.2	4.2	3.6	2.7
	Water pressure drop	kPa	56	38.1	28.8	17.6
Water 10°C - 15°C	Total Capacity	kW	25.9	20	16.4	11.3
	Sensitive capacity	kW	13.2	11.7	10.7	9.3
	Supply temperature	° C	21.9	20.4	19.4	17.7
	Waterflow	m³h	4.5	3.4	2.8	1.95
	Water pressure drop	kPa	41.4	26.4	18.6	9.7

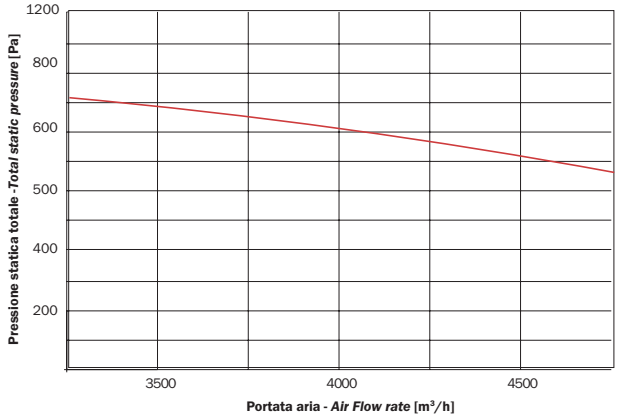
Thermal capacity of a 6-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	45.3	41.1	36.9	19.7
	Supply temperature	° C	35.1	36	36.7	39.6
	Waterflow	m³h	7.9	7.17	6.44	3.44
	Water pressure drop	kPa	41.1	34.7	28.8	9.6
Water 70°C - 60°C	Total Capacity	kW	65.1	61	56.8	39.8
	Supply temperature	° C	54.8	55.7	56.5	59.7
	Waterflow	m³h	5.7	4.4	4	3.5
	Water pressure drop	kPa	21.4	19	16.8	9

Thermal capacity of a 6-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	37.9	30	25.2	18.5
	Sensitive capacity	kW	28.9	16.7	15.3	13.3
	Supply temperature	° C	16.2	15.4	14.7	13.7
	Waterflow	m³h	6.5	5.15	4.33	3.18
	Water pressure drop	kPa	36	23.9	17.6	10.3
Water 10°C - 15°C	Total Capacity	kW	31.9	24.2	19.4	12.3
	Sensitive capacity	kW	16.6	14.6	13.3	11.6
	Supply temperature	° C	18.5	17.5	16.7	15.5
	Waterflow	m³h	5.5	4.16	3.34	2.12
	Water pressure drop	kPa	26.1	16.1	10.9	4.9

VAHU 40



Pressure drops of components			
Flow capacity (m³/h)	3500	4000	4500
Intake grille	12	15	19
G4 class pleated filter	63	80	103
Return air/Fresh air damper	8	10	13
4R cooling coil	88	112	144
6R cooling coil	139	177	227
Supply plenum with grilles	51	65	84

Thermal capacity of a 4-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	50.2	45.5	40.8	21.5
	Supply temperature	° C	27.5	29	30.5	36
	Waterflow	m³h	8.8	7.8	7.1	3.75
	Water pressure drop	kPa	33.3	28	23.2	7.5
Water 70°C - 60°C	Total Capacity	kW	71.7	67.2	62.5	43.6
	Supply temperature	° C	43.5	45.1	46.7	52.6
	Waterflow	m³h	6.31	5.91	5.5	3.84
	Water pressure drop	kPa	17.1	15.2	13.5	7.2

Thermal capacity of a 4-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	38.2	30.4	25.6	18.7
	Sensitive capacity	kW	19	17	15.6	13.7
	Supply temperature	° C	20.8	19.3	18.3	16.8
	Waterflow	m³h	6.6	5.2	4.4	3.2
	Water pressure drop	kPa	24.7	16.5	12.2	7.1
Water 10°C - 15°C	Total Capacity	kW	32.2	24.5	19.7	12.2
	Sensitive capacity	kW	16.8	14.9	13.7	12.2
	Supply temperature	° C	22.5	20.9	19.8	17.9
	Waterflow	m³h	5.5	4.2	3.4	2.1
	Water pressure drop	kPa	17.9	11.1	7.6	3.3

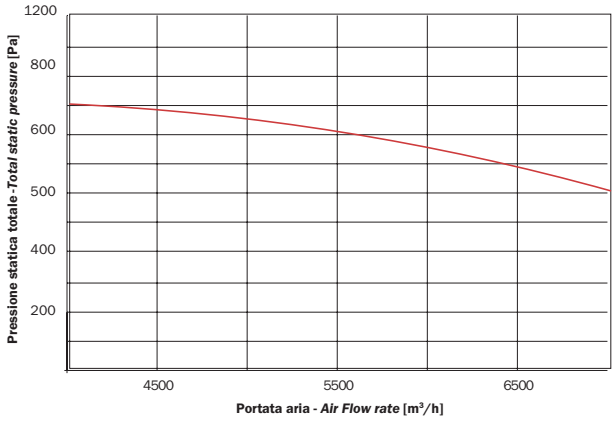
Thermal capacity of a 6-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	59.8	54.2	48.6	25.8
	Supply temperature	° C	34.6	35.5	36.3	39.3
	Waterflow	m³h	10.4	9.5	8.5	4.5
	Water pressure drop	kPa	22.9	19.3	15.9	5.3
Water 70°C - 60°C	Total Capacity	kW	85.8	80.3	74.8	52.3
	Supply temperature	° C	54.1	55	55.8	59
	Waterflow	m³h	7.55	7.1	6.58	4.6
	Water pressure drop	kPa	11.8	10.5	9.3	5

Thermal capacity of a 6-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	48.5	38	31.6	22.3
	Sensitive capacity	kW	24.4	21.6	19.8	17.3
	Supply temperature	° C	16.8	15.9	15.2	14.1
	Waterflow	m³h	8.3	6.5	5.4	3.8
	Water pressure drop	kPa	18.9	12.3	8.9	4.9
Water 10°C - 15°C	Total Capacity	kW	40.5	30.2	23.6	14.8
	Sensitive capacity	kW	21.5	18.9	17.3	14.8
	Supply temperature	° C	18.9	17.9	17.1	16
	Waterflow	m³h	7	5.19	4.1	2.54
	Water pressure drop	kPa	13.5	8.1	5.3	2.3

VAHU 55



Pressure drops of components			
Flow capacity (m³/h)	4800	5500	6200
Intake grille	12	15	19
G4 class pleated filter	51	65	84
Return air/Fresh air damper	8	10	13
4R cooling coil	91	115	148
6R cooling coil	145	184	236
Supply plenum with grilles	51	65	84

Thermal capacity of a 4-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	68.8	62.4	55.9	29.4
	Supply temperature	° C	27.3	28.9	30.4	36
	Waterflow	m³h	12	10.9	9.7	5.1
	Water pressure drop	kPa	33.8	28.5	23.5	7.7
Water 70°C - 60°C	Total Capacity	kW	98.2	92	85.6	59.8
	Supply temperature	° C	43.3	44.9	46.5	52.4
	Waterflow	m³h	8.6	8.1	7.5	5.26
	Water pressure drop	kPa	17.3	15.5	13.6	7.3

Thermal capacity of a 4-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	52.3	41.6	35	25.7
	Sensitive capacity	kW	26.1	23.2	21.4	18.7
	Supply temperature	° C	20.9	19.4	18.4	16.8
	Waterflow	m³h	10	7.1	6	4.4
	Water pressure drop	kPa	25	16.7	12.4	7.2
Water 10°C - 15°C	Total Capacity	kW	44.1	33.5	27	16.8
	Sensitive capacity	kW	23	20.4	18.7	16.8
	Supply temperature	° C	22.5	20.9	19.8	17.9
	Waterflow	m³h	7.6	5.8	4.6	2.9
	Water pressure drop	kPa	18.2	11.3	7.7	3.3

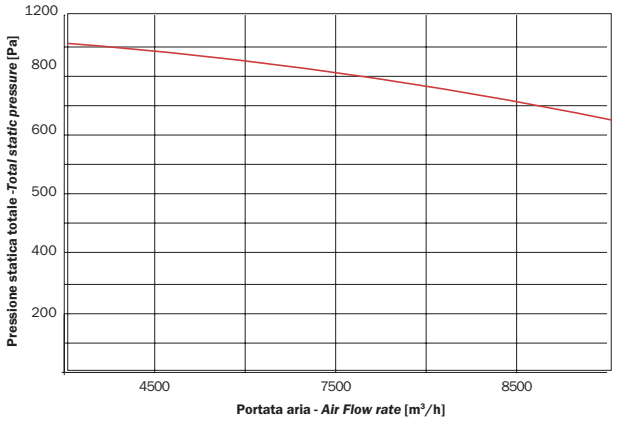
Thermal capacity of a 6-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	81.9	74.3	66.6	35.3
	Supply temperature	° C	34.5	35.3	36.1	39.2
	Waterflow	m³h	15.29	13	11.6	6.2
	Water pressure drop	kPa	22.8	19.2	15.9	5.2
Water 70°C - 60°C	Total Capacity	kW	117	110	102	71.5
	Supply temperature	° C	53.7	54.7	55.6	58.8
	Waterflow	m³h	10.3	9.7	9	6.29
	Water pressure drop	kPa	11.7	10.5	9.2	5

Thermal capacity of a 6-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	66.1	51.8	43	30.4
	Sensitive capacity	kW	33.3	29.5	27.1	23.5
	Supply temperature	° C	16.9	16	15.3	14.2
	Waterflow	m³h	11.3	8.9	7.4	5.2
	Water pressure drop	kPa	18.7	12.2	8.8	4.8
Water 10°C - 15°C	Total Capacity	kW	55.2	41.1	32.1	20.2
	Sensitive capacity	kW	29.3	25.8	23.7	20.2
	Supply temperature	° C	19.1	18	17.2	16.1
	Waterflow	m³h	9.5	7.1	5.5	3.47
	Water pressure drop	kPa	13.4	8	5.2	2.3

VAHU 75



Pressure drops of components			
Flow capacity (m³/h)	6500	7500	8500
Intake grille	12	15	19
G4 class pleated filter	51	65	84
Return air/Fresh air damper	8	10	13
4R cooling coil	89	113	145
6R cooling coil	141	179	230
Supply plenum with grilles	51	65	84

Thermal capacity of a 4-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	94.5	85.7	76.9	40.7
	Supply temperature	° C	27.6	29.1	30.6	36.2
	Waterflow	m³h	16.5	14.9	13.4	7.1
	Water pressure drop	kPa	46.5	39.2	32.4	10.6
Water 70°C - 60°C	Total Capacity	kW	135	127	118	82.4
	Supply temperature	° C	43.8	45.4	46.9	52.8
	Waterflow	m³h	11.9	11.2	10.4	7.25
	Water pressure drop	kPa	23.9	21.4	18.8	10.1

Thermal capacity of a 4-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	73.3	58.6	49.6	37.0
	Sensitive capacity	kW	36.3	32.4	29.8	26.0
	Supply temperature	° C	20.6	19.1	18.1	16.6
	Waterflow	m³h	12.6	10.1	8.5	6.4
	Water pressure drop	kPa	35.5	24	17.9	10.7
Water 10°C - 15°C	Total Capacity	kW	62	47.6	38.7	25.7
	Sensitive capacity	kW	31.9	28.3	26	22.8
	Supply temperature	° C	22.3	20.7	19.7	17.9
	Waterflow	m³h	10.7	8.2	6.7	4.4
	Water pressure drop	kPa	26	16.4	11.4	5.6

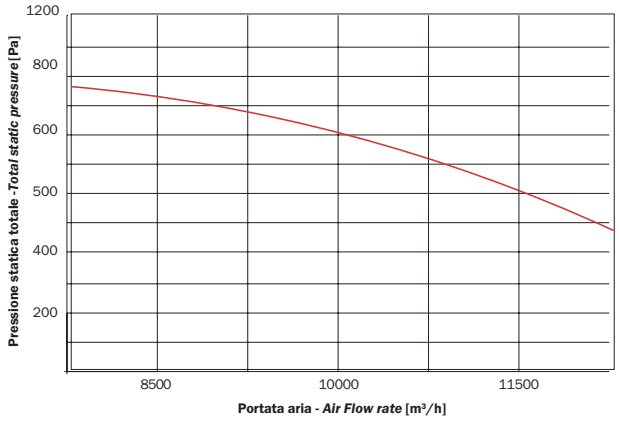
Thermal capacity of a 6-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	112	102	91.5	48.7
	Supply temperature	° C	34.8	35.6	36.4	39.4
	Waterflow	m³h	19.5	17.8	16	8.5
	Water pressure drop	kPa	30.5	25.9	21.4	7.1
Water 70°C - 60°C	Total Capacity	kW	161	151	138	90
	Supply temperature	° C	54.2	55.1	54.9	55.8
	Waterflow	m³h	14.2	13.3	12.15	7.9
	Water pressure drop	kPa	15.8	14.1	12.1	5.7

Thermal capacity of a 6-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	92.5	73	61.1	44.3
	Sensitive capacity	kW	46.3	41	37.6	32.7
	Supply temperature	° C	16.6	15.7	15	14
	Waterflow	m³h	15.9	12.5	10.5	7.6
	Water pressure drop	kPa	26	17.2	12.6	7.2
Water 10°C - 15°C	Total Capacity	kW	77.7	58.6	46.6	29.2
	Sensitive capacity	kW	40.8	35.9	32.8	28.4
	Supply temperature	° C	18.8	17.7	17	15.7
	Waterflow	m³h	13.4	10.1	8	5
	Water pressure drop	kPa	18.8	11.5	7.7	3.4

VAHU 100



Pressure drops of components			
Flow capacity (m³/h)	8500	10000	11500
Intake grille	12	15	19
G4 class pleated filter	51	65	84
Return air/Fresh air damper	8	10	13
4R cooling coil	81	103	132
6R cooling coil	132	168	216
Supply plenum with grilles	51	65	84

Thermal capacity of a 4-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	125	113	102	52.9
	Supply temperature	° C	27.4	28.9	30.3	35.8
	Waterflow	m³h	21.8	19.7	17.8	9.2
	Water pressure drop	kPa	13.9	11.6	9.7	3.1
Water 70°C - 60°C	Total Capacity	kW	179	167	156	108
	Supply temperature	° C	43.4	44.9	46.4	52.2
	Waterflow	m³h	15.7	14.8	13.7	9.5
	Water pressure drop	kPa	7.1	6.3	5.6	2.9

Thermal capacity of a 4-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	91.4	71.4	58.9	40.0
	Sensitive capacity	kW	46.4	41.3	38	33.3
	Supply temperature	° C	21.2	19.7	18.7	17
	Waterflow	m³h	15.7	12.3	10.1	6.87
	Water pressure drop	kPa	9.6	6.2	4.4	2.3
Water 10°C - 15°C	Total Capacity	kW	76	56.1	42.8	27.5
	Sensitive capacity	kW	41	36.4	33.6	27.5
	Supply temperature	° C	22.8	21.1	20	18.8
	Waterflow	m³h	13.1	9.6	7.4	4.7
	Water pressure drop	kPa	6.8	4	2.5	1.1

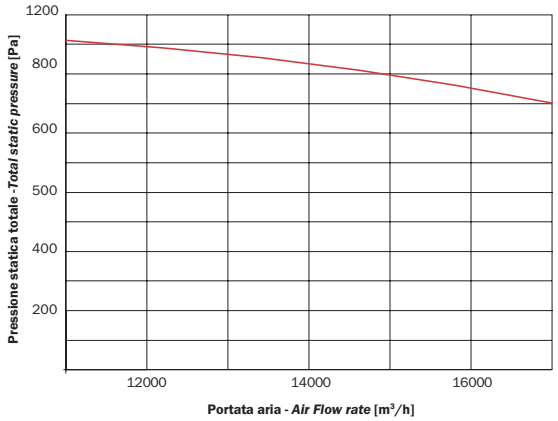
Thermal capacity of a 6-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	140	132	124	66.7
	Supply temperature	° C	31.8	34.4	37	39.9
	Waterflow	m³h	24.4	23.3	21.6	11.6
	Water pressure drop	kPa	58.1	52.5	47	15.9
Water 70°C - 60°C	Total Capacity	kW	219	205	186	120
	Supply temperature	° C	55.3	56.1	55.5	55.8
	Waterflow	m³h	19.3	18	16	10.6
	Water pressure drop	kPa	35	31.2	26.3	12.2

Thermal capacity of a 6-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	130	104	88.4	66.5
	Sensitive capacity	kW	64	57	52.4	45.5
	Supply temperature	° C	15.8	15	15.2	13.4
	Waterflow	m³h	22.4	17.9	14.2	11.4
	Water pressure drop	kPa	61	41.3	31	18.9
Water 10°C - 15°C	Total Capacity	kW	111	85.2	69.6	47.4
	Sensitive capacity	kW	57	49.7	45.3	39.1
	Supply temperature	° C	18.1	17.2	16.5	15.3
	Waterflow	m³h	19.1	14.7	12	8.2
	Water pressure drop	kPa	45.4	28.6	20	10.2

VAHU 140



Pressure drops of components			
Flow capacity (m³/h)	12000	14000	16000
Intake grille	12	15	19
G4 class pleated filter	51	65	84
Return air/Fresh air damper	8	10	13
4R cooling coil	76	97	125
6R cooling coil	121	154	198
Supply plenum with grilles	51	65	84

Thermal capacity of a 4-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	130	122	108	74.2
	Supply temperature	° C	17.1	20.4	22.5	35.3
	Waterflow	m³h	22.4	20.1	18.6	12.8
	Water pressure drop	kPa	60	54	43	22
Water 70°C - 60°C	Total Capacity	kW	254	236.7	219.6	148.4
	Supply temperature	° C	42.9	44.3	45.6	50.6
	Waterflow	m³h	21.8	20.3	18.9	12.8
	Water pressure drop	kPa	58	51	44	22

Thermal capacity of a 4-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	112.6	89.1	75.2	57.6
	Sensitive capacity	kW	67.5	60.1	56.3	49.5
	Supply temperature	° C	21	19.31	18.2	16.7
	Waterflow	m³h	19.4	15.3	13.3	9.9
	Water pressure drop	kPa	58.15	38.28	28.3	17.6
Water 10°C - 15°C	Total Capacity	kW	91.6	70.5	58.6	44.2
	Sensitive capacity	kW	64	54.5	50	42.7
	Supply temperature	° C	22.34	20.7	18.6	18.1
	Waterflow	m³h	15.7	12.1	10.1	7.6
	Water pressure drop	kPa	40.24	25.2	18.2	11

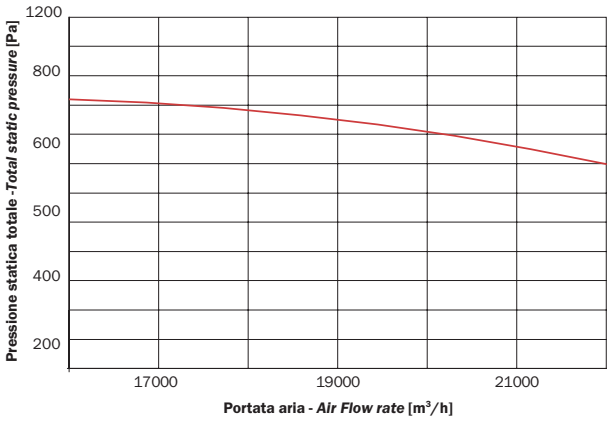
Thermal capacity of a 6-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	180	168	154	89.4
	Supply temperature	° C	27.5	30	32	38.4
	Waterflow	m³h	30.9	28.9	26.5	15.4
	Water pressure drop	kPa	55	49	42	16
Water 70°C - 60°C	Total Capacity	kW	302.1	283.6	264.3	178
	Supply temperature	° C	52.9	54.1	54.9	56.7
	Waterflow	m³h	25.9	24.4	22.7	15.3
	Water pressure drop	kPa	40	36	32	16

Thermal capacity of a 6-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	158.9	125.6	106	79.6
	Sensitive capacity	kW	87.4	77.9	71.1	62.1
	Supply temperature	° C	17.3	16.17	15.4	14.3
	Waterflow	m³h	27.3	21.6	18.2	13.7
	Water pressure drop	kPa	55	36	27	16
Water 10°C - 15°C	Total Capacity	kW	130.6	99.3	81.2	58.7
	Sensitive capacity	kW	77.1	68.5	61.7	57.9
	Supply temperature	° C	19.3	18.1	17.3	16.2
	Waterflow	m³h	22.5	17.1	14	10.1
	Water pressure drop	kPa	39	24	17	9

VAHU 190



Pressure drops of components			
Flow capacity (m³/h)	17000	19000	21000
Intake grille	12	15	19
G4 class pleated filter	59	75	96
Return air/Fresh air damper	8	10	13
4R cooling coil	77	98	126
6R cooling coil	124	157	202
Supply plenum with grilles	51	65	84

Thermal capacity of a 4-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	145	136	122	100.1
	Supply temperature	° C	12.3	15.9	18.7	35.3
	Waterflow	m³h	24.9	23.4	20.9	17.4
	Water pressure drop	kPa	61	54	45	32
Water 70°C - 60°C	Total Capacity	kW	282	264	245	180
	Supply temperature	° C	33.3	35.5	37.5	47.3
	Waterflow	m³h	24.3	22.7	21	15.5
	Water pressure drop	kPa	58	52	45	26

Thermal capacity of a 4-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	135	129	108.7	83.3
	Sensitive capacity	kW	83.7	86.4	79.4	69.9
	Supply temperature	° C	22.5	19	18	16.4
	Waterflow	m³h	23.2	22.2	18.7	14.3
	Water pressure drop	kPa	67	62	46	28
Water 10°C - 15°C	Total Capacity	kW	120	101.8	84.6	63.6
	Sensitive capacity	kW	80.4	77.4	70.2	59.5
	Supply temperature	° C	23	20.4	19.4	17.8
	Waterflow	m³h	20.6	17.5	14.5	10.9
	Water pressure drop	kPa	54	41	29	18

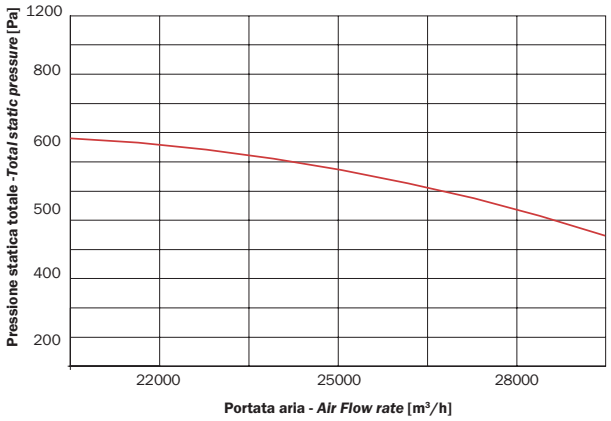
Thermal capacity of a 6-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	198	178	162	124.3
	Supply temperature	° C	20.4	22.3	24.8	38.8
	Waterflow	m³h	34.1	30.6	27.9	21.4
	Water pressure drop	kPa	54	45	38	24
Water 70°C - 60°C	Total Capacity	kW	410	380	350	230
	Supply temperature	° C	52.9	53.3	53.6	54.9
	Waterflow	m³h	35.3	32.7	30.1	19.8
	Water pressure drop	kPa	58	51	44	21

Thermal capacity of a 6-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	190	176	148	112.0
	Sensitive capacity	kW	106.5	107.4	97.7	85.1
	Supply temperature	° C	18.9	15.9	15.1	14.8
	Waterflow	m³h	32.7	30.3	25.6	19.3
	Water pressure drop	kPa	63	55	41	25
Water 10°C - 15°C	Total Capacity	kW	183	140	114.3	82.6
	Sensitive capacity	kW	106	95.2	85.7	72.7
	Supply temperature	° C	19	17.8	19.1	16
	Waterflow	m³h	31.4	23.9	19.7	14.2
	Water pressure drop	kPa	59	36	26	14

VAHU 250



Pressure drops of components			
Flow capacity (m³/h)	22000	25000	27500
Intake grille	12	15	19
G4 class pleated filter	50	64	82
Return air/Fresh air damper	8	10	13
4R cooling coil	72	92	118
6R cooling coil	117	148	190
Supply plenum with grilles	51	65	84

Thermal capacity of a 4-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	312	284	253	127.1
	Supply temperature	° C	26.4	28	29.4	34.7
	Waterflow	m³h	53.6	48.7	43.4	21.8
	Water pressure drop	kPa	48	40	33	10
Water 70°C - 60°C	Total Capacity	kW	448	418	382	26
	Supply temperature	° C	42.4	43.8	44.6	50.6
	Waterflow	m³h	38.5	35.9	32.9	22.8
	Water pressure drop	kPa	26	23	20	10

Thermal capacity of a 4-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	198	154.2	129.8	99.2
	Sensitive capacity	kW	120.8	108	99.9	87.3
	Supply temperature	° C	21.25	19.7	18.6	17
	Waterflow	m³h	34.1	26.5	22.3	17.1
	Water pressure drop	kPa	26	17	12	8
Water 10°C - 15°C	Total Capacity	kW	159.2	121.6	100.8	76.2
	Sensitive capacity	kW	108.3	97.3	88.7	74.7
	Supply temperature	° C	22.6	20.9	19.9	18.4
	Waterflow	m³h	27.4	20.9	17.3	13.1
	Water pressure drop	kPa	18	11	8	5

Thermal capacity of a 6-row heating coil at nominal flow rate

	Fresh air conditions		-10°C/80% R.H.	-5°C/80% R.H.	0°C/80% R.H.	20°C/50% U.R.
Water 45°C - 40°C	Total Capacity	kW	370.9	337.6	302.2	157.5
	Supply temperature	° C	33.2	34.36	35.2	38.2
	Waterflow	m³h	63.8	58.1	52	27.1
	Water pressure drop	kPa	32	26	22	7
Water 70°C - 60°C	Total Capacity	kW	536.9	500.1	458.4	319.2
	Supply temperature	° C	52.7	53.4	53.4	56.8
	Waterflow	m³h	46.2	43.1	39.4	27.4
	Water pressure drop	kPa	18	16	13	7

Thermal capacity of a 6-row cooling coil at nominal flow rate

	Fresh air conditions		35°C/50% R.H.	32°C/50% R.H.	30°C/50% R.H.	27°C/50% R.H.
Water 7°C - 12°C	Total Capacity	kW	266.8	209.4	175.4	130.8
	Sensitive capacity	kW	149.4	134	122.8	106.0
	Supply temperature	° C	18	16.8	16	14.9
	Waterflow	m³h	45.9	36	30.2	22.5
	Water pressure drop	kPa	22	14	10	6
Water 10°C - 15°C	Total Capacity	kW	216.6	163.5	132.9	96.5
	Sensitive capacity	kW	132.1	117.7	106.3	89.7
	Supply temperature	° C	19.9	18.65	17.9	16.65
	Waterflow	m³h	37.3	28.1	22.8	16.6
	Water pressure drop	kPa	15	9	6	4

Sound pressure

VAHU 30	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	52.1	50.1	55.1	56.1	50.1	49.1	47.1	45.1	57.3
Return	55.1	58.1	65.1	63.1	64.1	61.1	57.1	53.1	68.1
Unit external radiation	40.1	43.1	52.1	49.1	47.1	44.1	49	18.1	52.1

VAHU 40	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	52.1	50.1	57.1	56.1	52.1	51.1	49.1	45.1	58.6
Return	56.1	59.1	66.1	65.1	66.1	61.1	59.1	54.1	69.6
Unit external radiation	41.1	44.1	53.1	51.1	49.1	44.1	51	19.1	53.6

VAHU 55	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	58.1	53.1	63.1	61.1	56.1	55.1	54.1	59.1	64.3
Return	61.1	60.1	72.1	70.1	71.1	66.1	63.1	66.1	74.9
Unit external radiation	46.1	45.1	59.1	56.1	54.1	49.1	55	31.1	58.7

VAHU 75	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	62.1	65.1	66.1	62.1	57.1	53.1	51.1	53.1	64
Return	64.1	74.1	73.1	72.1	70.1	66.1	62.1	59.1	74.7
Unit external radiation	49.1	59.1	60.1	58.1	53.1	49.1	54	24.1	59.2

VAHU 100	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	62	56	67	60	60	57	51	49	65
Return	61	51	61	54	50	42	39	35	56.5
Unit external radiation	47	41	54	46	43	40	43	14	49.7

VAHU 140	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	63.1	66.1	68.1	64.1	59.1	56.1	53.1	54.1	66.1
Return	66.1	76.1	75.1	74.1	72.1	68.1	64.1	60.1	76.7
Unit external radiation	51.1	61.1	62.1	60.1	55.1	51.1	56	25.1	61.2

VAHU 190	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	60.1	69.1	66.1	62.1	60.1	57.1	56.1	53.1	65.9
Return	65.1	78.1	74.1	74.1	71.1	67.1	65.1	62.1	76.3
Unit external radiation	50.1	63.1	61.1	60.1	54.1	50.1	57	27.1	60.8

VAHU 250	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	dB (A)
Supply	70.1	72.1	71.1	65.1	65.1	62.1	59.1	56.1	70.2
Return	73.1	81.1	79.1	79.1	75.1	70.1	68.1	64.1	80.4
Unit external radiation	58.1	66.1	66.1	65.1	58.1	53.1	60	29.1	65.2

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