

CTA

AIR HANDLING UNITS

- ErP 2018
- Air flows from 1.500 to 250.000 m³/h
- Modular sections



The air handling units by Roccheggiani in the CTA range have represented the state of the art for over twenty years in terms of product reliability, construction and quality and provide the most advanced solution in terms of modularity, constructional flexibility, energy efficiency and performance.

Our CTA air handling units use the finest components on the market so as to ensure excellent performance even in the most challenging operating conditions and guarantee maximum flexibility to meet the most stringent requirements in modern air conditioning.

Manufactured in compliance with the UNI EN 12100 standard and the CE marking directives, they are built in compliance with the ISO 9001 and ISO 14001 certified quality assurance systems and adhere to the eco-compatible design specifications for ventilation units under Reg. EU 1253/2014.

In order to guarantee that the air handling units by Roccheggiani actually meet the declared product performance levels, they are EUROVENT-certified according to the ECP AHU program.

Regulatory Compliance

The company's quality system had already been awarded UNI EN ISO 9001 Quality Management System certification in 1996 and, in addition to this, it was awarded UNI EN ISO 14001 Environmental Management certification in 2014. Over the years numerous product certifications for the various ranges have been obtained from the most important European bodies (TÜV, EUROVENT, Istituto Giordano, VKFAEI, GOST, Achilles JQS, etc.). More specifically, the air handling units in the CTA range by Roccheggiani are designed and manufactured in accordance with the following benchmark regulations:

- Directive 2006/42/EU - Machinery;
- Directive 2014/30/EU Electromagnetic Compatibility (EMC);
- Directive 2014/35/EU Low Voltage Directive (LVD);
- Directive ECODESIGN (EU) No. 1253/2014 – ENER LOT 6 (ERP)

EUROVENT ECP AHU “Air Handling Unit” product certification

As part of the EUROVENT program, product certification involves mechanical performance testing, according to the EN 1886:2007 standards, of the identified “model box” of the casing used, the testing of the selection software functions and the validation of the software through testing the unit's actual performance as a result of the selection.



CERTIFICATE
N° 11.02.510



Air Handling Unit / Centrales de traitement d'air
Range Name / Nom de Gamme :
CTA

Granted on February 22, 2011 - Date 1ère admission 22 février 2011

This document is valid at the date of issue - Check the current validity on:
Document valable à la date d'émission - Vérifier la validité en cours sur :
www.eurovent-certification.com

Participant/Titulaire

ROCCHEGGIANI S.p.A.
Via 1 Maggio, 10 - AN
60021 CAMERANO - Italy

This certificate is issued by Eurovent Certita Certification according to the certification rules:

ECP AHU - « Air Handling Unit » in force at established date.

Pursuant to the decision notified by Eurovent Certita Certification, the right to use the mark ECP shall be granted to the beneficiary company for the above Range in the conditions defined by the certification program mentioned.

Unless withdrawn or suspended, this certificate remains valid as long as the requirements for the certification program framework are met. The validity of the certificate is to be verified on www.eurovent-certification.com

THIS CERTIFICATE HAS BEEN ISSUED ON 27/08/2019
THIS CERTIFICATE IS VALID UNTIL 30/09/2020

Ce certificat est délivré par Eurovent Certita Certification dans les conditions fixées par le référentiel :

ECP AHU - « Centrales de traitement d'air » en vigueur à date d'édition.

En vertu de la décision notifiée par Eurovent Certita Certification, le droit d'usage de la marque ECP est accordé à la société qui en est bénéficiaire pour la gamme visée ci-dessus, dans les conditions définies par le programme de certification mentionné.

Sauf retrait ou suspension, ce certificat demeure valide tant que les conditions du référentiel du programme de certification sont respectées. La validité du certificat est à vérifier sur le site Internet : www.eurovent-certification.com

CE CERTIFICAT A ÉTÉ ÉMIS LE 27/08/2019
CE CERTIFICAT EST VALABLE JUSQU'AU 30/09/2020



Organisme accrédité n° 5-0517
Certification Produits et Services selon la norme NF EN ISO/CEI 17065:2012
Portée disponible sur www.cofrac.fr
Accréditation #5-0517 Products and Services Certification according to NF EN ISO/CEI 17065:2012 -
Scope available on www.cofrac.fr
COFRAC est signataire des accords MSA d'EA et MSA d'IAF.
COFRAC is signatory of EA MSA and IAF MSA.
Not a member of ISO/IEC 17000.

Paris, 27 août 2019

MANAGING BOARD MEMBER / MEMBRE DIRECTOIRE




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SAR 506 TEMPLATE ECP RANGE REV.0

Model Box

Casing mechanical strength

Max flexure at +1000 Pa and at -1000 Pa.

Subsequent test at +2500 Pa and -2500 Pa, to test the maximum pressure resistance generated by the fan without incurring permanent distortion(>2mm).

Mechanical resistance categories:

D1	D2	D3
< 4mm	≤ 10mm	> 10mm

Leakage rate of the casing

Test at -400 Pa and at +700 Pa.

The leakage rate is compared to the total surface of the casing and the value must not exceed the values in the following tables.

Casing leakage rate – Pressure -400 Pa

L1	L2	L3
< 0.15 l/s/m ² (≤ F7)	< 0.44 l/s/m ² (≤ F9)	< 1.32 l/s/m ² (> F9)

Casing leakage rate – Pressure +700 Pa

L1	L2	L3
< 0.22 l/s/m ² (≤ F7)	< 0.63 l/s/m ² (≤ F9)	< 1.32 l/s/m ² (> F9)

Bypass loss of the filter

Test at -400 Pa (filters upstream of the fan) and at +400 Pa (filters downstream).

The table gives the accepted total leakage rates related to the various filter classes as percentages of the specified flow rate of the air handling unit.

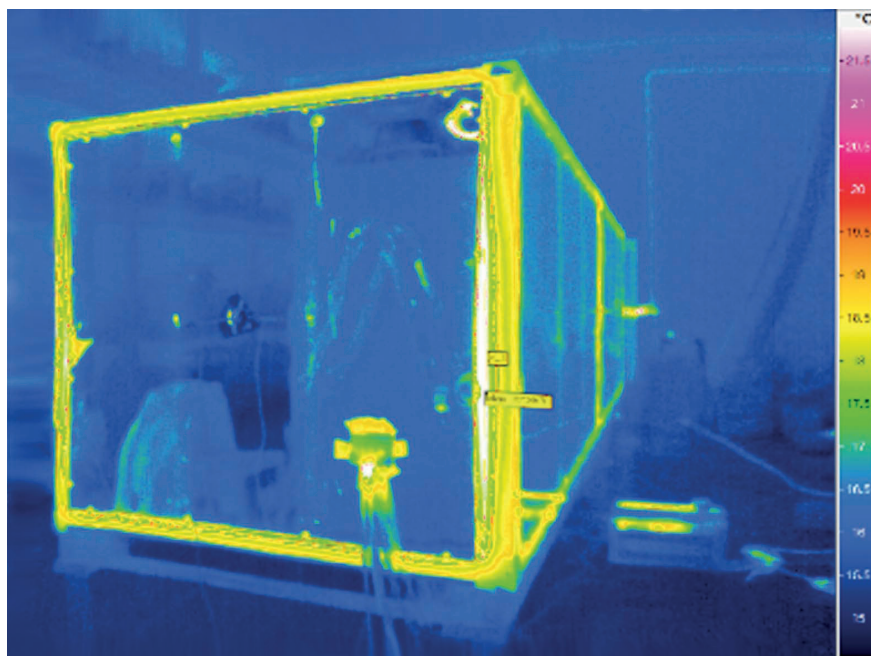
F9	F8	F7	F6	G1 – F5
0,5 %	1 %	2 %	4 %	6 %

Thermal transmittance of the casing

The EN 1886 standard classifies the transmittance (or global heat exchange value) and the thermal bridges connected to the structural design.

The thermal transmittance class defines the power dissipated through the casing by surface unit by temperature difference between the inside and outside [W/m² · K]:

T1	T2	T3	T4	T5
U ≤ 0,5	0,5 < U ≤ 1	1 < U ≤ 1.4	1,4 < U ≤ 2	Not requested



The thermal bridge class defines the capacity of the casing to prevent the formation of dew on the outside and is expressed by the dimensionless parameter kb.

TB1	TB2	TB3	TB4	TB5
0.75 < Kb ≤ 1	0.6 < Kb ≤ 0.75	0.45 < Kb ≤ 0.6	0.3 < Kb ≤ 0.45	Not requested

Sound-proofing of the casing.

The standard provides a procedure to determine the approximate sound transmission loss “De” of an air handling unit. Sound pressure measurements are performed over the casing surface of the unit by placing a sound source inside and repeating the measurements after removing the panels and obtaining thus the noise reduction of the casing.

The Roccheggiani range has nine certified “model boxes” with polyurethane foam or rock wool insulation that is 25, 54 and 90mm thick, with aluminium profiles, thermal cut aluminium and AISI316L stainless steel, achieving T1, TB2, D1(M), L1(M), F9(M) classification.

Model Box	Thermal Transmittance class	Thermal bridge class	Mechanical resistance class	Leakage rate class at -400 Pa	Leakage rate class at +700 Pa	Filter leakage rate	Sound-mitigation of the casing.						
							125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Pr05-Zn05-54PU-TT	T2	TB2	D1(M)	L1(M)	L1(M)	F9(M)	13	12	14	14	12	30	39
Thermal cut aluminium profile, 54mm panel of galvanised pre-coated steel/galvanised steel, polyurethane foam													
Pr08-Zn08-54RW-TT	T3	TB2	D2(M)	L1(M)	L2(M)	F9(M)	23	25	28	28	28	39	43
Thermal cut aluminium profile, 54mm panel of galvanised pre-coated steel/galvanised steel, rock wall													
Pr05-Zn05-54PU-ST	T2	TB4	D1(M)	L1(M)	L1(M)	F9(M)	11	13	13	13	12	29	36
Aluminium profile, 54mm panel of galvanised pre-coated steel/galvanised steel, polyurethane foam													
Pr05-Zn05-25PU-ST	T3	TB4	D1(M)	L1(M)	L1(M)	F9(M)	15	13	14	17	17	16	35
Aluminium profile, 25mm panel of galvanised pre-coated steel/galvanised steel, polyurethane foam													
A05-A05-54PU-IN	T2	TB3	D1(M)	L2(M)	L2(M)	F9(M)	12	13	14	14	12	29	36
Profile in AISI 304/316L stainless steel, 54mm panel in AISI 304/316L stainless steel/AISI 304/316L stainless steel, polyurethane foam													
A08-A08-54RW-IN	T2	TB3	D2(M)	L1(M)	L1(M)	F9(M)	25	26	27	24	25	34	39
Profile in AISI 304/316L stainless steel, 54mm panel in AISI 304/316L stainless steel/AISI 304/316L stainless steel, rock wall													
Pr05-A05-9090PU-TT	T1	TB2	D1(M)	L1(M)	L1(M)	F9(M)	19	16	14	17	17	34	41
Profile in thermal cut aluminium, 90mm panel in AISI 304/316L stainless steel/AISI 304/316L stainless steel, polyurethane foam													
Pr05-A05-9054PU-IN	T2	TB2	D1(M)	L2(M)	L2(M)	F9(M)	13	12	14	15	13	31	39
Profile in thermal cut aluminium, 90/54mm panel in AISI 304/316L stainless steel/AISI 304/316L stainless steel, polyurethane foam													
A08-A08-25PU_CO	T2	TB4	D1(M)	L1(M)	L1(M)	F9(M)	17	11	13	17	12	24	41
Profile in AISI 304/316L stainless steel, 25mm panel in AISI 304/316L stainless steel/AISI 304/316L stainless steel, polyurethane foam													

The following mechanical characteristics are certified:

- air flow rate;
- available static pressure;
- power absorbed;
- octave band sound power level in the duct;
- sound power level in the air;
- heating capacity;
- cooling capacity;
- heat recovery;
- pressure drop on water side.

Selection software

The Company has developed software for the selection and estimation of air handling units, including functions for component sizing, and has also had it certified according to the EUROVENT program.

The software allows a whole range of characteristics of an air handling unit to be selected such as the thickness of the metal panel sheet, the material covering internal surfaces, the material on the coil frames and the protective coating of the base and other components. It also allows great flexibility in the composition of the air handling unit as regards materials and accessories and also as regards the structure of the unit.

Each individual section can be customised, allowing any relevant accessory to be selected and providing the opportunity to position dampers as required.

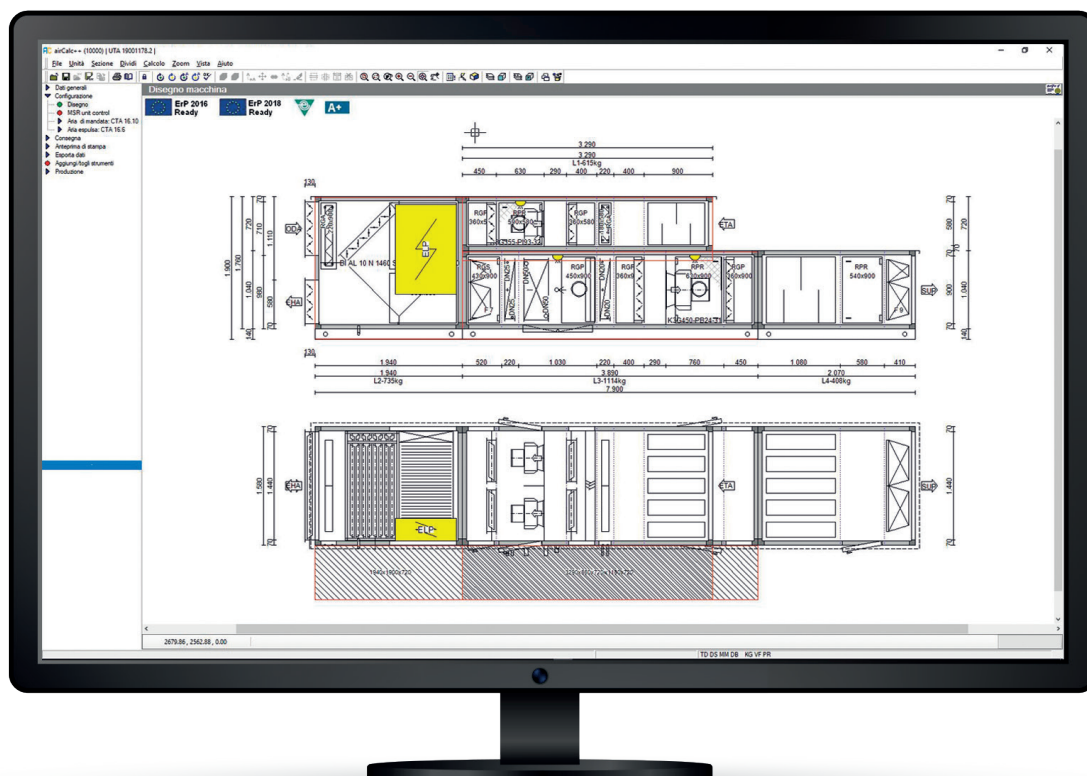
The software has a system that automatically checks input data so as not to allow the inclusion of sections or accessories that are incompatible with each other.

Once the overall size of the unit is chosen, all the components included in the program are dimensioned accordingly.

The ability to select different types of metal sheets with different gauges and the presence of sections with actual sizes means that, during the offer preparation stage, a complete executive plan of the air handling unit can be exported in .dxf format and then managed with any CAD software.


The software can calculate and manage the automatic regulation system as wired and mounted on board the machine, since it has access to a catalogue of probes, valves, actuators and field elements.


The program provides the technical characteristics of the unit in a complete and comprehensive manner and produces technical reports in .pdf format.



Technical reports show the air handling psychrometric charts and the work point on the curves of the fan.
According to the selected components, the software also gives an immediate feedback on the costs of the project.

ROCCHEGGIANI®
care for air





Offerta **UTA 19002071.1**

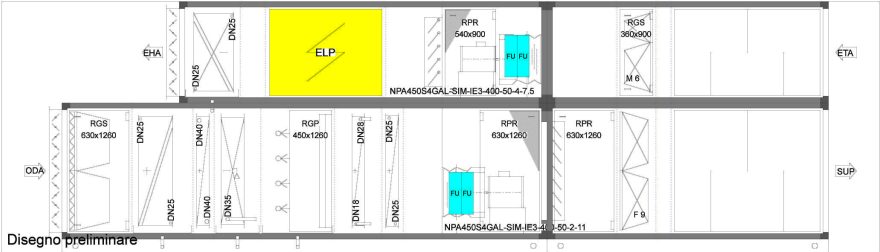
Progetto

Posizione **01**

Laboratori

Dalla data **14/10/2019**

Utente:



Disegno preliminare

Grandezza unità	CTA 17.14	C54TT	Lunghezza [mm]	7.900,0	Peso a vuoto [kg]	~3.748,0
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Pannello interno **AISI 304** **0,50 mm**

Pannello esterno **Zincato preverniciato** **0,50 mm**

Pannello int.fondo **AISI 304** **0,50 mm**


Profil **Alluminio - Taglio Termico**


Guide **AISI 304**

Isolamento **Poliuretano espanso** Spessore **54,0 mm**

Angoli **Nylon**

Classe di reazione al fuoco del pannello **1 (UNO)**
secondo UNI 9177:





airCalc++ Vers. P 2.6.1

Prestazioni meccaniche certificate secondo EN 1886:2007

Resistenza meccanica	D1(M)
Trafilamento aria attraverso involucro -400 Pa	L1(M)
By-pass dei filtri	F9
Trafilamento aria attraverso involucro +700 Pa	L1(M)

Prestazioni termiche involucro certificate secondo EN 1886:2007

Classe di ponte termico	TB2
Classe di trasmittanza	T2

Livelli di potenza sonora [dB]

Frq.[Hz]	63	125	250	500	1000	2000	4000	8000	Somma [dB(A)]
Livello di pot.sonora totale in aspirazione [dB]	82,0	75,0	79,6	83,8	77,7	75,7	72,0	66,9	84,2
Livello di pot.sonora totale in mandata [dB]	87,7	67,7	44,7	38,7	42,7	43,7	39,7	44,7	62,2
Rumore irradiato attraverso la struttura [dB]	80,7	75,7	78,6	81,7	80,7	78,7	55,7	43,7	84,7

Materiale tamponamenti **AISI 304**

Materiale serrande **Alluminio / Alluminio**

Materiale vasca condensa **AISI 304**

Materiale sep. gocce **AISI 304 / PPTV**

Dati principali:

Mandata	Portata aria 12.200 [m³/h]	Press.stat.utile 500 [Pa]	Pot. assorbita/nominale motore 8,900 /11,000 [kW]
Ripresa	Portata aria 10.100 [m³/h]	Press.stat.utile 300 [Pa]	Pot. assorbita/nominale motore 5,370 /7,500 [kW]

Numero certificato **11.02.510**

Numero model box **Pr05/Zn05-54PU-TT**

Certificazione **Unità da interno**

A.m.s.l. [m] **0**

Potenza specifica ventilatore [W/(m³/s)] **4,048** **SFP6**

Temp. Minima calcolo [°C] **-6,00**

Ricircolo [%]

Velocità aria [m/s] **1,68**

Peso specifico [kg/m³] **1,20**

Energy label class designed for wet conditions

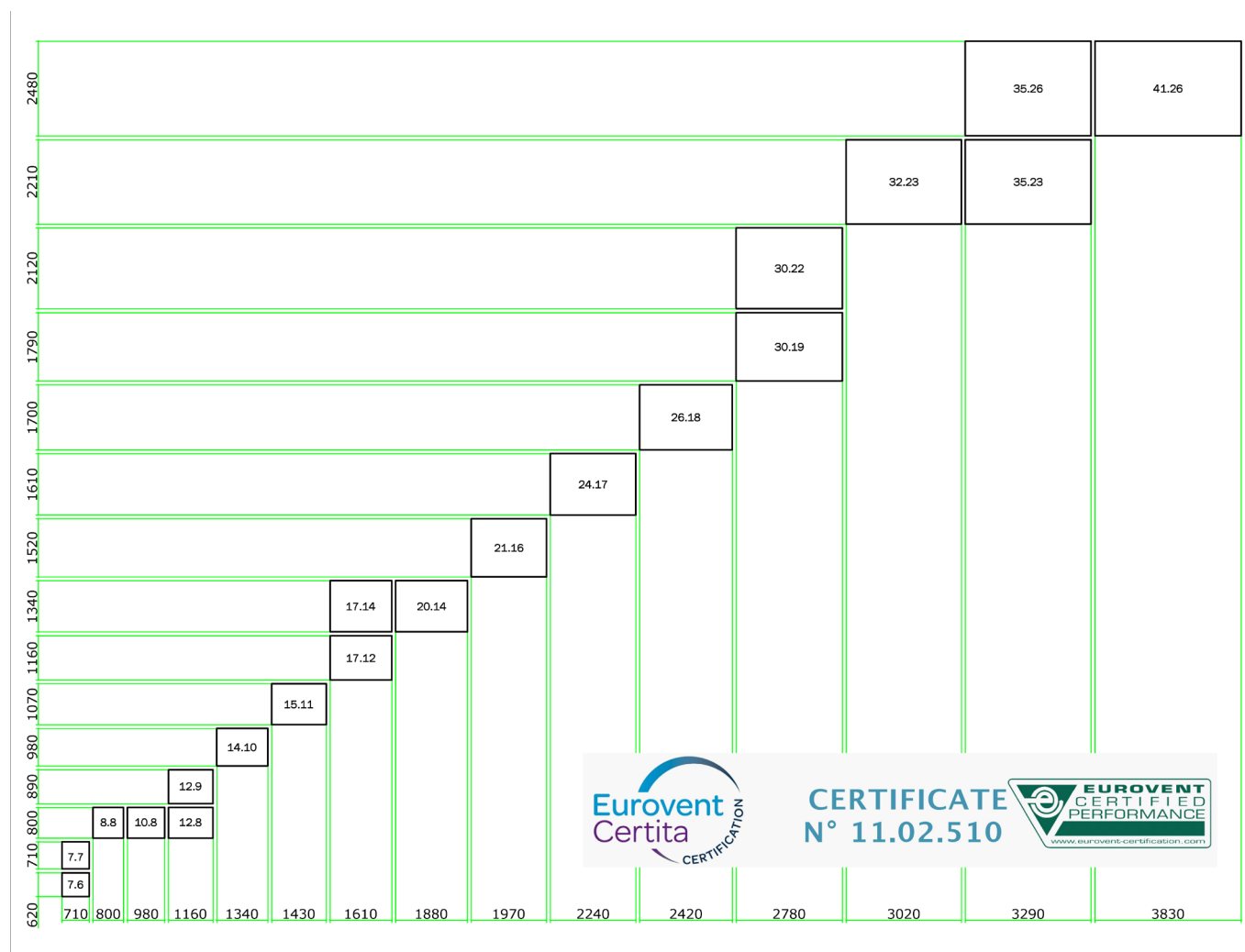
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Construction features

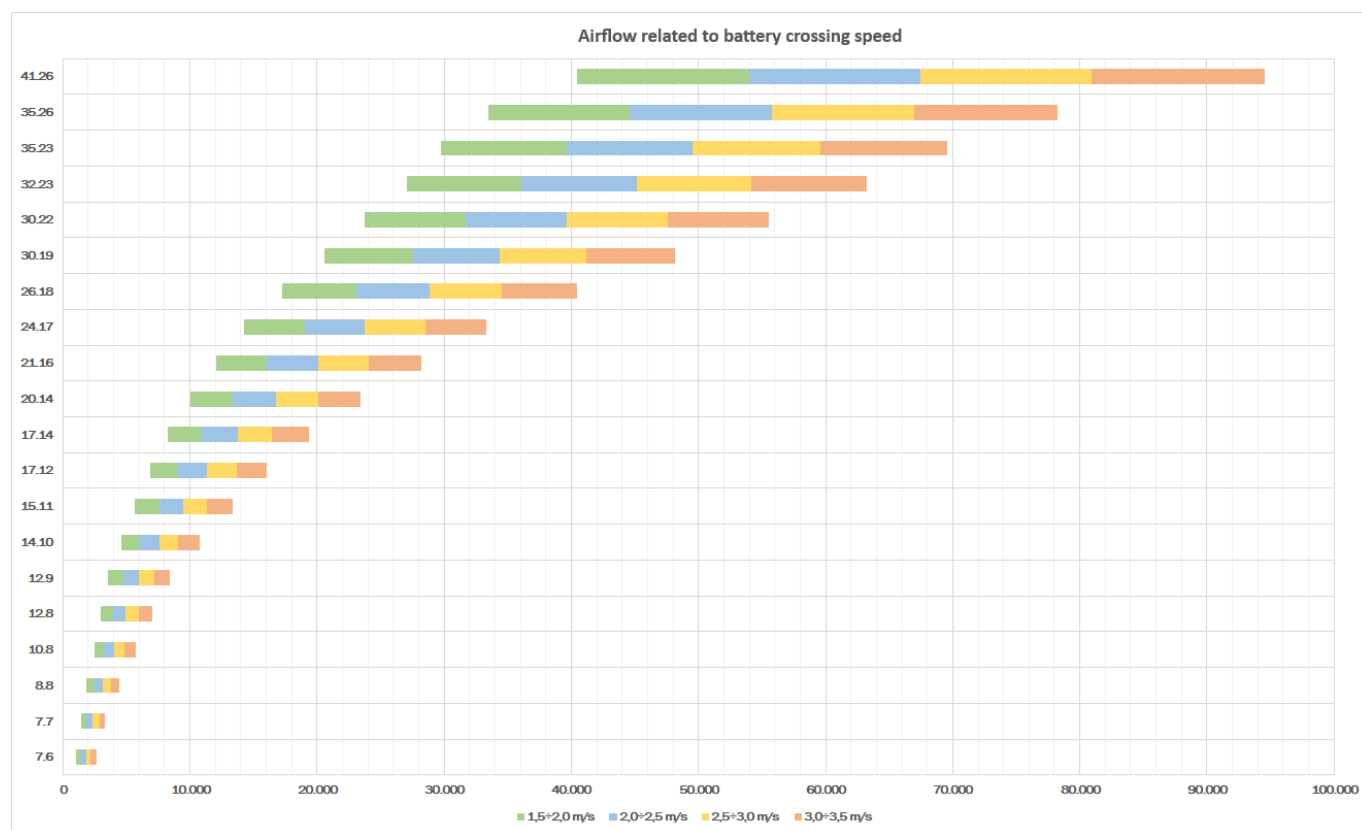
Roccheggiani can design and build air handling units with air flow capacities of up to 300.000 m³/h.

Standard production consists of 20 sizes with a modular dimension of 90 mm, identified with a two-digit code that characterises the two dimensions of the section (height and width).



Our standard production includes a range of air flow capacities from 1.500 m³/h to 85.000 m³/h.
The modularity of our units allows projects to be built and adapted to each individual need.

Each air handling unit is designed and produced considering the needs of the customer and easy installation. The unit manual provides all the necessary procedures for proper installation.



Panels and profiles

The metal supports can be made in galvanised sheet iron, in pre-coated galvanised sheet iron, in aluminium, in anodised aluminium or stainless steel with interposed high-density polyurethane foam (about 40 kg/m³) or rock wool (density of about 90 kg/m³).

The thickness of the metal sheet can be chosen in different sizes from 0.5 mm to 1.5 mm.

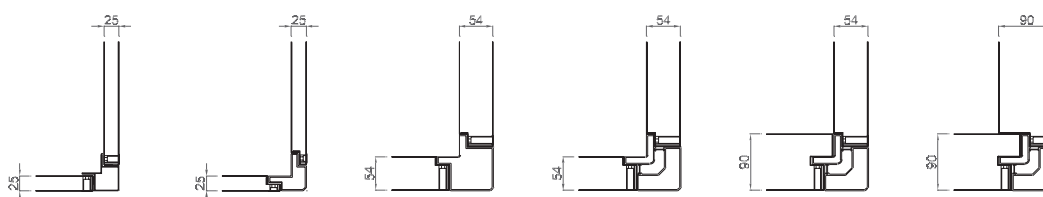
The panels are manufactured with a special shaping, which when coupled with the profile (and with the interposition of the airtight sealing) creates a single flush surface that improves air-handling efficiency and makes cleaning and maintenance operations far easier and safer.

All profiles are manufactured with shaping which improves safety conditions.

There are three standard types of panels (25 mm, 54 mm and 90 mm) and five types of profiles (40 mm, 40 mm AISI 316L, 70 mm, 70 mm with thermal cut and 70 mm AISI 316L).

All sections are joined together internally with a coupling system that ensures maximum precision and assembly speed.

Available constructions:



Profile:	Profile:	Profile:	Profile:	Profile:	Profile:
AISI 304	Aluminium	Aluminium	Thermal cut aluminium	Thermal cut aluminium	Thermal cut aluminium
AISI 316L		AISI 304			
		AISI 316L			

Insulation:	Insulation:	Insulation:	Insulation:	Insulation:	Insulation:
Polyurethane	Polyurethane	Polyurethane	Polyurethane	Polyurethane	Polyurethane
Rock wool	Rock wool	Rock wool	Rock wool		

Doors

The inspection doors are built with the same construction characteristics as the panels and can be opened quickly and easily to the outside.

All inspection doors are fitted with handles on the inside and outside to ensure easy access and can be equipped with lock and key or a padlock. Upon request, they can also be fitted with inspection windows so that conditions inside the machine can be checked without having to open up and stop the machine.

Airtight seals are placed between the doors and the frame made of twin-component, thixotropic polyurethane foam, applied directly on the structure using a numerically-controlled injection process, providing the following properties:

- level of sealing: IP60/IPX6 (-40°C/+80°C);
- fire resistance class: 55°C/30s (NF 20455);
- ozone resistance: class 6 (exposure 70h at 38°C, concentration, complies with FIAT 50417 standard);
- impermeability: absorption less than 2% with immersion of 2h.
- testing for resistance to heat cycles (10 cycles of 4h at 90°C ± 2°C, 4h at -40°C ± 2°C);
- testing for humidity variation cycles (200h at 40°C ± 2°C with RH>90%);
- testing for thermal shock (1h at 120°C ± 2°C, 2h at 100°C ± 2°C).



Dampers

All types of dampers are produced internally and can meet the most stringent construction requirements. They include regulation dampers with opposed fins, no-return dampers and shut-off dampers.

They can be made with galvanised sheet steel, aluminium or AISI 304 or AISI 316L stainless steel.

They are all prepared to be fitted with servo control and, upon request, can be equipped with manual controls.

No-return dampers are provided with an adjustable counterweight.



Filter sections

Filters of various kinds can be used: undulated prefilters with regenerative cells, automatic roll rotating filters, (efficiency up to ISO 16890 Coarse 50/55%) or metallic filters for oily fumes (ISO 16890 Coarse 30%), undulated filter panels (efficiency up to ISO 16890 ePM1 80%), multibag filters or rigid bag multi-dihedral filters (efficiency up to ISO 16890 ePM1 85%), HEPA absolute polyhedron filters with integral efficiency $\geq 99.995\%$ @ MPPS in accordance with EN 1822:2010 (class H14), activated carbon filters for the chemical and physical absorption of organic odours and chemical pollutant gases

Combined filters with rigid bags are also available to improve air quality, reducing concentrations of particulates and contaminating gases in a single filter, achieving ISO 16890 efficiencies up to ePM1 80%.

All filter counterframes are made internally in galvanised sheet steel or AISI 304/316L stainless steel and have a particular kind of shaping that reduces assembly tolerances and prevents all leakages. The airtight seal, made of twin-component, thixotropic polyurethane foam, is applied directly on the structure using a numerically-controlled injection process.

Fully airtight electrostatic filters in standard ASHRAE sizes fitted with built-in electronic circuit ensure high filtration efficiency on particles of 0.3-0.4 microns, comparable to class E10, E11 according to the UNI 1822:2009 standard and comparable to the class F7, F8, F9 according to standard EN 779:2012. They are an excellent solution against outdoor pollution from PM10, PM2.5 and PM1 and significantly reduce the bacterial load in the air. They ensure significant energy savings due to low pressure drop and a constant filtration efficiency up to a load of 600 g of particulate matter.

All filtering sections are fitted with an inspection door to allow simple and easy filter replacements. Upon request a differential pressure switch can be installed to control filter efficiency.



Fan Section

The fans used are centrifugal fans of the Plug-Fan type without scroll, equipped with a motor directly coupled to the impeller, and are made of galvanised sheet iron or techno-polymers.

They are fitted with asynchronous electric motors with minimum IE3 efficiency or, alternatively, with permanent magnets (PM) or electronic commutation (EC) with efficiency up to IE5 for exceptional system-wide yields and top-notch features in any application.

All asynchronous motors can be controlled by digital frequency converters, available as fully-wired IP55 on-board (built-in) accessories. The PM and EC motors have built-in electronics and are directly operated with a 0... 10V signal.

Both solutions can include automatic air flow (CAV) or pressure (VAV) control in a closed ring using an air flow meter with PID on board the machine.

For heavy uses or where required by the customer, in high static pressure applications, double-suction centrifugal fans are used whose impeller has reverse blades, flat blades or aerofoil blades.

All impellers are statically and dynamically balanced. The fan drive shafts are made of rectified carbon C45 steel and are protected with anti-corrosive coating.

The sealed-type ball bearings used are self-aligning and are locked to the drive shaft by means of an eccentric ring.

The mouth of the fan is connected to the supply line through an anti-vibration coupling which prevents the transfer of any vibration to the structure.

The transmission occurs via trapezoidal belts and pulleys with tapered clamping bushing made of ASTM A105 steel. Upon request, aluminium pulleys or variable pulleys can be mounted.

Fans are selected to ensure optimum performance and a quiet working level. The motor, complete with sled, and the fan are housed on a single base, made of galvanised sheet iron, insulated from the section structure by means of suspension devices made of springs or rubber.

Access to all fan sections is always protected with wire-mesh security doors.

Upon request, a micro-switch can be installed which interrupts the power supply to the fan motor, as soon as the inspection door is opened.



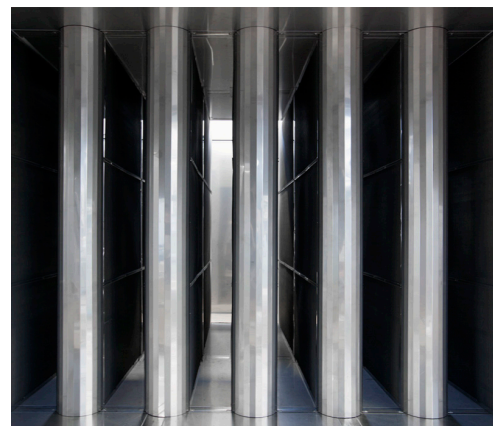
Silencer sections

The silencer sections, chosen according to the noise reduction requirements, are designed and sized on the basis of the fan noise spectrum. They can be mounted on the supply and return sections and have linear sound-proofing baffles..

The baffles, measuring between 500 and 2.500 mm in length with a thickness of 200 or 300 mm, are made of mineral wool with a high sound-proofing coefficient and are covered in erosion-proof, non-inflammable and non-rotting fibreglass fabric.

The support frame is made of galvanised sheet steel or AISI 304/316L stainless steel.

In addition to the standard type, variants with a protective perforated sheet are available and also in the resonating version with aluminium sheet on half the surface area.



Heat exchanger coils

Heat transfer fluid coils

Run with water, superheated water, steam or refrigerant, including CO₂, they are mounted on rails that allow them to be easily removed.

The construction materials used, based on the various applications, can include: copper, tin-plated copper, titanium and AISI 304/316L stainless steel for ducts; aluminium, coated aluminium, copper, tin-plated copper, titanium and AISI 304/316L stainless steel for fins.

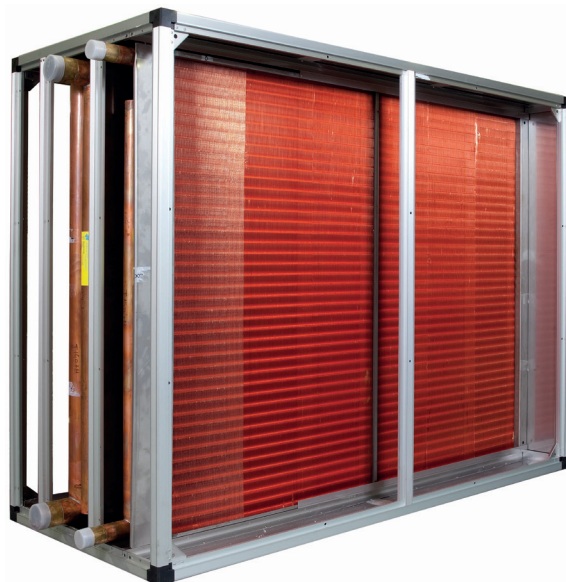
The cooling coils are equipped, if necessary, with a multi-fold droplet separator, built with the frame in AISI 304/316L stainless steel frame and the fins in polypropylene or, on request, in AISI 304/316L stainless steel. The inner part of the handling section contains a pan made of AISI 304/316L stainless steel, for collecting condensed water. At the customer's request, double-sloping pans towards the drain can be provided.

All coils are verified according to the 2014/68/EU PED Pressure Equipment Directive and certified according to the relevant class.

Electric coils

Electric heating coils are made with armoured electric heating elements in AISI 304/316L stainless steel. They can have smooth tubes or tubes lined with fins in galvanised steel or AISI 304/316L stainless steel.

They are always fitted with a safety thermostat, automatic reset, manual reset or in series automatic + manual reset (TSH-TSHH).



Humidification sections

The humidification sections are either of the adiabatic type or isothermal type.

The adiabatic types are available with evaporating pack and drip trap or with a recirculation pump, with spray mist nozzles with compressed air misting, ultrasound, with single or double sets of nozzles.

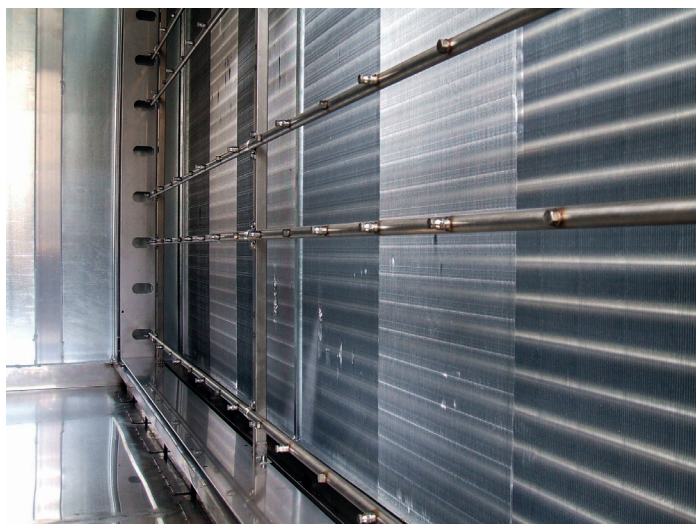
The isothermal types are available with network steam or with autonomous steam producers of type with immersed electrodes, with heating elements or with gas generator.

All humidification sections are fitted with water or condensate collection pans in AISI 304/316L stainless steel that always ensure the best hygienic conditions. At the customer's request, double-sloping condensate discharge pans towards the drain can be provided.

In humidification sections with nozzle bars and recirculation pump, there is a double-wall chamber so as to ensure greater insulation of the panel from the area in which the water is sprayed.

All humidification sections are fitted with a multi-fold droplet separator, built with the frame in AISI 304/316L stainless steel frame and the fins in polypropylene or, on request, in AISI 304/316L stainless steel.

Special projects and products are available for the car industry for the humidification of large air flows with precise regulation for increasing humidity.



Recovery sections

In accordance with the ErP-Ecodesign Directive 1253/2014, all two-way air handling units (BVU) must be equipped with a heat recovery system (HRS). Roccheggiani provides specific performance and regulatory compliance data for each unit it produces.

The proposed solutions are of the static type with cross-flow or countercurrent recovery units, coils with heat transfer liquid, thermal wheels.

Heat transfer fluid coils

The heat transfer fluid type coils consist of two coils with fins: one in the return/discharge air flow and one in the fresh air intake supply flow, inside which a heat transfer fluid is circulated consisting of a mixture of water and glycol with varying percentages depending on the operating temperatures.

The coils can be made of the same materials as the main coils. Upon request, the entire system with circulation pump, inverter, mixer valve, connecting pipes, probes and actuators can be provided. The recovery efficiency, of a sensitive type, can achieve efficiencies of up to 80%.

Thermal wheel

The thermal wheel type consists of an aluminium heat exchanger wheel operated by an electric motor controlled by an inverter via a belt transmission.

The casing can be made of coated galvanised steel or AISI 304/316L stainless steel.

The aluminium matrix has a highly hygroscopic surface treatment called Sorption Zeolite Molecular Sieve 3A, which is suitable for all applications where contaminations need to be avoided and the exchange must take place with no smell transmission.

The particular molecule chosen to perform this latent heat recovery is Zeolite.

At an atomic level, the structure of zeolite is an assembly of silica and alumina tetrahedrons combined regularly through shared oxygen atoms.

This configuration forms an open crystalline lattice with pores at the molecular level in which guest molecules can penetrate.

The totally-uniform crystalline lattice behaves like a sieve with an effective opening of 3.0 Angstrom [0.3nm].

Since methane is the smallest of organic molecules (i.e. that can transmit odours) and has a kinetic diameter of 3.542 Angstrom [0.3542nm], the molecular zeolite sieve can effectively shield the adsorption of all organic compounds (and thus prevent the transfer of any odours). The water molecule, with a kinetic diameter of 2.641 Angstrom, is smaller than 3 Angstrom [0.3nm] and can penetrate the structure of the zeolite so that it is easily absorbed.

The heat recovery unit is also equipped with a washing section that uses a share of fresh air through a round sector with a 5-degree opening and allows the small share of captured return air to be removed, immediately before moving to the supply section and which, otherwise, would remain trapped in the wheel and be transferred.

For diameters above 2400 mm, the wheel is built in sectors.

The total-type, both sensitive and latent recovery efficiency can achieve efficiencies of 90%, significantly reducing the necessary power potential of the installed plant and reducing winter humidification devices.

Cross-flow or countercurrent flows

The static type with cross-flow or countercurrent flows consists of a heat recovery unit with large-surface plates complete with a by-pass device. The heat exchange surface can be made of aluminium or pre-coated aluminium for applications in corrosive environments.

This sensitive-type recovery can achieve efficiencies of over 90%.



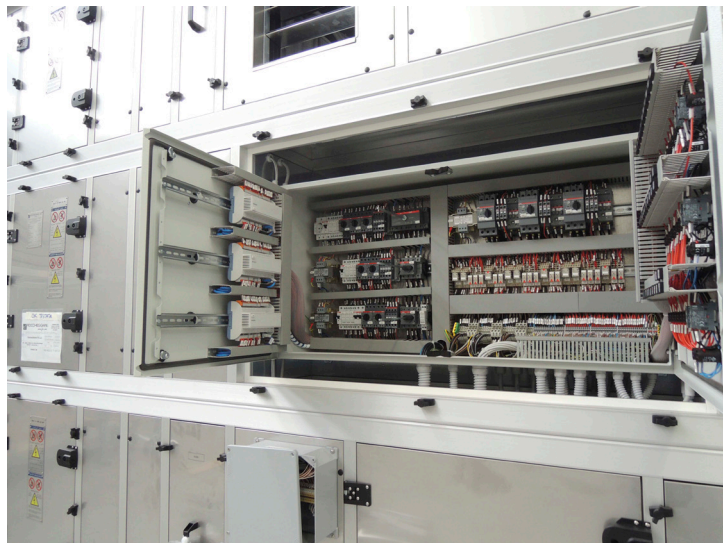
Special projects

Roccheggiani specialises in the supply of full units, complete with all cabling and on-board electric power and control panels, including the installation of all regulation equipment and on-site commissioning and testing.

Packaged units

Upon request, the air handling units can be supplied complete with all regulation devices, ready mounted and wired on board the machine, including the electric panel and control panel. In particular, the power and control panels may be located in specific niches within the unit or placed inside a remote electric panel.

The electric panel board, designed and dimensioned for each unit and based on the power and regulation requests is equipped with a door lock circuit breaker. Control is achieved via regulators with a microprocessor that allows the desired psychrometric parameter values to be viewed and set. They will act according to the parameters read by special sensors placed both in the rooms and in the unit.



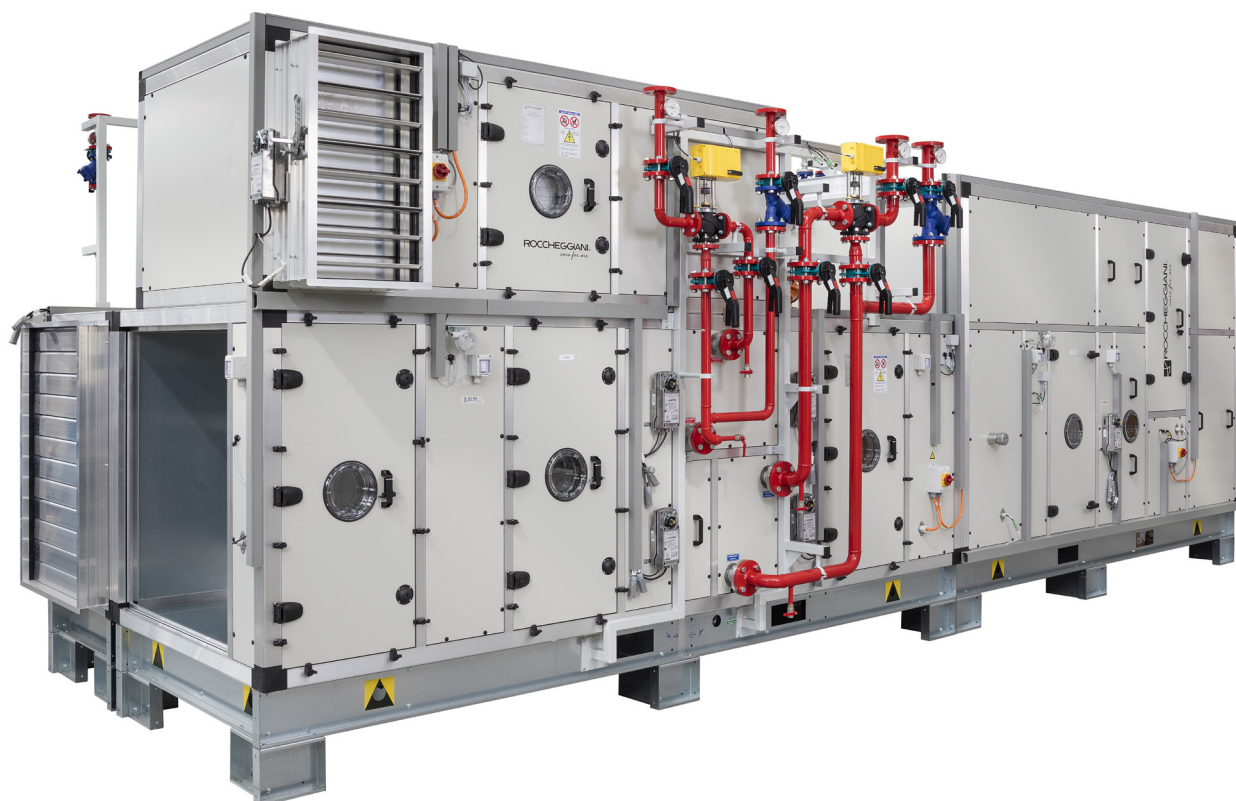
The outputs of the regulators, through the use of transducers, changes the operating parameters of the dampers, the modulating valves, the electric coils, the fans, humidifier, the dehumidifier, the antifreeze system, etc. The regulators can also adapt the air flow or pressure, by means of the microprocessor that regulates the frequency converter changing the number of fan revolutions, according to the set flow rate and the level of filter clogging or air quality.

In addition to the control of all parameters, the regulation of the air handling units also includes the reporting of any alarms that may occur while the units are working. Roccheggiani uses regulation systems of all major manufacturers in line with agreements made with the customers.

They can be fitted with integrated panels on board the machine or panels with their own metal frame.

The packaged air handling units by Roccheggiani can meet all plant needs and requirements to provide a fully-integrated solution including heat generation sections on board through heat pumps.







Pharmaceutical and Food industries - Hospitals

The basic structure is made using extruded Anticorodal UNI 9006/01 6060 T6 aluminium profiles, with shaping that improves safety conditions, or AISI 316L stainless steel which are connected by means of fibreglass or stainless steel joints according to an exclusive Roccheggiani design. The profiles are exclusively shaped and have no internal protrusions.

The high-performance structure consists of a continuous AISI 316L stainless steel profile that is fully welded and fully insulated from the panel outwards so as to prevent any thermal bridge. It is totally smooth on the inside and lends itself perfectly to all those applications in the food industry requiring low-temperature treatments.



The sandwich-type panels with a thickness of 90 mm for the bottom of the sections and 54 mm for the side and top walls, are built on the inside in AISI 304 or AISI 316L stainless steel and, on the outside, in pre-coated galvanised sheet iron, with injected, high-density polyurethane foam insulation material (about 45 Kg/m³) or oriented-strand rock wool (about 90 kg/m³).

They are fastened to the frame with screws housed inside nylon cover bushings applied to the panel. This ensures the insulation of the screw both inside and outside, whereas airtightness is guaranteed by seals resistant to various types of disinfectants made of acids and bases.

The units are suitable for both outdoor and indoor installation. The materials used are guaranteed to be weather-proof and the units can be fitted with protective roofing and a dedicated enclosure for valves and all regulation devices, built to the same standard as the main unit.

All internal components can be easily removed for practical interior sanitisation.



Ozone sanitisation

As an accessory, an automatic sanitisation system can be installed with an ozone generator, a powerful sanitising agent that provides effective air purification, with the elimination of pollutant particles, odour molecules and micro-organisms.

The properties of ozone can be used in these applications for the elimination of foul odours and micro-organisms, for maintaining optimum hygienic conditions, preventing the proliferation and development of airborne communicable diseases and to ensure oxygenation and renewal and also the elimination of toxins and VOCs (volatile organic compounds).

Ozone activates the elimination of odours by oxidising the odour-producing particles, as opposed to simple room deodorants, which mask odours by incorporating the odour-producing particles in a fragrant liquid film.

After reacting, the ozone reconverts and transforms back into oxygen without leaving any traces.

Air disinfection

To prevent the growth of micro-organisms and bacteria, modules with UV germicide lamps can be installed to achieve an effective reduction in microbial contamination in conditioned air (fight to Legionnaire's disease, Tuberculosis, Sick Building Syndrome).

The installation inside special sections means that very high exposure concentrations can be achieved, not compatible with installations in the environment, even reaching disinfection efficiencies above 99% (see ASHRAE 185.1-2015).



Marine - Offshore - Oil & Gas - Nuclear Power Plant

Marine

The special construction air handling units by Roccheggiani have been designed and built to meet all possible requirements for the installation of air handling plants in marine applications, those serving offshore platforms, onshore oil fields and thermonuclear power plants, in full compliance with the strictest safety standards.

Twenty years' experience in the Marine sector means we can build plants that meet the requirements of all shipowner companies and all shipyards. There are more than 50 large cruise ships that have air handling plants, fan coil units and cabin ventilation units made by Roccheggiani.



Offshore - Oil & Gas - "Full compliance"

Air handling units for the most extreme conditions, constructed and fully welded with AISI 316L stainless steel and additional C5-M coating according to ISO 12944. Upon request from the customer, a full analysis can be conducted on the finished elements of an air handling unit to assess their structural resistance according to: pressures, loads (stacked units), ageing due to vibrations, seismic stresses on the building response spectrum, waves (roll, pecking), wind and explosion.

The models for the finished elements have been validated and corrected through numerous tests on vibrating tables at ENEA, the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (formerly the Italian National Nuclear Energy Agency).



Full Compliance with ISO 15138 - Oil and natural gas industries - Installations for production at sea - Heating, ventilation and air conditioning.

Full compliance with the most stringent requirements for oil companies:

- Total - General Specification HVAC GS EP HVA 202;
- Shell DEP 37.76.10.10 - HVAC for offshore installations Equinor TR 1562 - HVAC Design and fabrication requirements

Full compliance with the requirements for Hazardous areas with risk of explosion:

- EN 14986:2007 - Design of fans working in potentially explosive atmospheres.
- EN 13463-1:2009 - Non-electrical equipment for use in potentially explosive atmospheres. Basic method and requirements.
- EN 60079-14 - Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines).
- EN 60079-17 - Explosive atmospheres. Electrical installations inspection and maintenance.
- EN 15198:2007 - Methodology for the risk assessment of non-electrical equipment and components for intended use in potentially explosive atmospheres.
- CLC/TR 50404:2003 - Electrostatics - Code of practice for the avoidance of hazards due to static electricity.
- CLC/TC31 - Electrical apparatus for potentially explosive atmospheres.

The air handling units, dampers and air condensation units by Rocceggiani can be marked as meeting the ATEX 2014/34/EU directive in class 2, suitable for installation in Zone 1 classified areas, with the technical file deposited with the Bureau Veritas Italia with the following registration numbers:

- BVI/ATEX/ITA/15/058
- BVI/ATEX/ITA/15/068
- BVI/ATEX/ITA/15/069



Joint Qualification System
for suppliers to the Oil Industry in Norway and Denmark

Certificate of Qualification

Awarded to

ROCCEGGIANI S.p.A.

Company Registration number: AN 60463

Achilles Id: 60423

Achilles Information AS hereby confirms that
ROCCEGGIANI S.p.A.

is Qualified in the Achilles Joint Qualification System for suppliers to the Oil Industry in Norway and Denmark. The Qualification concerns the product and service codes listed in the appendix.

Atle Gjertsen

Atle Gjertsen
Achilles Information AS
Sector Manager, Oil & Gas

Anja Thorsdalen

Anja Thorsdalen
Achilles Information AS
Operation Manager

The participating Oil Companies and Main Contractors may use Achilles JQS as the basis for preparation of bidder lists directly or together with additional qualification criteria established by the individual Company. Other qualification stages may be added by the individual Company if more information is found necessary to complete preparation of bidder lists.

29.10.2019
Issued date

09.11.2020
Expiry date

Roccheggiani makes air handling units in compliance with EN 62061 and IEC/EN 61508-1/7 that are perfect for ensuring functional safety in the process industry with safety integrity level up to SIL2.

The company is also qualified as a supplier to the oil industry in Norway and Denmark according to the Achilles certification program for the following products:

- 1.12.1 HVAC System Packages
- 1.12.2 Cooling and Refrigeration Units
- 1.12.4 Air Fans
- 1.12.5 Air Filters, Coalescers and Accessories
- 1.12.6 Dampers and Accessories
- 1.12.7 Ducting etc.
- 1.12.99 Other HVAC Equipment and Accessories

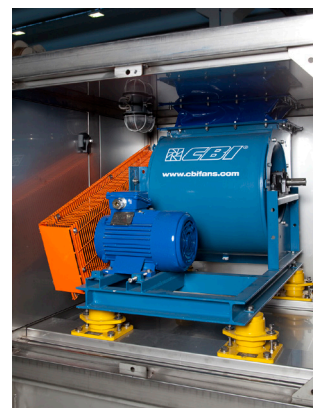


Nuclear Power Plant

Safety and reliability

Roccheggiani is qualified to build air handling plants according to the ASME AG-1:2017 Code on Nuclear Air and Gas Treatment, certified according to ASME QME-1 Qualification of Active Mechanical Equipment Used in Nuclear Facilities and IEEE 344-2013 - IEEE Standard for Seismic Qualification of Equipment for Nuclear Power Generating Stations.

All qualifications are performed after the units are tested according to the ageing, thermal, vibrational and seismic cycles to ensure mechanical characteristics for over 40 years.



FAT - Factory Acceptance Test

Upon request from the customer, the Units can undergo a Factory Acceptance Test (FAT) and Factory Performance Test to measure and check air flow, static pressure, vibrations, noise, air leakage, cooling and heating capacity.

Tests are carried out according to the following standards:

- EN 13053:2007
- EN 12599:2001
- EN 1886:2007
- ISO 14694:2003
- ISO 3744:2010

A mock-up room/cabin is available at the Roccheggiani premises to carry out a complete simulation.

