

Special constructionsMarine - Offshore - Oil & Gas - Power plants







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Entrance to the Headquarter | Head offices - Technical offices

COMPANY PROFILE

Commitment, intuition and a constant striving for quality

Roccheggiani has been developing and producing innovative HVAC&R solutions since 1958. The company started business in the metal construction and system engineering component sectors.

Thanks to the passion, commitment and intuition that has always been a part of the company, it has become market leader in the production of ducts and ventilation components, stainless steel flues, air handling units and HVAC equipment. A wide and diversified production which well represents the professional expertise of a company with a history lasting more than 60 years.

THE SIGN OF EVOLUTION, A REALITY WITH OVER 60 YEARS OF HISTORY

Competence and reliability: values that represent the heritage of more than sixty years of Roccheggiani business and who daily inspire the work of the present and the future.







Headquarter Technical & management offices Flues & Aeraulic department



HVAC department



A FEW FIGURES OF A COMPANY WITH MARKET LEADERSHIP

countries 1958 since

ROCCHEGGIANI® care for air









RESEARCH & DEVELOPMENT



Human capital is the driving force of a company, a treasure at the service of the customer

Roccheggiani has always been sensitive to market changes and customer needs and has been investing in human capital and technological research for years.

The aim is to manufacture increasingly innovative and qualitatively-evolved products. The company's precious centrepiece is its technical and information support offered to customers from design to the start-up and service.

Engineers and technicians are constantly updated concerning regulatory developments and analyse every aspect about plant engineering problems, working closely with domestic production.







HVAC DEPARTMENT

The company dispose of modern automated warehouses and production systems with an extremely high level of automation: production lines for profiling, extrusion, moulding, punching, robotised panelling and press-forming and laser cutting and welding. The integration between warehouses and production processes is managed through an advanced management system. These distinctive features, coupled with the technical and IT support offered to customers, have led Roccheggiani to success and meant that its brand is renowned both in Italy and overseas.









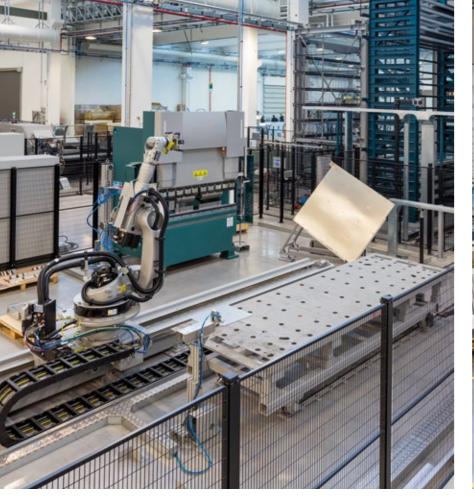
CONSOLIDATED EXPERIENCE AND THE EXCELLENCE OF THE PRODUCTION INFRASTRUCTURES

Roccheggiani has always invested in research and technology.

These initiatives are geared towards manufacturing increasingly innovative and qualitatively evolved products.













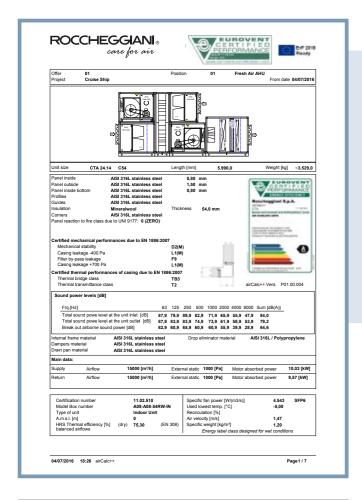


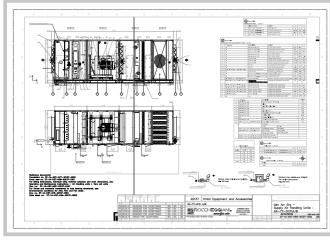
Among the first in the world to have a climate chamber, made according to the criteria of the EN15116 standard, the company has a test room for testing the performance of the air handling units.

The laboratory allows to have an accurate monitoring of all the performance characteristics so as to always achieve the highest product standards.



DESIGN TOOLS



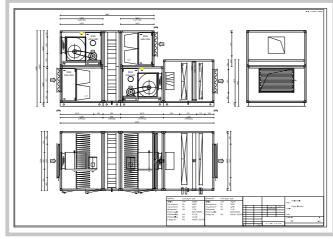


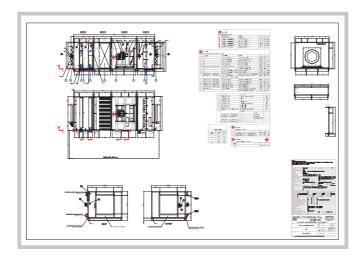
THE STRONGEST CONSTRUCTION FOR THE HARDEST CONDITIONS

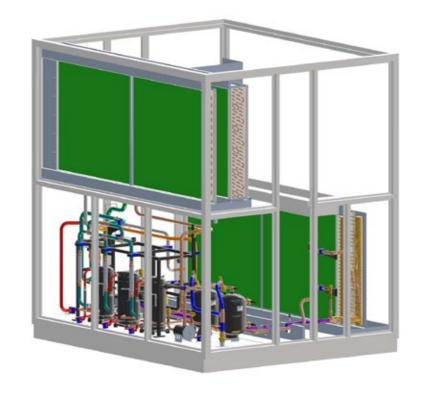
Air handling unit design

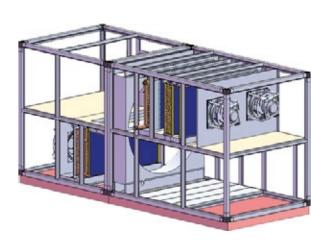
A complete technical datasheet including all the components performance and the unit layout is submitted to the approval of the customer before issuing certified drawings.

A fully detailed certificated AutoCAD® 2D drawing is submitted to the customer for approval before manufacturing.



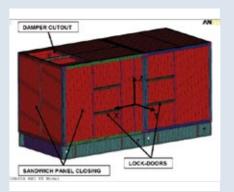


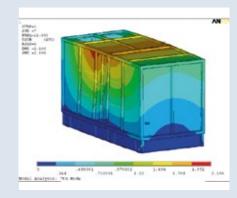




Upon Customer request a 3D model (Solidworks®) of the units can be provided for ducts, pipes and system interface.

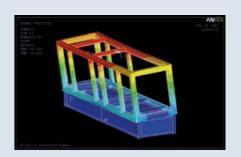
Upon Customer request a Finite Element Analysis can be performed on a unit model to evaluate structural strength to withstand: pressures, loads (double-deck units), vibrations ageing, seismic vibrations on building response spectrum, Waves (pitch, roll, heaves), Wind, ...





The Finite Element Models have been validated and corrected through several tests on shacking tables at E.N.E.A. (Italian National Agency for New Technologies), Energy and Sustainable Economic Development (former National Agency for Nuclear Energy).





COMPLIANCE

ISO 15138:2007

Petroleum and natural gas industries - Offshore production and installations - Heating, ventilation and air-conditioning:

- Annex A.12 in all the functional requirements, access doors and even, upon Customer request, factory fitted controls
- All the components related Annexes:
- A.4 Heating coils ...
- A.5 Cooling coils ...
- A.6 Humidifiers
- A.7 Fans
- A.8 Sound attenuators
- A.10 General dampers
- Annex E for duct interface flanges.

Equinor TR 1562

HVAC Design and fabrication requirements: All the units are designed to optimized the space inside the casing to minimize the pressure drop of the components; The casing Air leakage rate comply with class L2 (EN 1886: 2007). All materials and components comply with the fabrication requirements:

- "Draining" type F7 class filters (EN 779);
- Titanium coils when seawater circulating or above 60°C, AISI;
- 316L may be used in fresh water cooling coil;
- AISI 316L Electric heating coil Ex-d(e) T1-4 step or proportional control/thyristor with Ex-d IIB,C T1-T6 safety thermostats;
- Spark-proof Direct-driven Plug-fan preferred choice made of AISI 316L capable of 160% nominal duty in 2 x 50% systems, fixed mounted accelerometers available cabled to an external junction box;
- ATEX 2014/34/EU Ex marking for classified equipment.

Shell DEP

DEP 37.76.10.10 HVAC for offshore installations (amendments/supplements to ISO 15138); DEP 31.76.10.11-Gen. Installation, testing and balancing, and commissioning of HVAC systems.

Total

General Specification HVAC GS EP HVA 202; Air Handling Unit (AHU).

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.

AN AIR HANDLING **UNIT FULLY COMPLIANT TO...**

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 are CE marked in conformity to the following

standard:

- Directive 2006/42/EC on machinery;
- Directive 2004/108/EC Electromagnetic Compatibility (EMC);
- Directive 2006/95/EC Low Voltage Directive (LVD).

The Air handling units can be CE - ex marked in conformity to the 2014/34/EU - ATEX Directive up to Category 2 Zone 1 with the deposit of the Technical File (Annex VIII) at Bureau Veritas Italia notified body no. 1370.





BVI/ATEX/ITA/15/081

II 2/2 G II TX (-20°C < Tamb < +40°C)

EN 1886:2007

Air handling units Mechanical performance

The mechanical performance of the Roccheggiani Air Handling Units have been tested in the TÜV SÜD laboratories (rep. no. 6889) under the Eurovent Certification program and the units belong to the following classes:

- Mechanical strength of the casing: D1(M) with maximum measured deflection 2,6mm/m.
 - Units can withstand to ±2500 Pa with no permanent deflections.
- Casing Air leakage: L2(M)
- Filter by-pass leakage: F9 percent leakage < 0,1%



FACTORY ACCEPTANCE TEST





Leakage test according to EN 1886:2008

The Air handling unit can be tested upon Customer request on:

- Airflow volume and Static Pressure
- Vibration
- Leakage
- Noise
- Cooling (Water at 7°C up to 140kW)
- Heating (Water at 80°C up to 500kW)

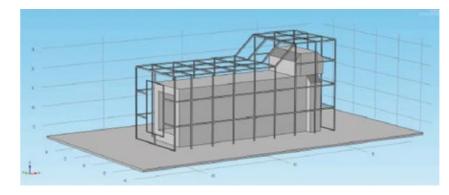
Due to the following standards:

- EN 13053:2007
- EN 12599:2001
- EN 1886:2007
- ISO 14694:2003 ISO 3744/3746
- ISO 9614

A mock-up room/cabin can be arranged in our laboratory for a complete simulation. Noise test according to ISO 3744/3746



Noise test according to ISO 9614-1 Sound power level determination











QUALITY & CERTIFICATIONS

The Achilles qualification

This qualification concerns the product and service categories listed in the appendix:

1.12.01	HVAC System Packages	C)
1.12.02	Cooling and Refrigerazion Units	C)
1.12.04	Air Fans	C)
1.12.05	Air Filters, Coalescers and Accessories	C)
1.12.06	Damper and Accessories	C)
1.12.07	Ducting etc.	C)
1.12.99	Other HVAC Equipment and Accessories	C)



KEYWORD: RESEARCH GOAL:

QUALITY

In order to be competitive on the market and retain a high degree of product quality, over the years Roccheggiani has established several synergies and collaborations with renowned research institutes. These activities are aimed at fostering the exchange of skills and constantly improving work methods in order to fully satisfy customer expectations.



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

Precision, efficiency, maximum reliability.

The distinctive traits of Roccheggiani, alongside the company's significant production and sales performances. The company's expertise is reflected in the UNI EN ISO 9001 Quality Management System certification obtained as far

back as 1996 in addition to the UNI EN ISO 14001 Environment Management System added in 2014. Besides the numerous product certifications received from the most prestigious European bodies.



www.dnvba.com

UNI EN ISO 9001:2008 and UNI EN ISO 14001:2004 certifications

DNV-GL

MANAGEMENT SYSTEM **CERTIFICATE**

Certificate No: CERT-01113-96-AQ-BOL-SINCERT

Valid: 03 July 2020 - 02 July 2023

This is to certify that the management system of

ROCCHEGGIANI S.p.A. - Sede Legale e Operativa

Via I° Maggio, 10 - 60021 Camerano (AN) - Italy and the sites as mentioned in the appendix accompanying this certificate

has been found to conform to the Quality Management System standard: ISO 9001:2015

This certificate is valid for the following scope:

Design, manufacture of double and single wall stainless steel chimneys,
flexible tubes, air handling units, extraction fans and chilled beams. Design, manufacture and installation of aeraulics plants. Trade of accessories (IAF: 17, 18, 28, 29)

Evaluated according to the requirements of Technical Regulations RT-05 This certificate is meant to refer to the general management aspects of the organization as a whole and may be used by construction companies for qualification purposes according to Art. 84 of the Legislative Decree n. 50/2016 and s.c.i. and ANAC's applicable Guidelines

ACCREDIA !

Lack of fulfilment of conditions as set out in the Certification Agreement may render this Certificate invalid. ACCREDITED UNIT: DNV GL Business Assurance Italia S.r.l., Via Energy Park, 14 - 20871 Vimercate (MB) -

ANAGEMENT SYSTEM ERTIFICATE

Valid: 20 May 2020 - 19 May 2023

DNV-GL

o certify that the management system of

CHEGGIANI S.p.A. - Sede Legale e rativa

aggio, 10 - 60021 Camerano (AN) - Italy

found to conform to the Environmental Management System standard: 4001:2015

tificate is valid for the following scope: , manufacture of double and single wall stainless steel chimneys, tubes, air handling units and extraction fans; design, manufacture tallation of aeraulics plants and chilled beams, by cutting and sheet processing, welding and soldering, insulation, assembly and tion. Trade of accessories

7, 18, 28, 29)
:ed according to the requirements of Technical Regulations RT-09



ent of conditions as set out in the Certification Agreement may render this Certificate invalid.





SPECIAL CONSTRUCTIONS PRODUCTION RANGE

Where the demand is for very high quality, Roccheggiani excels.

The Roccheggiani air handling units and systems are designed to comply with European standards and the CE mark, according to the highest standards that guarantee the best performance even in the most extreme conditions.







Off-shore, Oil & Gas



Power Plants

Roccheggiani's proposal for the Oil & Gas world includes:

- Air Handling Units (AHU)
- Weatherproof containerized Air Handling Units
- Fan Coil Units (FCU)
- Self Contained Units (SCU)
- DX Split Units
- Extract fan skids
- Fan heaters
- Louvres and air terminal devices
- Special dampers
- Ductworks





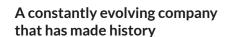


Marine Air Handling Units









Roccheggiani's Marine Air Handling Units have been designed and built to meet all possible requirements for marine air conditioning systems, in full compliance with the most stringent health and safety regulations. Each unit includes normalised standard modular sections, allowing maximum liberty in the selection of the air handling plant, and providing total comfort in the areas of utilization. Built in compliance with EN 1886 mechanical features, and adopting state-of-theart technology, all units are fully assembled in our facilities for stringent vibration and performance tests and certifications on the motor-fan assembly.



Main components

Mixing section including dampers providing opposed blade operation, manually or motor operated via electric actuators. Air filtering section including flat pleated or pocket filters (G4 efficiency), or rigid bag filters (efficiency F5, F6, F7, F8). Water or direct expansion Cu-Cu coil, up to 14 rows. Droplet separators. Rotary enthalpic heat recovery unit. Supply and return fan section. Supply and return plenum with connection for round or square ducting. The following range of accessories is available: inspection window, energy-saving internal lighting, antifreeze thermostat, differential pressure switch, U-type pressure gauge for filters, smoke dampers, actuators for dampers.

Base

Epoxy painted or Hot dip Galvanised steel base, 140 mm high.

Frame fabrication

Penta-post frame manufactured

from Roccheggiani own design Anodised Aluminium, AISI 304 or AISI 316L stainless steel sections and 40 mm or 70 mm pre-loaded fibreglass reinforced or AISI 304/316L corner pieces.

Panels

Sandwich-type panels, 25 or 54 mm thick, internal and external plates made of Galvanized Steel, AISI 304 or AISI 316L stainless steel plates. Interposed insulation in either high-density expanded polyurethane foam (approx. 45 Kg/m3) or approved mineral wool (approx. 100 Kg/m3). The panels are secured to the frame through AISI 304/AISI 316L nutser and bolts fitted inside closed nylon bushings. Maintenance and inspection panels are fittedwith lockable nylon handles and hinges.

Pan

Sloped drain pan, made of AISI 316, steel, fitted with single or twin drains (1½" gas) located in opposite positions, insulated externally with approved anti condensation material.

Internal plates

Internal plates manufactured from AISI 304 stainless steel or AISI 316 steel.

Dampers

Multiblade external air and recirculation air dampers with opposed blade operation, made of various materials, including airfoil aluminum, galvanized steel, AISI 304 or AISI 316L stainless steel. All dampers are suitable for manual or motorized operation.

Filters

The following types of filters are available: Cell type, with renewable multi-pleated synthetic filter section, 90 mm th., efficiency class G4-EN 779 Bag type, with synthetic filter section, 360 mm th., efficiency class G4-EN 779 These types of filters are self-extinguishing class 1.

Other types of bag filters, with efficiency classes F5, F6, F7, F8, or F9 are available upon request.

Hygroscopic sorption enthalpy heat recovery wheel

Air-to-air, rotary hygroscopic sorption enthalpy heat recovery unit, with honeycomb wheel in hygroscopic aluminum, can be provided with removable sections, or single body wheel, and fixed or variable rotation speed.

Heat exchange coil

Bundle-type heat exchange coils, operating with cold or hot water, and with copper pipes and fins. Stainless steel AISI 304 or AISI 316 frame. Copper manifolds with gas-threaded taps, fitted with air vent and water drainage valves. All coils have been tested to a pressure of 20 bar.

Droplet separator

Multi-blade droplet separator, with AISI 304 or AISI 316 stainless steel frame and flame-resistant polypropylene fins B2-DIN4102.

Industrial fans

Double intake fans are used, fitted with backward inclined, airfoil or flat plate blades.

The volute and the impeller are of heavy carbon steel construction, protected by an epoxy coating. Bearings and chocks are fitted with greasing nipples.

Electric motors

Three-phase asynchronous motors, made by UNEL-MEC, suitable for operation in tropical environments, with cast iron or epoxy coated aluminum casing. Insulation class F and protection IP55.

Motors of varying polarities are available as required, with 380V, 440V, 690V – 3 Phase - 60 Hz power supply.

Motor/fan frame

The base support frame of the motor/fan assembly is a galvanized carbon steel fabrication, and is isolated from the structure of the unit by special rubber suspensions.





Marine Cabin Fancoil Units







CabinVentilation Units







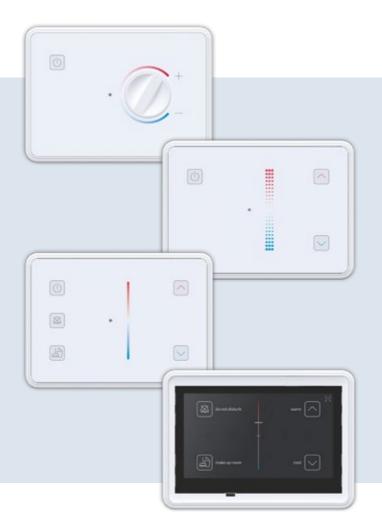
STRENGHTS

- Compact dimension
- Easy installation and maintenance
- Low power consumption
- Low noise level inside the cabin



TECHNICAL FEATURES

- Air flow range: 250-700 (m³/h) temperature and airflow control inside crew and passengers cabins and living quarters
- Casing insulated with marine-rules certified polyurethane foam or mineral wool
- Primary air inlet available as option
- Plug fan with direct-driven EC-motor
- Copper/Copper cooling coil with stainless steel frame
- Electric re-heater with safety thermostat
- Pleated or plane air filters, with efficiency from EU4 up to EU7
- AISI 316L stainless steel sloped drain pan
- Fully integrated electronic control system with available Modbus RTU connection to BMS
- Internal hydraulic circuit with regulation valve with electric actuator, in/out lock-shield valves, water filter
- NTC temperature probe
- Room control unit for wall installation, with integrated temperature probe (option). Many versions available: knob, LED bar, TFT touch screen



Air flow range: 100-350 (m³/h) -Temperature and Airflow control inside Crew and Passengers Cabins

and Living quarters;

- Manufactured with 0,8 mm thick galvanized steel 500 x 595 x 240 mm overall size
- Mobile aphonic air flow regulation damper made of Steel AISI 304 or AISI 316L S.S.
- Airflow equalizer with calibrated holes plate
- Internally insulated with Rockwool (code 759) mineral wool coated with Interglass (type 018) fibreglass Canvas; insulation fixed into position by interlocking plates without adhesives or glues

Available in the following models:

- Manual adjustment airflow volume
- Manual adjustment airflow volume with electric re-heater and room thermostat
- Automatic electronic control including:
- Linear actuator for mobile damper
- Temperature probe NTC (where required)
- Electric re-heater with safety thermostat (230V/1/50Hz)
- Power cable 3 x 1 mm with passthru connector
- 8 poles data cable 7 meters length (loose supplied)
- Diffuser (various plates available for different air-stream displacement)
- Room unit with room temperature sensor and set-point adjuster (thermostat)
- Differential pressure sensor and onboard ethernet communication (upon request)





Marine Public Space and Technical Space Fancoil Units







Air flow range: 1,000-13,000 (m³/h)

Temperature and Airflow control inside Crew and Passengers Cabins and Living quarters.

Horizontal line through or Vertical unit "Bottom to Top" or "Top to Bottom" air flow direction including:



- Driptray
- Filter
- Cooling coil
- Fan-motor assembly
- Double skin panels, made of galvanised steel 0,8 mm, DNV approved Rockwool Marine Firebatts 100kg/m3 insulation, 25 mm thickness
- Structure made of Anodised Aluminium profile with PA6 fiber-glass reinforced corner-pieces
- Air inlet connection: rectangular jointing frame made of galvanised steel with holes for duct mounting
- Air outlet connection: rectangular jointing frame made of galvanised steel with holes for duct mounting
- Water coil made of Copper pipes, Copper fins,
 Copper headers and AISI 316L Stainless Steel frame

- Drain pan manufactured from AISI 316L Stainless Steel
- Threaded pipe connection
- F5 class filter, U-tube manometer Filter monitor, Galvanised steel frame
- Direct-driven Plug-fan, epoxy painted 70 µm
- 440V/3/60Hz or 690V/3/60Hz DNV approved Motor Insulation Class F
- Wiring of the motor to a junction box outside of the unit, Halogen free flame retardant cable
- Lifting device consists of no. 4 female threaded eyebolts on top of the unit



Marine-Offshore Air Handling Units













Fully welded AISI 316L baseframe minimum thickness 3,0 mm certified as a Lifting frame for twice unit operating weight and capable of supporting the units on 4 supporting points.

AISI 316L Stainless Steel fully welded closed profile and AISI 316L Stainless Steel sandwich panels (available plate: 0,8 - 1,0 - 1,5 mm), (other materials such as Aluminium Alloys and pre-galvanized steel are also available.).

AISI 316L fully welded sloping drain pan "wet" sections and filter section (both upstream and downstream).

Flexibility in width and height, determined by max velocity through components.

Capable of Air volumes over 120,000 m³/hr and 3000 Pa.

Manufacturing & materials

The Units are manufactured to withstand the roughest conditions:

Fully welded AISI 304 or AISI 316L Baseframe minimum thickness 3,0 mm certified as a Lifting frame for twice unit operating weight and capable of supporting the units on 4 supporting point

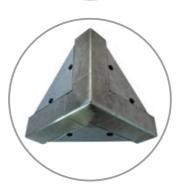
AISI 304 or AISI 316L Stainless Steel fully welded closed profile

AISI 304 or AISI 316L Stainless Steel fully TIG welded corner pieces

AISI 304 or AISI 316L Stainless Steel sandwich panels (available plate: 0,8 - 1,0 - 1,5 mm), Aluminium Alloys also available

AISI 316L fully welded sloping drain pan "wet" sections and filter section (both upstream and downstream)







The Components within the Air handling Units such as filter cells, coils, dampers, fans and motors are all selected from suppliers approved through Roccheggiani and WTSN quality system, according to specific project requirements.

A complete choice of coils is available (Cu, CuSn, Titanium, P-413C Heresite coating, Al, AlSI304, AlSI 316, ...) suitable for fresh water, seawater, steam, ... complete with drop eliminators.

DIDW, SISW, Plenum fans available from Epoxy painted Carbon Steel to fully AISI 316L construction for heavy duty purposes. Any kind of motors depending on project requirements from the most qualified manufacturers.

AISI 304 to AISI 316L IP56 Electric heaters 440V/60Hz or 690V/60Hz available.

Steam humidifications complete with drop eliminators available on Living Quarters units.

Sound attenuators for noise control available upon Customer request.

Manual or Automatic dampers made of AISI 304 or AISI 316L.















Offshore Weatherproof Air Handling Units

The outdoor installation AHUs are assembled in containerazed shelter units to face the most aggressive and the roughest conditions.

Construction: Monolithic Shelter body made of cold rolled AISI 316L profiles jointed with continuous welding and with lifting eyes - Insulation made of Rockwool 50 kg/m³



Features:

- Roof area: designed to carry maintenance work load, contributes to the entire resistance of the assembled structure, includes four upper lifting eyes for appropriate hooks
- Internal surface (floor): The floor is made by perimeter profile 6,0 mm with intermediate beams and covered with stainless steel sheet of 3,0 mm finished with anti-acid PVC
- Openings: The Shelter is supplied with several doors
- The entire structure has been designed to resist to the following mechanical stresses:
- Wind Thrust: 30 m/s
- Floor load: 1500 Kg/m² for equipment area
- Roof Load: 500 Kg/m²

Design Standards:

- UNI 10011/85 Steel construction Instruction for the calculation, execution and maintenance
- UNI 10022/85 Steel construction Instruction for use in the constructions
- UNI 10012/67 Load hypothesis in the construction
- UNI 10024/67 Computerized analysis: Approach and editing of the calculation reports
- LAW no. 64 The structure is built to withstand seismic action as foreseen by Italian law no. 64 of 02.02.74, Ministerial Decree of 24.01.86 and successive updates (structure in seismic areas, 7,5 grade Richter's scale, protection coefficient equal to 1.40)







Water cooled Offshore Fan **Coil Units**



Features:

- 10 std. sizes from 1100 to 13000 m³/h
- Upflow or Downflow Air Supply available
- High efficiency direct-driven Plug-fan available with AC-3 TEFC three-phase motors or fully integrated EC Electric
- High quality Sandwich Panels and Profile construction, 25 and 54mm thick
- Anodised Aluminium or AISI 316L S.S. profile
- Galvanised steel, Painted Galvanised steel, AISI 304 or AISI 316L panels
- Galvanised steel or AISI 316L internal plates
- Rockwool or Dunapol Rina Approved Polyurethane foam;
- Cu/Al, Cu/Cu, Cu/CuSn, Aisi316L/Cu, Tianium/CuSn or Titanium/AISI 316L Coils
- Blygold PoluAluXT®, EneryGuard DCC Fluxcoat® or P-413C Heresite® coating available for coils
- Factory fitted electric control box and control components available

DX Offshore Fan Coil Units

Self-contained Offshore Fan **Coil Units**









Features:

- 9 std. sizes from 1000 to 16000 m³/h
- Custom made construction available
- High quality Sandwich Panels and Profile construction, 25 and 54 mm thick
- High efficiency direct-driven Plug-fan available with AC-3 TEFC three-phase motors or fully integrated EC Electric
- Anodised Aluminium or AISI 316L S.S. profile
- Galvanised steel, Painted Galvanised steel, AISI 316L panels
- Galvanised steel or AISI 316L internal plates
- Rockwool or Dunapol Rina Approved Polyurethane foam
- Cu/Al, Cu/Cu, Cu/CuSn Coils
- Blygold PoluAluXT®, EneryGuard DCC Fluxcoat® or P-413C Heresite® coating available for coils
- Danfoss refrigeration components
- · Factory fitted electric box and control components available







Extract Fanskids

• Open Structure or enclosed solution

• Custom made design for severe duty

 Optional Protective Coating for Offshore facilities according to Shell DEP 70.48.11.30-Gen and NORSOK

Suitable for Hazardous Area ATEX

• Packaged skids including Shut-off

dampers and Sound attenuators

to meet the most stringent Noise

• Axial fans, Centrifugal Fans and Plug-

2014/34/EU up to Zone 1 2G IIC T3

available

operation

standard M-501

on request

requirements

fans available













ATEX 2014/34/EU Hazardous Area Fan Heaters

Fan heaters suitable for a number of applications within the Oil & Gas Offshore sector: heating up outdoor workforce on platforms, especially those subjected to harsh environments.

Airflow range: 2000 - 8000 m³/h.





Main components:

Axial Fan made of AISI 316L stainless

- Heating section: Electric heater or Water heating coil (stainless steel AISI 316L/CuSn)
- Diffuser made of stainless steel AISI 316L with of adjustable fins rows
- Suitable for Hazardous Area ATEX 2014/34/EU up to Zone 12G IIC T3 on request











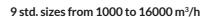


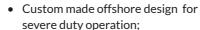
The split solution: DX - Air conditioning units and Air cooled condenser units











- High quality Sandwich Panels and
- Reliable operation with Twin Semihermetic, hermetic reciprocating and scroll compressors;
- Air cooled condenser units fully manufactured from AISI 316L S.S.;
- Factory fitted electric control box and control components available;
- Self-contained units and Packaged units suitable for outdoor mounting;
- Air cooled condenser units and Supply units suitable for Hazardous Area up ATEX 2014/34/EU Zone 1 on
- Design according to EN 62061 and IEC/EN 61508-1/7 "fail-safe" and/or "fault-tolerant" with safety standard up to SIL 2, available on request.





Indoor Unit

Outdoor Unit







The Self-contained solution

7 std. sizes from 5000 to 25000 m³/h

- Custom made offshore and onshore design for severe duty operation;
- High quality Sandwich Panels and Profile;
- Reliable operation with Twin Semi-hermetic, hermetic reciprocating and scroll compressors;
- Air cooled condenser units available in fully AISI 316L S.S. construction;
- Shell & Tubes Water cooled condensers for fresh water in Cu/Steel, for Seawater in Marine-grade CuNi/Aisi316L and Titanium/Aisi316L;
- Factory fitted electric control box and control components available;
- Self-contained units and Packaged units suitable for outdoor mounting;
- Air cooled condenser units and Supply units suitable for Hazardous Area up ATEX 2014/34/EU Zone 1 on request;
- Design according to EN 62061 and IEC/EN 61508-1/7 "fail-safe" and/or "fault-tolerant" with safety standard up to SIL 2, available on request.



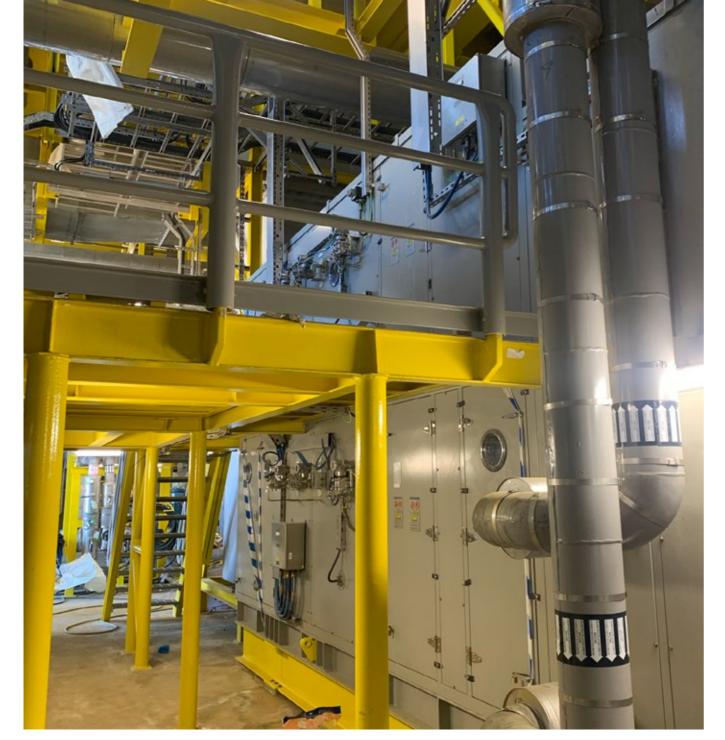
















The **Self-contained** solution **Custom Application**



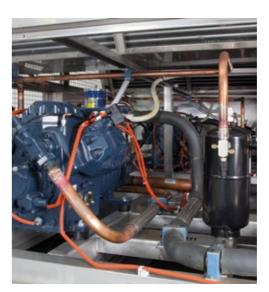






- Tailor made construction based upon Customer request
- Offshore and Onshore design for harsh environment severe duty operation
- High quality Sandwich Panels and Profile
- Reliable operation with Twin Semi-hermetic, hermetic reciprocating and scroll compressors
- Cu/Al, Cu/Cu, Cu/CuSn Coils
- Blygold PoluAluXT®, EneryGuard DCC Fluxcoat® or P-413C Heresite® coating available for coils
- Danfoss/Alco refrigeration components
- Factory fitted electric control box and control components available
- Air cooled condenser units and Supply units suitable for Hazardous Area up ATEX 2014/34/EU Zone 1 on request
- Design according to EN 62061 and IEC/EN 61508-1/7 "fail-safe" and/or "fault-tolerant" with safety standard up to SIL 2, available on request







The Ductworks **Indutair** System







Marine & Offshore Ductworks





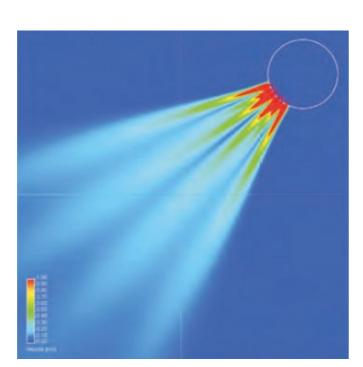


Roccheggiani introduces new high-tech aeraulic system: INDUTAIR, the perforated metallic duct for high induction air diffusion

- Circular perforated modules that integrate the function of the ducts and traditional air diffusion elements.
- Inductive effect, triggered by calibrated holes in the metal pipelines, characterizes the type of the system diffusion
- Strong effect, generated by the air micro turbulences across the holes, provides a massive induction movement of air in the proximity of the duct:
- + Significant amplification of the amount of ambient air motion;
- + Massive air mixing, up to 20 volumes;
- + Significant reduction of air stratification
- + Simplified layout: **No need of return ducts**, just a grille on the shelter wall or air conditioning unit

Roccheggiani CFD (Computational Fluid Dynamics) Design Validation and Modeling software:

- Dew points and Ambient Temperature verification
- Residual Airstream Velocity
- Air distribution
- Diffuser Shape design
- Diameter and position of the holes along the diffuser









Ducts are manufactured according to Offshore ISO 15138:2007 welded by TIG continuous

- AISI 304 or AISI 316L Stainless Steel fully welded, factory pickled and passivated.
- Black sandblasted and coated steel ducts: Inner and outer walls are finished by sandblast process SA 2 1/2 and a 15-20 µm thick shop primer layer and coated according to Shell DEP 70.48.11.30-Gen, NORSOK standard M-501 or Oil Company Standards

Standard Rectangular section ducts:

- Highly automated line for a final product of high quality
- Cross flanges obtained directly from the plate of the duct itself without fastening or riveting, for better air tightness and mechanical resistance
- Longitudinal junction of ducts by Pittsburgh-type seam
- Duct manufacturing is in compliance with UNI 10381 standards



Special Dampers



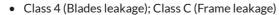




Shut-off dampers (Code SO) manufactured from AISI 304 or AISI 316L S.S. certificated according to EN 1751:2003:

- Class 4 (Blades leakage); Class C (Frame leakage)
- NORSOK H-001 Rev. 4 Gas tight dampers compliant
- hand-lever for manual operations available upon request
- Suitable for Hazardous Area ATEX 2014/34/EU up to Zone 12G IIC T3 on request
- Design according to EN 62061 and IEC/EN 61508-1/7 with safety standard up to SIL 2, available as option
- Suitable for Pneumatic or Electric Actuator

Opposed blades dampers (Code SC) for control, balancing and adjustment manufactured from Aluminum, Galvanised Steel AISI 304 or AISI 316L S.S. certificated according to EN 1751:2003:



- NORSOK H-001 Rev. 4 Gas tight dampers compliant
- Suitable for Hazardous Area ATEX 2014/34/EU up to Zone 1 2G IIC T3 on request
- Suitable for Manual hand-lever, Pneumatic or Electric

Back-draught Overpressure Damper (Code SS) manufactured from Galvanised Steel AISI 304 or AISI 316L S.S. certificated according to EN 1751:2003:

- Class 2 (Blades leakage); Class B (Frame leakage)
- Suitable for Hazardous Area ATEX 2014/34/EU up to Zone 1 2G IIC T3 on request























COMPANY EXPERIENCE & REFERENCES



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Off-shore, Oil & Gas

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Power Plants, Onshore

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Roccheggiani experience Cruise ships, ferry boat & mega-yacht equipment







COSTA CROCIERE CRUISING SHIPS OCEANIA CRUISES CRUISING SHIP

Costa Fortuna - 106.000 tons Fincantieri Shipvard N° 86 Air Handling Units Total Air flow: 1.350.000 m³/h Costa Magica - 106.000 tons Fincantieri Shipyard N° 86 Air Handling Units Total Air flow: 1.380.000 m³/h Costa Concordia - 115.000 tons Fincantieri Shipyard N° 102 Air Handling Units Total Air flow: 1.780.000 m³/h Costa Serena - 114.500 tons Fincantieri Shipyard N° 102 Air Handling Units Total Air flow: 1.810.000 m³/h Costa Pacifica - 114.500 tons Fincantieri Shipyard N° 102 Air Handling Units Total Air flow: 1.810.000 m³/h

Costa Favolosa - 114.500 tons
Fincantieri Shipyard
N° 102 Air Handling Units
Total Air flow: 1.810.000 m³/h
Costa Fascinosa - 114.500 tons
Fincantieri Shipyard
N° 100 Air Handling Units
Total Air flow: 1,870.000 m³/h
Costa Diadema - 132.500 tons
Fincantieri Shipyard

N° 101 Air Handling Units Total Air flow: 1,880.000 m³/h Costa Neoromantica - 54.000 tons

T. Mariotti Shipyard N° 36 Air Handling Units Total Air flow: 726.000 m³/h Costa Venezia - 135.000 tons

Fincantieri Shipyard

N°91 Air Handling Units Total airflow: 1.930.000 m³/h N°190 Technical Space Fan coil Units Total Air flow: 295.000 m³/h N°65 Public Space Fan coil Units

Total Air flow: 190.000 m³/h Costa Firenze - 135.000 tons Fincantieri Shipyard

N°91 Air Handling Units
Total airflow: 1.930.000 m³/h
N°190 Technical Space Fan coil Units
Total Air flow: 295.000 m³/h
N°65 Public Space Fan coil Units
Total Air flow: 190.000 m³/h

Marina - 66.000 tons Fincantieri Shipyard N° 58 Air Handling Units Total Air flow: 1.120.000 m³/h Riviera - 66.000 tons Fincantieri Shipyard

Fincantieri Shipyard
N° 58 Air Handling Units
Total Air flow: 1.120.000 m³/h

Oceania - Fincantieri Shipyard N°57 Air Handling Units

REGENT SEVEN SEAS CRUISES

Seven Seas Explorer - 56.000 tons
Fincantieri Shipyard
N° 47 Air Handling Units
Total Air flow: 1.056.000 m³/h
N° 60 technical Space Fan coil Units
Total Air flow: 126.400 m³/h
Seven Seas Splendor - 56.000 tons
Fincantieri Shipyard
N° 47 Air Handling Units
Total Air flow: 1.056.000 m³/h
N° 62 technical Space Fan coil Units
Total Air flow: 126.400 m³/h
Regent - Fincantieri Shipyard
N°47 Air Handling Units
N°47 Air Handling Units

TUI CRUISING SHIP

Mein Schiff 3 - 113.300 tons
STX Finland Shipyard
N° 111 Public and Technical Rooms
Fan Coil Units
Total Air flow: 380.000 m³/h
Mein Schiff 4 - 113.000 tons
STX Finland Shipyard
N° 111 Public and Technical Rooms
Fan Coil Units
Total Air flow: 380.000 m³/h
TUI Cruises - Fincantieri Shipyard
N°76 Air Handling Units

CARNIVAL CRUISING SHIP

Carnival Splendor - 113.300 tons Fincantieri Shipyard N° 101 Air Handling Units Total Air flow: 1.780.000 m³/h Carnival Dream - 130.000 tons Fincantieri Shipyard N° 96 Air Handling Units Total Air flow: 1.870.000 m³/h Carnival Magic - 130.000 tons Fincantieri Shipyard N° 96 Air Handling Units Total Air flow: 1.870.000 m³/h Carnival Breeze - 130.000 tons Fincantieri Shipyard N° 96 Air Handling Units Total Air flow: 1.880.000 m³/h

Total Air flow: 1.880.000 m³/h
Carnival Fantasy - 70.370 tons
STX Finland Shipyard
Dry-dock Refitting in Grand Bahama

N° 4 Air Handling Units Total Air flow: 52.750 m³/h Carnival Ecstasy - 70.370 tons

STX Finland Shipyard
Dry-dock Refitting in Grand Bahama

N° 8 Air Handling Units Total Air flow: 114.500 m³/h Carnival Vista - 133.500 tons

Fincantieri Shipyard N° 93 Air Handling Units

Total Air flow: 1.940.000 m³/h N° 190 Technical Space Fan coil Units Total Air flow: 295.000 m³/h

N° 78 Public Space Fan coil Units Total Air flow: 203.000 m³/h

Carnival Horizon - 133.500 tons

Fincantieri Shipyard
N° 98 Air Handling Units
Total Air flow: 1.940.000 m³/h
N° 190 Technical Space Fan coil Units
Total Air flow: 295.000 m³/h
N° 76 Public Space Fan coil Units

Total Air flow: 203.000 m³/h Carnival Panorama - 133.500 tons

Fincantieri Shipyard N°191 Technical Space Fan coil Units Total Air flow: 295.000 m³/h N°76 Public Space Fan coil Units Total Air flow: 203.000 m³/h

P&O CRUISING SHIP

Crown Princess - 109.000 tons
Fincantieri Shipyard
N° 87 Air Handling Units
Total Air flow: 1.820.000 m³/h
Emerald Princess - 116.000 tons
Fincantieri Shipyard
N° 88 Air Handling Units
Total Air flow: 1.880.000 m³/h
Ventura - 116.000 tons
Fincantieri Shipyard
N° 87 Air Handling Units
Total Air flow: 1.860.000 m³/h

Ruby Princess - 116.000 tons
Fincantieri Shipyard
N° 86 Air Handling Units
Total Air flow: 1.780.000 m³/h
Azura - 116.000 tons
Fincantieri Shipyard
N° 88 Air Handling Units
Total Air flow: 1.880.000 m³/h
Princess Cruises I-II
Fincantieri Shipyard
N°2399 Cabin Fan coil Units / each ship

MSC CRUISES

MSC Seaside - 154.000 tons Fincantieri Shipyard N° 73 Air Handling Units Total Air flow: 1.750.000 m³/h N° 78 Public Space Fan coil Units Total Air flow: 293.000 m³/h MSC Seaview - 154.000 tons Fincantieri Shipvard N° 73 Air Handling Units Total Air flow: 1.750.000 m³/h N° 78 Public Space Fan coil Units Total Air flow: 293.000 m³/h MSC Seashore - 169.500 tons Fincantieri Shipyard N°83 Air Handling Units Total Air flow: 2.060.000 m³/h N°87 Fan coil Units Total Air flow: 414.400 m³/h

MSC Cruise - Fincantieri Shipyard N°83 Air Handling Units N°87 Fan coil Units

MSC Cruises - Fincantieri Shipyard N°44 Air Handling Units N°3 Public Fan coil Units

DISNEY CRUISE LINE

Disney Magic - 83.340 tons

Fincantieri Shipyard
Dry-dock Refitting in Cadiz
N° 20 Air Handling Units
Total Air flow: 281.500 m³/h
N° 100 Cabin Fan coil Units
Total Air flow: 250.000 m³/h
Disney Wonder - 85.000 tons
Fincantieri Shipyard
Dry-dock Refitting in Cadiz
N° 14 Air Handling Units
Total Air flow: 155.000 m³/h

SEABOURN CRUISE LINE

Quest - 32.346 tons T. Mariotti Shipyard Windstar Cruises (Star) Pride 9.975 tons Schichau Seebeckwerft



Control of the contro

MS Superstar

Windstar Cruises (Star) Legend 9.975 tons Schichau Seebeckwerft Dry-dock Refitting, N° 5 Air Handling Units Total Air flow: 82.400 m³/h

VIKING OCEAN CRUISES Viking Star - 48.000 tons Fincantieri Shipyard N° 60 technical Space Fan coil Units Total Air flow: 99.000 m³/h Viking Sea - 48.000 tons Fincantieri Shipyard N° 60 technical Space Fan coil Units Total Air flow: 99.000 m³/h Viking Sky - 48.000 tons Fincantieri Shipyard N° 60 technical Space Fan coil Units Total Air flow: 99.000 m³/h Viking Sun - 48.000 tons Fincantieri Shipyard N° 60 technical Space Fan coil Units

Total Air flow: 99.000 m³/h **Viking Orion** - 48.000 tons

Fincantieri Shipyard

N° 60 technical Space Fan coil Units

Total Air flow: 99.000 m³/h

Viking Jupiter - 48.000 tons

Fincantieri Shipyard
N° 60 technical Space Fan coil Units

Total Air flow: 99.000 m³/h

Viking Venus - 48.000 tons

Fincantieri Shipyard

N° 61 technical Space Fan coil Units Total Air flow: 106.000 m³/h Viking Mars - 48.000 tons

Fincantieri Shipyard N° 63 technical Space Fan coil Units Total Air flow: 115.000 m³/h

Viking Cruises IX-X Fincantieri Shipyard N°63 Technical Space Fan coil Units/

each ship

Viking Cruises - Fincantieri Shipyard

N°68 Technical Space Fan coil Units

Viking Cruises - VARD Shipyard

NORWEGIAN CRUISE LINE

N°204 Cabin Fan coil Units

NCL I-II-III-IV - Fincantieri Shipyard N°1768 Cabin Fan coil Units/each ship AS Tallink group Ferry boat
37.000 tons Fincantieri Shipyard
N° 34 Air Handling Units
Total Air flow: 656.000 m³/h
Mega Express III Moby lines Ferry boat
30.000 tons Cantieri Apuania Shipyard
N° 13 Air Handling Units
Total Air flow: 260.000 m³/h
Mega-yacht Givi Private owner
CRN Ferretti Shipyard
N° 4 Air Handling Units
Total Air flow: 18.000 m³/h
N° 8 Fan Coil Units
Total Air flow: 9.000 m³/h

BRITTANY FERRIES

Brittany Ferries - FSG N°18 Air Handling Units N°3 Technical Space Fan coil Units

SV GOLDEN HORIZON

 $\begin{tabular}{ll} \textbf{Sv Golden Horizon} - Brodosplit Shipyard \\ N°150 Cabin Fan coil Units \\ \end{tabular}$

CRYSTAL CRUISES

Crystal Endeavor - MC Werften Shipyard N°240 Cabin Fan coil Units

CELEBRITY CRUISES

Celebrity Beyond - Chiantiers de l'Atlantique Shipyard N°29 Technical Space Fan coil Units N°15 Public Space Fan coil Units

AIDA CRUISES

AIDA Asia - Fincantieri Shipyard N°92 Air Handling Units N°190 Technical Space Fan coil Units N°65 Public Space Fan coil Units



Roccheggiani experience Oil & Gas Offshore











- N° 2 Air Handling Units
- N° 8 Extract Fan Skid Units
- N° 2 VSD Electrical Panels
- N° 1 Thyristor Electrical Panel
- N° 14 Packaged Self Contained Fan Coil Units



- N° 2 DX Packaged Self Contained Units
- N° 2 Air Intake Coalescer Filtering System
- N° 228 Cabin Units in AISI 316L
- Onshore and Offshore Assistance for Commissioning.



GVA 7500 (enhanced) Light NORSOK - ISO15138 Harsh Environment / Deepwater Semi-Submersible Drilling Unit Equipment delivered:

- N° 4 Columns & Pontoons Cooling AHUs
- N° 2 Galley Air Handling Units
- N° 16 DX-type Technical Rooms FCUs



- N° 6 Deck Cooling Air Handling Units
- N° 2 Accomodation Air Handling Units



FPSO Conversion - ISO15138 Equipment delivered:

- N° 2 Air Handling Units
- N° 1 Fully welded AISI 316L Complete Ductworks System



Fpso P-75 / P-76 / P-77 Area Development - ISO 15138 Floating Production, Storage and Offloading vessel Equipment delivered:

- N° 12 Safe Area Ventilation unit
- N° 15 ATEX rated extraction fans



Zuluf Gosp-1 Offshore Field ISO 15138 **Fixed Offshore Production facilities** Equipment delivered:

• N° 2 Pressurization Systems (AHUs and Ductworks)



Moss CS60E - Light NORSOK - ISO15138 Harsh Environment / Deepwater Semi-Submersible Drilling Unit

Equipment delivered:

- N° 4 Deck Cooling Air Handling Units
- N° 10 Columns & Pontoons Cooling AHUs

• N °7 DX-type Technical Rooms FCUs

- N° 2 Accomodation Air Handling Units
- N° 2 Galley Air Handling Units



• N° 8 DX Packaged Self-contained Units

• HVAC System Main Control Panel

- N° 4 Ventilation Skid
- HVAC System Power Distribution Board



LNG Onshore Process Terminal Full NORSOK - Full Shell DEP - ISO15138 Equipment delivered:

- N° 14 Air Handling Units
- N° 7 Encased Fanskid
- N° 4 DX Self-contained Units



Moss CS60E Full NORSOK - ISO15138 Harsh Environment / Deepwater Semi-Submersible Drilling Unit

- N° 4 Deck Cooling Air Handling Units
- N° 8 Columns & Pontoons Cooling AHUs
- N° 2 Accomodation Air Handling Units • N° 2 Galley Air Handling Units

Equipment delivered:

• N° 1 Air Compressor Room AHUs



Zakum West Super Complex ISO 15138 **Fixed Offshore Production facilities**

Equipment delivered:

• N° 2 Temporary Refugee DX Packaged Self-contained Systems (SCUs and Ductworks)



Living Quarter + Jkt Full Shell DEP - ISO15138 Equipment delivered:

- N° 2 Living Quarter Air Handling Units
- N° 2 Living quarter Extract Units
- N° 4 Fanskids
- N° 12 EN1751 Class C/4 Shut-off dampers



Draugen Platform - ISO15138 Full NORSOK - Full Shell DEP **Fixed Offshore Rig modification** Equipment delivered:

• Lifeboats Air handling Unit



Tempa Rossa Oil Field Full Total HVAC GS EP HVA 202 **Onshore Production facilities** Equipment delivered:

- N° 11 Air handling Units
- N° 36 Ventilation Unit



North Field Bravo NFB ISO 15138 Offshore Accomodation Expansion Project:

- N° 2 Air Handling Units
- N° 6 Fan Skids Units



Roccheggiani experience Oil & Gas Onshore - Power Plants









MOCHOVCE NUCLEAR POWER PLANT 3 VVER/4 VVER 440/213 440 MWe Mochovce (Slovakia)

• N° 102 Air handling Units



ZUBAIR OIL FIELD DEVELOPMENT Hammar/Rafidiyah/Zubair Iraq

• N° 33 DX Packaged Self-contained Systems (SCUs and Ductworks)



ZUBAIR OIL FIELD DEVELOPMENTMishrif/Rafidiyah Iraq

• N° 14 DX Packaged Self-contained Systems (SCUs and Ductworks)



TAWKE PSC Kurdistan Region of Iraq

• N° 2 DX Packaged Self-contained Systems (SCUs and Ductworks)



