AERON

PC 03

Air-Handling Units

AF GRUPPEN

Offshore
AERONMOLLIER

www.aeron.no

INDEX

AIR HANDLING UNIT

Aeron Marine Air Handling Units (AHU) is designed for ventilation and air treatment onboard ships. They can be delivered ready for placement on deck, or indoors below deck. Standard air volume range is between 3.000 m3/h and 35.000 m3/h.

Aeron air handling units are designed for the heavy mechanical loads these installations are subject to during construction and operation period. The units are ready mounted on a solid steel frame with ready- mounted hoisting equipment for fast installation, or divided into smaller sections as desired.

The housing is insulated with 50mm mineral wool sandwiched between Magnelis or Alu zink coated steel plates. A large removable door, with self sealing packing, provides easy access for inspection and service. Sleeves are installed on the inside for good vibration screening.

Units for placement on deck come with a special watertight outer wall which is primed and painted with colors of your choice.

The air is distributed throughout the ship through Aeron spiro pipe system and Aeron cabin Units. There are mainly two types of cabin units, 1-pipe and 2-pipes.

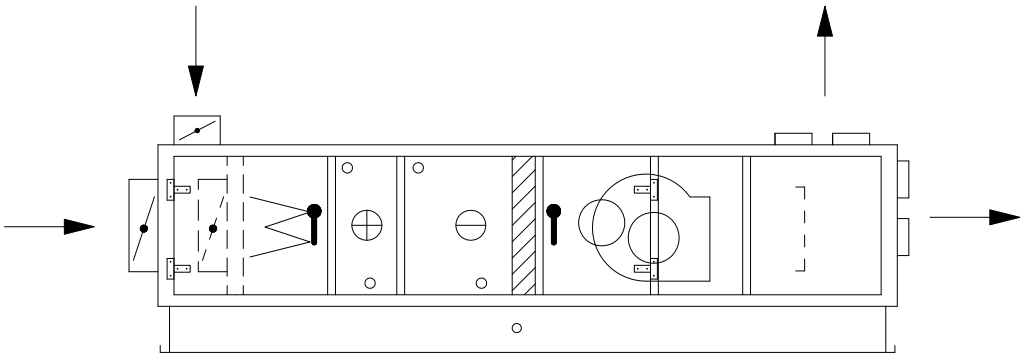
The 1-pipe system has a fixed air temperature and the airflow can be adjusted.

The 2-pipe system has fixed air flow and the temperature can be adjusted by mixing the “cold” and “warm” pipe.

Aeron Air handling Units are delivered in eight standard configurations, as described below. But can be configured in different ways when needed.

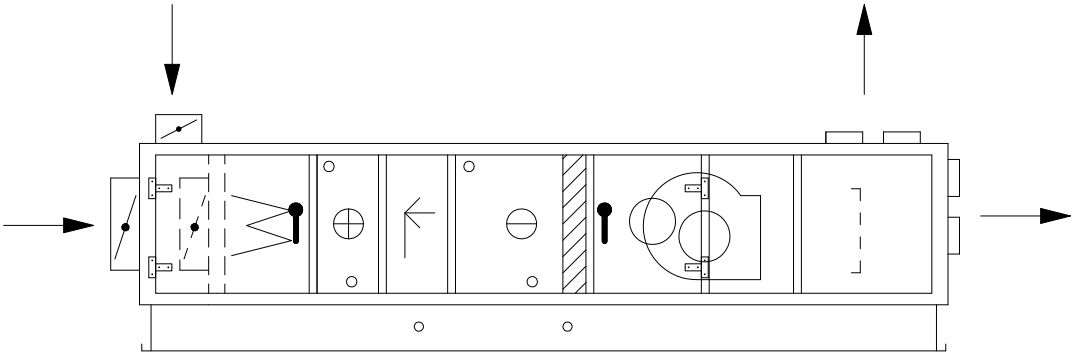
VARIANT 1 – 1-PIPE (SINGLE PIPE) WITH HEATING AND COOLING

The air taken in is 100% fresh air or combined with recycled air in desired proportion, and filtered before undergoing further treatment. The air is then heated or cooled to obtain the desired temperature on the air leaving the unit. The air is then distributed throughout the ship through Aeron spiro pipe system.



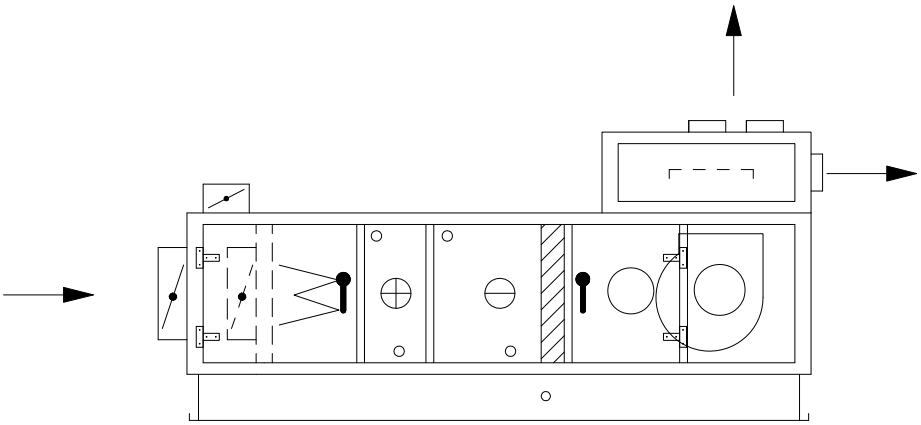
VARIANT 2 – 1-PIPE (SINGLE PIPE) WITH HEATING, HUMIDIFIER AND COOLING

The air taken in is 100% fresh air or combined with recycled air in desired proportion, and filtered before undergoing further treatment. During wintertime the air is heated and humidified to obtain the desired temperature and relative humidity. During summertime the air is cooled to obtain the desired temperature on the air leaving the unit. The air is then distributed throughout the ship through Aeron spiro pipe system.



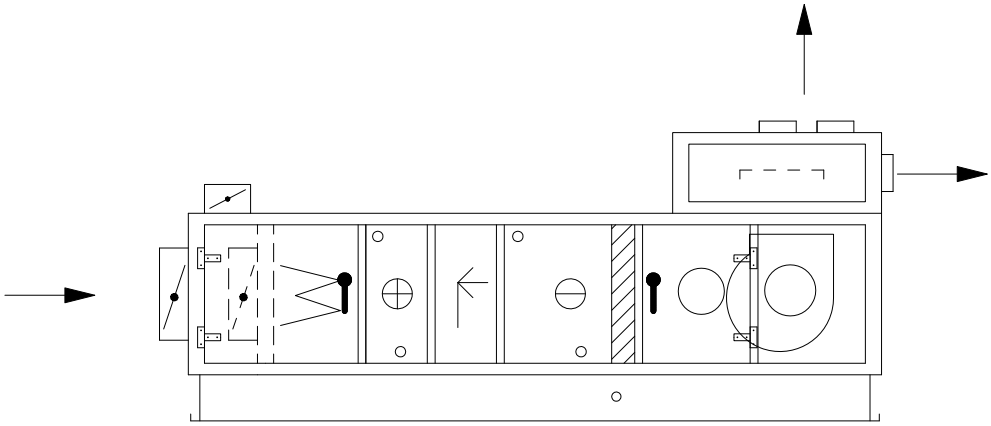
VARIANT 3 – 1-PIPE (SINGLE PIPE) WITH HEATING AND COOLING, WITH TOP MOUNTED PRESSURE CHAMBER

The air taken in is 100% fresh air or combined with recycled air in desired proportion, and filtered before undergoing further treatment. The air is then heated or cooled to obtain the desired temperature on the air leaving the unit. The pressure chamber is mounted on top of the unit in order to save space. The air is then distributed throughout the ship through Aeron spiro pipe system.



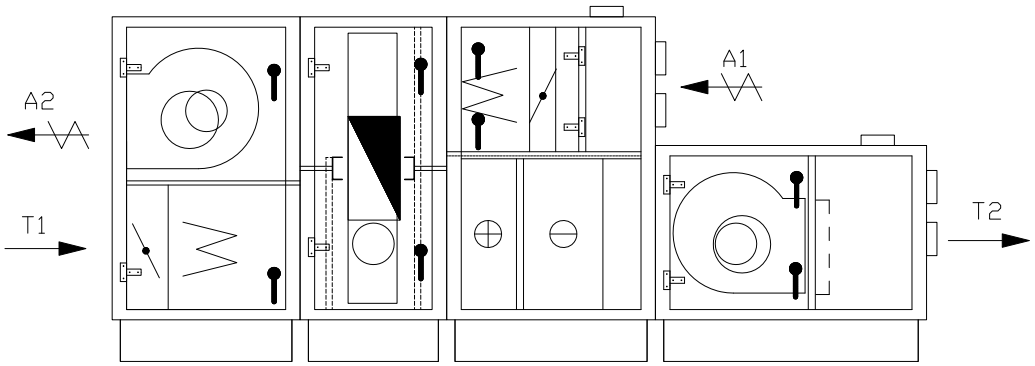
VARIANT 4 – 1-PIPE (SINGLE PIPE) WITH HEATING, HUMIDIFIER AND COOLING

The air taken in is 100% fresh air or combined with recycled air in desired proportion, and filtered before undergoing further treatment. During wintertime the air is heated and humidified to obtain the desired temperature and relative humidity. During summertime the air is cooled to obtain the desired temperature on the air leaving the unit. The pressure chamber is mounted on top of the unit in order to save space. The air is then distributed throughout the ship through Aeron spiro pipe system.



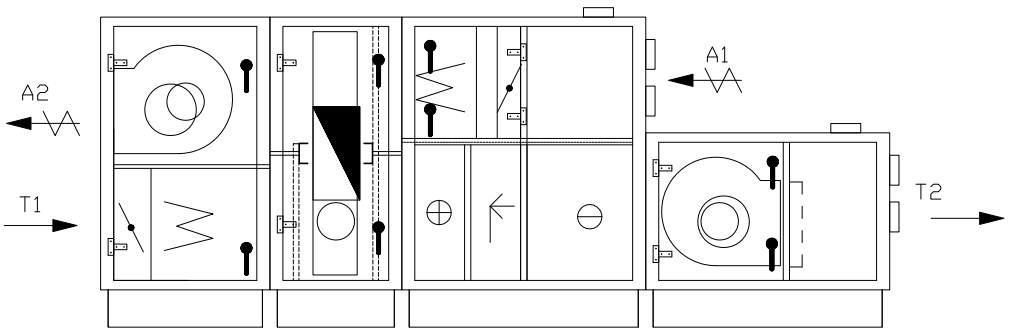
VARIANT 5 – 1-PIPE (SINGLE PIPE) – WITH HEATING, COOLING AND ENTHALPY RECOVERY

The air taken in is 100% fresh air, and it is filtered before undergoing further treatment. The air passes through the enthalpy recovery unit to obtain heat/cold from the used air that is extracted from the accommodation. If needed, the air is further heated or cooled to obtain the desired temperature on the air leaving the unit. The air is then distributed throughout the ship through Aeron spiro pipe system.



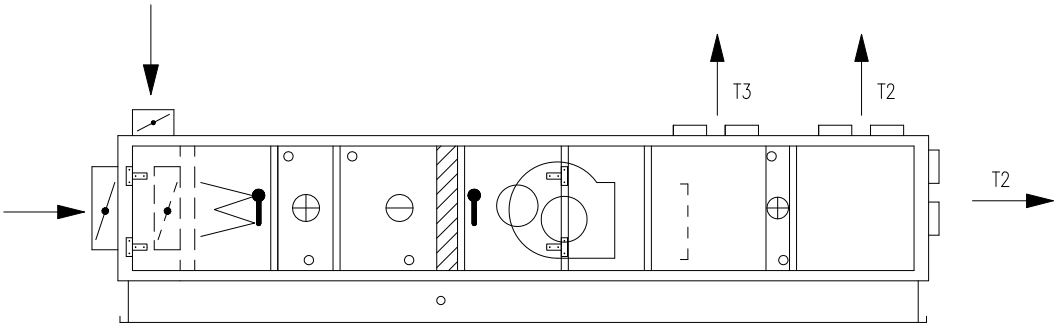
VARIANT 6 – 1-PIPE (SINGLE PIPE) with heating, humidifier, cooling and enthalpy recovery

The air taken in is 100% fresh air, and it is filtered before undergoing further treatment. The air passes through the enthalpy recovery unit to obtain heat/cold from the used air that is extracted from the accommodation. If needed, the air is further heated and humidified or cooled to obtain the desired temperature on the air leaving the unit. The air is then distributed throughout the ship through Aeron spiro pipe system.



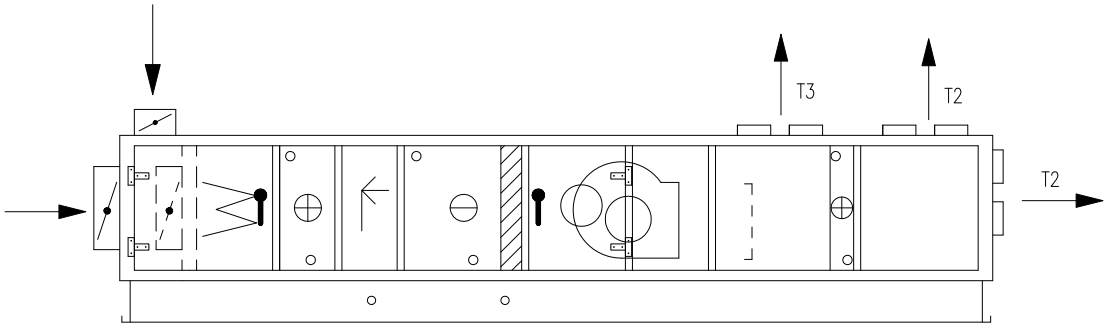
VARIANT 7 – 2-PIPE (DOUBLE PIPE) WITH HEATING AND COOLING

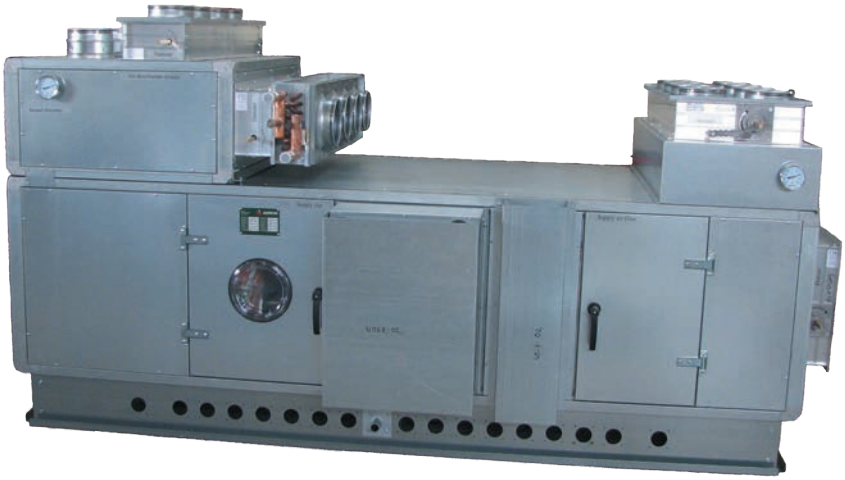
The air taken in is 100% fresh air or combined with recycled air in desired proportion, and filtered before undergoing further treatment. The air is then preheated or cooled to obtain the desired temperature on "cold pipe" (T3). Approx. 50% of the air passes through the re-heater in order to reach the temperature on the "warm pipe" (T2). The air is then distributed throughout the ship through Aeron spiro pipe system. Both pipes are lead to each room in the accommodation where the supply air temperature is obtained by mixing the air from the two pipes, by means of the adjustable cabin unit and diffuser.



VARIANT 8 – 2-PIPE (DOUBLE PIPE) WITH HEATING, HUMIDIFIER AND COOLING

The air taken in is 100% fresh air or combined with recycled air in desired proportion, and filtered before undergoing further treatment. The air is then preheated and humidified or cooled to obtain the desired temperature on "cold pipe" (T3). Approx. 50% of the air passes through the re-heater in order to reach the temperature on the "warm pipe" (T2). The air is then distributed throughout the ship through Aeron spiro pipe system. Both pipes are lead to each room in the accommodation where the supply air temperature is obtained by mixing the air from the two pipes, by means of the adjustable cabin unit and diffuser.





WORLD-CLASS, NORWEGIAN QUALITY

Quality and flexibility makes this Air Handling unit to one of the best on the market today.

Its construction is robust, tolerating the most extreme weather conditions, in all climatic zones, in the Arctic Sea or around the equator. The Air Handling Unit is specially-designed and fitted to each ship.

The Air Handling Unit shown in this image is only one example of how a tailor-made solution might look. In principle, all our models are constructed in the same way, whether these are adapted to a fishing vessel or a large passenger vessel.

The Air Handling Unit are delivered as single or doubleflow systems with heat recovery, depending on your needs.

AIR HANDLING UNIT, CECE IS MADE IN MARINE EXECUTION.
The casing is built to withstand high air pressure condition. Panels and inspection doors are made by sandwich construction, alu zink coated steel sheet, 0,9 mm inside and outside. Sound and heat insulated with 50 mm mineral wool, 65 kg/m3. Panels and inspections doors are sealed with EPDM-profile.

Framework is made of closed galvanized steel profile, thickness 1,5 mm, and corners in cast aluminium. The casing is tested by TUV-Nord according NS-EN 1886, casing strength class 1A (+/- 2500 Pa without damage) Base frame in 3 mm galvanized steel with holes for lifting.

Alternative executions:
Framework in stainless steel, AISI 316L Panels inside and outside in aluminium or stainless steel AISI 304L and AISI 316L.
Profiles inside insulated with mineral wool.

DAMPERS:
Dampers are installed outside the casing, and are delivered with square shaft 12x12 mm for manual handle or damper actuator. Standard dampers are supplied in leakage class 3 and made of aluminium, alloy 6060. The blades are equipped with rubber sealing strips between the blades themselves and the frame.

The dampers are designed with bearings and cogwheel in glass fiber with minimum needs for maintenance. Standard execution damper for fresh air in gable, and damper for mixing air on top. But our flexibility may easy change to opposite position.

Duct connection by flange.

Options:
- Counter flange
- Flexible connection.

FILTER SECTION:
Filter front and floor in filter section is made in stainless steel, AISI 304.
Bag filter are mounted in slide guide, and filter frame is squeezed to gasket by manual handle.

Several types of filters are available. Bag filter with large surface area. Panel filter, thickness 50 mm.

Standard filter supplied in class F6, length of bags 380 mm. Also available in class G3 – F5 – F7.

Panel filter is available in class G3.

News: Special filter execution:
- Compact filter, CAM-GT, in class F7 or F9.

This filter is specially made for offshore and marine installations. Its performance is maintained in humid or wet conditions. The construction of filter allows trapped filter to drain freely from the filter during operation, thus avoiding reentryment of dissolved impurities and maintaining low pressure drop under high humidity condition. Drip tray with drain in front of filter.

HEATING SECTION:
Different kind of heating coils are available:

Electric heaters are delivered in steps according to capacity and airflow. Connection box are outside the AHU and easy for electric connection. Inside the connection box we have a stand still heater. Heating elements are in stainless steel and frame in galvanized steel. Two safety cut-off thermostats are always supplied, one with variable set point and one with fixed set point.

Heating coils, hot water, are made in copper pipe and aluminium-magnesium fins (AlMg2,5). The coils are fitted with a connection piece to fit a temperature sensor in the water circuit.

Alternative execution:
- Fins in copper, AISI 304 or AISI 316
- Pipe in AISI 304 or AISI 316
- Frame in AISI 304

Heating coil, steam:
- Coils for maximum 4 bar pressure delivered with pipe in copper.
- Higher steam pressure than 4 bar, pipe is supplied in AISI 304.

Fins in aluminium-magnesium, AlMg2,5.

COOLING COIL:
Cooling coils are delivered for either chilled water or directly evaporation. Pipes are in copper and fins in aluminium-magnesium, AlMg2,5. A drip tray with drain is fitted in the cooling section to collect condensation. Two drains at the drip tray make sure that condense water easily leave the tray during sailing condition.

Water trap with ball is used at the drip tray.

To eliminate the risk of water droplets being carried into the airflow, cooling section are supplied with droplet eliminator when face velocity across 2,0 m/s. Droplet eliminator is made of polypropylene.

Pipe connection at dx-cooling coils are by welding. Connection at cooling coil for chilled water is by threaded pipes.

Alterative execution:
- Fins in copper, AISI 304 or AISI 316
- Pipe in AISI 304 or AISI 316
- Frame in AISI 304

HUMIDIFIER SECTION
Different systems are available for humidification of supply air depends on available system on board the ship.

Low pressure steam pipe connected to a boiler.

High pressure steam pipe connected to steam generator.

Sprayed water nozzles.
With use of spayed water nozzles, heating coil have to be calculated according ix-diagram.

FAN SECTION:
Fans can be delivered in high pressure (±2500 Pa) and low pressure (± 1200 Pa).

Double inlet fans with backwards-curved blades and with V-belt drive, are used for both high and low pressure. Fan has high level of efficiency. These fans provide very stable pressure and air flow. The fan and motor are built at a very stable frame, mounted at rubber anti vibrators. V-belt pulleys are fitted with taper bush, and are easy to gearing.

PLUG FAN

Plug fan are used for low pressure. The impeller is mounted directly at the electric motor shaft, and V-belt drive is not needed. The fan and motor are built at a very stable frame mounted at rubber anti vibrators.

Motors are in IP55, insulation class F and temperature class B.

Inspection door is fitted with inspection window for easy inspection during running time.

Alternative execution

- Anti condensation heater in connection box
- PTC thermistor or bi-metal contactors for overheating protection and signaling.
- SPM nipples mounted

DISTRIBUTION SECTION

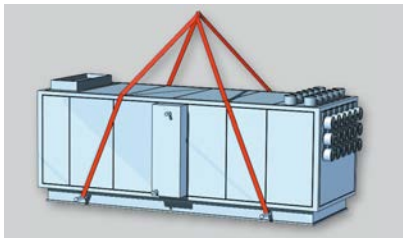
Distribution section is available in different configurations, but standard execution is with spigots diameter 160 mm. Spigots are delivered with gaskets for easy connection to duct system.

At fan outlet air distributor is mounted.

Distribution section is available to install both at end and top of the fan section.

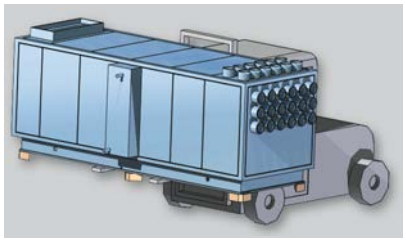
LIFTING INSTRUCTIONS

Lifting with crane: Lifting the air handling units with shafts trough the base frame. Holes in base frame Ø55 mm.



LIFTING WITH FORK TRUCK / JACK

Important notice: By use of fork truck or jack, always ensure that the lifting arms reach outside the frame.



ASSECCORIES

The CECE marine Air Handling Unit can be fitted with many different options:

- Air flow sensor with manometer at fan to measure air flow.
- Damper actuators, 24V and 230V
- Light in fan section
- Flexible connection at duct inlet and outlet Silencer
- Converters for fan motor
- Internal electric wiring
- Temperature and pressure sensors
- Painted execution
- Spare parts

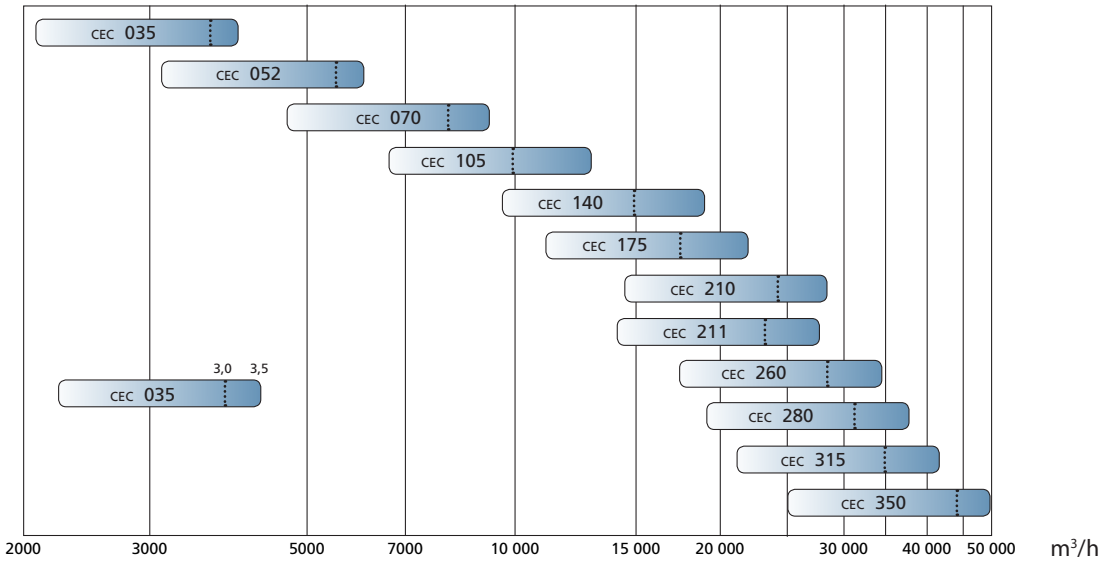
HEAT RECOVERY

If central exhaust fan are placed together with supply Air Handling Unit, you are able to save a lot of energy in winter and summer with heat recovery. Different types of heat recovery systems are available.

High efficient rotary heat exhanger can be delivered in different types, standard wheel, hygroscopic wheel or enthalpy wheel. Temperature efficiency up to 85%.

Run-a-round coils are used when supply air and exhaust air are not able to stay side by side. Temperature efficiency up to 50%.

QUIC SELECTION



GENERAL DIMENSION

				Airflow [m³/h]		
	Dimension		Filter	Air velocity in filter and cooling coil		
	With [mm]	Hight [mm]	Area [m²]	2,0 m/s	3,0 m/s	3,5 m/s
CECE 035	740	700	0,36	2400	3600	4200
CECE 052	1050	700	0,54	3500	5300	6200
CECE 070	1050	1010	0,72	5400	8000	9500
CECE 105	1290	1010	1,08	6800	10000	12000
CECE 140	1440	1300	1,44	10000	15000	18000
CECE 175	1730	1300	1,80	12000	18000	21500
CECE 210	1730	1690	2,16	16000	24500	28500
CECE 211	1980	1400	2,16	15000	23000	26500
CECE 260	1980	1690	2,70	19000	28000	33000
CECE 280	2480	1500	2,88	20000	31000	36000
CECE 315	2180	1940	3,24	24000	35000	41000
CECE 350	3120	1690	3,60	29000	44000	51000

We have supplied Offshore Air Handling Units (AHU) for North Sea projects for many years, and with years of experience, we can deliver a wide range of AHUs for all kind of HVAC offshore projects.

Our range starts at 500 m³/h, and goes to 100.000 m³/h, both indoors and outdoors execution – even as 1x100%, 2x100% and 2x50% of airflow.

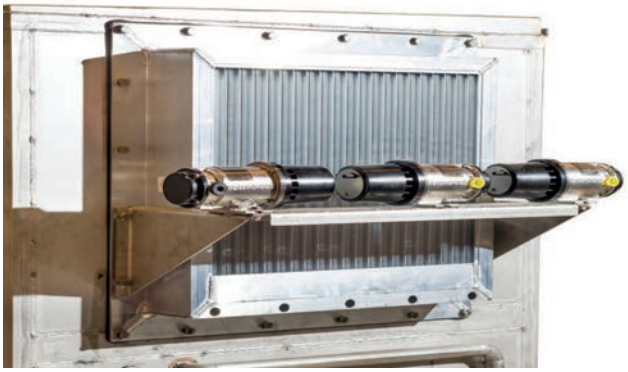
All Air Handling Units are customized with different solutions. Your specification is our delivery.

INDOORS
Framework and corners are welded in a strong construction.

Hatches and doors screwed to the framework. Doors are normally delivered with windows for inspection of components inside.

OUTDOORS
Our preferred execution for outdoor AHU, is a construction in the same framework construction, welded in a strong and rough execution. All outer skin panels in 1,5mm SS 316L sheet, welded to the framework, as a complete, tight construction. Roof in a sloop construction for water draining to the backside.

FLAT-PACK
Flat-pack is the ultimate alternative, when low-volume transportation space is necessary. Our technicians will make the assembling of the AERON AHUs inside your HVAC room, making a complete installation and commissioning on site or offshore wherever this solution is needed.



AIR INLET

All outdoors AHUs can be equipped with Mist eliminators, with or without heating element to avoid freezing in hazardous areas. To protect and taking care of the safety, we may put gas detectors in front of the Louvre. Even a coalescer might be used just inside, to ensure elimination of humidity.

FILTER

As standard, all AHUs are equipped with filter in EU7-quality. Filter area for maintenance and handling from not-clean side are standard. Draining of water (humidity) from filters, to water trap mounted outside AHU.

DAMPER

All dampers are manufactured by NORSOK standard; either they are manual or automatic shut off dampers, backflow dampers or Fire & Gas dampers. Normally delivered in SS 316L material, 3 (or 4) mm thickness. Automatic dampers to be delivered with 2 pcs of limit switch, and 1 solenoid.

FAN

For all offshore projects in the North Sea, we use only fans made in SS 316L quality, either as plug or centrifugal fans. All fans comes with motor from company-nominated suppliers, in NORSOK standard.

Fans can be supplied with Variable speed drives - VSD, Inlet Vane Control - IVC or without any regulation, just calculated for the motor speed. Normally delivered with DOL supply, up to 690V / 60Hz. All ATEX certified.

HEATER

Our electrical heaters are delivered with stainless steel elements and framework in SS 316L material. They are equipped with Temperature Switch High (TSH) and Temperature Switch High High (TSHH) safety thermostat and a stand-still element included in the termination box.

We only use ATEX certified quality. Hot water heater in material as required from project. Framework in SS 316L quality. All heaters are calculated to each project, to optimize space and efficiency.

SOUND ATTENUATORS

We make sure that all noise from the AHU is below the required level. Our calculation software take care of the internal silencers and make the unit ready for use to your required level. If there isn't sufficient space for internal silencer, we can supply attenuators as part of the duct system, to be set on the in- or outlet from the AHU.

COOLING

When Sea water is used as cooling medium, all cooling coils are made of titanium tubes, with SS 316L fins. Framework built in SS 316L. All AHU are customized.

Coils are delivered with droplet eliminator and max. air velocity below 2,5 m/s. Condensation water is drained into a drip-pans and into a water trap for further draining. Water traps are always adjusted to the pressure drop inside the AHU. Even Dx cooling coils are supplied when needed.

These might be delivered with cooling machinery, integrated into the AHU. This option make the total installation offshore simple and efficient.

The cooling system will be filled with gas before testing and complete FAT in the workshop.

INSTRUMENTATION

Any kind of instrument or electrical installation on AHUs may be executed in the workshop preliminary to delivery. This include commissioning and test of the same.

The project defines the scope that will be delivered into the AHU, but normally an instrument panel for operating of dampers, vibration monitoring system for all motors, emergency stop of fan, transmitters of different kind, assembling of different signal to JB outside the AHU, internal lighting etc., are just some of the many features that might be included in an AHU.

Thyristor panel to electrical heater might be delivered together with AHU, as loose items, just to be installed in LER or other safe area.

SKID AND FAN COILS

When an AHU isn't needed, a simple skid for fan and other items might be delivered. AERON delivers fan skids for different applications.

Skids might be equipped with dampers of any kind and attenuators based on the noise level accepted for in- and outlet. Skids are normally made in SS 316L quality, but for indoors application, even galvanized material can be delivered. Skids are delivered assembled on a common base frame, for 2 x 50% or 2 x 100%. Just customized, as specification tells us.

Fan coils are another product in our range. Standard cooling capacity from 10 to 55 kW. Airflow from 1.500 to 9.000 m³/h.

Casing in stainless steel, delivered with cooling coil for chilled water, or dx coils. Even a heating coil may be installed internally in the Fan Coil if needed. Normally we deliver fans with EC motors, just to have a various speed of fans.