AERON®

*After Sales Services*


*- Your total service partner in HVAC Systems to the global shipping and offshore industry*

AERON is a product of AF GRUPPEN

# YOUR TOTAL CONTRACTOR OF MAINTENANCE AND MODIFICATIONS


Our core business is to be a total contractor of Heating, Ventilation & Air-Conditioning – HVAC Systems for Marine and Offshore. However, when it comes to Maintenance & Modification of HVAC Systems, we can be your total technical contractor that includes turnkey responsibility from conception to completion for all technical subjects like ventilation, heating, cooling, piping, electro and automation.

With our interdisciplinary expertise, we give our customers fewer interfaces, good cost control and overview.
Our focus is to deliver cost effective solutions at the right time and with the right quality according to owner's requirements.

**VENTILATION** **HEATING & COOLING** **PIPING** **ELECTRO** **AUTOMATION** **REFRIGERATION**

## Energy Efficient HVAC Solutions

Most people will agree that it is important to protect the environment and there is an increasing focus on "green" ships. We believe that there would be even more investments in green solutions, if these investments will also be profitable for the owner.

For most vessels, the HVAC System is a one of the major energy consumer. We can analyze the energy consumption for all your HVAC Systems and upgrade to an energy efficient HVAC Systems. Our commitment is to provide smart and cost effective solutions that will be profitable for both our customers and the environment.  We call it the Blue Environment Effect.


# AF OFFSHORE AERONMOLLIER AS


*Head office in Flekkefjord, Norway*

AF Offshore AeronMollier is a total contractor for marine and offshore Heating, Ventilation and Air-Conditioning - HVAC systems. We are a leading supplier of complete HVAC systems to the global shipping and offshore industry with headquarters in the Norwegian coastal city of Flekkefjord.

AERON  HVAC SYSTEMS are designed to ensure optimal climate solutions for personnel, cargo, machinery and instruments on board all types of ships and offshore rigs. We want to be involved at all stages of the building process and for the entire lifespan of installed systems.

With more than 35 years of experience in the HVAC business, we has developed a high quality product range specially designed for shipboard environments. Years of experience have made us a reliable company with a good track record.

We make shipbuilding even more attractive through providing specialised products and services tailored for modern quality ships. We offer complete Heating, Ventilation and Air-Conditioning system packages comprising:

- Pilot studies / Analyses
- Design & Engineering
- Equipment delivery
- Installation/Supervising
- Commissioning/Testing
- Operator Training
- After Sales services

*You will find more technical information in our product catalogue at our web site www.aeronmollier.no*


MARINE AFTER SALES SERVICE
Our After Sales Department is the customer's link and lifeline to spare parts and maintenance. Our sta will ensure that our plants continue to live up to the customer's expectations. Our after sales service department will always be on hand and oers a variety of service programmes, from service on demand, service contracts for preventive maintenance to system management. We will be at your service with professionals ready to analyse and solve any problem before it becomes critical.

We provide services for conversions, upgrades and replacement of all types of HVAC systems, including those from other manufacturers. We specialise in surveys and proposals for complete conversions, including design, materials, installation and commissioning. We have extensive dry dock experience, typically involving exchange and installation of equipment on vessels ranging from cruise ships and ferries to merchant vessels. Our key clients are ship owners and shipyards across the world.

A RELIABLE PARTNER
AeronMollier has supplied HVAC systems for over 30 years, and one of our core values is Reliability and we are for sure a partner our customers know they can trust. We are proud that so many of our customers choose us again and again, year after year. But we do not let success go to our heads, and work hard to full the requirements and expectations our customers have of us.

AeronMollier believes strongly that job satisfaction is vital to maintain highly skilled personnel, a policy conrmed by the extremely low personnel turnover we experience, and taking Aeron from a small company to one of the world leaders within maritime HVAC systems.

Consequently, we have a very high level of experienced and skilled engineers and service engineers within a wide range of elds, and which are exible, service-minded and used to travelling all over the world on behalf of our customers.






WE PUT ENERGY IN ENERGY TO SAVE ENERGY
Investing to save money is well worthwhile! At Aeron-Mollier, we analyse HVAC plants and compile a status report, propose improvements and energy-saving s olutions to improve the indoor climate and reduce energy consumption.

Within AeronMollier, we have extensive experience in energy savings in buildings, Industry, Ships and Rigs. We may deliver cost effective HVAC Systems with high focus on Energy Efficient Solutions.

In stead of using electric power, we increase the use of hot water for heating and chilled water for cooling connected to our AERON Energy Central with heat pump for heating and cooling in stead of traditional refrigeration machinery for cooling only. We are of course utilizing existing heat from the Ships HT and LT systems.

We regulate the waterflows and the airflows by demand control to optimize the energy savings. High efficient equipment and use of energy recovery systems are important part of our **Energy Efficient HVAC Systems**.

We recommend owners to focus on costs over the vessel's lifetime, and not just the building cost. By investing in more energy saving solutions, the result is an environment-friendly ship, which can repay the extra investment within a few years.

# AERONMOLLIER – YOUR MARINE LIFECYCLE HVAC PARTNER


**Pilot Studies/Analysis**
- On board inspections
- Condition reports
- Energy analyses & reports
- Clarifying requirements and demands
- Calculation of energy-saving potential
- Preparation and suggestion of optimised HVAC solutions


**Design & Engineering**
- Design and calculation of heating
- and cooling capacities
- Airow and pressure calculations
- Design of an optimised HVAC system with components.
- All necessary approvals from authorities and classification bodies


**Documentation**
- Complete documentation for installation, maintenance and operation.
- Documentation of energy savings and environment-friendly solutions.
- Necessary documentation for comfort class with vibration and climate rating.
- Documentation of Clean Class, Clean Design and Green passport.

**Your Marine lifecycle HVAC partner**.

We want to be a partner for our customers throughout the ship's lifetime, right from pilot studies, to consultation, project execution and through to maintenance. By being such a partner, our customers can be sure that their own personnel have a well indoor climate provided with optimum energy-eciency which saves money.

One of the key issue to make protable investment is not only to focus on the investment of the newbuilding, but consider the total cost including the operation time. It is a known fact how important a well dimensioned HVAC system is for the indoor environment onboard a ship. Fresh air is vital to both personnel and machinery. Feeling good improves productivity.

We have always worked closely with our customers in the marine environment, learning their needs and meeting their special requirements. The experience gained has been incorporated into our products and made Aeron a highly competent supplier of marine HVAC systems.




**Equipment delivery**
Delivery of all Aeron marine HVAC components
- Air Handling Units
- Refrigeration machinery for air-conditioning
- Automation control systems
- Cabin units
- Spiro pipes
- Fans, louvers, sound traps, dampers


**Execution & Installation**
- Dismantling and/or installation
- Cleaning, conversions and upgrades
- Supervision


**Commissioning**
- Start-up and trial run of all HVAC systems
- Testing of all HVAC equipment
- Adjustment of airow, temperature and humidity in all rooms
- Measuring and verifying all approved drawings


**Operation training**
- On-site training and instruction of operating staff
- General training in HVAC products and systems


**After sales service**
- Supply of all spare parts for HVAC systems
- System management
- Preventive maintenance with service contracts
- On-line and on-site troubleshooting
- System optimisation
- Handling of warranty issues
- Cleaning and upgrading
- Conversion and replacement of equipment

UPGRADING & CONVERSIONS.
Retrot provides services needed for conversions, upgrades and replacement of all types of HVAC systems. A ship is not just a workplace, but a second home for the crew. Under such conditions, it is important that the indoor climate works properly, delivering fresh air to the entire ship. A well indoor climate improves the health on board and reduces the risk of sickness among the crew.

Aeron specialises in HVAC plants, and knows what needs maintaining and when it will be cost-ecient to replace components to maintain a good indoor climate.

We nd that many shipping lines want increased refrigeration capacity to be able to operate ships in warmer waters. Aeron can solve this dilemma by performing transmission calculations in every compartment to demonstrate level of need. With our long experience we know what to replace, what to keep and what to upgrade to make protable investments for our customers.

THE AIR HANDLING UNIT AS THE HEART OF A HVAC SYSTEM.
The Air Handling Unit – AHU - is the heart of any HVAC system. This is where the air is ltered, cooled or heated, and humidity added or reduced. The dimensioning of the AHU along with the rest of the components is therefore the key to a good, energy-saving indoor climate.

Aeron supplies AHUs of excellent quality, custom-built for use on board ships. High quality and exibility mean our AHU's are market leaders. "The Aeron Marine Air Handling Unit" is robust, and can tolerate even the most extreme climatic conditions, from the North Sea to the Equator. Our AHU's are designed and customised for each individual ship, and when replacing older equipment, can be built to t within the same available space. They can also be adapted to fit the ship's existing air ducting to avoid expensive replacement.

AHU's which do not meet modern quality requirements, or which are too old to justify further maintenance, should be replaced. In many instances this is not an easy job, as it can often be a complicated and time-consuming operation, because many such plants are installed deep in the hull in a conned space. Previously, it used to be necessary to cut a large hole in the ship to be able to install a new AHU - but fortunately, this is no longer the case.



SERVICE
Maintenance and service is vital to ensure optimum air quality and long life for the HVAC plants. Aeron offers both service "on demand" and a range of service agreements, which can be adapted to customer requirements.

AeronMollier can perform service on all ventilation and air-conditioning equipment on board, even if not supplied by Aeron. A normal onboard service visit will involve checking all service points listed in the maintenance manuals. Normally, we will also replace all consumables such as filters, drive belts, bearings and other key parts to ensure continued optimum function.

All our service engineers are skilled and trained in every detail of our HVAC systems. Supervising, commissioning and service is based on customer demand and is supplied worldwide. Service and inspection visits are conducted through our own trained service engineers or by author-ized partners.

PREVENTIVE MAINTENANCE & SERVICE AGREEMENTS
A breakdown on the HVAC systems may cause serious problems for the ship operation. To prevent any breakdown and keep the systems up to date, regularly maintenance and service is required.

AeronMollier has a number of service agreements with many customers, and we may offer a service agreement to our customers for all HVAC systems onboard any kind of ships. We offer regularly service, maintenance and priority for all our customers with service agreement. We also serve our customers with a service agreement with special reduced price for spare parts. We recommend to contact our service department for an oer of a service agreement. Please contact us at **service@aeron.no**

SPARE PARTS
Preventive maintenance helps reduce the risk of equipment breakdown at sea but cannot eliminate it entirely. Climate, temperature and vibration can all cause an air-conditioning system, refrigeration plant, or other crucial onboard equip-ment to break down. When this happens, the rst priority is to get the equipment operating with minimal disruption to the vessel's schedule.


AERONMOLLIER AFTER SALES OFFERS:
- An extensive stock of filters and spare parts available
- Attractive prices for new Iters and spare parts
- Spare parts normally sent by courier same day as ordered
- Worldwide network of representatives to assist you
- Experienced marine personnel ready to assist you
- Delivery of quality spare parts quickly and eciently
- High quality spare parts at a favorable price
-

NEW - FLAT-PACK MARITIME AIR HANDLING UNITS.
We have developed a special system which makes it possible to supply 'at-pack' AHUs as an alternative to fully assembled. This unique system means that the unit can be taken down to the ventilation compartment in pieces, and assembled there. This saves a lot of time and cost compared to cutting a hole in the hull!

Neither does the work have to be performed at a shipyard, as it can be done anywhere in the world, and even while the ship is in transit.

AeronMollier supplies and installs AHUs all over the world and we can take responsibility for the complete Project from Conception to Completion. We may offer complete Project Management and take responsibility for all disci-plines like Piping, Electrisity, Painting, Sheet metal work Automation System etc.

GREEN AND PROFITABLE COMFORT
Simple, economical measures can be all that are necessary to make a ship more environment-friendly, save energy and increase comfort. To follow are a few examples of measures Aeron can implement:

**Cleaning the ducting system**
We can send micro-cameras into all air ducts to check their condition and perform necessary cleaning, including documentation of the nished result. This can be extra important if using a humidier on board, as humidication can increase the build-up of bacteria and dirt in the system. To keep the spiroduct clean is protable as it reduces spreading of bacteria, improves the air quality and reduces the resistance and the energy consumption in the HVAC system.

**Readjustment of the plant**
After several years in use, the plant will often have been adjusted which can cause it to run out of balance, and the indoor climate can be improved by simply readjusting it, to obtain the correct air volume for all compartments.

**Pressure control of HVAC system for accommodation**
Automatic regulation of airow pressure in accommodation reduces the energy consumption and prevents unbalance due to regulation in each single cabin. The phenomenon on board ships of the problem of reducing airow in some compartments will increase the airow in others because of the increase in pressure.

By using a frequency converter with a pressure regulator, the pressure in the system will be constant and increase the indoor comfort and reduce the energy consumption. An complete VAV system may also be delivered and will even increase the energy reduction.

**Temperature control of fans for thruster compartments**
Normally, fans for the thruster compartment do not have to be on all the time. They are usually designed to be able to cool the compartment when the thrusters are working at full speed. By installing frequency converters with temperature control, the air volume will be automatically reduced according to cooling need.

In addition to saving energy, drawing in humid air will also be avoided. This will reduce corrosion and thus increase the service life of the equipment tted in the compartment.




**Temperature- and pressure-control of engine room fans**
Engine room fans are also designed to supply sucient air when the engines are in use at maximum capacity. This means that the need for full air volume will not always be necessary. With modern, inexpensive frequency converters, we now recommend temperature and pressure control of engine room fans using frequency converters.

The pressure control will adjust the fans to secure necessary over pressure in the engine room. The temperature control will secure the right temperature at all times in the engine room.

This will also avoid unnecessary amount of humid air in the compartment, reducing corrosion and giving a better working environment. It will also reduce noise on deck, not to mention reducing costs by reducing energy needs, as the fans will never run more than necessary.

**Control of the water flow for cooling and heating**
The correct amount of humidity is essential for heating and cooling. Even the best refrigeration and heating plants run ineciently when they do not have the correct amount of water in their hot and cold supply pipes.

We often find the water amounts incorrect and by adjusting the water flows, the system becomes much better with correct performance and without cavitations. This is an important issue to check when new plants are commissioned and should also be checked during service inspections.

**AERON Energy Heating & Cooling System**
We have great experience in design and delivery of energy efficient central heating and cooling systems. We may deliver a complete Energy central either with parts installed onboard, or as a complete prefabricated unit which includes Heating & Cooling pump, frequency operated pumps, valves and complete automation system.

This system could include heat exchangers to the sea water, and to to the Ships LT or HT system to utilize energy from sea, engines & machinery. When required, the heating & cooling pump will supply necessary varm and cold water to heat or cool the accommodations and the technical rooms. In less demaning areas, the cooling could be done only by exchanging the fresh water with sea water to obtain free cooling without starting any refrigeration machinery.

## KEEP THE SHIP DRY AND CLEAN INSIDE

AVOID EXHAUST GAS INBOARD
Many ships have a problem with exhaust gas from the engines seeping into the air intakes, to the detriment of the indoor climate. Naturally, this must be taken into account when designing new ships, and the placement of intake louvers. Relocating the intakes on existing ships will be prohibitively expensive. Aeron can oer attractively solutions for installation of carbon lters to solve the problems of exhaust gas in AHUs. The use of Carbon lters will eliminate the exhaust gas from coming into the accommodation and you will easily get back your need for fresh air.

DROPLET SEPARATORS, FILTERS AND COALESCERS
Damage caused to ships operating in bad weather conditions caused by humid air entering through the air intakes is a common problem. The humid and salty air accelerates corrosion and shortens the service life of equipment and the salt content in particular can cause serious damage, and even breakdown of electrical components. That's why it is important to take this into account when designing new ships and retting older ships. Aeron can offer the following solutions:

1). Inlet Louvers with droplet separators*
2). Inlet louvers with droplet separators and lter coalescer.*
3). NEW – Special lter coalescer for Air Handling Units
4). Dehumidiers**

* All kind of lovers may be delivered in dierent materials and with hatch or even in combination with heating to prevent icing at the lover intake.** Dehumidiers do not prevent humid air entering the ship, but can be a good solution to remove humidity in certain corrosion-sensitive compartments.



## ANTENNA COOLING UNIT


AERON® Antenna unit type AM is a lightweight, compact cooling unit designed for cooling of antenna systems. The AM unit is equipped with compressor, evaporator and air-cooled condenser all fitted together in a "ready to use" unit.

The AM can operate at surrounding temperatures up to 65˚C. The units will be delivered with thermostat and complete control panel for easy operation.

The AM Unit is a compact, flexible and quiet running air-condition unit. The unit is designed to operate inside or below radar domes in a non EX zone. The unit normally has a cooling capacity of 2,5 - 3.5 kW.

The unit is built in stainless steel chassis AISI 316 quality for long lasting lifetime. The construction is strong due to the harsh environment often found in demanding marine and offshore installations.

# Your local and global HVAC partner


HEAD OFFICE - FLEKKEFJORD
AF Offshore AeronMollier AS
Nulandsvika 8
N-4400 Flekkefjord
Norway

Phone: +47 38 32 78 00
Telefax: +47 38 32 78 01
E-mail: adm@aeron.no
E-Mail: service@aeron.no

BRANCH OFFICE - STAVANGER
AF Offshore AeronMollier AS
Auglendsmyrå 8
N-4016 Stavanger
Norway

Phone: +47 51 96 26 00

BRANCH OFFICE - BERGEN
AF Offshore AeronMollier AS
Sjøkrigsskoleveien 15
N-5163 Laksevåg
Norway

Phone: +47 55 38 80 80

BRANCH OFFICE - ABERDEEN
AF Offshore AeronMollier AS
Centurion Court
North Esplanade West
Aberdeen, AB11 5QH
United Kingdom

Phone: +44 1224517840.
Mobile: +44 454685698
E-mail mbr@aeron.no

www.aeronmollier.no
www.afgruppen.com

SUBSIDIARY - SINGAPORE
AF Offshore Aeron Pte Ltd.
Tradehub 21,
18 Boon Lay Way #06 – 108
SG-609966 Singapore
SINGAPORE

Phone: +65 6846 8180

SUBSIDIARY - SHANGHAI
Aeron Energy Technology Co Ltd
Flat 7,
530 Huicheng Road,
Huinan County, Pudong District,
201300 Shanghai
P.R. China

Phone: +86 21 52282590
Telefax: +86 21 52286173

E-mail: shanghai@aeron.no
www.aeronmollier.no


AERON®
HVAC-R PRODUCTS

AF GRUPPEN
Offshore
AERONMOLLIER

*Addressing Future*