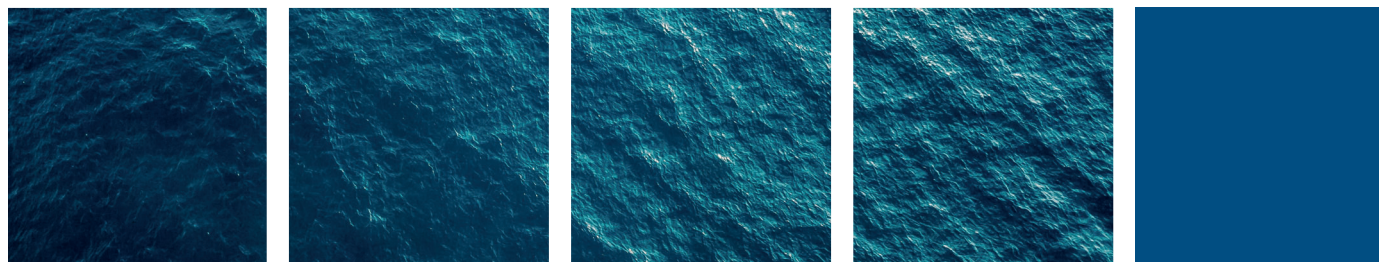
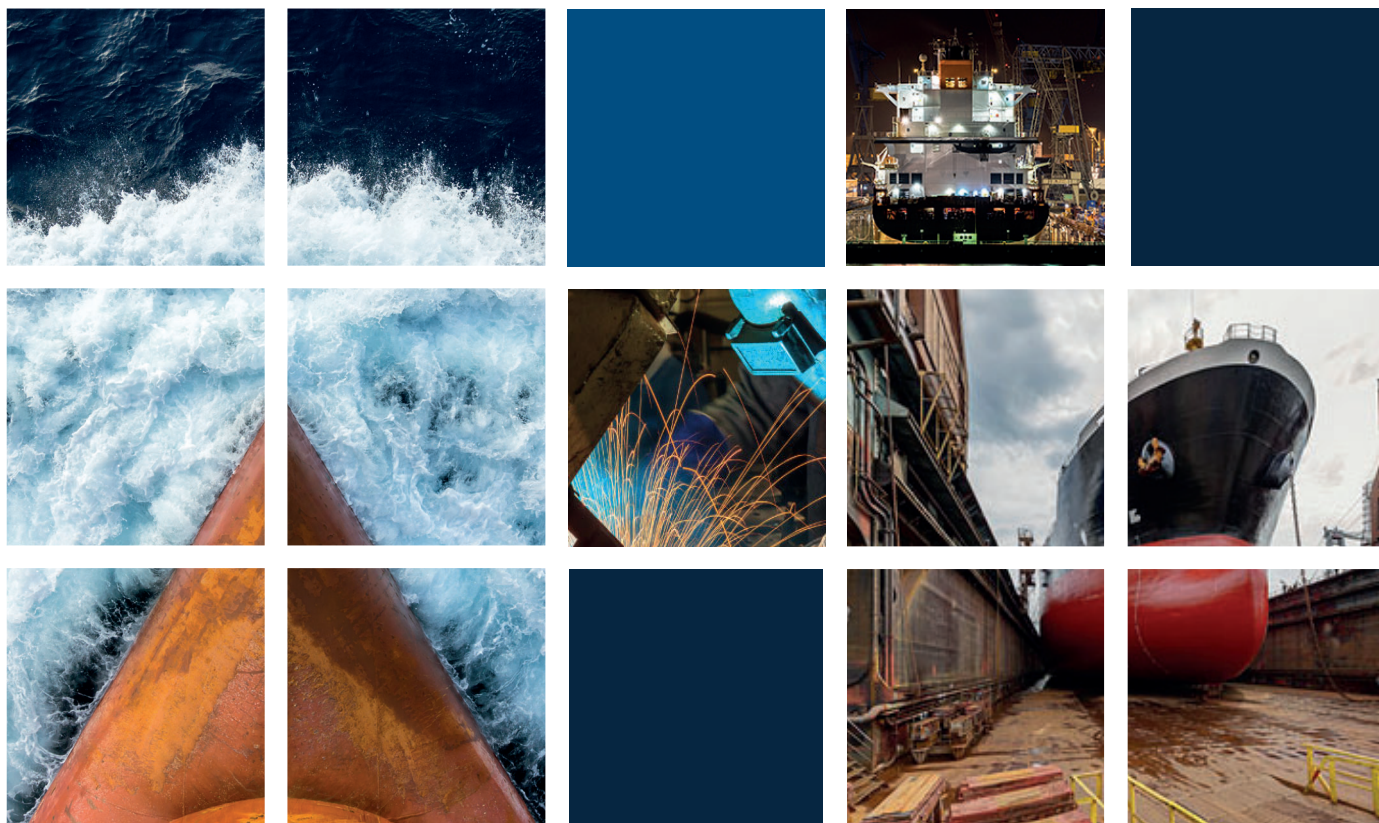




ENVIRONMENTAL
CLIMATE CONTROL
EQUIPMENT
& SOLUTIONS



HVAC solutions for the Marine, Navy & Shipyards



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High-quality
Marine equipment

ETT, the air treatment expert

Energie Transfert Thermique is a 100% French company, based on the Brittany coast, which has been designing and manufacturing high-performance thermal units since 1979.

With 330 employees, the company has based its growth on continuous innovation, the quality of its machines and Customer Service.

ETT has a long history of supplying HVAC systems to the maritime sector.

Low-carbon economy, Durability, Recyclability

ETT is committed to an **eco-design** approach aimed at reducing the environmental impact of all its units, from their design to their dismantling.

All the structures are made of aluminium (100 % recyclable), in the AG4 MC grade used in shipyards, without the use of paint or solvents.

The refrigerants used have no impact on the ozone layer and have a **very low** 'Global Warming Potential'.

The machines are designed to last over time and to maximise their maintainability.

The energy performance (**SEER** and **SCOP**) is consistently among the best on the market.

In accordance with the French Environmental Code, ETT has signed up to **EcoLogic** for the collection and recycling of its end-of-life units.

ETT, a Breton company with the sea in its DNA

1979

Creation of **Energie Transfert Thermique**

1984

1st unit delivered to the French **Direction des Travaux Maritimes** of Brest, now **ESID Brest** (29)

1988

1st units manufactured for the French **DCAN**, now **Naval Group** (Brest-29)

1995

1st Shipowner equipped: **Emeraude Lines** (St Malo-35)

1998

1st private shipyard supplied: **Jeantot Marine** now **Privilege Marine** (Les Sables-d'Olonne-85)

1999

AFAQ ISO 9001 Organisational certification

2010

AFAQ ISO 14001 Environmental certification

2019

Equipment for the French Navy's 6 surveillance frigates based in the French overseas territories

2020

CSR approach launch

2023

Around a hundred references to date.



ETT membre de Bretagne Pole Naval

Dedicated resources FOR effective project management

Very early on in its existence, **ETT** was entrusted with a number of projects involving the marine environment. The units adapted to this sector all have specific features (corrosion resistance, reliability, durability, energy performance, dimensions, etc.) that are unique to the very specific conditions they face, in the open sea or on the coast.

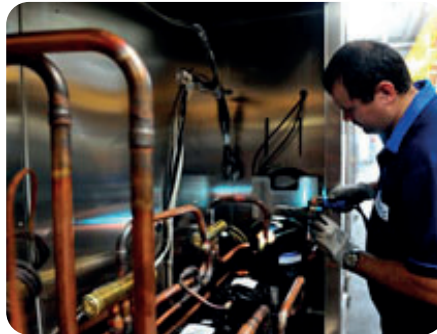
A **department dedicated entirely to the Marine and Shipyards sector** has been set up to keep in constant touch with the players involved and remain at the cutting edge of innovation in this field. Over the years, combined with constant monitoring of technological developments and standards, **ETT** has acquired recognised expertise in the design and supply of heating, ventilation and air conditioning equipment specifically for the marine sector.

To ensure the success of each of its projects (both new building and revamping), **ETT** relies on proven processes:



Engineering & Documentation

- A specialist project manager dedicated to each project
- Three engineering & design offices involved (Design, Electricity/Regulation)
- Compliance check list based on client's specifications
- 2D and 3D detail drawings
- Wiring diagrams
- Recommendations on interfaces with HVAC-related stakeholders
- Material certificates
- Sensor calibration certificates
- Welding log books
- Layout of pipes and ducts
- Other documentation as required



Manufacturing

- Premium components
- Tests and inspection plans for units and components
- Visual inspection of units
- Verification of operation in accordance with the functional analysis
- Cooling and heating capacity up to 200 kW
- Ambient temperature range of +2°C to +45°C (+55°C for some specific units)
- Weighing / listing of components and units
- Factory-tested units before delivery



Trials & Tests

- Climatic chamber where performance tests are carried out
- Recording of sensor data on a central data acquisition system
- Air and water flow measurements
- Units technically monitored by our R&D department before delivery
- Test reports
- Tests according to EN 1886
- Maintainability testing
- Sound level measurements

ETT strength IS ALSO IN ITS Services

The staff of ETT Services have extensive experience and can intervene in France as well as internationally, in the different marine sectors.

All units supplied include **services** performed by qualified **ETT** staff:

- Commissioning and settings by experienced technicians
- On-site refrigeration connection
- On-site and telephone technical support
- Troubleshooting within the warranty period
- Dedicated team of engineers and technicians for after-sales service

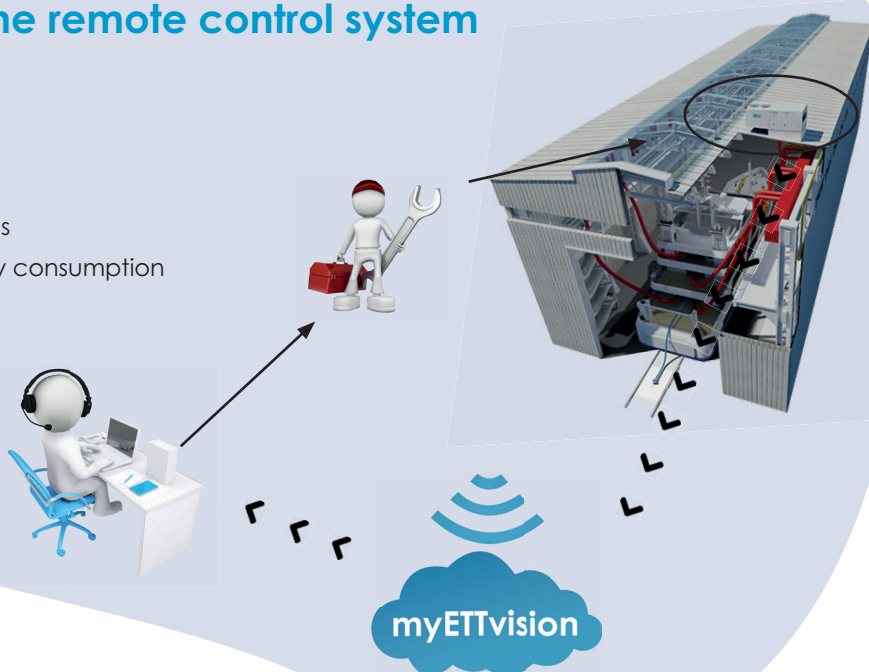
ETT also offers customers a choice of **service contracts**:

- Customised maintenance programme or maintenance contract
- Safety regulatory controls and tightness checks (PED)
- Emergency spare parts supply
- Factory supervision
- Staff training



myETTVision One remote control system

- > Operating diagnosis
- > Indoor climate control
- > Notifications on faults
- > Define the schedule of operations
- > Control performance and energy consumption





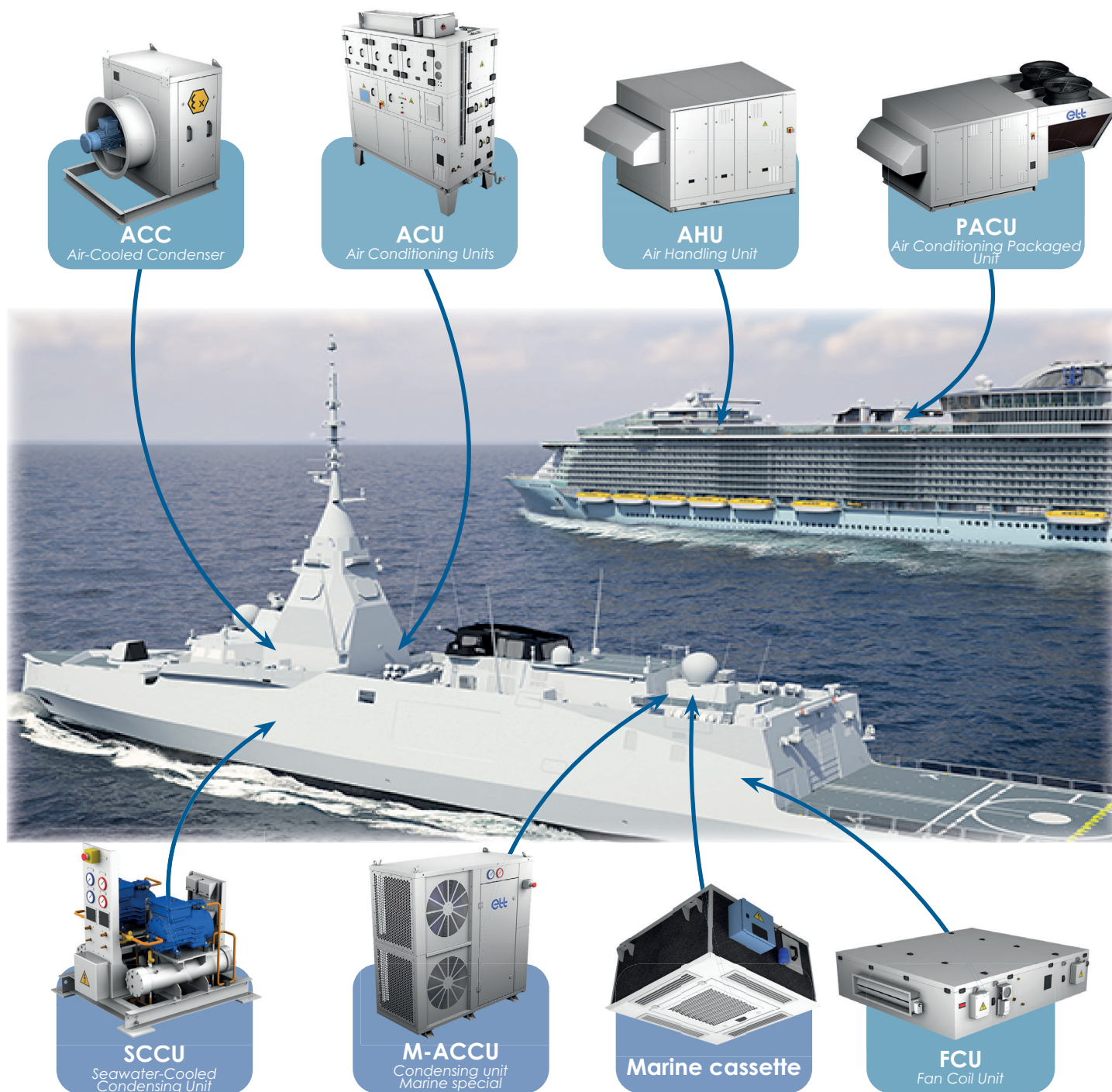
MARINE

ETT has positioned itself as **a recognised player** in this **market** thanks to its referencing at various shipyards.

With its **wide range of units**, ETT can offer any standard or customised solution to **suit the client's requirements and constraints**. ETT can therefore design solutions that are strictly identical in terms of dimensions to existing machines for revamping projects, but with latest-generation technical components.

Their design gives priority to **maintenance, repairability, robustness** and **performance** even in highly corrosive environments associated with salty air.

Marine



Marine applications

Electrical rooms / Pressurisation of electrical premises

- ACU (page 11) / ACC (page 12)
- AHU (pages 12-13)

ACC Revamping and AIR COOLERS

- ACC (page 12)
- DCO (page 16)

Engine rooms

- AHU (pages 12-13)

Generators

- PACU ULTIMA GREEN LINE (pages 10-11)

Living quarters (bedrooms, gyms, laundries)

- ACCU (page 13) / AHU (pages 12-13)
- FCU (page 15) / CWU (pages 14-15) / M-ACCU (page 15)
- Marine Cassette (page 13)

Food Fridges

- ACCU (page 13) / AHU (pages 12-13)
- SCCU (page 14) / AHU (pages 12-13)
- FCU (page 15) / CWU (pages 14-15) / M-ACCU (page 15)

Conversion halls

- PACU ULTIMA GREEN LINE (pages 10-11)

A large ship is being constructed in a shipyard. The ship's hull is a dark reddish-brown color, and its upper decks are white. A massive, multi-level gantry structure made of steel beams and walkways spans over the ship, with several bright lights illuminating the scene. The water in the foreground is dark and reflects the light from the shipyard.

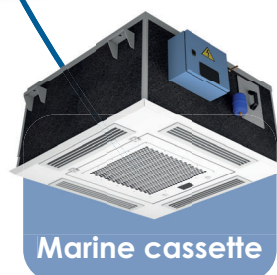
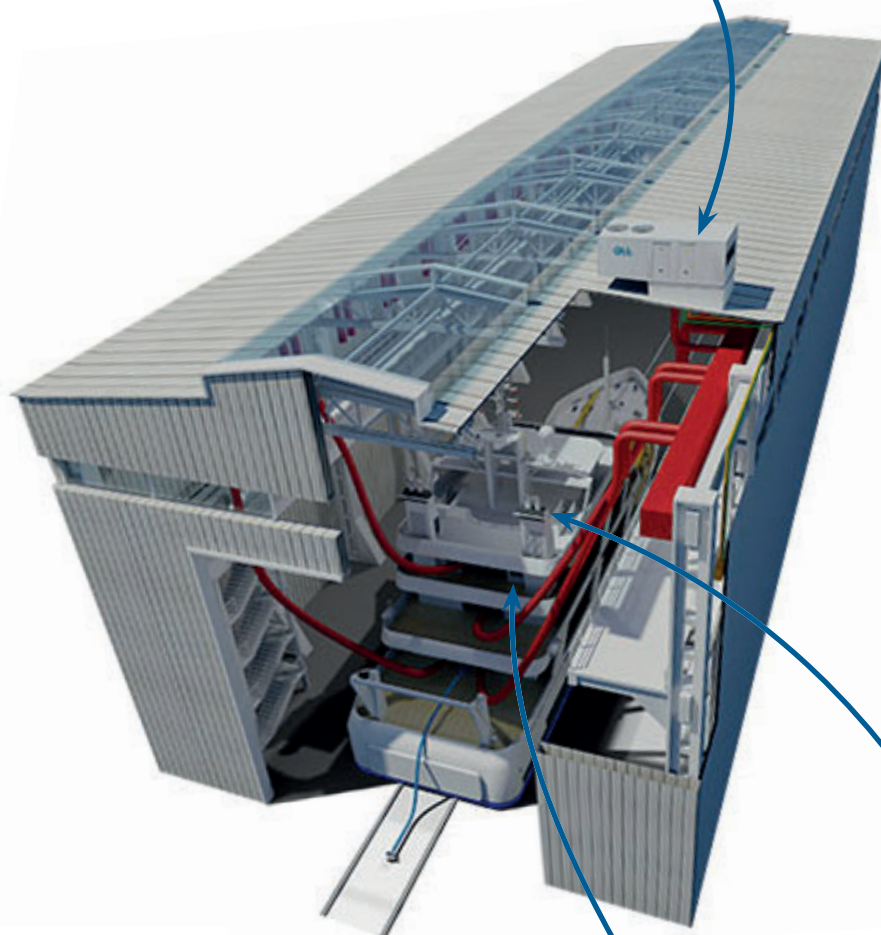
SHIPYARDS INDUSTRY

With a strong presence in the industrial sector, **ETT** is a **recognised player** in this **market**, thanks to the many technical solutions available in the range to meet different constraints.

The constraints of ventilation and extraction, dust control and air quality in the working environment and on board ships under construction are implemented on our different types of **units**.

Their design gives priority to **maintenance, repairability, robustness** and **performance** even by the sea, which can be very corrosive due to the salty air.

Shipyards industry



Shipyard applications

Production halls

- PACU ULTIMA GREEN (pages 10 -11)
- CWU (pages 14-15) / AHU (pages 12-13)

Extractors for welding zones

- CTA EX (page 16)

Food Fridges

- ACCU (page 13) / AHU (pages 12-13)
- SCCU (page 14) / AHU (pages 12-13)
- FCU (page 15) / CWU (page 14) / M-ACCU (page 15)

Living quarters (bedrooms, gyms, laundries)

- Marine Cassette (page 13)



PRODUCTS

ETT unit range

ETT produces hundreds of aluminium rooftops per year. This material has been used by ETT for 40 years due to its excellent properties in terms of weight, corrosion resistance and recyclability. However, in some areas this material is not suitable. **ETT has therefore developed a range in 316L (1.4404) stainless steel** and has specially dedicated a team to its design, manufacture and commissioning.

ETT has extensive experience in designing machines for use in explosive hazardous areas. Our equipment can be adapted to the characteristics of Zone 1 to Zone 2 sites, and carries the ATEX marking. Our machines are subject to third party inspection before delivery. All ATEX/IECEx components come from manufacturers known for their quality.

All the units below can be designed for **voltages** of 690/460/400/220 V and **frequencies** of 50/60 Hz.

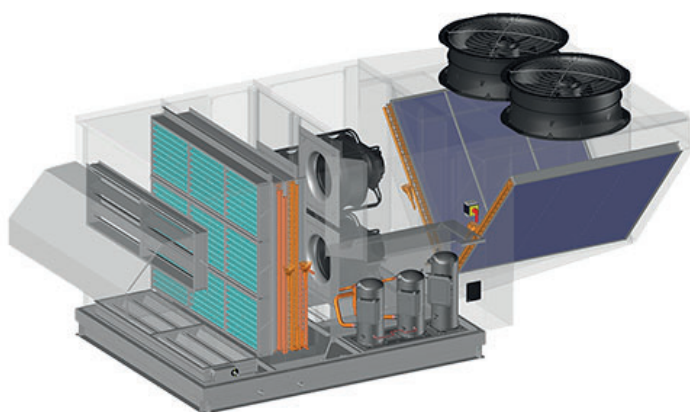
Packaged air conditioning unit (PACU) - Standard range

Suitable for non-ATEX areas - Can be used in shelters in "non-critical" areas

- Standard unit in aluminium - **Stainless steel available as an option**
- Refrigerant: R134a - R410A - R32
- Nominal air flow rate from 750 to 54,000 m³/h
- Net cooling capacity (R32) from 35.1 to 273.3 kW

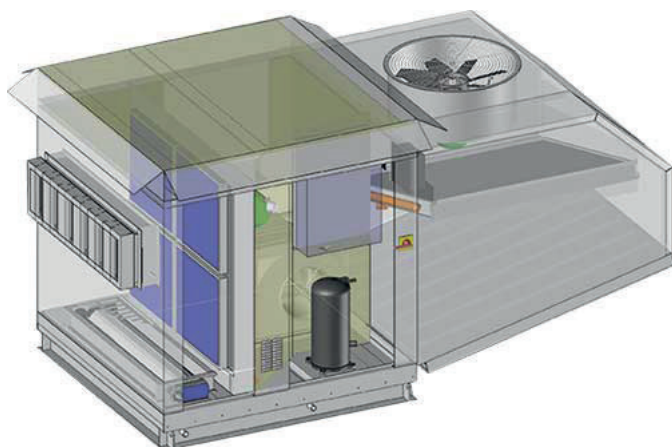
This unit includes :

- An ETT communication system for HPE+ control
- A IE4 high performance plug fan
- Coarse filtration ISO 65% (G4)+ ISO ePM1 50% (F7) without glass fibre
- ETT Tandem technology



Packaged air conditioning unit (PACU) - Customised range

Suitable for non-ATEX or ATEX zones -  For use in Zone 1 and Zone 2



Technical features :

- **Unit in aluminium or stainless steel**
- Refrigerant: R134a or R410A
- Nominal air flow rate from 1,500 to 30,000 m³/h
- Net cooling capacity from 8 to 150 kW (R410A)
- **Sand filter available as an option**

ETT unit range

Packaged air conditioning unit (PACU) - RTS range

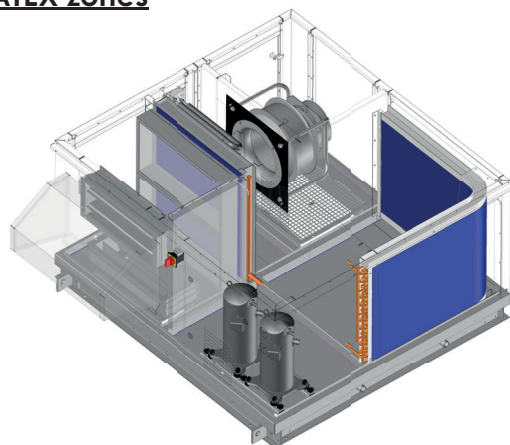
Applicable for non ATEX zones

Technical features :

- Standard unit in aluminium - **Stainless steel available as an option**
- Refrigerant: R134a- R410A – R32 - R513A
- From 2,500 to 4,000 m³/h
- From 10 to 20 kW

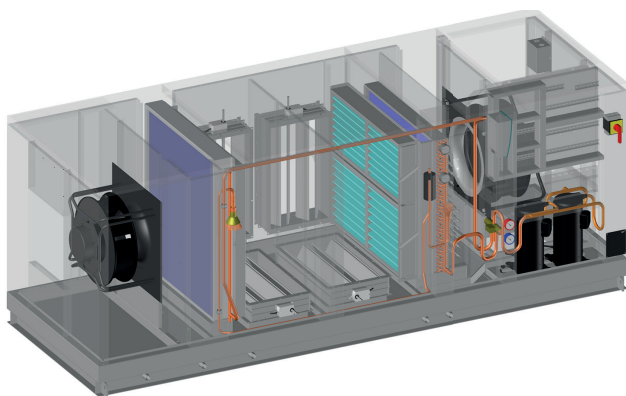
This unit includes :

- IE4 high performance plug fan
- Coarse filtration ISO 65 % (G4) + ISO ePM1 55 % (F7) without glass fibre
- ETT tandem technology



Packaged air conditioning unit (PACU) - 4-damper ULTI+ RE range

Applicable for non ATEX zones



Technical features :

- 4-damper unit with extract air energy recovery
- Standard unit in aluminium - Stainless steel available as an option
- Refrigerant: R134a- R410A – R32 - R513A
- From 2,500 to 4,000 m³/h
- From 10 to 20 kW

This unit includes :

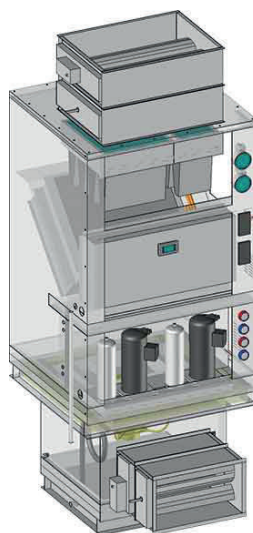
- IE4 high performance plug fan
- Coarse filtration ISO 65 % (G4) + ISO ePM1 55 % (F7) without glass fibre
- ETT tandem technology

Air conditioning units (ACU)

Applicable for non ATEX zones

Technical features :

- Standard unit in aluminium - **Stainless steel available as an option**
- Refrigerant: R134a or R410A
- Nominal air flow rate from 1,500 to 15,000 m³/h
- Net cooling capacity from 8 to 70 kW



ETT unit range

Air-cooled condenser (ACC)

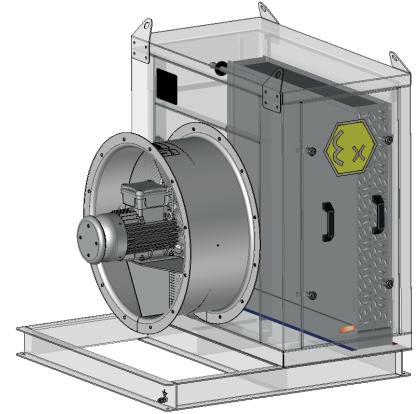
Applicable for non ATEX and ATEX zones



- Standard unit in aluminium - **Stainless steel available as an option**
- Refrigerant: R134a or R410A (hot water can also be used as a refrigerant)
- Nominal air flow rate from 2,000 to 28,000 m³/h
- Net Heating capacity from 13 to 200 kW (R410A)

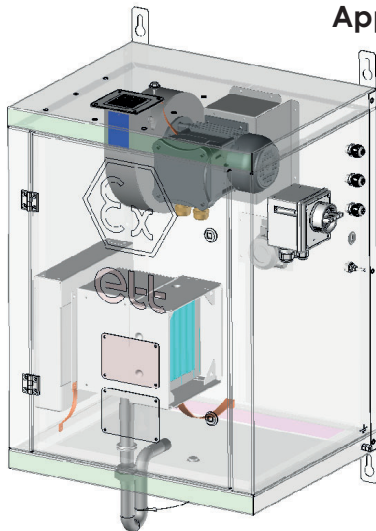
Available options :

- Coils with specific treatment (Heresite)
- Emergency stop switch



Pressurisation Unit (UPR)

Applicable for non ATEX and ATEX zones



Technical features :

- **Standard unit in stainless steel**
- Nominal air flow rate from 200 to 400 m³/h for standard UPR units
- Nominal air flow rate from 400 to 2,000 m³/h for custom-built units.

Vertical air Handling Unit (AHU V)

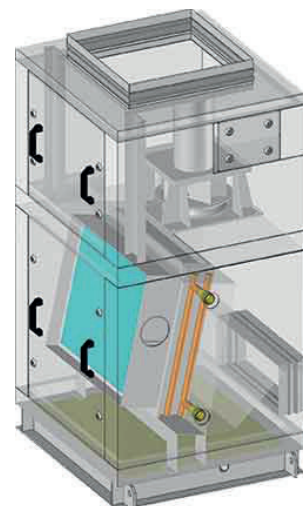
Applicable for non ATEX and ATEX zones



Vertical unit

Technical features :

- Standard unit in aluminium - **Stainless steel available as an option**
- Nominal air flow rate from 1,000 to 50,000 m³/h
- Available components: centrifugal fans, refrigeration coils, thermodynamic coils (electric or hot water), droplet separators, sound traps, dampers)



ETT unit range

Horizontal air handling unit (AHU H)

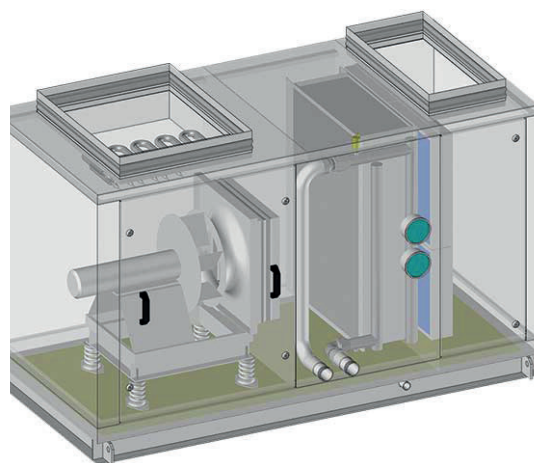
Applicable for non ATEX and ATEX zones



Horizontal unit

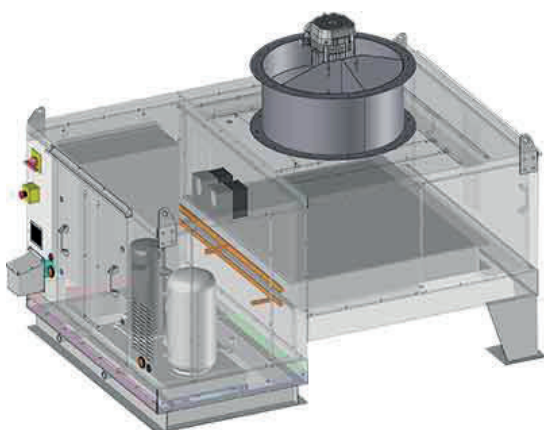
Technical features :

- Standard unit in aluminium - **Stainless steel available as an option**
- Nominal air flow rate from 1,000 to 20,000 m³/h
- Available components: centrifugal fans, refrigeration coils, thermodynamic coils (electric or hot water), droplet separators, sound traps, dampers)



Air condensing unit (ACCU)

Applicable for non ATEX and ATEX zones



Technical features :

- Standard unit in aluminium - **Stainless steel available as an option**
- Refrigerant: R134a or R410A (chilled water can also be used as a refrigerant)
- Nominal air flow rate from 300 to 1,100 m³/h
- Net cooling capacity from 2 to 8 kW (R410A)

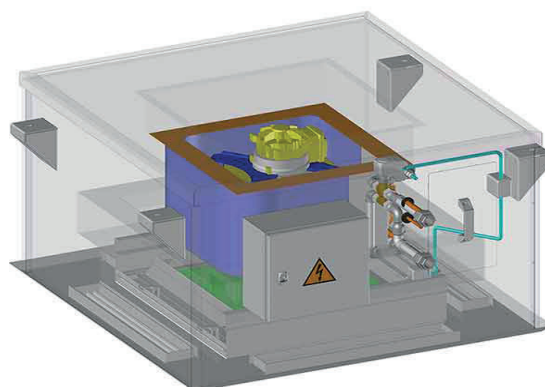
Marine cassette

Applicable for non ATEX and ATEX zones



Technical features :

- Standard unit in aluminium - **Stainless steel available as an option**
- Refrigerant: R134a or R410A
- Net cooling capacity from 5 to 15 kW (R410A)



ETT unit range

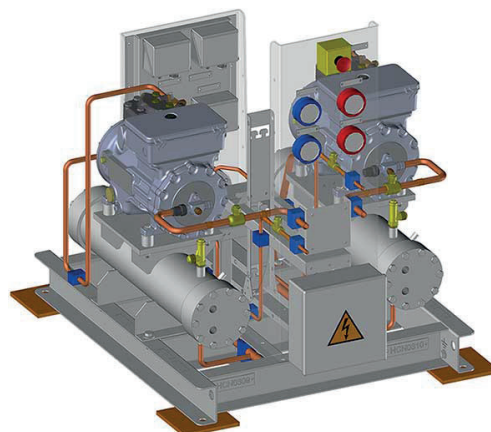
Water or Seawater Cooled Condensing Unit (WCCU/SCCU)

Applicable for non ATEX and ATEX zones



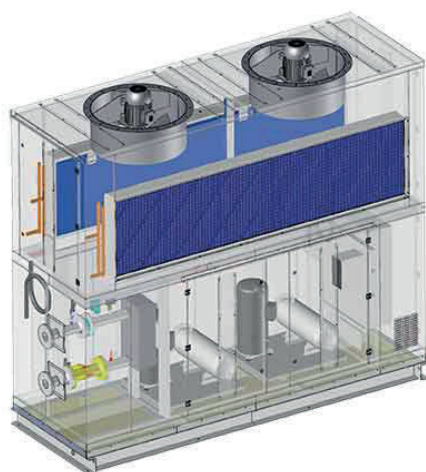
Technical features :

- Standard unit with aluminium base frame - **Optional stainless steel base frame available**
- Refrigerant: R134a– R410A– R290
- Suitable for both seawater systems (titanium exchangers) and hot water systems (stainless steel exchangers)
- Possibility to equip the unit with an external casing
- Suitable for voltages of 690/460/400/220 V and currents of 50/60 HZ
- Net cooling capacity from 7 to 150 kW (R410A)
- With Scroll or piston compressors



Chilled Water Unit (CWU) - R134a or R410A range

Applicable for non ATEX and ATEX zones



Technical features :

- Standard unit in aluminium - **Stainless steel available as an option**
- Refrigerant: R134a or R410A
- Net cooling capacity from 15 to 200 kW (R410A)
- Available components: centrifugal fans, sound traps
- Suitable for low ambient temperatures

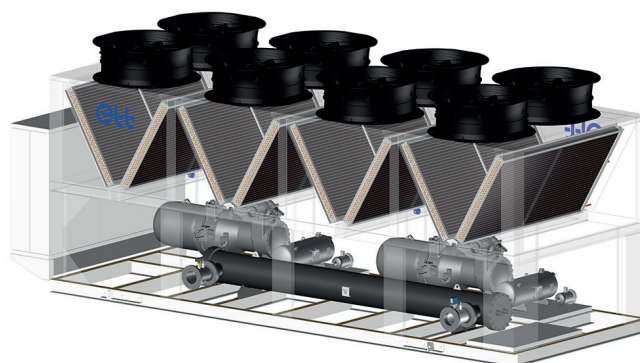
Chilled Water Unit (CWU) - EC+ R290, R134a & R513A range.

Applicable for non ATEX and ATEX zones



Technical features :

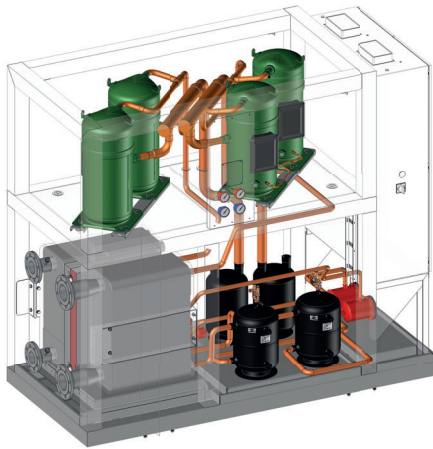
- Standard unit in aluminium - **Stainless steel available as an option**
- Refrigerants: R290 (Propane), R134a & R513A.
- Net cooling capacity from 300 to 1200 kW (7/ 12°C)
- Optional full or partial heat recovery
- Suitable for low ambient temperatures



ETT unit range

Chilled Water Unit (CWU) - water-cooled – R134a – R513A range

Applicable for non ATEX and ATEX zones



Technical features :

- Standard unit with aluminium structure – **Stainless steel as an option.**
- Refrigerants: R134a – R513A
- Net cooling capacity from 50 to 400 kW (7-12 °C – 30/35 °C)
- Optional full or partial heat recovery

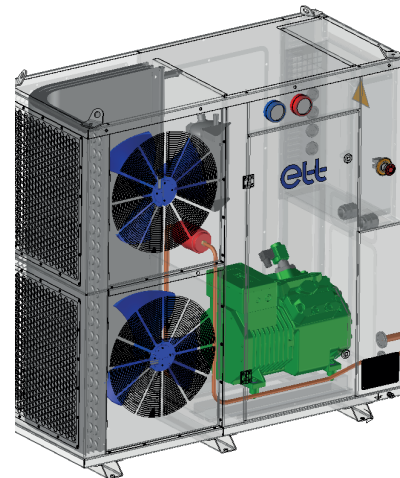
Air-Cooled Condensing Unit for the Marine market (M- ACCU)

Applicable for non ATEX and ATEX zones



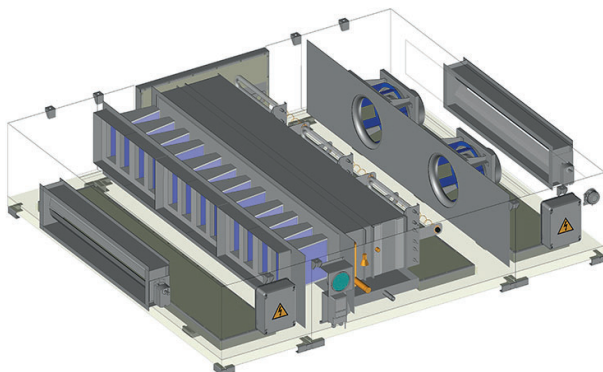
Technical features :

- Standard unit in aluminium - **Stainless steel available as an option**
- Refrigerant: R134a or R410A
- Net cooling capacity from 5 to 15 kW (R410A)



Fan Coil Unit (FCU)

Applicable for non ATEX and ATEX zones



Technical features :

- Standard unit in aluminium - **Stainless steel available as an option**
- Rated air flow rate from 1,600 to 4,800 m³/h
- Many components available, such as centrifugal fans, DX or chilled water coils, thermodynamic coils (electric or hot water), droplet separators, sound traps, dampers)

ETT unit range

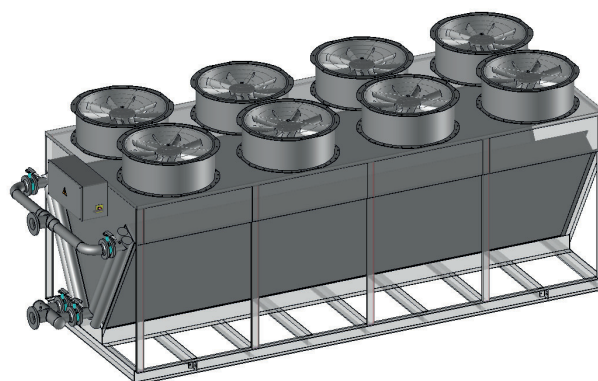
Dry Cooler (DCO)

Applicable for non ATEX and ATEX zones



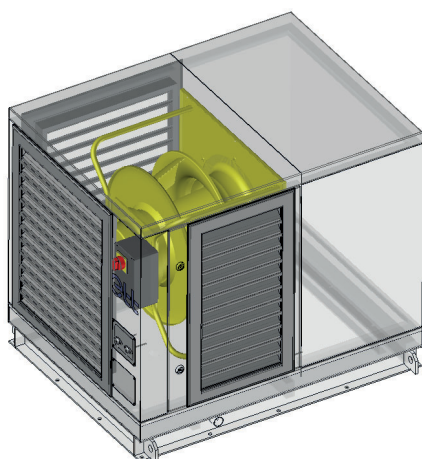
Technical features :

- Standard unit in aluminium - **Stainless steel available as an option**
- From 15 to 600 kW
- From 7,700 to 84,000 m³/h
- EC or AC fans



Extraction unit (CTA EX)

Applicable for non ATEX and ATEX zones



Technical features :

- Standard unit in aluminium
- Stainless optional
- Exhaust air flow rate from 1,000 to 10,000 m³/h
- EC Fans

Aluminium and stainless steel registers

ETT distributes a complete range of manual or motorised dampers for the Marine market. From 150 x 200 mm to 2,400 x 3,000 mm, the dampers are class 3 with low pressure drop and leakage.

- IP 54 damper motors as standard, IP 66 as an option, BELIMO brand (other brands on request).
- They can be ATEX certified.





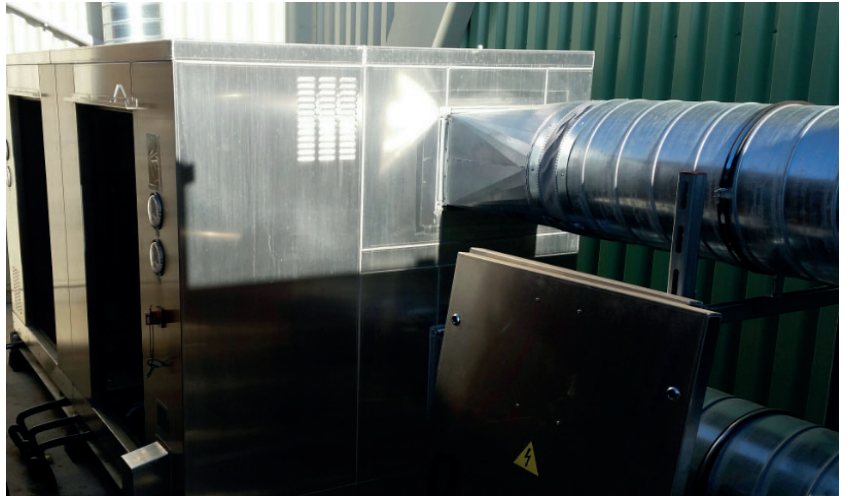
ETT REFERENCES

References

Shipyards



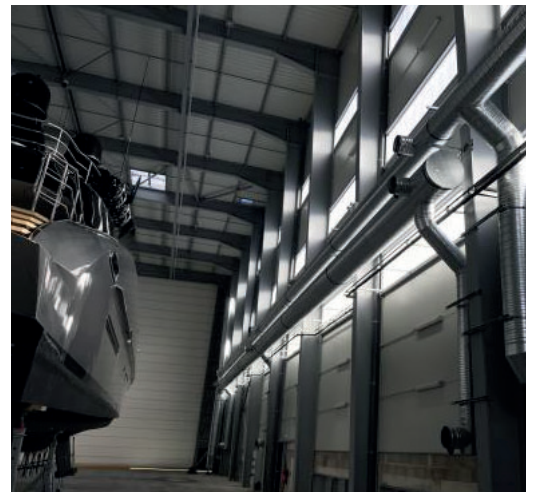
Air-to-air" heat pump for paint shop



PACARE VF SRV



Heat pump 385/GAC 300 (Warm air heater) CH 57/GAC (Warm air heater) 120 V



Air-to-air" heat pump for paint shop



Chilled Water Unit (CWU)



Heat pump 69 RE HPE + RL SRV PACARE 125 SRV

References

Shipyards



Exhaust Air Handling Unit



CTA 35 (Air Handling Unit) – Hall Ventilation



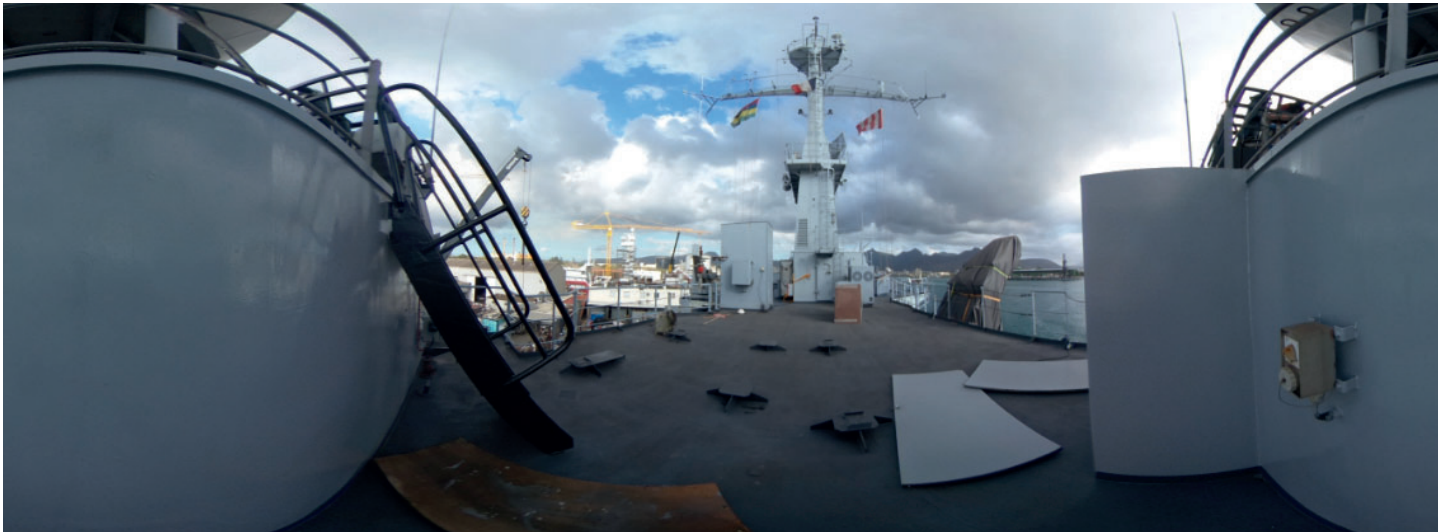
CTA CC+ (Air Handling Unit) for ventilation and heating - Production hall



Chiller for submarine cooling in Operational Maintenance Condition

References

Navy



CAPDEG 109 RO



Rooftops on dockside shelters



M-ACCU for conversion shelter



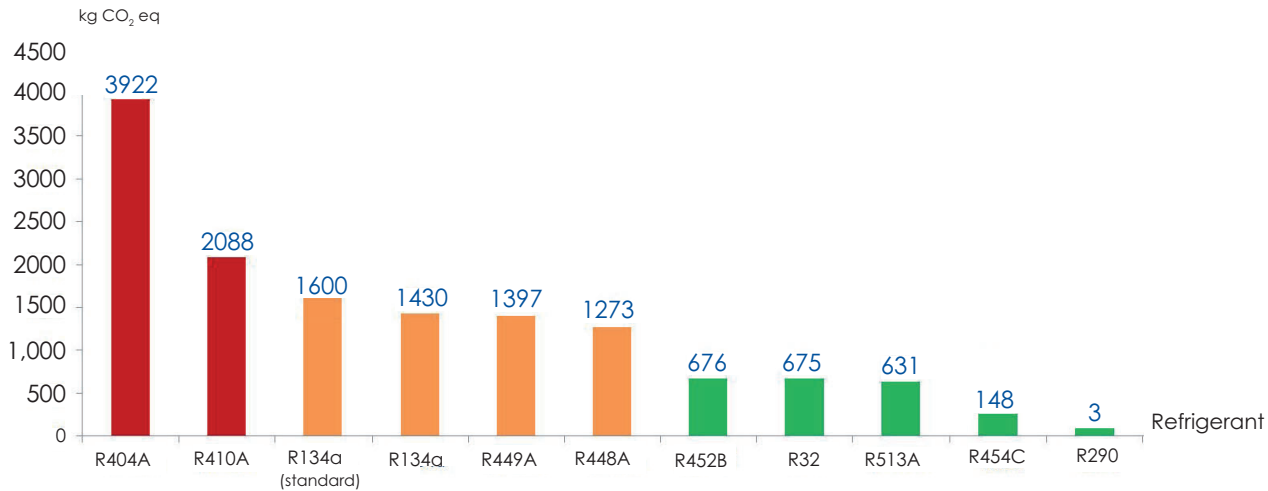
FCU for conversion shelter



Cold room condensing unit

Technical memo

Available refrigerants



Depending on customer's specifications, the type of refrigerant can be adapted to each project.

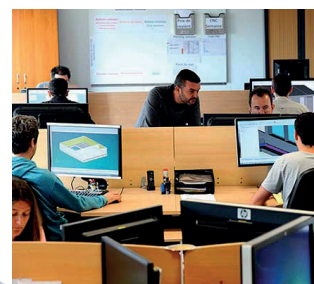
What is the GWP of a refrigerant?

GWP=Global Warming Potential

This index reflects the warming power of a refrigerant emitted into the atmosphere compared to that of the same mass of CO₂

(GWP of CO₂ = 1).

The higher the GWP of a gas, the more negative its impact on the environment



ETT and ECOdesign:



EcoDesign favors DECONSTRUCTION: ETT units are 98% recyclable.

- **Aluminium: a good choice for the planet!**
 - Aluminium is 100% recyclable indefinitely. Recycling provides over 30% of aluminium needs.
- **Low polluting ETT manufacturing process:**
 - Selective sorting by raw materials, all waste is recovered, 80% of which is recycled.
 - No paint on casings, no use of solvent.
 - ISO 14001 Certification (Environmental Management System).
- **Consumable waste, efficient management:**
 - Filtration: ETT units incorporate "ecoDesign" air filters (selective sorting: frame - grid - media)



Reference: MARK-BRO_61-EN_A

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ETT Services: +33 (0)2 98 48 02 22

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