Refrigerants and Refrigeration equipment
Marine Products
**Prepare for a Low Global-Warming Potential (GWP) future**

Refrigeration systems perform the vital function of maintaining temperatures on board. Nonetheless, they are operating on refrigerants which are known for having a negative effect on the environment. Now, environmental regulations require the refrigerants to be low in GWP, and there are deadlines for that.

Driven by international agreements to protect climate and the ozone layer, refrigerants high in GWP are being phased out in favour of more environmentally-friendly solutions.

As the world’s largest provider of marine refrigerants, we offer you the complete refrigeration solution. A wide range of refrigeration equipment, spares, and the Unicool range of high-quality refrigerants in Unitor cylinders, is available to keep your system working at an optimal level while being fully compliant with environmental regulations today, and always.

**Commitment to the Environment**

A crucial aspect of keeping in line with environmental regulations involves maintaining the integrity of the refrigeration system; leaks increase energy consumption - the biggest environmental impact from a refrigeration system. For example, a 10% loss in refrigerant increases energy consumption by up to 20%.

To keep your system free of leaks and working at its optimum, we provide a complete range of tools, spares and maintenance equipment. A well-maintained system will help you stay within the boundaries of environmental regulation and keep your refrigeration costs down.

**Refrigerant Leak Detection**

- Handheld Leak Detector: An easy to use, battery powered tool with audible and visual alarm.
- UV Tracer Kit: An effective tool for pinpointing tiny or intermittent leakages hidden in inaccessible areas.

**Refrigerant Recovery Package**

- A comprehensive package consisting of carefully selected quality equipment that supports a variety of operations (e.g. refrigerant recovery, maintenance and repair).

This is Marine Products, done better.
Unicool R-404A, a popular refrigerant in the marine sector today, has been phased out in the EU since 2020 due to its high GWP, and other regions will soon follow.

We understand that changing to low GWP alternatives will incur huge retrofitting costs, that’s why we recommend the Unicool R-407F as your choice. Serving as a drop-in replacement, the R-407F is compatible with the existing R-404A system for both low and high temperature applications as they are both Zeotropes – fully compatible for each other. To eliminate any downtime and reduce costs, simply top up your R-404A system with R-407F and you’re good to go; no technical upgrade or retrofitting is required. The option of mixing R-404A and R-407F has been tested with satisfactory results. To date, more than 300 ship owners have benefited from the R-407F top up option*.

*The top up option is not applicable to US flagged vessels. It will be necessary to recover the R-404A and replace the entire system with R-407F.

Compliant
R-407F is fully compliant with the F-gas regulation that requires a GWP lower than 2500. It has a GWP of 1824 that is 53.5% lower than R-404A.

Convenient & cost-effective
No downtime & no extra costs incurred due to full compatibility.

No Performance Drop
R-407F provides similar capacity and better energy efficiency.

Unicool R-417A: Recommended Replacement for Existing R-22 Systems

Unicool R-22 is being phased out under the Montreal Protocol due to its ozone depleting potential (ODP). R-417A is compatible with the existing mineral oil used in R-22 systems and it helps to minimise the downtime and retrofitting works required.

We recommend R-417A as the cheapest and fastest way to replace existing R-22 systems while maintaining acceptable performance and capacity. Globally, more than 5,000 ships have been retrofitted from R-22 to R-417A.
A New Generation of Low GWP HFO/HFC Blends

Wilhelmsen prides itself on continuously developing new solutions to help you adapt to new challenges and a constantly changing climate.

A new generation of three low GWP HFO/HFC blends have been identified and newly added to our comprehensive WSS global cylinder exchange programme to better serve the needs of ships owners and operators for low GWP refrigerants in new installations. Like the current HFC range of refrigerants, the HFO and HFC blends are non-toxic, non-flammable and have been assigned the A1 safety classification under EN 378 and ASHRAE standards.

**Unicool R-448A**
- Zeotropic blend of HFCs (R32, R125 & R134a) with HFOs (R1234yf & 1234ze)
- GWP of 1387 (AR4)
- Low and medium temperature applications
- High energy efficiency
- Same lubricant as HFCs (POE)
- Suitable for new installations

**Unicool R-449A**
- Zeotropic blend of HFCs (R32, R125 & R134a) with HFO (R1234yf)
- GWP of 1397 (AR4)
- Low and medium temperature applications
- High energy efficiency
- Same lubricant as HFCs (POE)
- Suitable for new installations

**Unicool R-452A**
- Zeotropic blend of HFCs (R32, R125) with HFO (R1234yf)
- GWP of 2140 (AR4)
- Low temperature applications
- Low discharge temperature
- Same lubricant as HFCs (POE)
- Suitable for both new installation and retrofit of existing reefer containers

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**The New Generation of HFCs**

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<tr>
<th>GWP</th>
<th>R-448A</th>
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**EU F-gas Service Ban from 1st Jan 2020**

- R-448A
- R-449A
- R-407F
- R-452A
- R-417A

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For reefer containers

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Value-Adding Services Available

Building a strong relationship with our customers is important to us. At Wilhelmsen, we pride ourselves on going the extra mile beyond selling high-quality products to coming up with additional services that help you navigate existing and future regulations to come in the maritime industry.

Quality Guaranteed

Some refrigerants are cheaper upfront, but they’ll cost you in other ways: refrigerants susceptible to moisture contamination can cause corrosion in compressors in a short period of time – you’ll pay more via lesser operating efficiency and frequent mechanical breakdowns.

With Unicool refrigerants, purity and moisture content are guaranteed as per AHRI Standard 700 - filled and sealed only by approved suppliers.

Cylinder Safety and Maintenance

Strict rules govern cylinder inspections before filling and those that fall below our standards are scrapped, because the integrity of our cylinders is our hallmark.

Complete Compliance

The ISPS Code enforces strict rules on the close monitoring of high-pressure cylinder movements. Thankfully, global track and trace does just that; allowing us, and thereby, you, to stay fully compliant.

Our gas products and services also comply with all international regulations for global warming reduction and the prevention of ozone depletion.

Global Cylinder Exchange Programme

Know the whats, wheres, and whens of all your cylinders with our global cylinder exchange programme: our accurate, secure, and cost-effective stock management system. With this, you can have your Unitor cylinders delivered, exchanged, serviced, and re-supplied on a worldwide stage – we’ll go to wherever your vessels are.

By providing full traceability, you can be assured of the authenticity of the refrigerants. Additionally, it helps you to eliminate the risks of receiving illegal or counterfeit refrigerants.

Technical Expertise

We have a wide range of documents available detailing all the specific technical data, properties, and other information on our products and their usage to help you maximise your resources effectively.
Switch to Low GWP Refrigerants Today

We are here to equip you with the best possible refrigeration solutions to support you in making your experience as smooth sailing as possible while keeping up with long-term compliance through changing circumstances and new regulations.

Reach out to your WSS sales representative for more information about our refrigerant solutions. For more information, visit https://www.wilhelmsen.com/marine-products/refrigeration-solutions/ or scan the QR code below.