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The European magazine for climate control system professionals

All clear ahead, **it's time to take action!**

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Editorial

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All clear ahead, it's time to take action!

Those in our industry are having to face up to new challenges in Europe. From 2015, refrigerant producers will be required to reduce the quantity of HFCs on the market in order to comply with the F-Gas regulation set to come into effect. Obviously, a restriction such as this is going to have an impact on the refrigeration and air-conditioning industries. It will also affect other sectors such as fire suppression and even shoe manufacturing.

However, with change also comes opportunity! We survived the ban on CFCs and HCFCs, so why wouldn't we be up to the challenges of tomorrow?

These new conditions will have a natural positive impact in years to come. Innovative technologies will bring about new ways of working, both in terms of the technical design of future systems and their implementation.

The process is not one which can be reversed, and so we have to accept it and look to the future.

Just look at the investments made by companies in our industry over recent years to prepare for these changes.

Low global warming potential HFCs and HFOs, as well as non-halogenated hydrocarbons and solvents will allow equipment owners and users to meet requirements. Our aim is to provide cutting edge technology that is energy efficient and tailored to the budget of the user.

All of us here at Climalife are ready to assist you in choosing the solutions of tomorrow.

Happy reading!

Political agreement finally reached on F-Gas regulation

For several years, the regulations on refrigerants have been changing our business.

In 1987, the Montreal Protocol made commitments to reduce substances that deplete the ozone layer (see Regulation 2037/2000EC, amended by 1005/2009 EC).

In 1997, the Kyoto Protocol made commitments regarding the reduction of greenhouse gases, particularly flourinated ones (see Regulation 842/2006 EC, known as F-Gas).

This F-Gas Regulation stipulated, amongst other things, the publication of an intermediary report. This report was drafted in September 2011, and the ENVI Committee was entrusted to study and propose a text to revise F-Gas to the European Council and European Parliament.

After the publication of this first draft revision in November 2012, the positions of the European Parliament, European Council and ENVI Committee were diametrically opposed.

The ENVI Committee was erring towards reinforcing the ban on HFCs in refrigeration, air conditioning and heat pump systems.

Three trialogue meetings were unable to come up with a compromise text. The Committee, the Council and the Parliament therefore met one last time on 17 December 2013.

At this 4th trialogue, the European authorities finally reached an agreement and a compromise has been drafted.

This text is currently being revised by European Union lawyers. Following this review, two further steps need to be completed before this new regulation becomes fully validated:

1) A majority vote by the members of the ENVI Committee will take place in late January/early February.

2) A vote at first reading in the European Parliament will take place on 13 March 2014.

Given that many preliminary discussions have taken place, it would now be very surprising if the entire F-Gas revision is not voted through.

Following the vote, this new regulation would enter into force on 1 January 2015, but would not cancel existing European regulations, which will remain in force at least until their abrogation.

What would be the principle measures of the new F-Gas regulation for refrigeration, air conditioning and heat pump professionals?

Climalife will answer this question in this issue of Climalife Contact.

Everything you need to know about the new F-Gas Regulation

Laurent Guegan, Regulatory Affairs Manager at Climalife, gives us more details about these draft European regulations* focusing his explanations on four basic points for the refrigeration, air conditioning and heat pump markets.

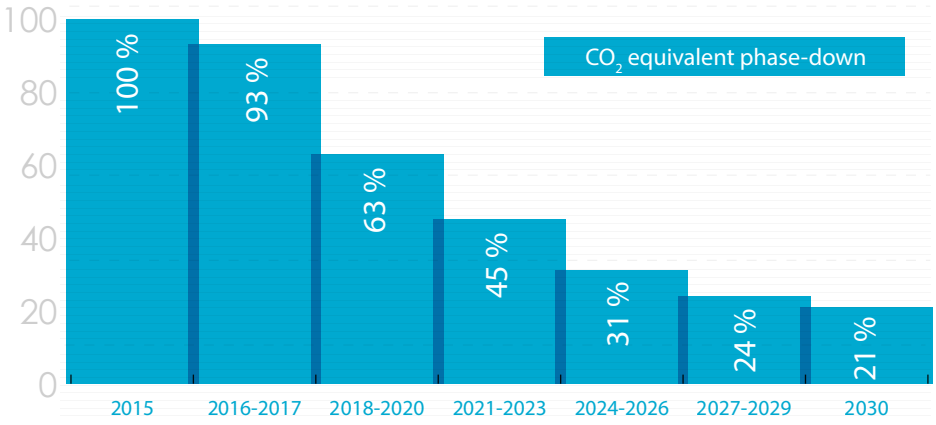
Namely what restrictions there will be on using HFCs, how to prevent greenhouse gas emissions, what the future labelling of fluorinated products will look like and when the text will be revised again by the European authorities?

Market restrictions

On 01/01/2015: Set-up of a CO_2 equivalent HFC phase-down (i.e. a reduction in the quantities marketed).

The global quantity of HFCs** placed on the market in Europe by 2015 will be the average of the quantities placed on the market between 2009 and 2012. By 2030, 21% of this volume could still be placed on the market.

By 31st October 2014 at the latest, the European Commission will allocate each producer or importer (of HFCs or equipment containing HFCs) an annual marketing quota which will gradually decrease until 2030.



Marketing bans on new equipment containing HFCs.

01/01/2015: ban on domestic refrigerators & freezers containing HFCs with GWP ≥ 150.

01/01/2020: ban on hermetically sealed commercial refrigerators & freezers containing HFCs with GWP ≥ 2500.

On 01/01/2022: ban on hermetically sealed commercial refrigerators and freezers containing HFCs with GWP ≥ 150.

On 01/01/2022: ban on refrigeration units (2 or more parallel compressors) whose power is ≥ 40 kW and containing HFCs with GWP ≥ 150. This ban will not apply to primary centralised cascade refrigeration systems where the fluid has a GWP < 1500 (medium temperature system to which one or more refrigeration systems are connected for cooling their condenser(s)).

01/01/2020: ban on fixed refrigeration systems containing HFCs with GWP ≥ 2500 except for equipment whose operating temperature is lower than -50°C.

01/01/2020: ban on mobile air conditioning units containing HFCs with GWP ≥ 150.

01/01/2025: ban on marketing split air conditioning systems whose fluid charge is < 3kg and contains HFCs with GWP ≥ 750.

Prohibition on using HFCs

For the servicing and maintenance of refrigeration equipment whose load is ≥ 40T equivalent. CO_2 (except for equipment whose temperature is < -50°C):
- The use of virgin HFCs or virgin blends containing HFCs with GWP ≥ 2500 is prohibited from 01/01/2020.
- Regenerated or recycled HFCs will be allowed until 2030 (nonetheless, recycled HFCs cannot be used and considered if it comes from the original equipment). **None of these prohibitions will apply to eco-designed equipment or to military equipment.**

Prevention of emissions

Leak inspections

Installation whose charge is ≥ 5T equivalent. CO_2: every 12 months or every 24 months if there are fixed detection devices fitted with an alarm sent to the operator.

Installation whose load is ≥ 50T equivalent. CO_2: every six months or every 12 months if there are fixed detection devices fitted with an alarm sent to the operator.

Refrigeration, air conditioning and heat pump installations, refrigerated trailers and trucks whose load is ≥ 500T equivalent. CO_2: every 6 months with mandatory fixed detection devices fitted with an alarm sent to the operator.

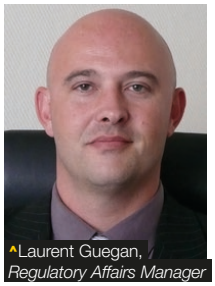
Rankine cycle installation whose load is ≥ 500T equivalent. CO_2: every three months or every six months if there are fixed detection devices fitted with an alarm sent to the operator (mandatory from 01/01/2017).

Hermetically sealed systems, labelled as such, with a load < 10T equivalent CO_2 will be excluded from this regime.

Until 31st December 2016, hermetically sealed, labelled equipment whose charge is lower than 6 kg of fluid and non-hermetically sealed equipment containing less than 3 kg of fluid are not subject to periodic controls.

* The text is not definitive at this stage and still has to be put to the vote at the European Parliament to become definitive.
** HFCs concerned are those listed in the Annex 1 of the draft text of the F-Gas Regulation.

Fluids	R-507	R-404A	R-422A	R-422D	R-417A	R-427A	R-407A	R-410A	R-407F	R-407C	R-134a
GWP	3985	3922	3144	2730	2347	2138	2107	2088	1825	1774	1430



Laurent Guegan, *Regulatory Affairs Manager*

"The operator must take action as soon as possible in the event of leaks. Leakage checks must be carried out within one month of repair".

Recovery
Operators of equipment, including mobile equipment, should have fluids recovered by certified individuals.
The fluids recovered should be recycled, regenerated or destroyed. This provision will apply to the operators of the following equipment:
- Refrigeration, air conditioning and HP, including refrigerated trailers and trucks.
- Equipment containing solvents.
- Fire protection systems and extinguishers.
- Electric switching systems.

Packaging that has contained greenhouses gases should be processed to recover any waste gases for recycling, regeneration or destruction.

Training
The training certificates and programmes issued in accordance with regulation 842/2006 EC will remain valid, in accordance with the conditions in which they were initially issued.

The member states will report their training and certification programmes by 1st January 2017 at the latest, which must include the following points:
- Regulations and standards in force.
- Prevention of emissions.
- Recovery of greenhouse gases.
- Handling.
- Alternative techniques allowing the replacement of greenhouse gases.

Product labelling and information

The label should be clearly legible and indelible and should be placed beside the service valves for charging or recovering the fluorinated greenhouse gases, or the part of the product or equipment that contains them.

This would affect refrigeration, air conditioning and heat pump installations, fire protection systems, electrical transformers, aerosols and any packaging containing these F-Gases.

The label should contain:
• a statement indicating that the product contains fluorinated greenhouse gases
• the type of F-Gas according to its nomenclature or, if not, its chemical name
• the quantity in kg
• from 1st January 2017, the CO_2 equivalent charge and the GWP.

This information should also be included in user manuals as well as in the descriptions used for advertising purposes, in so far as they relate to equipment whose GWP is ≥ 150.

Furthermore,
- regenerated or recycled fluorinated greenhouse gases should have an indication that the substance has been regenerated or recycled, information about the batch number and the name and address of the regeneration or recycling installation.

- the containers of fluorinated greenhouse gases placed on the market for destruction should state that they can only be destroyed.

- the containers of fluorinated greenhouse gases placed on the market for direct export should state that they can only be directly exported.

- the containers of fluorinated greenhouse gases placed on the market for use in military equipment should state that they may only be used for this purpose.

Revision of all or part of the text

• No later than 1st July 2017, the Commission will publish a report assessing the prohibition of centralised or cascade refrigeration systems ≥ 40 kW. It will assess the availability of cost-effective, technically feasible, energy efficient, and reliable alternatives for this provision.
• No later than 1st July 2017, the Commission will publish a report assessing the method for allocation of quotas, including the impact of the cost-free allocation of these quotas, the costs of implementing these regulations in the Member States and a possible international agreement on HFCs, if necessary.
• No later than 1st January 2017, the Commission will publish a report examining EU legislation concerning the training of individuals in the handling of alternative refrigerants to replace or reduce the use of fluorinated greenhouse gases and will submit, if applicable, a legislative proposal to the European Parliament and the Council in order to amend the European Union legislation.
• No later than 1st July 2020, the Commission will publish a report assessing whether cost-effective, technically feasible, energy efficient and reliable alternatives exist, which make the replacement of fluorinated greenhouse gases possible in small split air conditioning systems.
• No later than 31 December 2020, the Commission will publish a report about the availability of HFCs in the European Union market.
• No later than 31 December 2022, the Commission will publish a full report on the effects of these regulations.

Through its controlled refrigerant purchasing policy, its partnerships and its dynamic Research & Development Department, Climalife already has solutions to respond to these changes in the F-Gas regulation.

Quantity of CO_2 equivalent per fluid load

Fluid load in Kg	R-507	R-404A	R-422A	R-422D	R-417A	R-427A	R-407A	R-410A	R-407F	R-407C	R-134a
GWP	3985	3922	3144	2730	2347	2138	2107	2088	1825	1774	1430
5 t éq CO_2	1.25	1.27	1.59	1.82	2.13	2.33	2.37	2.39	2.74	2.41	3.49
50 t éq CO_2	12.5	12.7	15.9	18.3	21.3	23.3	23.7	23.9	27.4	24.1	34.9
500 t éq CO_2	125	127	159	183	213	233	237	239	274	241	349

New equipment bans

1st year of placing on the market quotas

Placing on the market ban for pre-charged equipment containing HFC not taken into account in the quotas

Ban on new movable air conditioning appliances (hermetically sealed) that contain HFCs with GWP ≥ 150

Ban on stationary refrigeration equipment containing HFCs with GWP ≥ 2,500, but excluding equipment intended to cool products to temperatures below -50 °C

Ban on new split air conditioning systems < 3kg containing HFCs whose GWP ≥ 750

2015 | 2016 | 2017 | 2018 | 2020 | 2022 | 2023 | 2025 | 2030

Ban on new domestic refrigerators and freezers containing HFCs with GWP ≥ 150

Ban on new refrigerators and freezers for commercial use, hermetically sealed, containing HFCs with GWP ≥ 2,500

Ban on new refrigerators and freezers for commercial use, hermetically sealed, containing HFCs with GWP ≥ 150

Ban on multipack centralised refrigeration systems for commercial use with a capacity ≥ 40 kW containing HFC with GWP ≥ 150 except primary circuit of cascade systems where HFC with a GWP < 1,500 may be used

Exempt from this regulation are military equipment and eco-designed equipment in accordance with Directive 2009/125/EC

Maintenance ban and other important dates

1st year of placing on the market quotas

Report assessing the quota allocation method and possible amendments

Annual audit of documentary compliance and respecting of quotas for manufacturers and importers of pre-charged equipment

Report assessing applying the ban of split systems containing HFCs ≥ 750 GWP

A comprehensive report on the effects of this regulation and F-Gas forecasts until 2030

2015 | 2016 | 2017 | 2018 | 2020 | 2022 | 2023 | 2025 | 2030

Annual audit of documentary compliance and respecting of quotas for manufacturers and importers of fluorinated greenhouse gases

Report assessing the possibility of applying the ban on centralised refrigeration equipment ≥ 40kW containing HFCs ≥ 150 GWP

Service and maintenance ban on refrigeration equipment containing HFCs with GWP ≥ 2,500 and whose charge size is ≥ 40 T CO_2 eq. except installations operating <-50°C
This ban does not apply to reclaimed HFCs or to recycled HFCs from the same equipment

Service and maintenance ban on refrigeration equipment with virgin, reclaimed or recycled HFCs whose GWP ≥ 2,500 and whose load is ≥ 40 T CO_2 eq. except installations <-50°C

Exempt from this regulation are military equipment and eco-designed equipment in accordance with Directive 2009/125/EC

COMMERCIAL COOLING

Performax® LT / R-404A: a life-size confirmation of achievable energy savings

Installed by Safriclim for Les Salaisons du Mâconnais, an 8,200 m³ LT cold room operating with two identical devices, one using Performax® LT, and the other using R-404A. An opportunity to compare the performance of the 2 fluids...

Les Salaisons du Mâconnais, directed by the Fouilloux Family since 1919, is located in the centre of the village of Pierreclos, in the Saône-et-Loire department. Specialising in dry sausages, the company produces 4,500 tons annually primarily for supermarkets and superstores (+80%), in particular under distributor brands.The IFS Certified (*) plant, which employs 120 people and occupies an area of 16,000 m² was recently expanded by 1,500 m², in which an 8,200 m³ low temperature (LT) cold room was installed.

Commissioned in March 2013, "it allows for the storage of all frozen raw materials (pork meat and fat) required for sausage production at -22 °C, up to 2,500 pallets, each loaded with approximately 400 kg of meat", explained Franck Marchand, Industrial Manager.
In the past, these ingredients were stored outside the plant, several kilometres away. Bringing them back to the production site eliminates costs incurred for external storage and transport.

The high storage volume is also needed due to the requirement to keep raw materials for which prices can fluctuate significantly. While the old cold room was kept to hold buffer stock, it is now linked to the new one by a tunnel also kept at negative temperature. The tunnel was dug under a road.

(*) IFS : International Food Standard

In-situ comparison

To develop the new LT cold room, Les Salaisons du Mâconnais called upon Safriclim with whom the organisation had worked in a trusted relationship since its incorporation in 1996. Located in Charnay-lès-Mâcon, the company is jointly directed by Jean-Luc Hervé, Eric Lay, and Jean-Charles Barlet. Heavily involved in the early stages of the project, Safriclim proposed various options to account for a budget that was already strongly affected by the complex construction of the building (earth works, tunnel, etc.). The other imperative was a low sound level due to the location of the plant within the village, which also eliminated an ammonia solution.

Three variants were studied, explained Jean-Louis Hervé, for which the customer also wanted sectionalised equipment. The one combining CO_2 and glycol was quickly eliminated for budgetary reasons, as was the direct expansion system with 3 units, including one emergency unit to provide spare capacity.

In the end, the solution adopted consisted of two identical devices sized to produce up to 125% of the power required, but still independent to make it possible to provide at least 50% of cooling production in the event one unit failed. Originally designed to use R-404A, the facility was revised to allow for regulatory changes concerning refrigerants to select those with a lower GWP.

Hence the choice of Performax® LT (R-407F with a GWP = 1824) distributed by Climalife for one of the compressors while the other uses R-404A. This configuration allowed the installation engineer to test the performance of both fluids under identical conditions. The assembly built by R System has a rated cooling capacity of 78 kW at -32 / + 45 °C.

It incorporates sub-cooling of the liquid to 15 °C through the above-zero rack that cools the loading dock.

The decision was made to use two Bock semi-hermetic compressors, on the advice of Franck Sgaramella. The manufacturer committed to R-407F, which at the time the decision was made was not yet in use by all compressor manufacturers, remembers Jean-Luc Hervé.

Company: Safriclim
Activity: Industrial cooling - Supermarkets and Superstores - Air-conditioning -Heating (HP)
Location: Charnay-lès-Mâcon (71) - France
Incorporation date: 1996
Workforce: 17 employees
Turnover: 2 Million in 2012

COMMERCIAL COOLING

He added, “Although this fluid certainly has a higher discharge temperature (on the order of 20%) than R-404A and a greater glide, but this is managed very well, and for safety reasons, head fans were added.”
The facility has an Artika regulation system and GTC developed by R System, which also produced the V condensers. They were placed on a gangway 10 m above the ground and were designed with a sound level sensitive to their location in the centre of the village, working silently at night.
Since the commissioning of the room in March, and its loading in May, Safriclim, in conjunction with Climalife and Honeywell, instrumented the facility for a three months, including the summer, to compare its performance. **The comparisons were highly favourable to the R-407F with a difference of -7% in power absorbed over 800 hours of operation (See comparison table).** Heat is recovered from the unit to heat the packaging storage area.

It should also be noted that as part of this plant expansion, Safriclim added cooling for the loading dock (+ 5° C) and a LT airlock (- 20° C) located just in front of the entry to the new cold room. The dock has a condensing unit shared with the under-coolers for the equipment used for the cold room. This unit includes two Bock HGX 4/555-4 semi-hermetic compressors using R-407F (95 kg) including one with a frequency converter. Its cooling capacity varies from 11 to 60 kW at – 8 / + 45 °C.

To maintain - 20 °C, the LT airlock has its own cooling system with a Bock HAX 5/830-4 semi-hermetic compressor using R-407F (40 kg), with a cooling capacity of 11.6 kW at - 30 / + 45 °C. In light of the results observed at the facility, for Safriclim, there is no doubt that for an identical facility, it would now use only Performax® LT. “This solution responds to changes in the F-Gas European regulation, which favours low GWP fluids”, emphasises Pierre-Emmanuel Danet, Technical Support Manager at Climalife. This life-size study once again confirms the choice of R-407F as a replacement for R-404A and the real benefit in terms of energy efficiency.

Source © Rpf N°1021 – December 2013

Operating readings from the 8000 m³ low temperature cold room (07/10/2013) - Les Salaisons du Maconnais

			Unit 1 R-407F	Unit 2 R-404A	Deviation
LP	Evaporating pressure	bar	0.56	0.83	
	Evaporating temperature	°C	-32.6	-32.4	
	Suction temperature	°C	-24.4	-24.5	
	Overheating	°C	8.2	7.9	
HP	Condensing pressure	bar	11.1	11.1	
	Condensing temperature	°C	26.8	25.5	
	Liquid temperature (heat exchanger output)	°C	16.8	15.8	
	Sub-cooling	°C	10	9.7	
Temperatures	Housing temperature	°C	49.3	42.2	+7.1
	Discharge temperature	°C	82.6	66.5	+16.1
Evaporator	Input air temperature	°C	-22.9	-22.7	
	Output air temperature	°C	26.3	-25.5	
	Δ Input / Output temperature	°C	3.4	2.8	+0.6 or +18%
Electricity	Supply voltages	V	3 x 391	3 x 390	
	Compressor current	A	3 x 42.4	3 x 44.9	-2.5 or -5.6%
	Consumption	kW/h	25028 pour 835 h	24965 pour 780 h	
	Consumption per hour	kW/h	29.97	32.01	-2.04 or -6.8%

Key features of the facility

Low temperature cold rooms (- 22°C).
Volume: 8,200 m³. Dim: L. 29.4 x l. 24.3 x H. 11.5 m.
Rated cooling capacity: 78 kW (2 x 39 kW) at -32 °C / +45°C.
Refrigerant: 1 device using R-407F (130 kg) -
1 other using R-404A (130 kg).
Lubricant: Mobil EAL Arctic 46

Compressors: Bock semi-hermetic HGX 8 2470 -
4 with 8 cylinders - winding cooled by the exhaust gases.
Individual swept volume: 214.3 m³/h.
Power consumption: 25.7 kW at -32 / + 45 °C. Head fan.

Condensers: R System PV series - V Condensers with multiple coils on guide rails. 2-speed fans - 375 rpm with low sound level PV.

Evaporators: Contardo - 2 evaporators with recirculating and shut-up sections. Electric de-frost (1 per 24 hrs.).
Electric step-by-step regulators. Installed on a gangway.

Regulator and GTC: Artika.

INDUSTRIAL REFRIGERATION

Thermera® is chosen for Jaguar Land Rover Climatic Test Chamber

The Climatic Wind Tunnel, at the Gaydon site of Jaguar Land Rover, is one of the facilities used for product development testing. This tests vehicle performance in all the climates they will experience around the globe.

In April 2013 Johnson Controls, upgraded the refrigeration plant for this facility for Jaguar Land Rover. As -40C testing was now supported using other facilities, Johnson Controls had concerns over the suitability of the existing heat transfer fluid entering the evaporator on this climatic test chamber as the system design had changed greatly from the original requirements.

The original fluid used was an Acetate based salt and was only available from the USA each time it was required. Jaguar Land Rover wanted to see if there was any other fluid that could be used that had similar environmental credentials, was readily available from a UK supplier, but more importantly could also have similar heat transfer characteristics to ensure the test chamber would perform with the existing specification of pumps and other equipment.

In use the chamber can be configured for 4 wheel or 2 wheel drive vehicles and can create a maximum speed of up to 220 km/ hour. Wind speed, relative humidity, temperature and solar load can all be varied to simulate a variety of conditions that Jaguar Land Rover vehicles may encounter.

Whilst it was known that Mono Ethylene Glycol would work, Johnson Controls contacted Climalife UK to see if there was a suitable fluid and to discuss the properties of those available. It quickly became clear that Mono Ethylene Glycol (MEG) would not be allowed in the system because of environmental concerns, whereas Mono Propylene Glycol (MPG) did not have the desired properties for it to work effectively in this system.

Four other fluids were considered and the characteristics of each fluid was evaluated for thermodynamic properties, specific heat, viscosity, flow characteristics and thermal conductivity, with the restriction that the system had to work efficiently with the existing pump design and the test chamber needed to be able to operate between +55C and -8C.

With Neil Sims, the Senior Sales Engineer from Johnson Controls liaising with Peter Dinnage the Technical Director at Climalife UK for the technical data of the fluids, Mike Jones, also of Johnson Controls, produced the computer modelling results for the potential fluids. After discussion with Climalife UK, it was concluded that Thermera® AC provided the best match of properties for this system and would be safe to the environment.

Thermera® is an environmentally friendly heat transfer fluid, made from natural ingredients, water and betaine which is a natural compound produced when manufacturing sugar. It has excellent anti-corrosion properties, is non-toxic and ecologically safe. As Thermera® offers excellent thermal and microbiological stability and requires very few inhibitors its durability in use is as good if not better than some traditional fluids.

New chillers, pipework and new pumps were installed, the system flushed and the secondary loop was filled with 12,000 Litres of Thermera® AC that had been supplied by Climalife direct to site in 1000 Litre IBCs.

The Thermera® AC was monitored for the next three months and it has performed to expectations.

Company: Johnson Controls
Business: Commercial and Industrial Refrigeration
Location: Meriden, Coventry.
Date of creation: 1885
Employees: 170,000 around the world

INDUSTRIAL REFRIGERATION

Greenway® RTU, the ideal cooling fluid for meeting environmental standards in the food industry

The RICARD company, which has been committed to a responsible approach since 1932, has converted its two cooling processes from MPG to Greenway® RTU for its new ISO 22000 certification.

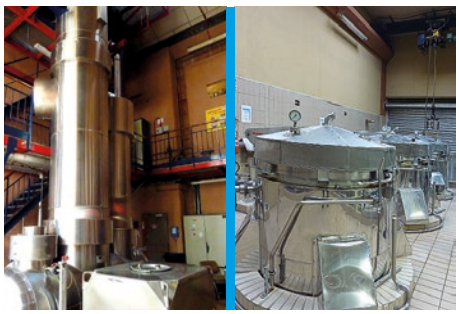
The Ricard distillery in Bessan, near Béziers, produces the two flavours essential for producing Ricard Pastis, the legendary drink from Marseille now famous all over the world. In March 2013, this plant with a surface area of 11,000 m², was certified according to the ISO 22000 Food Safety Standard, as were the other two production sites based in Bordeaux and Lille.

To enhance their environmental commitment and meet the recommendations of this certification, the two cooling processes using diluted monopropylene glycol have now been converted to Greenway® RTU, a ready-to-use cooling fluid with 1.3-Propanediol (Bio-PDO™) base and longlife organic corrosion inhibitors.

“Since 1932, respect has been at the heart of our commitments, whether we are talking about consumers, employees, partners or the environment”, explained Michel Foulquier, Regional Site Manager at Bessan. “Under this certification, we performed a risk analysis on all of our industrial processes. In the cooling process we use Friogel® cooling fluid, which is approved by the French General Directorate of Health, but we wanted to go further in our approach and to use a more environmentally-friendly fluid”.

A strict production process

To respond to this environmental awareness, Ricard made use of the Cantie Process company, who are responsible for the design of cooling and heating processes on the site, to find



the right product. This company, which specialises in the food industry, chose Greenway® after consulting several suppliers, including Climalife. “It was the only cooling fluid approved by the Ministry of Health and in which the raw material used comes from a natural resource, glucose syrup”, said Nicolas Cantie, Managing Director.

The first system cools the second stage of the rectification column used for the star anise, which is the principal ingredient processed by Ricard. The star anise, mainly harvested in China and distilled for the first time there, arrives at the Bessan site in the form of essential oils. These are then processed in this column in order to separate the 12 to 14% of impurities through the use of various parameters (vacuum, pressure and flow rate) to obtain the molecule known as anethole.

Certain volatile compounds are trapped at a temperature of -1 / -2°C which requires a glycol production system at -5°C with a Daikin EUWAB 16 KAZ chiller unit with a cooling capacity of 22 KW.

To produce Ricard, a second ingredient is necessary, liquorice. This is crushed on the site and then placed in autoclaves in the INOXA building. As it passes through successive baths, via a steam heating process and then a cooling phase in a loop circuit with chilled water at 7°C, the liquorice flavours are extracted and give a homogeneous liquid.

The second glycol circuit cools and controls the storage temperature of the alcohol that will be added to the manufacturing process. It produces water at +2/+6°C using a TRANE CGAN300 cooling unit with a cooling capacity of 76.2kW installed on the roof of this building. The alcohol is cooled via two plate heat exchangers and then stored in two T51 insulated tanks with variable cooling speeds where the Greenway® circulates. These tanks are maintained at +10°C.

Conversion to Greenway® RTU

The work took place over three days last spring, taking advantage of a production shutdown. The two glycol circuits were drained once the machines were stopped in coordination with the site maintenance managers. The circuits and filters were cleaned and then rinsed with clean water. Greenway® RTU was then injected by pump.

After purging any air, the installations were restarted and samples were taken at different levels to check the temperature. The product has now been in circulation for more than nine months and the results are satisfactory.

Company: Cantie Process
Business: Design and installation of heating and cooling production systems - Air processing - Management of energy and technical fluids.
Location: Mazamet (81) - France
Date created: 1967
No. of employees: 20
Turnover: €5 million in 2012

Climalife at your service: for each se rigorously established

CLIMALIFE OFFERS A COMPLETE RANGE OF SERVICES FOR CLIMATE CONTROL INSTALLATION SYSTEMS.

Our team can offer you maintenance solutions to improve the energy efficiency of your facilities. Our know-how also helps us carry out special operations to help contain fluorinated gases at facilities. Regulations change, and we change with them to help you with implementation.

Climalife can handle the entire service or work in an occasional capacity to supplement your teams. Here are some examples of services that we can provide.

Annual verification of fixed-installation sensors

The objective of the inspection service for an environmental controller is to ensure that the sensor reacts properly to the refrigerant and that all the sensor outputs function properly.

Why regularly inspect the fixed-installation sensors?

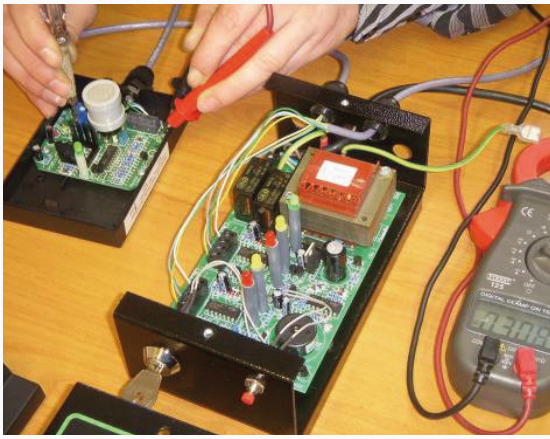
The F-Gas regulation and the EN378 standard require an annual inspection in accordance with the manufacturer's recommendations. The regulation does not require calibration of the apparatus. The inspection helps verify that the apparatus is operating properly for employee safety, as well as to guard against any unidentified leaks.

1 – Definition of a work plan
A prevention plan is established together with the company operating the facility before the service is carried out.

First of all, the regulatory context is defined:
F-Gas as re-transcribed into the environmental code (FR) as well as European standards EN 378 and EN 14624.

The technician carrying out the work must hold a certification and an electrical authorisation.

The inspection procedures for the apparatus are established by the manufacturer of the apparatus to be inspected.
On-site preparation of the work site:
Power to the apparatus must be left on for an entire night. The areas of access to the detectors should be identified to validate the resources to be implemented for accessibility of the devices to be checked (scaffolding, cradle, etc.).



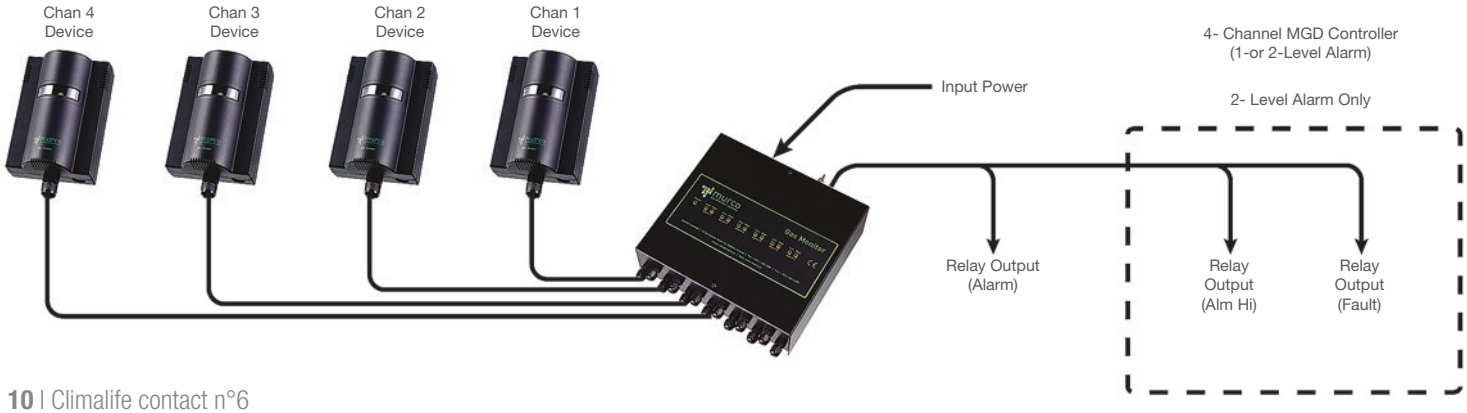
2 – Verification protocol
The protocol is set out according to the category of the detector to be checked.
A specific procedure has to be carried out for each model concerned.

During the operation, the alarm timer for each device should be deactivated.

The adjustment to be made is either in the controller itself or in the sensors, this depends on the number of probes present in the installation.

This is to adjust the standby voltage of the sensor and to adjust the alarm setpoint, which is often close to 1.2 V.

After the inspection process, a test certificate must be prepared for each apparatus inspected.



rvice, a process

Removal of one tonne of ammonia in the heart of Budapest

Many consider the Millenaris as the cradle of competition sports and of Hungarian sport in general. This building was constructed in 1896 to host sports programmes amongst the many events commemorating the thousand year history of Hungary.

During the inter-war period, the stadium was transformed into an international velodrome based on plans by Hajós Alfréd. In winter, the centre of the stadium is used as a skating rink. During this season, running from October to April, the building is mainly dedicated to the training of young hopefuls.

Built in 2002, the training rink, which is considered a modern building due to its low human impact halogen refrigeration system, gradually relegated to the background the ammonia-based installation used for refrigerating the skating rinks (Millenáris and Kisstadion). It was therefore decided to dismantle this entire facility. The large quantity of ammonia present in the facility represented a major risk for the athletes and for those living nearby because it was near the sports facilities, residential buildings and a shopping centre.

The owner required the refrigerant from the facility to be extracted without any discharge of ammonia into the atmosphere. Gazsó László, operations manager of the Millenáris centre, contacted Climalife in order to find a safe solution that would meet this requirement from every point of view.

Following this request, a study was conducted jointly with the operator in order to accurately determine the area of intervention and the technology to be used for perfect execution of the task.

For more than 140 years, the Dehon group has been specialising in the storage, handling and transport of various hazardous materials (toxic, flammable, explosive, environment hazards, etc.). Climalife Kft, the Dehon subsidiary in Hungary, therefore made use of the professional expertise of its sister companies in order to draft a proposal to suit the client's needs and successfully carry out this first project in Hungary.

After a site visit, the technology required for recovering the ammonia had to be secured in order to avoid any emergency situation in view of the site location, the population present in the surrounding area and the toxicity of the fluid. The advantage of our proposal was its closed circuit extraction technology with zero emissions.

Around one tonne of ammonia present at the facility had to be extracted, Climalife Kft supplied special containers and devices necessary for this operation, monitoring and eliminating the hazardous waste produced and providing qualified professionals to successfully lead the task.

The operation date was especially important because no unauthorised personnel were allowed to have access to the site during the extraction. The operator was responsible for informing the athletes about this ban on access and Climalife Kft planned to carry out the work at the weekend so as to reduce the inconvenience caused.

The competent authority (disaster management) was contacted first to inform them of the scheduled date for the extraction, the technology intended to be used and the plan for preventing any damage. This authority formally recorded that the work was to take place and did not impose any measures to mitigate additional risks.

Due to the short time allowed for the extraction, a simulation (checking for the presence of appropriate connections, hose lengths and suitable connectors for the containers, operation of the equipment, etc.) was carried out the day before on the previously supplied equipment and storage capacities.

To carry out the work, Climalife Kft, in close collaboration with qualified personnel from the Dehon Group, took charge of making available a large number of containers, because the exact quantity of ammonia was unknown, very long industrial hoses, extraction devices, a vacuum pump, OMH certified scales and 2m^3 of demineralised water. Furthermore, two high power ATEX type extraction devices were delivered to the site, because the compressors installed in the facility had been switched off beforehand.

The first phase of the operation, monitored via an integrated control hatch, consisted of decanting the mixture of ammonia and oil in the compressor from the heat exchanger to a separate container. When ammonia without oil appeared in the control hatch, the decanting was directed towards another container.

Extraction from the heat exchanger continued while the ammonia was in liquid form. When vapour appeared, this transfer was interrupted to pick up liquid again from the two tanks.

The next day began with the continuation of the above-mentioned operation. At the same time, extraction of oil from the compressors took place. Cooling of the storage tanks and the vapour extracted was essential because the ambient temperature of more than 30°C complicated the extraction process. Cooling of the vapour and the tanks, respectively, was carried out by a mobile refrigerator and spraying of water. By the end of the day, up to 4 bar of ammonia had been collected.

By midday on the third day, the extraction of 1 bar maximum of ammonia had been completed. Extraction of the residual ammonia vapour was carried out using a high power vacuum pump (1000 m^3/hour). This vapour from the vacuum pump was neutralised in demineralised water producing a solution of 4 to 6% ammonium hydroxide.

After a complete vacuum was achieved, different parts of the circuit were opened for cleaning with compressed air for several hours in order to eliminate any traces of ammonia remaining in the pipe. Thus, the refrigerant and the oil from the ammonia system of the Millenáris training rink were eliminated with zero emissions.

Considered as hazardous waste, the ammonia, used oil and ammonium hydroxide were transferred to packaging provided with appropriate markings (labels) from the site to an incinerator by a carrier approved for the transport of hazardous waste.

The client expressed his complete satisfaction at the end of this project. Climalife proved once again its service provision capabilities in Hungary.

TERTIARY

MTS approves the cleaning of the he apartment block carried out by Clim

To improve the energy performance of a building in the Paris area, the maintenance company, MTS, sub-contracted treatment of the heating system water, based on the Thermonett solution, to Climalife.

Since 2009, the residential building at 37-39 avenue Jean Rousseau in Livry Gargan has been equipped with a new heating system with two De Dietrich C230 gas-fuelled condensation boilers, installed by MTS. A dymatic cascade system controls the operation of the two boilers; the logic controller only allows the second boiler to run when the capacity of the first one is insufficient. It switches over from one to the other every fifty hours, so that one boiler is always running.

This 1980s building contains twenty or so apartments. Following several draining operations, MTS noticed that the water system was no longer protected by a passivating product, the purpose of which is to inhibit the appearance of metallic oxides and limescale.

Nowadays, this situation occurs frequently, since, in the majority of cases, treatment of the water in the heating system is not included in boiler house maintenance contracts, explains Jean-Luc Minet, who founded MTS in 1973. “Water treatment is far from being standard practice. Co-owners do not always see the value of preventive measures when systems are operating correctly, even though we remind them regularly during our periodic visits”. However, treating the system is fundamental to improving its energy performance, preventing radiators from becoming blocked, prolonging boiler life and limiting gas release phenomena.

Climalife, a formulator of innovative and sustainable solutions for thermal systems, has developed a solution which is both curative and preventive in producing optimum results to combat sludge and scale problems in heating and air conditioning systems.

Company: MTS (Minet Techniques Services) - MEnergies Group
Business: Boiler rooms - Maintenance - Technical assistance - Diagnostic work - Approved technical centre for Viessman, De Dietrich and Cuenod.
Location: Torcy (77) - France
In business since: 1973
No. of employees: 16
Turnover: € 1.8 million in 2012

As an extension to its range of services, Climalife offers to assist to those involved in maintaining thermal installations as a sub-contractor for this type of operation.

It was in this context that MTS, which had validated the methodology, agreed to contract such cleaning work to Climalife.

^ Clément Coffinier - Branch manager
Jean-Luc Minet - Founder of MTS

At the end of August 2013, after previously auditing the site, Climalife sampled the mains water to determine its quality and at the same time analysed the water in the building’s heating system, an essential step in diagnosing whether or not the treatment of the system was adequate (see analyses 1 and 2).

Thermonett® Sludge Remover, added at a rate of 1% by volume to water with a neutral pH, was injected on 29 August and circulated for five weeks at ambient temperature. The objective was to disperse accumulated corrosion debris. Thermonett® Sludge Remover dissolves sludge and scale deposits and will remove heavy metals in solution (Fe, Cu, Al, and Ca).

During this treatment period a water sample is taken every week to progressively monitor the removal of sludge from the system (results shown in the table on the next page).
Analyses 3 to 5 confirm changes in the complexation of metals in solution, then, after three or four weeks, analyses show that the iron has been stabilised.

The Climalife team then drains the installation using a liquid recovery pump. The water recovered from the system is stored in containers to be sent for destruction, accompanied by a Waste Transfer Document.

The magnetic filter is dismantled for the cleaning and recovery of matter in suspension deposited on the walls. Finally, the system is refilled with water with a corrosion inhibitor, Thermonett® Protector, approved by the Ministry of Health as complying with specifications covering accidental contact with the drinking water system, added at a rate of 1%.

After two weeks with the Thermonett® Protector additive circulating, analyses show that the iron content is still steady. The aluminium content is reduced by half, as this is associated with the dispersing effect of the Thermonett® Protector which continues the action of the Thermonett® Sludge Remover. There is also an increase in the total alkali strength linked to the chemical composition of the corrosion inhibitor. The concentration of metallic debris should reduce over time, as it is captured by the magnetic filter.


^ Low point of the installation - Magnetic filter


^ Water circul
Thermonett® S

To ensure that this is happening, a sample is taken once a month.

If the system is not drained, the corrosion inhibitor will protect the system for five to eight years. The level of concentration should therefore be checked once a year using a colour test kit.

ating system in an alife

De-scaling of two De Dietrich brand boilers Livry Gargan site

Date samples taken		Results of analyses						
		pH NFT 90008	Chloride in mg/L ISO 15882	Matter in suspension* mg/l NF 872	Iron mg/L ISO 11882	Copper mg/l NF ISO 11885	Al mg/l NF ISO 11882	Total alkali strength** Ca mg ISO 9963.1
Mains water		8	25	< 1	0.001	0.02	0.035	283.7
Water circulating in the system	29th Aug			17	1.04	0.02	0.06	849
Water with 1% Thermonett Sludge Remover treatment	5th Sep		48	6	31.25	0.03	4.96	1,842
	11th Sep	7.8	46	2	34.24	0.08	4.08	1,649
	19th Sep		43	7	33.82	0.13	3.35	1,326
	26th Sep		44	< 1	32.31	0.02	3.11	1,326
	30th Sep	7.6	42	< 1	34.41	0.02	3.4	1,191
Water with 1% Thermonett Protector	22nd Oct	7.5	60	6	34.05	0.07	2.92	2,989

* Matter in suspension - ** Total alkali strength as calcium

ating in the system sample with ludge Remover

^ Connection of the liquid recovery pump

^ Cleaning the magnetic filter (elimination of iron oxide)

^ Recovery of system water in containers to be sent for destruction. (waste transfer documents)

Outsource your services, the benefits can become your profit!

OUR INDUSTRIAL SERVICES TEAM IS YOUR SUBCONTRACTOR FOR CONDUCTING OTHER SPECIAL OPERATIONS INCLUDING:

Drainage and/or refilling of facilities:

- Recovery of refrigerants, heat transfer fluids or secondary refrigerants, fluid treatment in accordance with current regulations, recovery of unclean containers.
- Loading refrigerants or heat-transfer fluids into installations: bulk supplies, warehousing under special conditions, network concentration (doping).

Regulatory maintenance:

- Periodic inspection of pressurised equipment: inspection of refrigerant storage and distribution equipment and the issue of certificates.
- Periodic re-qualification of pressurised equipment: preparation of equipment (tanks, pipes, etc.), re-qualification of mobile equipment.

GREENWAY® SOLAR, THE HEAT TRANSFER FLUID WITH HIGH THERMAL STABILITY, WINS **THE GRAND PRIZE FOR ENVIRONMENTAL QUALITY**

On the occasion of the interclima + elec international trade fair for construction and energy efficiency in buildings, organised in conjunction with idéo bain and BATIMAT, Climalife entered its new Greenway® Solar -30°C heat transfer fluid in the innovation competition for systems using renewable energy.

Success! Climalife takes the grand prize for Environmental Quality!

Greenway® Solar -30°C is a ready-to-use heat transfer fluid based on 1.3-Propanediol (Bio-PDO™) and organic long-duration corrosion inhibitors. The raw material used is 1.3-Propanediol (Bio-PDO™), which is produced by fermentation of natural, 99.7% purified glucose syrup. Greenway® Solar's environmental footprint is reduced by 40% in terms of CO_2 emissions and energy use compared with a traditional mono propylene glycol heat transfer fluid (oil industry product).

The Greenway® Solar formula is borax-free in compliance with European Directive 2005/58/CE of 15/09/2008, and contains organic corrosion inhibitors developed by the Climalife Research and Development department. These organic inhibitors are placed only on the areas subject to corrosion by creating a molecular film, resulting in the optimisation of heat transfer, unlike mineral inhibitors traditionally used, which form a film. The inhibitor does not react chemically, does not degrade over time and gives long-term anti-corrosion protection.

Innovation rewarded!

Greenway® Solar is particularly suitable for sanitary hot water production in thermal solar systems at medium temperatures (panels) and high temperature (vacuum tubes).

The high thermal stability of Greenway® Solar is one of its innovative characteristics for application in thermal solar systems. Professionals usually encounter problems related to degradation of the heat transfer fluid during periods of uncontrollable stagnation due to seasonal shutdown. This raises serious thermal issues which result in the formation of viscous deposits in the solar sensors (tarring or caramelisation of the heat transfer fluid). Such damage leads to a decrease in the yield of the solar panels.

Greenway® Solar provides protection against periods of stagnation, avoids the "tarring" of systems and gives installations a longer working life. At over 150 °C for 150 hours, Greenway® Solar degrades three times more slowly than a traditional 50% concentrated solution of mono propylene glycol, thus maintaining the level of performance required and established by the manufacturers.

Greenway® Solar -30°C is approved by the French Ministry for health (ANSES) for thermal processing in simple exchange systems for water intended for human consumption.

Greenway® Solar -30°C is the result of a technical collaboration between Climalife and Dupont Tate & Lyle, manufacturer of the raw material Bio-PDO™. The contribution by DuPont Tate & Lyle of the technical characteristics of this new plant-based raw material has allowed Climalife to add its expertise to its application and to develop a specific formula that meets the needs of our business sector.

Expansion of the Greenway® offer

To meet all the requirements of professionals, Climalife has also formulated a Greenway® product range for application in refrigeration, air conditioning and heat pumps.
The most recent one, Greenway® RTU -55°C, has a lower viscosity than that of an MPG and thus can be used at temperatures normally reserved for products based on Alkalis, Acetate or Potassium Formate.
Climalife is soon to launch a concentrated version of Greenway® RTU, which will allow it to meet all user expectations.

You can find all our new products at:
www.climalife.dehon.com

Dates for your diary!

France

Les journées de la GÉOTHERMIE
10 et 11 avril 2014 • PARIS

The third edition of this Geothermics conference organised by the AFPG (Association of Geothermics Professionals) will be held at the Centre des Congrès in the Cité des Sciences de la Villette, Paris.
Climalife, as a specialist in technical fluids for HP, will have a stand on 10th and 11th April 2014 at this conference to promote its innovative and sustainable solutions.
You can find the full conference programme at http://www.journeesgeothermie.com

Salon Energies Froid

énergies froid
salon professionnel régional
FROID, CLIMATISATION, CUISINE PRO, ENR

A date for your diary on 9th and 10th April 2014 **at the Lille Grand Palais for the next stage of the Energies Froid trade fairs** dedicated to thermodynamics. Your Climalife sales representatives will be there and will inform you about the latest regulatory and technical developments.
Pre-register and get your free badge at: http://www.energiesfroid.com

Great Britain

THE ACR SHOW

Climalife in the UK are pleased to be showcasing at the ACR (Air Conditioning & Refrigeration) Show in 2014. The event takes place at the Birmingham NEC between 11th and 13th February. Peter Dinnage, Technical Director in the UK will be running two seminars during the course of the event discussing how to avoid the pitfalls of refrigerant conversion and the future of heat transfer fluids. We look forward to welcoming you to our stand **N°G40.**

Italy

Mostra Convegno

From 18th to 21st March 2014, the international Mostra Convegno trade fair will open its doors to professionals in refrigeration, air conditioning, heating and water treatment.

Innovation, comfort, energy efficiency and energy saving are the main subjects of the exhibition.

On this occasion, the entire Climalife team will welcome you in **Hall 24 Stand T13** to present the technical fluid solutions for the future F-Gas regulation and will show you their complete range of refrigerant oils.

mce
mostra convegno expocomfort
18-21 March 2014
Fiera Milano Quartiere Rho

Russia

For the 5th consecutive year, Climalife will take part in "Climate World 2014", the international trade fair specialising in the heating, ventilation, air conditioning and refrigeration industry. This year's fair will take place from 11th to 14th March at the Expocentre in Moscow.

CLIMATE WORLD

Climalife will be present at this event with high attendance levels in Russia, in partnership with the producer of the Mexichem® Fluor refrigerant to present the Klea® range and also our innovative and sustainable solutions, namely:

- HQ POE refrigerant oils
- The Frionett® range of cleaning products
- The Duonett® D7 descaler
- The global range of heat transfer / cooling fluids.

The Climalife team will be waiting to meet you in **Pavilion 1, stand 1P6**.

Europe

In "Izenah"

The Voiles du Froid offer refrigeration and air conditioning professionals from all over Europe the chance to meet in an exceptional setting to share a sporting adventure that is friendly and unusual.

Around fifteen single-hull vessels will set off for a regatta voyage around the islands of the Gulf of Morbihan towards the Ile aux Moines, known as Izenah in the Breton language. This 22nd edition sponsored by our loyal partners, **Assurfroid, Clima+confort, Eurovent Certification Company, GEA Heat Exchangers, Exxon Mobil, Honeywell, HRS, ITE, the RPF and the Snefcca** will start on Friday 23rd May towards midday in the port of Crouesty (France -56).

For three days, the Voiles du Froid committee will offer you a varied programme made up of regattas, discovering culinary specialities and exploring the island of Izenah.

Will the VDF 2013 trophy won by the Dutch team continue its journey around Europe? Or will it return to France? You will find out by attending the profession's unmissable event ...

Please contact your Climalife sales representative by 25th February 2014 for a registration form.

International

CR 中国制冷展 2014 | CRH 2014 | HVAC&R

The Climalife Galco team will welcome you from 9th to 11th April 2014 at the Beijing International Exhibition Centre at the international China Refrigeration Trade Fair. Come and discover our latest products at our stand **N°E3G02.**

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HFO: the fourth generation of refrigerants

2010

1990 HFC

HCFC / CFC

1930

NH_3 / SO_2 / CCL_4 ...

1830

Invest today, improve tomorrow

1. Reduced environmental impact: (low GWP)
2. Safety of environment and people
3. Excellent energy efficiency of systems
4. Approved by equipment manufacturers

Honeywell

climalife®