GOING BEYOND THE RECLAMATION OF FLUORINATED GREENHOUSE GASES WILL ACCELERATE THE TRANSITION TO A CIRCULAR ECONOMY

03/07/2023 – Laurent GUEGAN / Morgan BOVE
SUMMARY

- Climalife, the pioneer in responsible refrigeration
- The concept of recovery
- A comprehensive approach to the service
- Refrigerant services
- $\text{SF}_6$ and extinguishing agents services
- Transfert and inerting of packaging
- Comprehensive support
- The concept of a circular economy, the very essence of our brand
- Why is it necessary now to increase collection and update reclamation processes?
- An excellence hub in circular economy
- Climalife, key player in waste management
- Sustainability

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A strong brand of the Dehon group
Since 1989, a refrigerant recovery and waste treatment system was set up

- Awareness of the impact of fluorinated greenhouse gas emissions
- Introduction of the first recovery cylinders on the French market
- Initiative leading to the signing of a voluntary commitment with the French government
- Information and education for professionals in the HVACR sector
PIONEER IN RESPONSIBLE REFRIGERATION

Development of services to support professionals in the management of F-gases, halons and other molecules

- Gas analysis
- Recycling (purification of used fluids)
- Treatment of non-condensables
- Technical assistance for product selection
Since 2008, valorisation of refrigerants and SF\textsubscript{6}

- Anticipating regulations on fluorinated greenhouse gases
- Certified reclamation of gases
- Reuse of reclaimed gases to maintain installations/equipment until end of life
Procedure for gas recovered for regeneration / destruction

1. **Recovery by operator**
2. **Recovery packaging returns: via Climalife sites**
3. **Document control: WTD (1)**
4. **Weight**
5. **Destruction: WTD, return to client**
6. **Analysis: composition, purity, acidity, water content, oil content**
7. **CFC, HCFC or non conformity analysis**
8. **Regeneration: WTD, return to client**
9. **HFC & R-22 (non pure) compliant analysis**

*(1) WTD: Waste Transfer Document*
THE CONCEPT OF RECOVERY

- F-Gas life cycle management
- Qualified employees
- Simplification process: on-site intervention
- Tailor-made operation
- Time saving

- Reduction of CO₂ emissions
- Waste management
- Regulatory compliance

- Recovery and treatment (reclamation or destruction) of refrigerant and SF₆
- Filling and removal of heat transfer fluids
- Cleaning of thermal installations

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A COMPREHENSIVE APPROACH TO THE SERVICE

Benefits

- Energy performance
- Regulatory and environmental compliance
- Reduction of waste and CO₂ emissions

- Qualified and certified staff (F-Gas qualification, forklift trucks, working at height, chemical risks II, SCBA, NH₃/chlorine, etc)
- Tailor-made solutions
- A single supplier (One stop shop)
Challenges

- Complex configuration of installations (volume, special fluids, etc.)
- Need for specific equipment and occasional lack of resources
- Difficult logistics and access
- Management of recovered fluids and traceability
- Waste reduction

Solutions

- Recovery
- Reclamation
- Inerting of containers
- Waste treatment
- All types of refrigerants, e.g. HFO, NH₃, HFC, CFC, HCFC
- All types of installation, from a few kilos to several tonnes
**SF₆ AND EXTINGUISHING AGENTS SERVICES**

### Challenges
- Complex configuration of installations (volume, special fluids, etc.)
- Need for specific equipment and occasional lack of resources
- Difficult logistics and access
- Management of recovered fluids and traceability
- Waste reduction

### Solutions
- Recovery
- Reclamiation
- Waste treatment
- Inerting of containers
- All types of installation, from a few kilos to several tonnes
TRANSFERT AND INERTING OF PACKAGING

Challenges

- Need for specific equipment
- Administrative complexity
- Difficult logistics and access
- Management of recovered fluids and traceability
- Waste management

Solutions

- Qualified employees
- Local and dedicated contact
- Appropriate and dedicated packaging
- Specific equipment
- Administrative management
- Logistics management
- Reclamation or destruction
The Path of a Pressurised Gas Waste: SF₆ & Refrigerant CFC, HCFC, HCF, HFO, NH₃, HC

- Traceability
- All containers identifiable by barcode or QR code
- Limit the risk of error
- 400 to 600,000 files/year
- + More than 54,000 certified establishments
The Path of a Pressurised Gas Waste: SF₆ & Refrigerant CFC, HCFC, HCF, HFO, NH₃, HC

- Carriers have 1 or more subcontractors
- Poor knowledge of regulations by drivers
- Several stop points
- Grouping of containers / waste of different types

Transit platform, Distributor storage

Full truckload chartering
Up to 1000 containers of different types of waste

Repalletizing

Carrier B, ...
Carrier A

No visibility carrier B doing the collection

Carrier X
Carrier Y
Carrier Z, ...

Carrier A is chartered by the distributor
Carrier B is a subcontractor of carrier A, etc.
The Path of a Pressurised Gas Waste: SF₆ & Refrigerant CFC, HCFC, HCF, HFO, NH₃, HC

- Checking of waste documentation
- Reception, by full truck, from regrouping (repalletising)
- Identification by packaging number
- Choice of waste treatment after individual analysis of each container
On-site service: your advantages

Tailor-made solutions
(define and analyse the need)

Fast and efficient service
(specific equipment, packaging availability)

Cost optimisation
(planning, risk management, product regeneration, etc.)

All products
(liquefied gases, flammables, heat transfer fluids, etc.)

Availability
(services throughout Europe)

Planning & document management

Qualified and empowered staff

Environmental protection
(reduction of emissions, waste recovery)

Regulatory compliance

Sharing of knowledge
(expertise, physico-chemical properties of fluids, etc.)
The environmental responsibility is at the heart of our technological innovations

**IN FIGURES**

- 75% of fluorinated greenhouse gas waste is recovered.
- More than 30 millions t. Eq. CO₂ avoided by our action in Europe
- R&D Investment: + 10% TO
- Introduction of bio-sourced materials in the formulation of heat transfer fluids
WHY IS IT NECESSARY NOW TO INCREASE COLLECTION AND UPDATE RECLAMATION PROCESSES?
### Montreal Protocol Parties agreed to reduce the use of HFCs in a gradual process with different schedules for developed (art.2) and developing (art.5) countries:

<table>
<thead>
<tr>
<th>Period</th>
<th>A5 Group 1: Belarus, Russian Federation, Kazakhstan, Tajikistan, Uzbekistan</th>
<th>A5 Group 2</th>
<th>A2: Le Belarus, la Fédération de Russie, le Kazakhstan, le Tadjikistan et l’Ouzbékistan</th>
<th>Baseline 2020-2022</th>
<th>Formula 2024-2026</th>
<th>Average HFC consumption in teq CO\textsubscript{2}</th>
<th>Average HFC consumption in teq CO\textsubscript{2}</th>
<th>Average HFC consumption in teq CO\textsubscript{2}</th>
<th>Average HFC consumption in teq CO\textsubscript{2}</th>
<th>Baseline 2009-2012</th>
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For Belarus, Russian Federation, Kazakhstan, Tajikistan, Uzbekistan 25% HCFC component of baseline and different initial two steps (1) 5% reduction in 2020 and (2) 35% reduction in 2025

Notes:
- Group 1: Article 5 parties not part of Group 2
- Group 2: GCC, India, Iran, Iraq, Pakistan
- Technology review in 2022 and every 5 years
- Technology review 4-5 years before 2028 to consider the compliance deferral of 2 years from the freeze of 2028 of Article 5 Group 2 to address growth in relevant sectors above certain threshold.
WHY IS IT NECESSARY NOW TO UPDATE RECLAMATION PROCESSES?

F-Gas review

- Risk of shortage as early as 2027 in UE:
  - Highlighting recycled or reclaimed refrigerants
  - No filling with non-recycled or non-reclaimed refrigerants
  - Recovery: maintaining existing systems

UE Virgin F-Gases needs + Reused vs F-Gas Proposals
WHY IS IT NECESSARY NOW TO UPDATE RECLAMATION PROCESSES?

Reclamation process no longer suited to new blends or future products: several limitations

More and more products on the market: increase in the number of molecules (over 19 vs. 5 in 2015)

- Too many products for selective collection

Creation of unintentional azeotropic mixtures during collection

- Increase in impurities present in fluorinated gas waste
  Hydrocarbons, CO₂, other fluorinated gases, ...

- Increased deposition in waste
  Increase in non-reclamable waste
Climalife builds a new site which includes fluorinated waste treatment activities.

Management of waste fluorinated gases
- Waste analysis
- Sorting of waste CFC, HCFC, HFC, HFO
- Simple reclamation of used refrigerants
  - HFC, HFO
  - Non-flammable & Flammable gases
- Substance separation ARHI standard 80% of ultimate fluorinated greenhouse gas waste recycled
Climalife builds a new site which includes fluorinated waste treatment activities.

Management of waste fluorinated gases:

- Substance separation ARHI standard 80% of ultimate fluorinated greenhouse gas waste recycled
- A project in collaboration with European research centers since 2018
- Climalife patented technology.
- Project supported by the French and European authorities
AN EXCELLENCE HUB IN CIRCULAR ECONOMY

Climalife builds a new site which includes fluorinated waste treatment activities

Management of waste fluorinated gases:

- Substance separation ARHI standard 80% of ultimate fluorinated greenhouse gas waste recycled
- **What types of waste are we able to distill?**
  - Flammable & non-flammable waste
  - Zeotrope & azeotrope mixture
    - Including impurities HC, CO₂, CFC, HCFC
- Target substances
  - HFC
  - HFO
AN EXCELLENCE HUB IN CIRCULAR ECONOMY

Climalife builds a new site which includes fluorinated waste treatment activities.

MDIs Crusher:

- MDIs management
  - Recovery & reclamation of fluorinated propellants (HFA & HFO)
  - Processing of impurities and scrap

SF₆ reclamation unit:

- Used SF₆ management
  - Reclamation of SF₆ waste IEC standard
30 years of Climalife expertise

The strength of an international presence

- **The Climalife network for second life**
  - Direct with HVACR contractors and wholesalers
  - Direct with automotive workshops and distributors

- **Climalife, the specialist in waste collection**
  - Management of recovery containers
  - Recognised laboratory
  - Collection points in the main countries
  - Agreement with the waste carrier

Climalife has established its activities over the years by developing a unique global offer and a tailor-made service for its customers thanks to its presence in growth markets.

Our territorial coverage allows us to be even closer to our customers. The cultural and linguistic diversity of our employees enriches our brand and strengthens our ability to respond locally to the specific needs of industries.

- **15** Climalife subsidiaries on three continents
- **40** A network of distributors in over 40 countries around the world
- **14** production sites and logistics centres
- **200** Over 200 local depots in Europe

We want to extend our positioning and our expertise by offering more local services through our existing distribution network and by deploying our key success factors in new territories distribution network and by deploying our key success factors in new territories.

climalife.com

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+ than 12,000 customers trust Climalife
CLIMALIFE COMMITMENTS

2021 SME Climat Hub charter signed
- Green solution provider
- Net zero 2050

2023 joins the COPA alliance
- For responsible F-Gas management and end-of-life
SUSTAINABILITY

Accelerate the transition to a circular economy

**Climalife plays a proactive role** in reducing carbon footprint

**Products**
- Reclaimed fluids
- Bio-sourced heat transfer fluids
- Leak detection & management to avoid gas emissions

**Technical and connected tools**
- Selection of low GWP fluids to improve energy efficiency
- Eco-efficiency model to optimise refrigeration systems
- Monitoring and management of refrigeration systems & packaging traceability (Clim’app)

**Waste recovery and treatment**
- Recovery filters for HFC, HCFC, HFO, NH₃, SF₆
- On-site dismantling operations
- Waste treatment

**Services**
- On-site services: recovery, retrofit / refilling, draining
- Engineering: filling stations for non-flammable or flammable products, storage units, customised recovery units, etc.
- Advocacy management

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Reclaimed and regenerated products
On-Site Recovery
Waste Management
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