F-Gas Regulation: Ecologic Refrigerants Explored

As the world focuses on reducing greenhouse gas emissions, one important area is the use of refrigerants.

Refrigerants’ proven contribution to global warming has led to increased regulation of fluorinated gases (known as F-gases) used in various types of refrigeration systems. To meet these regulations, many businesses have begun searching for

ecologic refrigerant solutions that still provide optimal cooling performance.

Below, we explore F-gas regulations and discuss key considerations when selecting between traditional and ecologically friendly refrigerants such as those classified as A2L.

F-Gas Regulation for Refrigerants

The F-Gas Regulation for Refrigerants is an important initiative that seeks to limit the emission of fluorinated greenhouse gases into the atmosphere. The regulation, implemented in 2014, seeks to reduce the overall equivalent CO^2 released by limiting HFCs consumption through a progressive phase-down process. The regulation has established global standards for refrigerant selection and energy efficiency while promoting carbon reduction in order to achieve a 79% reduction in the use of HFCs by 2030. This regulation poses a challenge for industries around the world but also presents them with an opportunity to be more sustainable and eco-friendly.

Traditional Refrigerant Solutions

Traditional refrigerant solutions, such as HFCs A1 Class and R134A/R410A, are considered medium/high GWP (Global Warming Potential) refrigerants that have significant environmental impacts. Under the new regulation, the use of these traditional refrigerants will be largely reduced.

It should be noted that R410A at present is still very widely used in new equipment and whilst alternative options are emerging, unlike previous legislative moves this generation of refrigerants were in themselves better than the generation before and the documented intention is to phase them down but not out, in order that older equipment which is still efficiently serviceable can continue to be maintained.

The field of refrigeration is in a period of continuous transition and careful consultation and discussion prior to purchase is advised to ensure that the best refrigerant in terms of performance at the desired temperature profile in conjunction with the equipment design and lifetime cost is chosen.

Ecologic Refrigerants

In place of traditional refrigerants, new ecologic refrigerants with a low GWP have been in development and are beginning to be used throughout the HVAC market. These alternative refrigerants are compliant with the latest trends and emissions standards.

However, there are some compromises to be made with this new generation of refrigerants. The new generations are mildly flammable and flammable refrigerants, compared to the traditional non-flammable A1 HFCs.

Secondly, to achieve successful integration of these new refrigerants, further changes to cooling equipment will need to take place, such as improving system designs and implementing advanced technologies to help promote greater efficiency.

The use of these new refrigerants has an impact on unit performance, requiring dedicated components, such as compressors, expansion valves, and more, as well as a dedicated unit design - all of which come at a cost.

Furthermore, the refrigerants are subject to safety certifications including safety precautions according to EN378 Standard and local standards.

A2L Class Refrigerants

A2L class refrigerants are a new generation of mildly flammable and non-toxic alternatives to traditional refrigerants.

Despite their mildly flammable label, these refrigerants have limited risk due to their ignition being only possible in specific temperature and concentration conditions, as well as requiring high energy for ignition.

Additionally, the low burning velocity of A2L gases does not negatively affect building evacuation in case of fire, ensuring occupants can safely evacuate.

Key Considerations

When evaluating the suitability of A2L class refrigerants for air conditioning systems, it is important to consider some key factors, including:

- Technical characteristics
- Availability
- Time-to-market
- Effect on cooling equipment and the need for dedicated components
- Product industrialisation, production and testing requirements

Evaluating the technical characteristics of refrigerants to ensure they’re suitable for cooling systems is foremost. Alongside this, the effect on cooling equipment should be analysed, as well as the need for any additional components.

Refrigerant availability across countries will affect the selection process, as well as the relationship with compressor manufacturers.

In addition, time-to-market and industrialisation, production and testing of the refrigerant must be considered as time limitations in accessing the product.

The F-Gas Regulation has catalysed the use of ecologic refrigerants as viable alternatives to traditional solutions. A2L class refrigerants, in particular, are increasingly being adopted due to their low global warming potential.

This shift towards greener and more efficient technologies will have a significant impact on the environment by reducing emissions and preserving current energy resources for future generations.

However, with this positive development, businesses must be prepared to make the necessary changes to their systems and processes to account for the requirements of the new refrigerants.