

Creard R-455A



REFRIGERANTS

Creard R-455A

Application and Handling

Introduction

The European F-Gas regulation EU517/2014 requires an accelerated phase-down of the HFC consumption within the EU28. Especially high-GWP refrigerants like R-404A / R-507 are under pressure. An early replacement of existing systems with low-GWP refrigerants enables the ambitious targets to lower the CO₂-weighted emissions down to 21 % in 2030 compared to the 2015 baseline.

Creard R-455A is a zeotropic blend, mildly flammable refrigerant (A2L) designed to serve in low-, medium-, and high- temperature applications in new systems. Its GWP of only 146 (IPCC AR5) makes it a long-term, F-Gas-compliant solution. It provides a close capacity match to R-404A, a similar operating envelope when compared to propane, and high energy efficiency.

Applications

Commercial Refrigeration

- Condensing units
- Water loop systems for discount stores and small supermarkets
- Plug-in systems for low and medium temperatures typically covered by R-404A and R-507
- Low temperature side of cascade systems

Transport Refrigeration

- Monobloc refrigeration systems
- Container refrigeration

Handling

Creard R-455A is a low-GWP refrigerant with a low flammability (ISO 817 A2L class) and zeotropic behaviour. These characteristics require special cautions in the handling and application of R-455A.

Decanting

As a zeotrope, R-455A always has to be decanted from the liquid phase.

It is recommended to decant R-455A in one step. If you have to decant into a number of smaller cylinders, make sure you do it without longer interruptions. This minimizes the enrichment of the low boilers in the vapour phase.

Decanting at lower ambient temperatures is preferable.

Temperature Glide

When developing blends for low flammability, high performance and low GWP, the glide of the refrigerant is a resulting trade-off which needs to be taken into account for system design.

R-455A has a normal boiling point (NBP) of -52 °C. The temperature glide of R-455A at the NBP is 12.8 K.

Zeotropic blends have been in use for many years, and heat exchangers can be designed to take advantage of the glide through an optimized flow configuration. However, as some systems might not allow operation with zeotropic blends, an analysis regarding the suitability of the system with the zeotropic characteristic should be done.

Based on a recent scientific study, the composition of R-455A remains very stable in a system, even in case of leakages.

Further information regarding the specific behaviour of refrigerants with a temperature glide can be downloaded from the ASERCOM Website (www.asercom.org).

Material Compatibility

Creard R-455A is compatible with most standard materials used in RACHP systems. Further information regarding compatibility on elastomers and plastics can be provided on request. Please contact our technical team.

Safety

The following general safety advice should be noted when using R-455A:

- Wear personal protective equipment when working on refrigeration systems, including safety shoes, gloves and goggles.
- Vapours are heavier than air and may cause suffocation due to oxygen displacement.
- Care should be taken that the working environment is well ventilated at all times. Ensure that the oxygen concentration inside machine rooms does not fall below a safe limit.
- Prevent the decomposition of product vapour, e.g. on hot surfaces or through electrical arcing (welding operations).
- Do not smoke in areas where you could be exposed to refrigerants.
- Avoid overfilling gas cylinders when recovering refrigerants.
- Use electronic leakage detectors whenever possible.

Flammability

According to ISO 817, R-455A is classified as a mildly flammable A2L refrigerant. Regardless of its low flammability profile, rules and guidelines for flammable gases have to be applied.

Charge Limitations and Risk Assessment

It is important to maintain compliance with the instructions of the equipment manufacturer, the European and national safety standards and regulations, as well as the relevant building codes.

Furthermore, in the European Union it is explicitly allowed to use a risk assessment in order to accommodate for appropriate refrigerant charge sizes. In the standards ISO 5149 and EN 378, the maximum refrigerant charge is given as a function of the system location, occupancy type and refrigerant safety classification. Please check the valid standard for your maximum charge size.

Recovery

The EU F-Gas regulation stipulates the recovery of fluorinated gases. Daikin offers a unique recovery and reclamation system which ensures that the value of high-performance refrigerants is maintained and kept in the value chain of RACHPs.

Further information can be obtained from the Daikin website.

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