Opteon™

ASDA Bootle Cold Room Solution

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MARSTAIR
REFRIGERATION AND SPECIALIST AIR CONDITIONING

ASDA

Introduction

Asda is actively engaged in finding future-proof solutions for their estate and, as such, has been involved in testing and comparison of available solutions.
Their refrigeration strategy is founded on real data and results.
In 2007 ASDA became an early adopter of CO_2 technology in their Bootle store.
After 15 years, Asda decided to make a like-for-like energy comparison using low GWP refrigerants (OpteonTM XL40) in the main store.
The success of which has been well documented and is publicly available.
Additionally, a solution was sought for their back-of-store operations, and TEV were engaged in supplying their award-winning range of A2LSysteMatch for the cold rooms.
To ensure compliance, Marstair developed and supplied nine A2LSysteMatch systems to serve the main chill and frozen cold rooms (three systems in each room), the produce and home shopping chill and frozen cold rooms (one system in each of these cold rooms).
An evaluation was conducted against the former CO2 solution looking at energy, emissions, CapEx, volume charge, and total cost of ownership, with the following results.

Executive Summary

It is now well known that the pressure on refrigerant supply due to F-Gas regulations and the drive to reduce carbon dioxide equivalents (CO_2eq) will require systems to be designed with Low Global Warming Potential (LGWP) refrigerants in mind. Failure to do so will result in quota levels severely limiting the amount of refrigerant available for new installs and maintenance, as High GWP refrigerants will consume a disproportionate amount of quota, and consequently will be very expensive.
The current plan is to reduce quota in 2024 to 69% from the 2015 baseline.

Add to this the possibility of

- An even larger cut to quota in 2024, as proposed by the F-Gas review
- The expected exponential increase in Heat Pump installations in the UK and EU
- The inclusion of Metered Dose Inhalers requirements into the quota makes it clear that our industry has to rapidly adopt low-GWP solutions

Global events in 2022 have added further pressure on the choice of available refrigerants, both through the cost and supply of energy and Actual Global Warming (GWA) impact of the energy consumed when considering the percentage of fossil fuels used to generate this power.
Lower GWP refrigerants are a recognised and important alternative to legacy HFCs and "Natural" refrigerants when considered a holistic solution to the pressures on our industry.

Objective of case study

To demonstrate the benefits of a careful balance between the refrigerant and GWP versus Actual impact (GWA) on the environment and the savings to be made in terms of OpEx and CapEx. OpteonTM XL40 (R-454A GWP 238) was chosen as the closest comparison in terms of performance to the legacy refrigerant CO_2.

Major Findings

Energy consumption

34.5%

Savings on KWh

SysteMatch combined with Opteon™ XL40 R-454A significantly offset rising energy costs.

Total cost of ownership

36%

Saving

Energy savings over a 20-year lifetime and CapEx make SysteMatch with Opteon™ XL40 R-454A a cost-effective solution in the face of increasing energy costs.

Capital cost comparison

44%

Reduction

A2L SysteMatch can be installed and commissioned with minimal additional training and at much lower cost than an equivalent CO_2 system.

Refrigerant charge volume

75%

Reduction in volume

Marstair's unique design allows the refrigerant charge to be kept within 20% of LFL for even the smallest of cold rooms, whilst meeting EN378:2016 requirements.

Emissions

28.5%

Reduction

The low GWP of Opteon™ XL40 R-454A combined with reductions in Actual GW from the energy used to run the plant contributes to significant savings in TCO_2 Equivalent*.

*Based on a 3% leak rate and an emissions factor of 0.21233.

"As we embarked on our low carbon refrigeration journey, we realised that an important piece of the jigsaw was missing. The complexity and risk of connecting ASDA cold rooms to larger low carbon distributed systems presented several safety and performance challenges which needed to overcome, requiring a solution which needed to be overcome, requiring a solution that was not only low-carbon but would be a simple, safe, cost-effective, and efficient technology. Marstair stepped up to the challenge and, in 2021, provided nine individual SysteMatch A2L systems that operate all our cold rooms at one of our flagship stores in Bootle. These systems meet the key requirements of our refrigeration strategy providing great value for money when compared to other low-carbon refrigeration options."

Brian Churchyard – Asda

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