Opteon™

Pharmacy Retail Chain Successfully Adopts A2L Refrigerant,

Leading the Way in Advancing Innovative Commercial Refrigeration Solutions.

Chemours™

HUSSMANN®

Introduction

Refrigeration systems are a cornerstone of every convenience store's infrastructure, which is essential for preserving quality and safety of food, beverage and pharmaceutical products. While the basic purpose of these systems has remained unchanged, the underlying technology continues to evolve rapidly. As refrigeration equipment ages, it typically becomes less energy efficient and more costly to maintain. Older systems are also prone to unexpected breakdowns, which can lead to significant, unplanned expenses and product loss.

Investing in a new commercial refrigeration system is a significant decision for any retailer. However, it also presents valuable opportunities to reduce operating costs, enhance energy efficiency, and minimize the store's environmental footprint.

Customer Challenge

Walgreens, one of the largest pharmacy chains in the U.S., leads the industry in testing and adopting advanced refrigeration technologies. As a cornerstone of American healthcare, the company continues to focus on improving service, community health, and operational efficiency.

Walgreens has taken a proactive approach by testing various refrigeration technologies to mitigate the risks associated with repairing aging equipment and refrigerant availability. By prioritizing food quality and safety, Walgreens aims to prevent costly losses and operational disruptions that could negatively impact their compound annual growth rate (CAGR).

Solution

Established under the American Innovation and Manufacturing (AIM) Act, the technology transition rule is driving a nationwide shift away from high-GWP hydrofluorocarbons (HFCs) in refrigeration and air conditioning systems. To meet these new regulatory requirements and reduce greenhouse gas emissions, businesses are turning to advanced, low-GWP A2L solutions. Opteon™ XL40 (R-454A), with a GWP of 238, offers an efficient and environmentally responsible alternative to traditional HFC refrigerants. Its superior performance and high thermodynamic efficiency make it especially well-suited for small convenience stores, where it ensures consistent cooling for display cases, reach-in coolers, and freezers. By adopting Opteon™ XL40 (R-454A), retailers can not only comply with current and future regulations but also enhance energy savings and support the long-term sustainability of their business.

Opteon™ XL40 (R-454A) also offers a close performance match to existing R-404A and R-448A/R-449A systems, making remodeling and new equipment installations straightforward and cost-effective. Additionally, it is widely recognized for its safety profile and reduced environmental impact, supporting Chemours' commitment to responsible chemistry. With easy maintenance and broad equipment compatibility, Opteon™ XL40 (R-454A) enables small convenience stores to maintain product freshness and customer satisfaction with minimal disruption.

The customer partnered with Hussmann and piloted field trials with Opteon™ XL40 (R-454A) refrigerant in several of its stores, with two main objectives:

1. To identify and understand the key differences in installing A2L units for walk-in cooler and freezer applications.
2. To measure and compare the energy consumption and refrigerated space temperature profiles of A2L systems against those of R-448A equipment used in the same applications.

The Installation

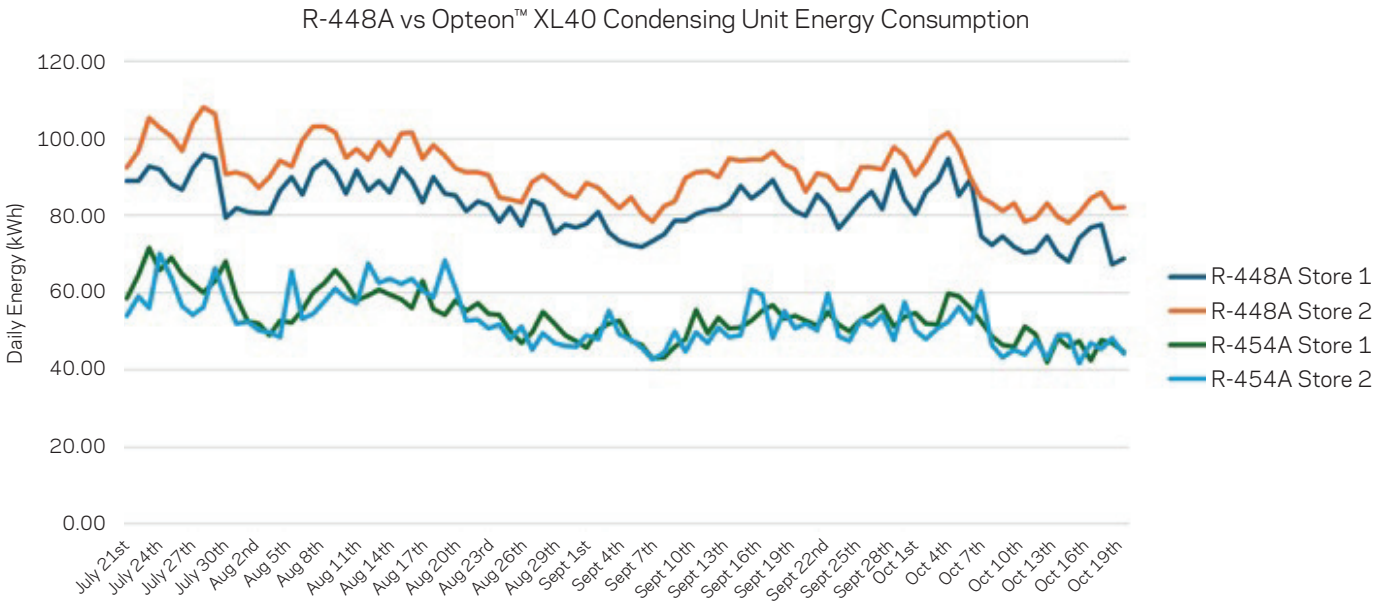
Each store that completed a field trial serviced two coolers with one system and one freezer with a second system. Overall, the Hussmann Evolve® KR evaporator equipment used for this field trial was very similar in size and design when compared to equipment designed for A1 refrigerants. However, the two key additions included to comply with the new safety requirements for A2L systems were refrigerant leak sensors on the evaporators and safety shut off valves outside of the coolers and freezers close to the top of the box to minimize releasable charge.

In a situation where a large leak may occur, the leak sensor would energize the safety shut off valves to close so that the amount of refrigerant that could be leaked in a confined space of the walk in cooler or freezer would comply with the guidance provided in the safety standards that have been updated to enable the use of A2L refrigerants.

Shown: Hussmann KR-A2L Evaporators

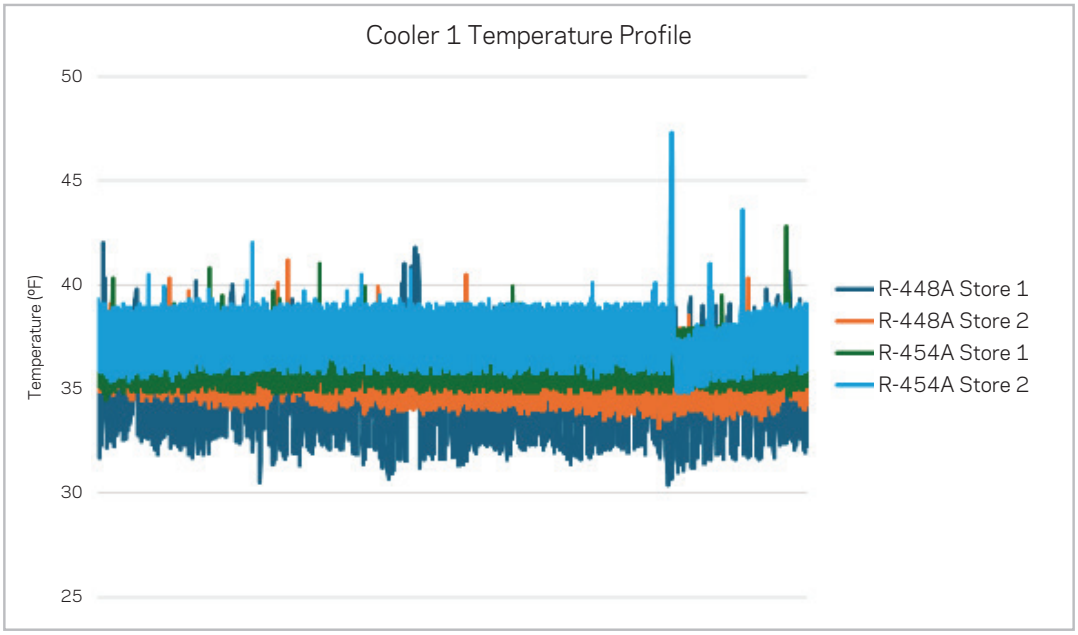
The Performance

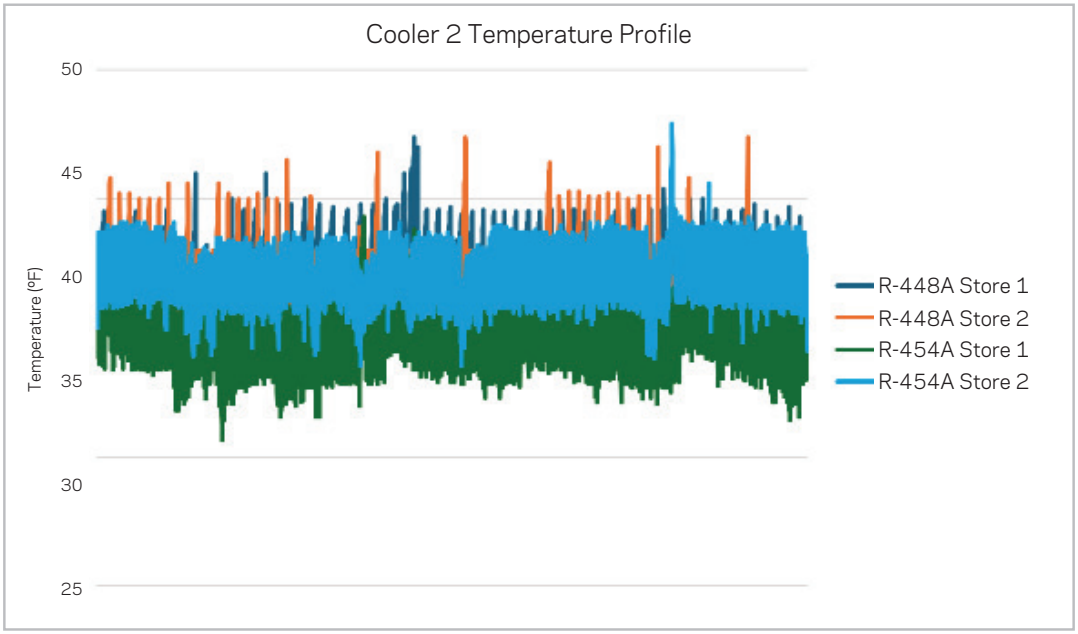
To evaluate performance, two refrigeration systems using R-448A were compared to two systems using Opteon™ XL40 (R-454A) over a three-month period. All four systems were in northern Illinois and used equipment from the same manufacturers, ensuring location and equipment consistency for an accurate comparison.

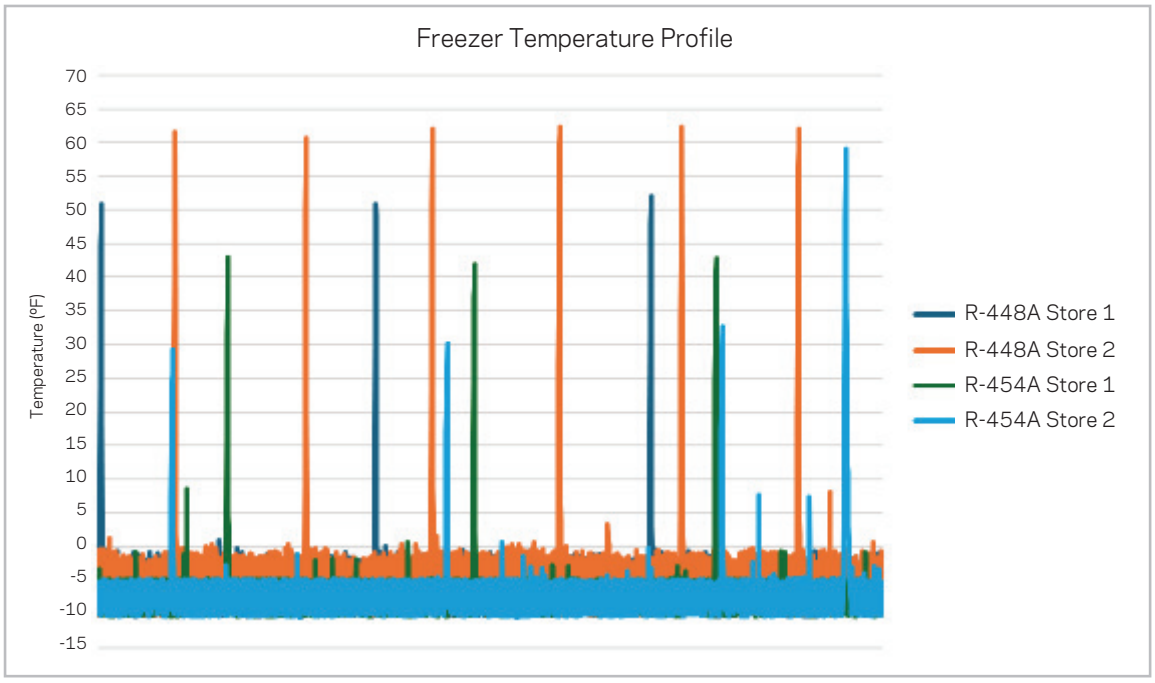


Both R-454A systems in this field trial showed significant energy savings compared to the R-448A systems. However, it's important to note that the R-448A units had already been in use for several years, while the R-454A units were brand new. Although the stores and their cooling demands were similar, the difference in equipment age may have affected the comparison of energy performance. To further validate the performance of the R-454A systems, temperature profiles for the coolers and freezers were monitored during a steady-state period in the R-454A test stores and the two R-448A control stores.

Test Store	Cooler 1 Average Temp (°F)	Cooler 2 Average Temp (°F)	Freezer Average Temp (°F)
R-448A Store 1	35.26	37.01	-5.61
R-448A Store 2	35.82	36.77	-4.79
R-454A Store 1	36.69	35.12	-6.85
R-454A Store 2	37.57	37.17	-6.72







Although the temperature profiles for the coolers and freezers did not match exactly, all coolers and freezers maintained a similar average temperature throughout the test period. This consistency in temperature further supports the significant energy savings achieved from the Opteon™ XL40 (R-454A) units.

Conclusion

Retailers today are challenged to find refrigeration systems that balance sustainability, cost-effectiveness, safety, and efficiency. Opteon™ XL40 (R-454A) stands out as an optimal solution, offering an exceptional combination of energy efficiency, operational simplicity, and environmental responsibility. Field trial results confirm that Opteon™ XL40 (R-454A) systems not only deliver significant energy savings compared to R-448A, but also maintain reliable cooling performance, ensuring product quality and customer satisfaction.

As a next-generation, low-GWP refrigerant, Opteon™ XL40 (R-454A) is an excellent choice for new installs now and into the future.