



# Hussmann & Chemours: Transforming the Future of Refrigeration with Opteon™ XL20 (R-454C)





**Hussmann** is a global leader in the manufacturing of display cases and refrigeration systems for the food industry. The company also provides a wide range of specialized services, including installation, preventive and predictive maintenance, as well as after-sales support for parts and replacements in North America, Latin America, and the Asia-Pacific region.

In collaboration with **Chemours**, a global leader in refrigerant innovation, Hussmann deployed an A2L-based commercial refrigeration system at one of Mexico's most renowned supermarket chains.

## Project Development

This project was developed as a response to the need to modernize a refrigeration system operating with refrigerant Opteon™ XP40 (R-449A), which has a Global Warming Potential (GWP) of 1,397. The initiative focused on the implementation of a lower GWP alternative that balances sustainability with high performance. This industry leading work was carried out by Hussmann Mexico, who led the project's execution and implementation.

The selected refrigerant was **Opteon™ XL20 (R-454C)**, which offers an 89% reduction in GWP compared to R-449A. With a GWP of 148 (AR4), **Opteon™ XL20 (R-454C)** offers an optimal blend of sustainability, performance, and regulatory compliance.

The solution proposed for this application consisted of two distributed systems. Each system incorporated two condensing units: one designed to operate at medium temperature, and another dedicated to freezing applications.

According to ASHRAE Standard 34, **Opteon™ XL20 (R-454C)** has an A2L safety classification, meaning it is lower toxicity and lower flammability. Therefore, it is essential that all installations comply with safety codes and standards.

To monitor and validate the system performance, two data acquisition monitors were installed to measure and assess the performance of both units operating with the new refrigerant over a period of approximately two months. This allowed detailed data to be gathered under actual operating conditions.

The test results exceeded the performance of the previous system, confirming the technical viability and practicality of implementing systems with this new refrigerant. During the evaluation, **Opteon™ XL20 (R-454C)** achieved the desired temperatures delivering excellent refrigeration capacity and energy efficiency (EER), while meeting the store's established operational requirements.

## Main benefits:

The installation, start-up, and commissioning were straightforward and similar to those used for traditional refrigerants, requiring only adherence to the manufacturer's safety recommendations.

- A2L refrigerants such as **Opteon™ XL20 (R-454C)** have demonstrated their ability to deliver a lower total cost of ownership (TCO) compared to other alternatives. The TCO includes the initial investment as well as the operational expenses such as energy consumption and maintenance throughout the system's useful life.
- The installed system features variable speed compressors, electronic expansion valves, and a low GWP refrigerant —elements that taken together, make it 12 to 15% more efficient than the traditional direct-expansion mechanical systems.
- Thanks to the performance characteristics of **Opteon™ XL20 (R-454C)**, the installed system enables one of Mexico's most prominent supermarket chains to comply with the most demanding environmental standards.

If you have a project in mind, do not hesitate in contacting us at:

[infolatam@chemours.com](mailto:infolatam@chemours.com)

800 737 5623 / 55 5125 4907

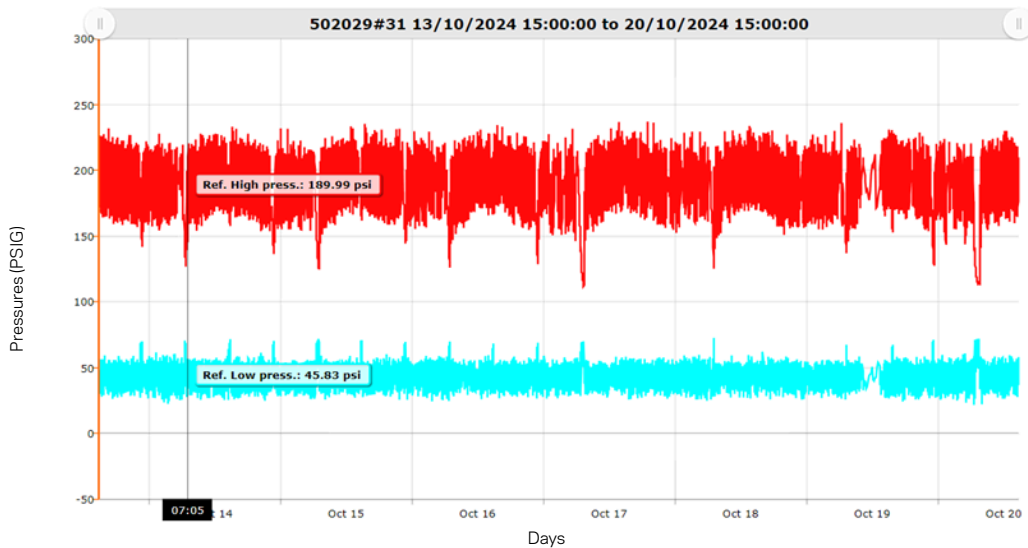


Scan the QR code to learn more about Opteon™ XL20 (R-454C)

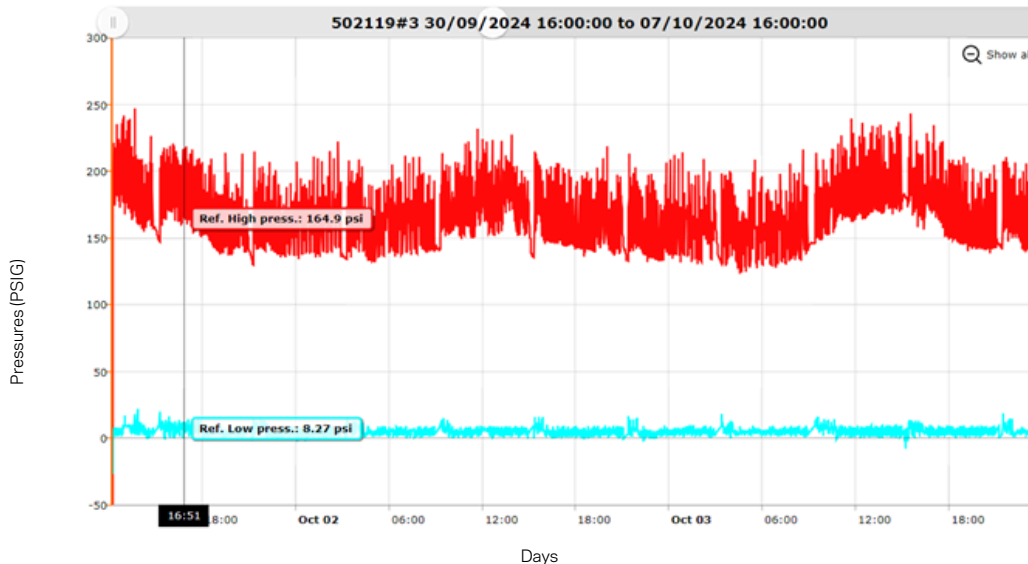
# Supporting Data

In this section, you will find further details on the system operation and the unit performance when using **Opteon™ XL20 (R-454C)**.

## System operating pressures



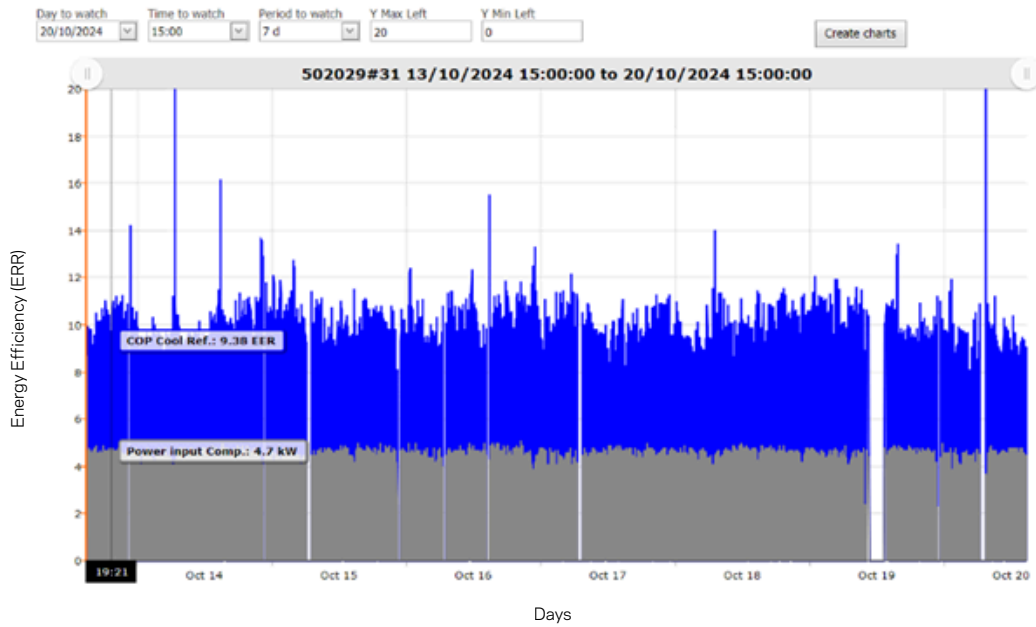
**Figure 1-** Operating pressures of the medium-temperature system using Opteon™ XL20 (R-454C). This refrigerant operates at lower system operating pressures than R-449A, helping to reduce leak potential. Opteon™ XL20 (R-454C) also features a low compression ratio, which translates into reduced amperage demand and lower electrical power requirements.



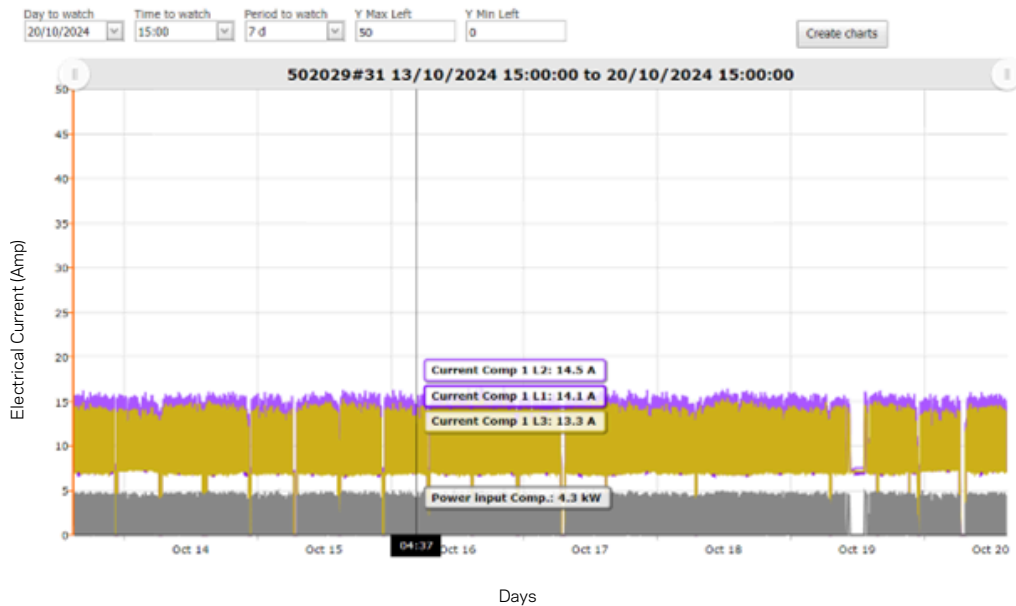
**Figure 2-** Operating pressures of the low-temperature system using Opteon™ XL20 (R-454C). This refrigerant operates at lower operating pressures compared to R-449A, helping to reduce leak potential in refrigeration systems. Opteon™ XL20 (R-454C) also features a low compression ratio, which translates into reduced amperage demand and lower electrical power requirements.

# System Operation

Charts below show the efficiency of the medium temperature system and the compressor power and current consumption.

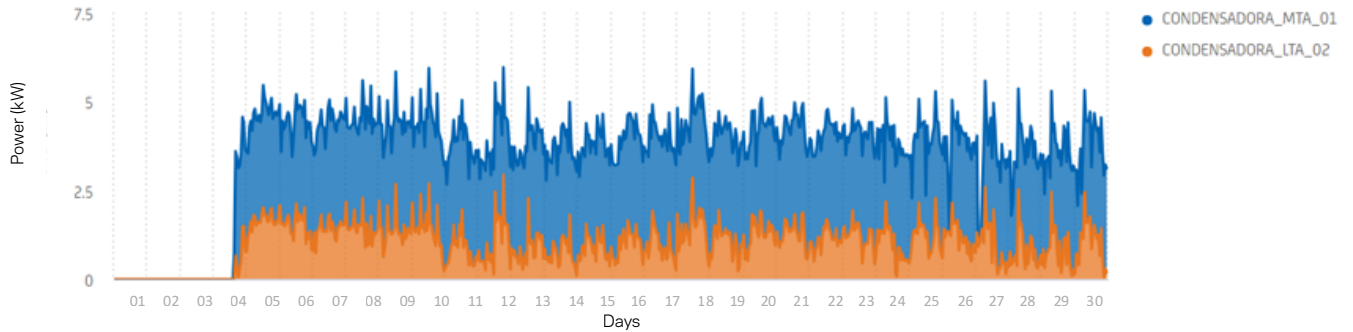


**Figure 3-** The average energy performance of the medium-temperature unit, expressed as EER (Energy Efficiency Rating), is shown in blue, while the average compressor power consumption, expressed as compressor power input, is shown in gray.

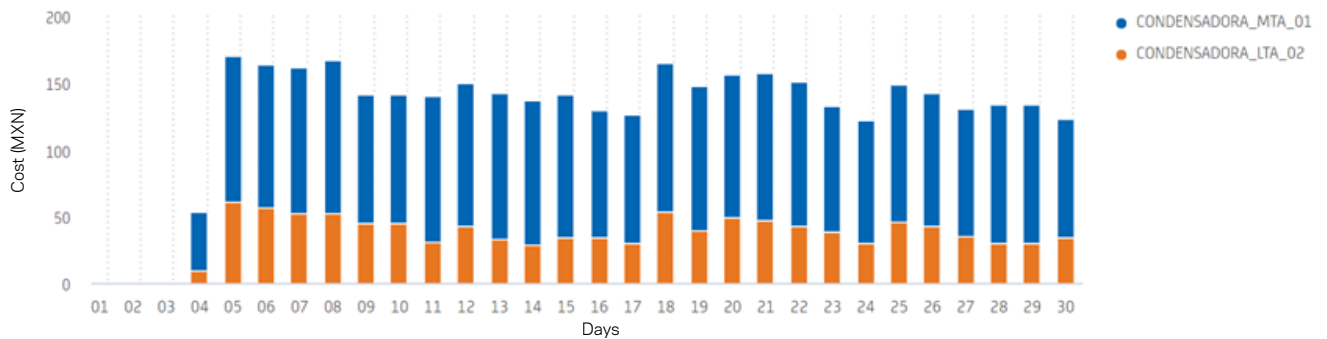


**Figure 4-** Electric current consumption (amperes) per line and compression power consumption.

The following figures display the power demand of the medium temperature (MTA) and low temperature (LTA) system in November 2024, and the energy cost per day in Mexican Pesos (MXN).



**Figure 5-** Electrical power consumption (kW) during the monitoring period for the medium-temperature unit (blue) and the low-temperature unit (orange). This consumption is multiplied by the equipment operating hours to obtain kWh/day.



**Figure 6-** Daily energy cost (MXN) during the one-month monitoring period for the medium-temperature unit (blue) and low-temperature unit (orange).

Technical data is based on sources Chemours believes to be reliable and is intended for readers with appropriate technical and regulatory expertise. Chemours makes no warranties and disclaims all liability related to its use.

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