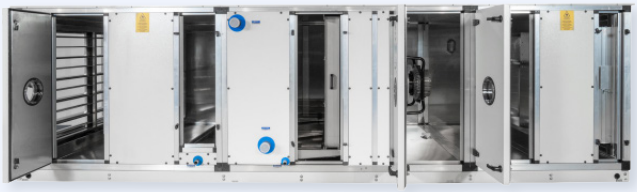
KEEP IT COOL

REFRIGERATION ENGINEERING NEWS *from* **emanuelson-podas** | Q2.24

Building Knowledge about Natural Refrigerants

NATURAL REFRIGERANTS have become a hot topic for discussion among engineers lately. To stay up on the most recent developments and changes, our staff regularly reviews current research on CO2, ammonia, and other approaches, and attends conferences held by such organizations as the International Institute of All-Natural Refrigeration.

Emanuelson-Podas managing partner John Nordstrom, PE, and refrigeration engineer Kevin Galbraith, PE, recently traveled to Orlando, Fla., to attend the 2024 IIAR Natural Refrigeration Conference & Heavy Equipment Expo. In addition to attending presentations on "Heat Pump integration in a Dairy Plant" and "Energy Baselining and Energy Savings," Nordstrom and Galbraith took advantage of the opportunity to connect with equipment manufacturers and other vendors. "One of the coolest things was the opportunity to walk through a hygienic air handler — the kind used in meat processing plants," Galbraith said. "We'd seen diagrams and videos before, but to see the system in person gives you a different perspective."



Hygenic Air Handling Unit © Daikin Industries

The conference also offered engineers an opportunity to compare different compressor packages and talk with peers about what worked and what didn't. "It's really a great chance to interact with other experts," Galbraith continued, "and compare notes on the challenges and benefits of each approach."

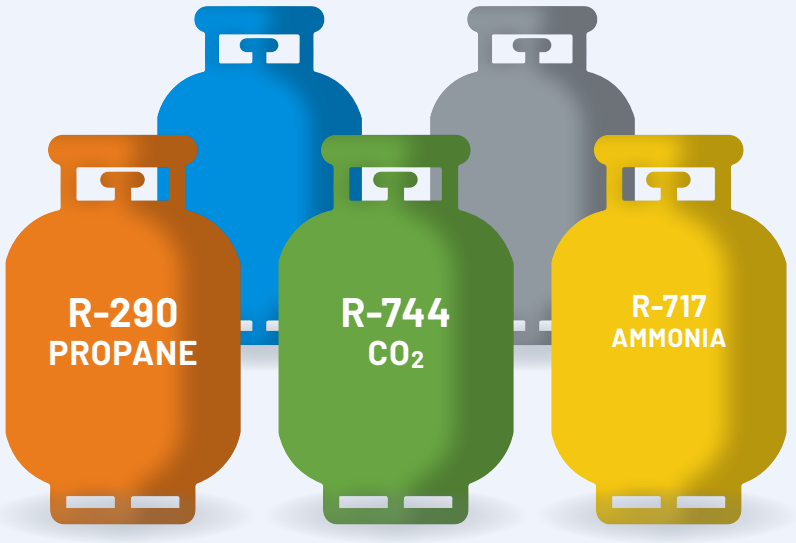
The EPA's New List of Acceptable Refrigerants

The EPA, which regulates the use of refrigerants to reduce environmental impacts, recently issued Final Rule 26, which affects equipment manufacturers, service technicians, and commercial and consumer end users of equipment and products using refrigerants. Here's what you need to know.

What is finalized in the Rule?

- Lists 10 refrigerants as acceptable, subject to use conditions
- Modifies use conditions for R-290 (propane)
- Incorporates latest version of UL 60335-2-89, ASHRAE 15-2022, and ASHRAE 34-2022, bringing them into alignment
- Exempts R-290 in refrigerated food processing and dispensing equipment from the CAA section 608 venting prohibition
- Approves multiple A2L refrigerants, including Ultra Low GWP refrigerants (<150 GWP)

Review the Final Rule 26 Fact Sheet for further details.



A Refrigeration Planning Checklist

DURING THE SCHEMATIC DESIGN PHASE of a project, architects and the engineers assemble local code and client criteria. But what happens then if the design team has little experience in the design type?

This is a common challenge across industry segments, but especially on grocery store projects. For a strong finish on a grocery project, here are items that need to be prioritized throughout design and construction:

1. Understand the type of grocery space.

Grocery stores are characterized as follows:

- Small format
- Full service
- Multichannel/Omnichannel – grocery +
- E-commerce
- Combo/Hybrid
- Warehouse/Club

Each type requires a different approach when it comes to refrigerated spaces. A full-service grocery with the perimeter of a 45,000 square foot store lined with five deck cases will be much different than 25 doors of reach-in display doors in a 100,000 square foot space. The high ratio of refrigerated fixtures will dominate the HVAC loads, energy use, and plumbing.

2. Set aside your assumptions about refrigeration and HVAC.

"Why doesn't the refrigeration manufacturer furnish a curb like on HVAC units?"

A refrigeration unit does not have a supply and return duct routed through a curb. Instead, steel dunnage or raised rails are commonly used.

"Doesn't the cut sheet show all the information?"

There are many options for controls, defrost, and lights that are all listed on the sheet. Such details must be determined and coordinated between the refrigeration engineer, equipment manufacturer, and electrical engineer.

"What sizes do the walk-in boxes come in?"

Grocery boxes typically are built to fit the fixture plan due to the various angles, abnormal sizes. There are limitations on span, however. The manufacturer will not stock an L-shaped 12-foot dairy cooler, for example. A plan outlining temperatures, doors, length, width, and heights of boxes is required.

"Won't a standard HVAC system will work for this space?"

The cooling impact of refrigerated cases skews the load profile of HVAC systems. Cooling impact is highly sensible, lowering temperature more than humidity. Off-the-shelf HVAC units are not designed for this skewed load profile.

"Why does a store in South Florida need heat?"

Refrigerated fixtures make spaces cooler. Your space will need heat.

3. Plan for regular service of refrigeration equipment.

When the project is complete there will be one trade that is on site regularly. Refrigeration! Expect to make service of refrigeration equipment a higher priority than any other mechanical or electrical equipment maintenance. This means well thought space for interior machine rooms — accessible year-round regardless of temperature. Year-round service is required. Ideally, equipment can be kept indoors. A well-planned indoor machine room is an investment that will improve maintainability.

4. Mitigate risk.

When it comes to enclosed spaces, leak detection is always necessary. Most refrigerants used for supermarket refrigeration are ASHRAE Class A1 (see our A2L piece for more info) so the refrigerant is not toxic or highly flammable. A large charge in an enclosed space, however, can still be lethal. Leak detection is also great for asset protection — you can protect food loss in the event of a system failure due to leaked refrigerant.

YOUR EXPERTS IN REFRIGERATION ENGINEERING

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