Flexible Merchandising Gets Cooler

How grocers are adding mobile refrigeration to the retail mix

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The practice of rotating inventory in customer-facing product displays is a common merchandising tactic for grocers, both large and small. Often referred to as flexible merchandising, this strategy provides an opportunity for retailers to highlight seasonal offerings, promote flash sales and maintain a vibrant store appearance — while giving customers the sense that there’s always something new to discover every time they walk through the doors.

With dry goods, these mobile displays can be moved and rotated relatively easily. But what if the displays are full of fresh or frozen local produce that needs to be refrigerated? For refrigeration fixtures to be viable components of a flexible merchandising strategy, they will need to have built-in mobility to move from one location to another.

Unfortunately, common supermarket refrigeration architectures are often inherently incompatible with a flexible approach. Many outlets have fixed layouts in which refrigerated fixtures and piping are literally affixed into the store’s floor plan with pre-determined insets. Moreover, the use of centralized direct expansion (DX) refrigeration — which is common in most supermarkets — also doesn’t lend itself to refrigerated display case flexibility.

Changing supermarket landscape

For retailers seeking to introduce mobile refrigeration into their merchandizing strategies, there are also market conditions driving their system or architecture decisions. A quickly evolving retail landscape must be factored into this equation, as the trend for smaller stores (40k sq. ft. or less) may necessitate a different set of refrigeration requirements. These new outlets, which are becoming especially popular in densely populated urban areas, don’t need the cooling tonnage generated by the standard large, centralized DX strategy.

At the same time, retailer refrigeration criteria are also quickly evolving. It’s a concept that we at Emerson refer to as the Six S’s. Based on a recent research study of several leading food retailers, the following factors were considered most important when preparing for an implementation of a new refrigeration system.

1. **Simple** — Operators are seeking to minimize complexities by using systems that are easy to understand and diagnose. Many associate system simplicity with reliability and believe it can be
achieved with fewer moving parts, traditional system architectures and proven refrigeration strategies.

2. **Serviceable** — Technician familiarity is important to help facilitate ease of service and maintenance activities, and to help ensure the availability of parts and refrigerants. Engine rooms should be located away from customers and be relatively easy to access.

3. **Secure** — Maintaining customer, employee and technician safety while preserving food quality and safety are always top priorities for retailers. With many operators now integrating IoT technologies for more effective facility and enterprise management, securing proprietary operational data is also critically important. Operators seek system architectures that can address these multifaceted safety and security concerns.

4. **Stable** — Grocers consistently cite system stability and reliability as primary selection criteria. Systems should be capable of maintaining consistent temperatures, delivering predictable performance, and working according to design specifications.

5. **Smart** — Electronic controls, system connectivity and integration with facility management services via IoT are becoming more important to modern supermarket operators. They’re evaluating self-monitoring systems that give store managers immediate access to issues, allowing them to take prompt actions to protect shoppers, preserve their brands and prevent unnecessary service calls.

6. **Sustainable** — For those supermarket operators driven by corporate sustainability objectives or regional regulatory requirements, the push toward lower-GWP refrigeration strategies is continuing in earnest. Sustainability also speaks to the long-term economic viability of the refrigeration selection, as operators must factor in the total cost of ownership throughout the lifecycle. Reducing energy consumption to minimize operating costs is a concern shared by all.

**Flexible merchandising refrigeration options**

With retailer preferences and market trends in mind, there are several viable refrigeration architectures that offer varying degrees of flexible merchandising capabilities.

**Distributed** — this strategy is based on installing outdoor condensing units (“OCUs”), essentially allowing compressors and refrigeration systems to be located outside of a facility. Often utilized by smaller-format stores, this approach makes it easier for operators to scale their refrigeration system to the needs of the store. Modern OCUs are quiet, energy-efficient and offer installation flexibility while leaving small physical footprints outside the store. Because they’re typically installed to support refrigerated fixtures in different sections of the store, they offer only limited merchandising flexibility.

**Micro-distributed** — featuring display cases that have the compressors integrated within the case, this emerging system type is becoming more common, especially in smaller-format stores. To remove the compressor exhaust heat, cases are connected to a shared water-cooled loop that’s directed to the roof of the facility for heat removal. These systems utilize a variety of low-GWP refrigerants at low charges, including hydrofluorocarbons (HFCs), hydrofluoroolefins (HFOs) and hydrocarbons such as R-290. The integrated-case with
water loop design enables a greater degree of merchandising flexibility, while still not achieving true mobility.

**Self-contained** — for increased merchandising flexibility, these display cases incorporate the entire refrigeration system within the case — essentially serving as plug-and-play refrigerated units on wheels. Due to the size of the refrigeration system, they typically do not require large refrigerant charges. These systems use a variety of low-GWP HFC and HFO refrigerant options, and are among the most common applications for low-charge, R-290 applications. For larger-format stores with a centralized DX system, incorporating these self-contained display cases is a logical means of achieving refrigerated case flexibility.

It’s important to remember that in the U.S., the use of R-290 or other A2Ls may require the approval of local authorities having jurisdiction (AHJ). Despite that, these systems have seen wide adoption with major U.S. retailers; for more than a decade, they’ve been widely accepted in Europe, where the use of natural refrigerants is much more commonplace.

**Meeting a variety of emerging industry needs**

As refrigeration technologies evolve to address changing industry dynamics, look for emerging system architectures that help meet the needs for flexible merchandising and smaller store footprints. Manufacturers are answering the call by innovating new systems and blending pieces of proven architectures — borrowing from what has worked in the past and improving upon existing technologies.

Retailers are working with manufacturers around the globe in field trials that address a full spectrum of emerging refrigeration requirements. Many of these trials focus on systems that utilize lower-GWP, HFO refrigerants designed to meet improved environmental goals and address regional regulatory compliance.

While flexible merchandising will continue to be a growing area of emphasis, refrigeration system integration within a complete facility ecosystem is quickly becoming a key requirement for future architectures. Retailers are seeking self-diagnosing systems with always-on connectivity — helping them to quickly and easily address issues that impact their operators while reducing their reliance on the ever-declining pool of qualified technicians.

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**More than just refrigeration**

The refrigeration decision is no longer made in a vacuum. Modern retailers are seeking a more holistic approach to complete facility management, where refrigeration is just one of a multitude of factors:

- Energy optimization of entire ecosystems
- HVAC
- Ovens and other heat sources
- Hot and cold thermal storage
- Lighting systems
- Equipment connectivity, remote facility monitoring and intuitive systems for fast response and reaction
- Enterprise/network optimization and management
- Food quality and safety monitoring and reporting

Refrigeration systems are more commonly being integrated into a larger facility strategy that helps retailers seamlessly manage their entire operational footprint.