

Article | Online Grocery

Why the rise of **online grocery shopping** requires a new approach to refrigeration

The pandemic has prompted a change in consumer shopping habits. Indeed, many have switched to buying groceries online, whether choosing home delivery or click-and-collect. But for OEMs working in food retail, this switch to e-commerce requires new refrigeration solutions.

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With online grocery shopping looking to sustain a 10%* growth post-COVID , click-and-collect models—including local distribution centers, supermarket drive-ins, and refrigerated food lockers—are increasingly viable, bringing new opportunities and challenges when it comes to maintaining food temperature.

Unlocking new alternatives to the expensive last mile

Online grocery shopping isn't new, and delivery services have been growing in popularity for years. However, the cost of last-mile delivery can outweigh its benefits. High vehicle maintenance and running costs result in a high delivery cost for every order. And last-mile storage temperatures can be difficult to control, potentially compromising food quality—from the frozen lettuce to the melted ice cream. Reliable refrigeration and monitoring solutions are needed to maintain the cold chain during the transport.

Micro-fulfilment centers, shortening delivery trips, are one alternative. Another is local pick-up points or food refrigeration

lockers—with individual cells for different products—enabling customers to collect their order from a convenient location. They're efficient, minimize delivery and maintenance costs for retailers, and significantly reduce labor. But developing these lockers isn't an easy task. It requires the right equipment and expertise.

Creating standalone refrigeration lockers is a complex process. Each locker needs to withstand conditions outside, and to be closely monitored, to guarantee food safety. And when you're storing different types of produce—for example, storing meat alongside tomatoes—you'll need to incorporate different temperature zones. It's like fitting an entire supermarket into a closet.

What do OEMs need to consider when developing outdoor grocery refrigeration?

There are several factors for you to consider when designing sustainable, efficient refrigeration solutions to enable grocery storage outside a store:

* www.nytimes.com

Monitoring

In many parts of the world, food retailers need to comply with Hazard Analysis and Critical Control Point (HACCP) standards for food hygiene and safety. That requires them to accurately monitor control points, such as temperature—which might be difficult across a network of remote locations. Thankfully, digital solutions can help.

With smart remote monitoring, retailers will be able to protect perishable stock, align with regulations, and reduce food loss costs. For example, solutions like IoT enablers and cloud services—available in the Danfoss Alsense Food Retail range—can connect the locker to the cloud, enabling 24/7/365 temperature monitoring and alarms, remote control and management, and even automatic HACCP records.

And the Danfoss IoT portfolio offers flexible solutions, including very simple GSM, app-based monitoring solutions. These can be integrated into the retailer's own central monitoring system, as well as the Danfoss Alsense services.

Durability and efficiency

Many of these lockers will be situated outside. So they need to withstand adverse weather conditions, urban pollution, and high humidity. At Danfoss, we have a portfolio of highly durable solutions to ensure robust refrigeration. Our products, such as our compressors, have been used in various rugged applications—including refrigerated road transport and reefer shipping containers.



Efficiency and performance are also key considerations. Our portfolio of ball, solenoid, and thermostatic expansion valves provide accurate superheat control and ensure maximum energy efficiency.

Complex temperature control

For multi-zone lockers, the temperature in every cell needs to be precisely maintained—despite the wide range of ambient temperatures that potentially come with an outdoor location.

These conditions require the right compressor for positive and negative temperature applications. For a refrigerated locker, a drive-in cold room or a larger micro fulfillment center, a Danfoss variable or fixed-speed scroll or reciprocating compressor would work well. Danfoss light commercial compressors are a better choice for smaller applications – providing high cooling capacity and reliable operation in a compact design.

With an electronic thermostat and electronic controller, you can ensure a higher accuracy of the temperature as well as optimizing the compressor, fan, or defrost control. This generates higher efficiency and, in turn, reduces energy costs.

Energy efficiency and refrigerants

Low energy use is important to control costs, and minimize environmental impact.

Micro channel heat exchangers are a great fit to achieve this. They're highly energy efficient (especially compared to traditional fin-and-tube condensers), made of lightweight, corrosion-resistant aluminium, and can reduce refrigerant charge by up to 30%.

Refrigerants are another key environmental factor. To ensure your design aligns with tightening F-refrigerant regulations, our entire portfolio of products is qualified for use with low-GWP A2L and A3 refrigerants.

R290 refrigerant is a promising option for this application—but given its flammable nature, it will need to be subject to certain safety and location precautions. Siting is also an issue for component choice; if the locker is located in a residential area or near offices, OEMs will need to opt for low-noise components.

A partner with the right expertise, portfolio, and testing facilities

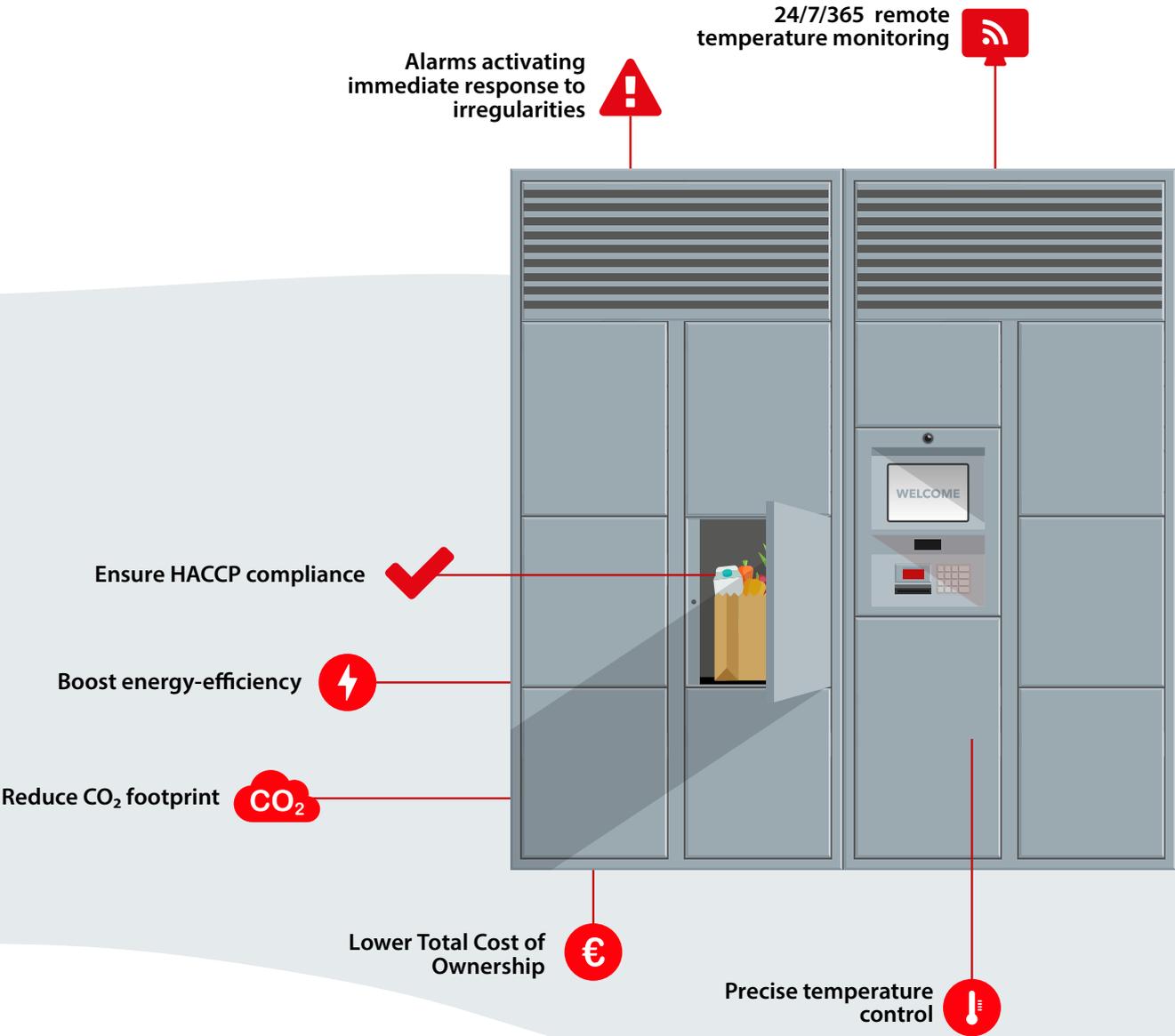
At Danfoss, we have decades of experience in developing cooling solutions, a comprehensive product portfolio, and cutting-edge testing facilities such as our Application Development Centers located around the world to support our customers. If you're creating a design for a new kind of refrigeration technology, we're here to help.

In fact, we've already helped several of our customers—including one of the largest retail technology providers in Europe—to develop and test complex refrigeration units. With multiple temperature zones to maintain, they needed the right equipment and tools to ensure constant, reliable temperature in each one.

By delivering a full portfolio of compressors, valves, condensers and more, qualified for use with R290 and A2L

refrigerants, we helped them develop and test a new range of grocery lockers—delivering precise temperature control, alarm monitoring. Today, they're being rolled out across Europe.

To find out more about how Danfoss can help you develop your refrigeration lockers and accelerate online fulfilment, visit cr.danfoss.com and search for the lockers application dedicated page.



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