

Going with the grain

Specialty wood fixture refrigeration OEM exceeds regulatory mandates.





When it comes to complying with Environmental Protection Agency (EPA) and Department of Energy (DOE) regulations, OEMs of self-contained commercial refrigeration equipment were among the first to face this challenge. But when you're an OEM whose core principles are based on environmental sustainability—e.g., JSI Store Fixtures of Bangor, Maine—clearing these regulatory hurdles is just the cost of doing business.

So, in 2014, when the DOE mandated 30–50 percent reductions in energy consumption on stand-alone commercial refrigeration equipment by March 27, 2017, leadership at JSI saw the new efficiency standard as an opportunity to revamp its refrigeration platform. Duane Hollowell, JSI's director of refrigeration, said that the regulation was in alignment with the goals of the company's commercial refrigeration business unit.

"While we were eager to get out in front of the regulatory deadline, we were even more motivated by the prospect of reducing energy for our customers," said Hollowell.



JSI fixtures help to improve the presentation of a grocer's produce section while preserving food quality.

The OEM began working with its component suppliers in 2014 to begin the design, testing and DOE certification processes. At the same time, the EPA proposed the phase-out of commonly used HFCs in stand-alone commercial refrigeration equipment—a ruling that would become final in the summer of 2015 with a compliance date of 2019. For OEMs like JSI, this presented a design dilemma: comply with each regulation separately or combine compliance efforts into a single design cycle.

Hollowell said that Copeland's stewardship in the regulatory arena, combined with its proven expertise in compressor and electronic controls technology, helped enable the JSI team to tackle both DOE and EPA compliance requirements in the same design cycle. JSI tapped the resources of Copeland's Refrigeration and Integrated Products group to develop an optimized, high-efficiency condensing unit that would serve as the basis of its wooden refrigeration fixture platforms.

The condensing unit features Copeland components, including: compressor, flow control and unit controller to facilitate tighter refrigeration control and an efficient assembly process into JSI's refrigeration equipment. To make sure the new units met required energy objectives, JSI also utilized the DOE test validation and certification services of Copeland's Design Services Network (DSN).

"We needed a partner that understood the two sides of this equation and could lead us down both paths in parallel," stated Hollowell. "We worked closely with all our component suppliers to make sure we were using the best equipment available to meet these challenges," he added.

Completion of design, testing and certification

By the end of Q4 2016, JSI had completed the DOE certification process on 46 of its standard products, well ahead of the 2017 deadline. The effort required the commitment and dedication of the OEM's strategic suppliers and partners, including an electronically commutated evaporator fan motor manufacturer, a third-party testing provider and Copeland's DSN resources. In addition, JSI invested in an in-house testing facility where its units were ultimately rated for final certification.



To get out in front of the EPA's HFC refrigerant ban in 2019, JSI opted to design its new stand-alone units to be "R-448A ready"—as the industry waits for the EPA to list new refrigerants R-448A/449A as acceptable for use through its Significant New Alternatives Policy (SNAP) program. Hollowell said this decision was based on a desire to align with the general direction the industry was heading and not impose difficult operating and servicing requirements to their customers.

"There's still no clear leader in the new refrigerant race, but with Copeland's guidance, we thought R-448A seemed to make the most sense and would cause the least disruptions to our customers' current infrastructures," said Hollowell. Until the SNAP listing is received, JSI continues to use R-404A in the production of its products today.

Hollowell added that once they had achieved the energy efficiency threshold, completing the certification and submittal process proved to be equally challenging. Per DOE standards, this required

the building of an alternative efficiency determination method (AEDM) database on the new equipment. Each base model had to be tested twice, and any variations to these models had to be documented. And since JSI also sells to customers in Canada, they were tasked with complying with Natural Resources Canada as well. The final step in the process was registration in the DOE's compliance certification management system (CCMS) database—a step that must be completed for qualifying models each year.

Hollowell said that without the support of Copeland's DSN and other provider partners, completing this process would have been nearly impossible.

"When you stop and think about all that's required—electrical safety, sanitation listings, DOE compliance, EPA readiness—covering all those bases is not something many smaller OEMs are equipped to handle," explained Hollowell. "For other OEMs going through this process, I would urge them to lean on the expertise and best practices of their own supplier networks," he added.

Carving out a green niche in commercial refrigeration



JSI is a relatively recent entrant into the commercial refrigeration market. The company's background in wood store furnishings for merchandising enabled them to quickly carve out a specific niche in refrigeration. In just a few short years, this niche has led to an ever-expanding customer base that spans the continental United States and extends north into Canada. Grocers use JSI's beautiful, eye-catching display cases to improve point-of-sale product merchandising and preserve food quality. From the careful selection of wood types and grains to decisions impacting a fixture's design, JSI considers every detail when producing these state-of-the art refrigeration units.

When Hallowell joined the company in 2013, JSI was just beginning to formalize their refrigeration offerings. Since that time, he has helped the

company implement lean manufacturing principles to improve production efficiencies and develop strategic partnerships with leading component suppliers to leverage their technologies and insights. These actions have led to the development of standardized product lines with an increased emphasis on quality, all while keeping costs down for their growing customer base. With a doctorate in environmental sustainability and background in refrigeration, Hallowell is committed to instilling these core values in the company's refrigeration division.

Hallowell explained that the process of achieving regulatory compliance translated into a 300 percent increased investment in engineering resources.

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