DESIGN & ENGINEERING SERVICES

ENERGY IMPACT OF NEW FDA FOOD CODE ON A DAIRY DISPLAY CASE

Testing at the Refrigeration Technology and Test Center showed that dropping the product core temperature in a dairy case by 4˚ F could increase power consumption by as much as 31 percent.

Today's store operations are sensitive to even minor changes in product temperature codes.

Supermarkets in Southern California operate on a narrow profit margin, meaning that overhead costs can directly impact their competitiveness. Electric energy usage is a major component of their overhead costs, and in some cases it can exceed their profit margins. Since supermarkets' annual electric energy costs depend heavily on the energy usage of their refrigeration systems, store operations are sensitive to changes in food and energy codes.

For additional protection against foodborne illnesses, supermarkets must now lower the core temperature of potentially hazardous food products by 4˚ F, according to a Food and Drug Administration (FDA) requirement. The FDA's 1993 Food Code reduces the core temperature requirement from 45˚ F (7.2˚ C) to 41˚ F (5˚ C), which potentially increases the stores' refrigeration load.

To help its supermarket customers make smart equipment decisions as they comply with the FDA code, Southern California Edison (SCE) conducted a test to evaluate the code's impact on power use and **performance of a multi-deck display case commonly used for storing dairy products.**

Edison conducted this test at its state-of-the-art Refrigeration Technology and Test Center (RTTC) located in Irwindale. The RTTC's sophisticated instrumentation provided detailed tracking of the refrigeration system's critical temperature and pressure points. SCE engineers then used these readings to determine various heat transfer and power-related aspects in the refrigeration cycle.

The bottom line: SCE's testing of the dairy display case indicated that the FDA's temperature recommendation may increase supermarkets' power consumption by 31 percent and their cooling load by 15 percent.

Read on to learn more about how this new code can affect your store's refrigeration performance.

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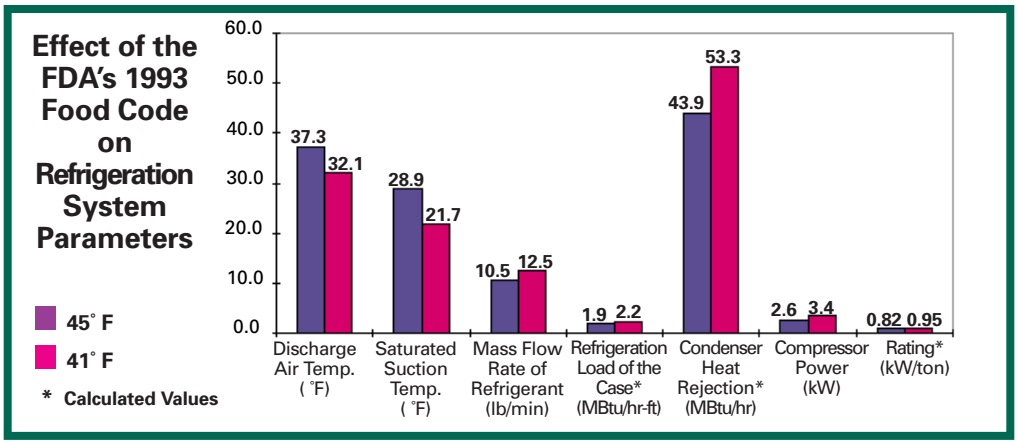
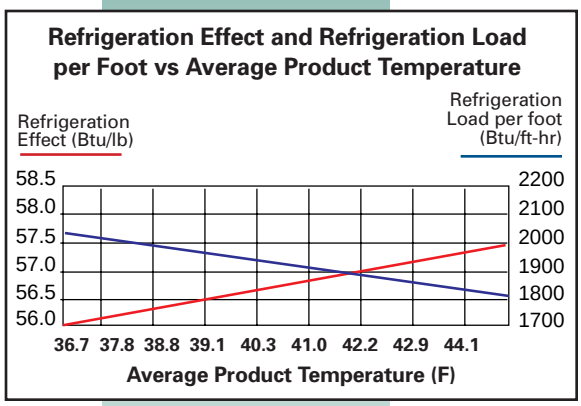
RTTC Test Shows FDA Code Can Increase Dairy Case Energy Use





FOOD CODE BASED ON PREVENTION

The focus of the FDA Food Code is preventing problems in store operation rather than detecting them in the food product. This code represents the FDA's best advice for a uniform system of regulation to assure that food at the retail level is safe and properly protected.

The code applies to the products' core temperature, not the air temperature within the case. It requires that the refrigeration temperature of so-called "hazardous foods" (including meat, dairy, deli, fish, poultry and cut produce) be lowered from 45˚ F to 41˚ F throughout packaging, shipping, receiving, loading and storing. This requirement also applies during the entire refrigeration cycle, including the defrost periods.

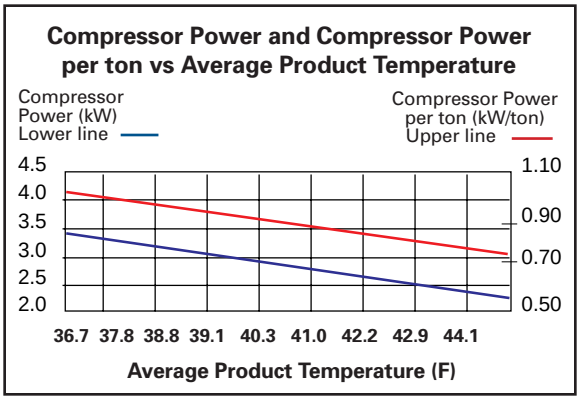
RTTC TEST CONDITIONS

To determine the energy impacts of compliance with this FDA requirement, SCE engineers tested a typical multi-deck dairy display case in a controlled environment maintained at 75˚ F at 50 percent relative humidity, and served by a refrigeration system using a hydrofluorocarbon (HFC) refrigerant, R-404A. The results of their testing showed that the FDA's 1993 temperature recommendation can noticeably increase the refrigeration load and power consumption of dairy display cases. (See the chart above.)

ADDITIONAL FINDINGS

The RTTC testing revealed that the variation of product temperature between the top and bottom shelves may cause a problem with targeting and maintaining a uniform product temperature to comply with the FDA requirements. This may create undesirable cold temperatures for product located on top shelves when the temperature of the product on the bottom shelves is targeted to comply with the code.

SCE engineers determined that product temperatures should be lowered below the FDA's requirement, so that by the end of the defrost cycle, the product does not exceed the allowable temperature limits. However, under this condition, some under- or over-cooling of the products may occur that could adversely impact the quality, safety and shelf life of the products.



FOR MORE INFORMATION

about how Southern California Edison's Refrigeration Technology and Test Center can help you improve your company's energy efficiency and profit margin, call your SCE account executive, or call the RTTC at (626) 812-7660, or visit www.sce.com

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