

Target Corporation

Refrigeration Engineering Department

Comments on Section 127 Mandatory Requirements for Supermarket Refrigeration, California Title 24

Docket Number 10-BSTD-01

Subject: April 18, 2011 Staff Workshop- 2013 Building Energy Efficiency Standards

Target's Refrigeration Engineering is submitting the following comments concerning the proposed language for Title 24 Draft Language for supermarket refrigeration.

SECTION 127 – MANDATORY REQUIREMENTS FOR SUPERMARKET REFRIGERATION

Retail food stores with 8,000 square feet or more of conditioned area or more, and that utilize either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units, shall meet the requirements of this section.

(a) Condensers. Fan-powered condensers shall conform to the following requirements.

1. All condenser fans for air-cooled condensers, evaporative-cooled condensers, air- or water-cooled fluid coolers or cooling towers shall be continuously variable speed, with the speed of all fans serving a common condenser high side controlled in unison.

2. The refrigeration system condenser controls for systems with air-cooled condensers shall use

variable-setpoint control logic to reset the condensing temperature setpoint in response to ambient drybulb temperature.

3. The refrigeration system condenser controls for systems with evaporative-cooled condensers shall use variable-setpoint control logic to reset the condensing temperature setpoint in response to ambient wetbulb temperature.

Target comment: Item 3 states "...in response to ambient wetbulb temperature". The intent of the language is to require condenser control based on a single variable value. Accurately measuring wetbulb temperature is challenging, especially in an outdoor environment. We ask that the committee consider expanding the language to include the options of sump temperature, dry bulb temperature or head pressure. Devices for measuring the temperature of the water in the sump, the dry bulb temperature or head pressure are easier to obtain, more reliable and are lower cost.

EXCEPTION 2 to Section 127 (a) 5: Existing condensers that are reused for an expansion or remodel.

6. Air-cooled condensers shall have a fin density no greater than 10 fins per inch.

Target comment: Item 3 sets a requirement for a "fin density no greater than 10 fins per inch". While we support the requirement in general we feel that the main benefit is reduced maintenance and is not appropriate for an energy code.

EXCEPTION 2 to Section 127 (b) 1: Suction groups that have a design saturated suction temperature of 30°F or higher, or suction groups that comprise the high stage of a two-stage or cascade system or that primarily serve chillers for secondary cooling fluids.

2. Liquid subcooling shall be provided for all low temperature parallel compressor systems with a design saturated suction temperature of -10°F or lower, with the subcooled liquid temperature maintained continuously at 50°F or less, using compressor economizer port(s) or a separate parallel medium or high temperature suction group operating at a saturated suction temperature of 18°F or higher.

Target comment- *We agree with and support the requirement for subcooling on parallel compressor racks we ask for clarification of the point of measurement for the 50° requirement. The goal of the language is to establish a maximum subcooled liquid temperature. We ask that the committee clarify the language and establish a fixed point in the refrigeration system where the liquid temperature shall be measured.*

Liquid temperature can be measured in several locations. For example, a liquid temperature at the outlet of a subcooler may be measured at 50° however the same fluid at the expansion valve may be significantly warmer due to parasitic heat gain.

Requiring a liquid temperature of 50° at the expansion valve will require the liquid line to be insulated, the subcooler to be larger and will provide improved subcooling at the evaporator. It will also improve the efficiency of the system when compared to 50° at the subcooler outlet.

(c) Display Cases.

1. Lighting in refrigeration display cases, and lights on glass doors installed on walk-in coolers and freezers shall be controlled by either A or B:
 - a. Automatic time switch controls to turn off lights during non-business hours. Use of timed overrides to turn the lights for stocking shall not exceed one hour for any case line-up or walk-in and if manually imitated shall time-out automatically.
 - b. Motion sensor controls on each case that reduce display case lighting power by at least 50% within 30 minutes after the area near the case is vacated.

(d) Refrigeration Heat Recovery

1. Refrigeration and HVAC systems shall utilize 25% or more of the design Heat of Rejection of all refrigeration systems for space heating.
2. The increase in HFC refrigerant charge for associated with refrigeration heat recovery shall be no greater than 20% of the total refrigerant charge without heat recovery, or 0.50 lbs per 1.000 BTU/Hr of heating capacity, whichever is less.

Target comments:

Item 1: The inclusion of the term “HVAC” requires that the air conditioning system be designed with hot-gas reheat and is outside of the scope of Title 24, Section 127, Supermarket Refrigeration. The requirement for HVAC would be better placed in a different section.

The phrase “all refrigeration systems” can be interpreted to mean individual spot merchandisers and pop coolers located in point of sale locations throughout the store. This will require a different system design for those pieces of equipment as well as a unique engineered system to remove heat from the condenser and move it to the heat reclaim coil. The amount of heat recovered from the equipment will likely not be worth the expense of the required piping system.

Item 1 also requires the heat to be used for space heating. In some areas of California during specific seasons there will not be need for heat nor there a need to use the heat for dehumidification. The intent of the language is to require heat recovery and to put the energy to useful work. We ask that the committee consider expanding the language to include water heating.

**TITLE 24 PART 11 - CALIFORNIA GREEN BUILDING STANDARDS CODE
REQUIREMENTS FOR SUPERMARKET REFRIGERATION**

(a) CO₂ Indirect or Cascade Cooling Systems

Tentative pending additional stakeholder input and clarification on TDV values:

1. Cooling for all refrigerated display cases and walk-in coolers and freezers shall be provided using carbon dioxide (CO₂), connected to compressors as a direct expansion refrigerant, or as a phase-change indirect cooling fluid.

EXCEPTION 1 to Section TBD (b) 1: Stores with less than 20,000 square feet of sales area.

EXCEPTION 2 to Section TBD (b) 1: Existing compressor systems that are reused for an expansion or remodel.

Target comments: *Exception 1 establishes the requirement to use CO₂ in facilities with greater than 20,000 square feet of sales area. We ask that the committee consider establishing the requirement for CO₂ based on the connected refrigeration load or required refrigeration horsepower.*

The current language requires that point-of-sale refrigerators, like beverage coolers located near cash registers as well as spot merchandisers use CO₂ as a refrigerant.

The intent of the language is to move the industry towards low ODP and low GWP refrigerants. The language also assumes that CO2 is the final answer to both problems. While the environmental impact of CO2 is well known, the application of the technology within the United States is limited. We ask that the committee further consider the practical limitations of the technology equipment availability, acceptance within Mechanical Codes and training of mechanics before mandating the use of CO2. We are concerned that the energy code will be ahead of the technology.

The current language limits innovation. Requiring the use of CO2 will prevent the development of new, environmentally friendly refrigerants that may have better performance characteristics than CO2. The language also prevents the application of other natural refrigerants.