THE CALIFORNIA ENERGY COMMISSION | EFFICIENCY DIVISION

Commercial Refrigeration

When do the Standards Apply?

The **2016 Building Energy Efficiency Standards** (Energy Code) has requirements for new and altered commercial refrigeration systems in retail food stores with 8,000 square feet or more of conditioned area that have refrigerated display cases, walk-in coolers, or walk-in freezers connected to remote compressor or condensing units.

Requirements for commercial refrigeration systems can be found in the California Code of Regulations, Title 24, Part 6, §120.6(b). The requirements for commercial refrigeration systems are mandatory and may not be traded off when using the performance method of compliance.

What are the Requirements?

Condensers

The Energy Code has requirements for new condensers. However, new condensers that are replacing existing condensers are exempt from these requirements if the attached compressor system total heat of rejection does not increase, and less than 25 percent of both the attached compressors and display cases are new.

- New air-cooled condensers must have a fin density no greater than 10 fins per inch unless it is a microchannel condenser.
- The condenser controls must use variable-setpoint control logic to reset the condensing temperature setpoint in response to ambient temperature in accordance with the following temperature type:
  - » Air-cooled condensers: drybulb.
  - » Evaporative-cooled condensers: wetbulb.
- The minimum condensing temperature setpoint must be less than or equal to 70°F.
- All condenser fans for air-cooled condensers, evaporative-cooled condensers, air or water-cooled fluid coolers or cooling towers must be continuously variable speed, with the speed of all fans serving a common condenser high side controlled in unison.
- Fan-powered condensers must meet the specific efficiency requirements listed in Table 1 with the following exceptions:
  1. Condensers with a total heat of rejection capacity of less than 150,000 Btuh at the specific efficiency rating condition.
  2. Stores located in Climate Zone 1.
  3. Existing condensers that are reused for an addition or alteration.

TABLE 1: FAN-POWERED CONDENSERS - SPECIFIC EFFICIENCY REQUIREMENTS

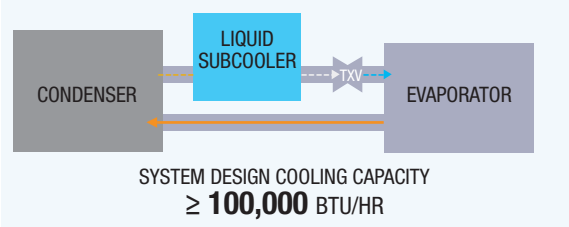
CONDENSER TYPE	MINIMUM SPECIFIC EFFICIENCY	RATING CONDITION
Evaporative-Cooled	160 Btuh/W	100°F Saturated Condensing Temperature, 70°F Entering Wetbulb Temperature
Air-Cooled	65 Btuh/W	105°F Saturated Condensing Temperature, 95°F Entering Drybulb Temperature

Compressor Systems

New refrigeration compressor systems and condensing units must conform to the following requirements:

- Compressors and multiple-compressor suction groups must use floating suction pressure logic to reset the target saturated suction temperature based on the display case or walk-in temperature setpoint with the following exceptions:
  1. Single compressor systems that do not have continuously variable capacity capability.
  2. Suction groups that have a design saturated suction temperature of 30°F or higher.
  3. Suction groups that comprise the high stage of a two-stage or cascade system.
  4. Suction groups that primarily serve chillers for secondary cooling fluids.
- Liquid subcooling must be provided for new low temperature compressor systems with a design cooling capacity greater than or equal to 100,000 Btu/hr and a design saturated suction temperature of -10°F or lower with the following exception:
  1. Low temperature cascade systems that condense into another refrigeration system rather than to ambient temperature.
- When liquid subcooling is required, the subcooled liquid temperature must be maintained continuously at 50°F or less at the exit of the subcooler using one of the following methods:
  - » Compressor economizer port(s).
  - » A separate suction group operating at a saturated suction temperature of 18°F or higher.

System diagram with liquid subcooling



Source: California Energy Commission Video - Mandatory Requirements for Commercial Refrigeration

Refrigerated Display Cases

Lighting in refrigerated display cases, and lights on glass doors installed on walk-in coolers and freezers shall be controlled by one of the following:

- Automatic time switch controls that turn off lights during nonbusiness hours. Timed overrides may be used to turn the lights on for up to one hour. Manual overrides must turn the lights off after one hour.
- Motion sensor controls on each case that reduce display case lighting power by at least 50 percent within 30 minutes after the area near the case is vacated.

Refrigeration Heat Recovery*

New refrigeration systems must utilize refrigeration heat recovery for the benefit of space heating and must comply with the following requirements:

- The recovered heat must be 25 percent or more of the sum of the design total heat of rejection of all refrigeration systems that have individual total heat of rejection values of 150,000 Btu/h or greater at design conditions.
- The increase in hydrofluorocarbon refrigerant charge associated with refrigeration heat recovery equipment and piping must not exceed 0.35 lbs per 1,000 Btu/h of heat recovery heating capacity.

* Refrigeration heat recovery requirements do not apply to stores located in climate zone 15.

Refrigerated display case

Source: California Energy Commission Video - Mandatory Requirements for Commercial Refrigeration