

When Does the Energy Code Apply?

The 2022 Building Energy Efficiency Standards (Energy Code) apply to all refrigerated warehouses and refrigerated spaces served by a single refrigeration system where the sum of the refrigerated spaces is greater than or equal to 3,000 square feet. The Energy Code definition of a refrigerated warehouse is:

“A building or a space greater than or equal to 3,000 square feet constructed for storage or handling of products, where mechanical

refrigeration is used to maintain the space temperature at 55°F or less.”

The energy requirements specific to refrigerated warehouses can be found in Section 120.6(a) of Title 24, Part 6. The requirements for refrigerated warehouses are mandatory and must be met or exceeded.

What Is Covered?

Insulation

Exterior surfaces of refrigerated warehouses must be insulated, at a minimum, to the R-values from Table 120.6-A.

Underslab Heating

Electric resistance heat must not be used for underslab heating unless it is thermostatically controlled and disabled during the summer on-peak period defined by local electric utility.

Evaporators

- Single-phase fan motors less than 1 horsepower (hp) and less than 460 volts in newly installed evaporators must be electronically commutated motors or must have a minimum motor efficiency of 70 percent when rated in accordance with National Electrical Manufacturers Association (NEMA) Standard MG 1-2006 at full-load rating conditions.
- Evaporator fans served either by a suction group with multiple compressors or by a single compressor with variable capacity capability must be variable speed, and the speed shall be controlled in response to space temperature or humidity. When served by a single, non-variable speed compressor, airflow must be reduced by at least 40 percent for at least 75 percent of the time when the compressor is off.*

Condensers

- The design saturated condensing temperature setpoint must be based on local design conditions.*
- The minimum condensing temperature setpoint must be 70°F or less and be reset in response to ambient temperature.*
- Fans 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 efficiency requirements listed in Table 120.6-B where the efficiency is defined as the “total heat of rejection” (THR) capacity divided by all electrical input power, including fan power at 100 percent speed and power of spray pumps for evaporative condensers.*
- Air-cooled condensers shall have a fin density no greater than 10 fins per inch unless it is a micro-channel condenser type.

Compressors

- Compressors must be designed to operate at a minimum condensing temperature of 70°F or less for non transcritical CO₂ systems and 60°F or less for transcritical CO₂ refrigeration systems.*
- Open-drive screw compressors with a design saturated suction temperature (SST) of 28°F or lower that discharges to the system condenser pressure must control compressor speed in response to the refrigeration load.*
- Screw compressors with nominal electric motor power greater than 150 HP must include the ability to automatically vary the compressor volume ratio (Vi) in response to operating pressures.

Infiltration Barriers*

Passageways between freezers and higher-temperature spaces and passageways between coolers and nonrefrigerated spaces must have an infiltration barrier consisting of strip curtains, an automatically closing door, or an air curtain.

Refrigeration System Acceptance

- The following acceptance tests, as specified in Reference Nonresidential Appendix NA7, must be completed as applicable:
- Electric resistance underslab heating systems are tested in accordance with NA7.10.1.
- Evaporator fan motor controls are tested in accordance with NA7.10.2.
- Evaporative condensers are tested in accordance with NA7.10.3.1.
- Air-cooled condensers are tested in accordance with NA7.10.3.2.
- Adiabatic condensers shall be tested in accordance with NA7.10.3.3.
- Variable-speed compressors are tested in accordance with NA7.10.4.
- Transcritical CO₂ refrigeration systems shall be tested in accordance with NA7.20.1.

Transcritical CO₂ gas coolers*

New fan-powered gas coolers on all new transcritical CO₂ refrigeration systems shall conform to the following:

- Air-cooled gas coolers are prohibited in Climate Zones 9 through 15.
- Design leaving gas temperature for air-cooled gas coolers shall be less than or equal to the design dry-bulb temperature plus 6°F.*

- Design leaving gas temperature for adiabatic gas coolers necessary to reject the design total heat of rejection of a refrigeration system assuming dry mode performance shall be less than or equal to the design dry-bulb temperature plus 15°F.
- All gas cooler fans shall be continuously variable speed, with the speed of all fans serving a common condenser high side controlled in unison.
- While operating below the critical point, the gas cooler pressure shall be controlled in accordance with Section 120.6(a)4F.
- While operating above the critical point, the gas cooler pressure setpoint shall be reset based on ambient conditions such that the system efficiency is maximized.
- The minimum condensing temperature setpoint shall be less than or equal to 60°F for systems utilizing air-cooled gas coolers, evaporative-cooled gas coolers, adiabatic gas coolers, air or water-cooled fluid coolers or cooling towers for heat rejection.*
- Fan-powered gas coolers shall meet the gas cooler efficiency requirements listed in Table 120.6-C. Gas cooler efficiency is defined as the Total Heat of Rejection (THR) capacity divided by all electrical input power (fan power at 100 percent fan speed).

Automatic door closers

- Doors designed for the passage of people that are between freezers and higher-temperature spaces, or between coolers and nonrefrigerated spaces, shall have automatic door closers.

*NOTE: *Exceptions may apply. See Section 120.6(a) in the Energy Code for details.*



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