

When do the Standards Apply?

The 2022 Building Energy Efficiency Standards (Energy Code) apply to all space conditioning systems serving computer rooms. The Energy Standards define a computer room in Section 100.1 as:

“A room within a building whose primary function is to house electronic equipment and that has a design information technology equipment (ITE) power density exceeding

20 watts/ft² (215 watts/m²) of conditioned floor area.”

When the Standards apply, the energy requirements specific to computer rooms can be found in Section 120.6(j) and §140.9(a) of Title 24, Part 6. The prescriptive requirements for computer rooms may be traded off if the performance method of compliance is used.

What is Covered in the Mandatory Requirements?

Reheat

Each computer room zone shall have controls that prevent reheating, recooling and simultaneous provisions of heating and cooling to the same zone, such as mixing or simultaneous supply of air that has been previously mechanically heated and air that has been previously cooled, either by cooling equipment or by economizer systems.

Humidification

Humidification shall be adiabatic. Nonadiabatic humidification, including but not limited to steam and infrared, is prohibited.

Fan Control

Each unitary air conditioner with a mechanical cooling capacity exceeding 60,000 Btu/hr and each chilled water fan system shall be designed to vary the airflow rate as a function of actual load. Fan motor demand shall not exceed 50 percent of design wattage at 66 percent of design fan speed.

What is Covered in the Prescriptive Requirements?

Economizers

Each individual cooling system primarily serving a computer room(s) shall include either:

- An integrated air economizer capable of providing partial cooling even when additional mechanical cooling is required and capable of providing 100 percent of the expected system cooling load at 65°F to 80.6°F supply air temperature at outside air temperatures of 65°F dry-bulb and below or 50°F wet-bulb and below and equipped with a fault detection and diagnostic system as specified by Section 120.2(i).
- An integrated water economizer capable of providing partial cooling even when additional mechanical cooling is required and capable of providing 100 percent of the expected system cooling load at 65°F to 80.6°F supply air temperature at outside air temperatures of 50°F dry-bulb and below or 45°F wet-bulb and below.

There are exceptions to economizers requirements:

Exception 1: Individual computer rooms with an ITE design load under 5 tons (18 kW) and the building does not have any economizers.

Exception 2: Computer rooms with an ITE design load less than 20 tons (70 kW) may be served by a second fan system without an economizer that also serves other spaces within the building if all of the following are met:

- The economizer system is sized to meet the design cooling load of the computer room when the other spaces within the building are at 50 percent of their design load at outside air temperatures of 65°F dry-bulb and below or 50°F wet-bulb and below; and

- The economizer system has the ability to serve only the computer room connected to it, e.g. shut off flow to other spaces within the building when unoccupied.

Power Consumption of Fans

The total fan power at design conditions of each fan system shall not exceed 27 W/kBtu-h of net sensible cooling capacity.

Air Containment

Computer rooms with air-cooled computers in racks that have a ITE design load exceeding 10 kW (2.8 tons) per room shall include air barriers such that there is no significant air path for computer discharge air to recirculate back to computer inlets without passing through a cooling system. See Figure 1.

There are exceptions to air containment requirements:

Exception 1: Expansions of existing computer rooms.

Exception 2: Computer racks with a design load less than 1 kW (0.28 tons) per rack.

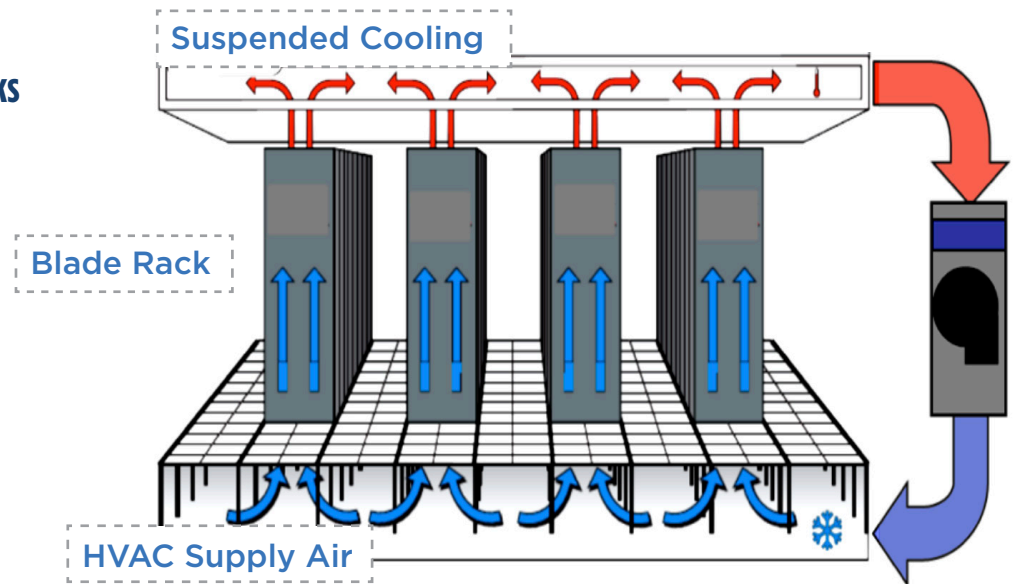
Exception 3: Equivalent energy performance based on computational fluid dynamics or other analysis.

Alternating Current-Output Uninterruptible Power Supplies (UPS)

Alternating current-output UPS systems serving computer room shall meet or exceed minimum average efficiencies in the Table 140.9-B.

Exception: Alternating current-output UPS that utilizes standardized NEMA 1-15P or NEMA 5-15P input plug, as specified in ANSI/NEMA WD-6-2016.

Figure 1: Example of Aisle Containment Using Chimney Racks



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