

Data Centers Standard 90.1 Update



TC9.9 Review of ASHRAE Standard 90.1

Title: Energy Standard for Buildings Except Low-Rise Residential Building

Purpose: To establish the minimum energy efficiency requirements of building other than low-rise residential buildings for:

- Design, construction and a plan for operation and maintenance;
- Utilization of on-site, renewable energy resources

Scope of the Standard by version year

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90.1-2007 and Before

- Computer Rooms and other spaces containing IT Equipment are not included in the scope of the Standard
- Thus the spaces and the Cooling Equipment serving them are exempt from the Standard.
- They were considered process loads.

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90.1-2010

- The 2010 version Scope was amended (expanding) the scope to include process loads that were specifically listed in the Standard.

“new equipment or building systems specifically identified in the standard that are part of industrial or manufacturing processes”

- A definition is then added to the Definitions for Computer Rooms:

“computer room: a room whose primary function is to house equipment for the processing and storage of electronic data and that has a design electronic data equipment power density exceeding 20 watts/ft² of conditioned floor area.”

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90.1-2010

- These 2 revisions brought the computer rooms, data centers and telecommunication facilities into the scope of the energy efficiency requirements of Standard 90.1 This included:
 - Building envelope
 - HVAC Systems
 - Lighting Systems
 - Water Heating
 - Some Electric Power Components including motors
- TC 9.9 members had significant comments during the Public Review Period. Adoption without significant customization for Mission Critical Facilities would be of extraordinary RISK to the industry.

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90.1-2010

- TC9.9 Leadership influenced additional changes to the Standard:
 - CRAC Unit equipment table based on test standard 127
- Exemptions to Economizer Requirements for existing system modifications, small systems, National Defense and FED regulated financial transaction families: Exemption k.

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90.1-2010

Dedicated systems for computer rooms where a minimum of 75% of the design load serves:

1. Those spaces classified as an essential facility
2. Those spaces having a mechanical cooling design of Tier IV as defined by ANSI/TIA-942
3. Those spaces classified under NFPA 70 Article 708 - Critical Operations Power Systems (COPS)
4. Those spaces where core clearing and settlement services are performed such that their failure to settle pending financial transactions could present systemic risk as described in "The Interagency Paper on Sound Practices to Strengthen the Resilience of the US Financial System," April 7, 2003

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90.1-2010

- Compliance with the 2010 Standard is primarily prescriptive.
- Chapter 11 the Energy Cost Budget Method, an energy modeling approach is available but is limited to cooling approaches that mirror commercial HVAC Systems.

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90.1-2013

- Most significant change comes with the efforts of TC9.9 to get an Alternative Compliance path based on PUE.
- The alternative compliance path is a good stride forward to allow innovative designs, but not without caution:
 - Good modeling tools for Data Center Energy are lacking
 - PUE values are aggressive based on data collected by the DOE.
 - Actual PUE is measured data capturing every load, not a model.
- Many design parameters were revised to reflect realistic equipment safe operating conditions particularly in cold climate zones.

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90.1-2016

- CRAC Unit Tables are replaced by newly established AHRI Standard for Computer Room HVAC Equipment.
- Computer Room Economizer Climate Zone table is eliminated via an extensive payback analysis by the 90.1 Mechanical Sub-committee.
- Combined Economizer climate zone requirements include all zones except zones 0 and 1.
- Addendum cz that coordinates 90.1 and Data Center Energy Standard 90.4-2016 is stalled in the Mechanical Sub-committee and does not make it into the 90.1-2016 Standard.