



# STANDARD

**ANSI/ASHRAE Standard 90.4-2016**

# Energy Standard for Data Centers

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**NOTE**

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## FOREWORD

*ASHRAE SSPC 90.4 is pleased to offer this energy standard for data centers. The committee has worked hard to craft the standard in a manner that does not stifle innovation in the data center industry, while simultaneously offering criteria to help ensure energy savings. It is critically important to note that data centers are mission-critical facilities where risk management is the primary concern.*

*Standard 90.4 was developed to be code-intended, similar to Standard 90.1, and references in Standard 90.4 are made to Standard 90.1 for building envelope, service water heating, lighting, and other equipment criteria. In addition, Standard 90.4 references Standard 90.1 for mechanical cooling equipment efficiencies. Standard 90.4 is a performance-based design standard that offers the design components of mechanical load component (MLC) and electrical loss component (ELC). Calculations of MLC and ELC are made and then compared to the maximum allowable values shown in the standard based on climate zones. Compliance with Standard 90.4 is achieved when the calculated values do not exceed the values contained in the standard. An alternative compliance path is provided that allows tradeoffs between MLC and ELC.*

*The committee initially pursued a Green Grid PUE-like process for setting the criteria in the standard, but the Green Grid's PUE metric is based on measured energy use data rather than design criteria calculations. The committee realized that the design calculations contained in Standard 90.4 would not likely match the actual energy use data, so this approach was abandoned.*

*Standard 90.4 follows ASHRAE'S continuous maintenance process, which allows changes to the standard to be made on a continuous basis through addenda to the existing standard. This process allows for frequent changes to the standard to keep pace with rapidly changing technologies in the industry. In addition, the chairs of the committees responsible for both Standard 90.1 and Standard 90.4 will meet with members of the ASHRAE Standards Committee to address any conflicts in scope between the two standards.*

*The input we received from the data center industry was invaluable in helping to bring the standard to fruition, and it is the hope of the committee that knowledgeable people within the data center industry will continue to offer their talents in order to sustain and improve the quality and accuracy of the standard moving forward.*

## 1. PURPOSE

The purpose of this standard is to establish the minimum energy efficiency requirements of data centers for

- a. design, construction, and a plan for operation and maintenance; and
- b. utilization of on-site or off-site renewable energy resources.

## 2. SCOPE

2.1 This standard applies to

- a. new *data centers*, or portions thereof, and their *systems*;
- b. new additions to *data centers*, or portions thereof, and their *systems*;
- c. and modifications to *systems* and *equipment* in existing *data centers* or portions thereof.

2.2 The provisions of this standard do not apply to

- a. *telephone exchanges*,
- b. *essential facilities*, and
- c. *information technology equipment (ITE)*.

2.3 Where specifically noted in this standard, certain other buildings or elements of buildings shall be exempt.

2.4 This standard shall not be used to circumvent any safety, health, or environmental requirements.

## 3. DEFINITIONS

**3.1 General.** Certain terms, abbreviations, and acronyms are defined in this section for the purposes of this standard. These definitions are applicable to all sections of this standard.

**3.1.1 Coordination.** Where terms are not defined in this standard but are defined in ASHRAE/IES Standard 90.1, those terms shall have the meanings as assigned to them in ANSI/ASHRAE/IES Standard 90.1. Where terms are not defined in either document, they shall have their ordinary accepted meanings within the context in which they are used. Ordinarily accepted meanings shall be based on standard American English language usage as documented in an unabridged dictionary accepted by the adopting authority.

### *Informative Notes:*

1. See Informative Appendix E for ASHRAE/IES Standard 90.1 definitions.
2. Only terms that appear in Section 3 of this standard are italicized throughout the document. Terms that appear in Informative Appendix E are not italicized.

### 3.2 Definitions

**air, ambient:** the air surrounding a building or space; the source of outdoor air brought into a building.

**air, exhaust:** air removed from a space and discharged to outside the building by means of mechanical or natural ventilation *systems*.

**air, recirculated:** air removed from a space and reused as *supply air*.

**air, return:** air removed from a space, then to be recirculated or exhausted.

**air, supply:** air delivered by mechanical or natural ventilation to a space, composed of any combination of outdoor air, *recirculated air*, or transfer air.

**alteration:** a replacement not in kind or addition to a building or its *systems* and *equipment*. Routine maintenance, repair, replacement in kind, and service, or a change in the building's use classification or category shall not constitute an *alteration*. *Alterations* exclude *ITE adds, moves, and changes*.

**annualized mechanical load component (annualized MLC):** the sum of all cooling, fan, pump, and heat rejection annual energy use divided by the *data center ITE energy*.

**automatic:** self-acting, operating by its own mechanism when actuated by some nonmanual influence and without human intervention, such as a change in current strength, pressure, temperature, or mechanical configuration.

**cabinet:** a container that encloses connection devices, terminations, apparatus, wiring, and *equipment*.

**circuit breaker:** a device designed to open and close a circuit by nonautomatic means and to open the circuit automatically at a predetermined overcurrent without damage to itself when properly applied within its rating.

**computer room:** a room or portions of a building serving an *ITE* load less than or equal to 10 kW or 20 W/ft<sup>2</sup> (215 W/m<sup>2</sup>) or less of *conditioned floor area*.

**conditioned floor area:** floor area of a building or structure that is conditioned space. See *space, conditioned* (Informative Appendix E).

**construction:** the fabrication and erection of a new building or any addition to or *alteration* of an existing building.

**construction documents:** drawings and specifications used to construct a building, building *systems*, or portions thereof.

**cooling energy:** the sum of all site energy in kilowatt-hours required to provide cooling via vapor compression, ventilation, dehumidification, humidification, evaporation, absorption, adsorption, or other means.

**data center:** a room or building, or portions thereof, including *computer rooms* being served by the *data center systems*, serving a total *ITE* load greater than 10 kW and 20 W/ft<sup>2</sup> (215 W/m<sup>2</sup>) of *conditioned floor area*.

**data center energy:** annual energy use of the *data center*, including all *ITE energy* plus energy that supports the *ITE* and *data center space*.

**data center ITE design power:** the combined power in kilowatts of all the *ITE* loads for which the *ITE system* was designed. The *data center ITE* power shall not include any additional loads, such as *cabinet fans* or other devices, that are not inherent parts of the *ITE*, even if the loads are part of the *UPS operational design load*.

**data center ITE energy:** the sum of all energy, in kilowatt-hours, consumed by the *ITE* on an annual basis.

**data center point of presence (PoP):** the location where the common carrier connects to the *data center telecommunication equipment*.

**data center systems:** HVAC *systems*, electrical *systems*, *equipment*, or portions thereof, used to condition *ITE* or electrical *systems*. *Data center systems* may also be shared, serving other *data center* additions or non-*data-center* loads.

**design electrical loss component (design ELC):** the *design electrical loss component* for the *data center* or *data center addition* shall be the combined losses (or the losses calculated from efficiencies) of three segments of the electrical chain: *incoming electrical service segment*, *UPS segment*, and *ITE distribution segment*. The *design electrical loss component* shall be calculated using the worst-case parts of each segment of the power chain in order to demonstrate a minimum level of electrically efficient design. The *design ELC* does not, and is not intended to, integrate all electrical losses in the facility.

**design ELC demarcation:** the *incoming electrical service point* as defined by the National Electrical Code (NFPA 70).

**design mechanical load component (design MLC):** the sum of all cooling, fan, pump, and heat rejection design power divided by the *data center ITE design power*.

**dew point:** the temperature to which air must be cooled (assuming constant air pressure and moisture content) to reach a relative humidity of 100% (i.e., saturation).

**efficiency:** performance at specified rating conditions, usually expressed as a percentage or as a decimal factor of 1.0 or less.

**equipment:** devices for conditioning of electric power and *ITE*.

**essential facility:** those portions of a *data center*, whether on the same site or at a remote location, serving one of the following functions:

- a. Hospitals and other health care facilities having surgery or emergency treatment facilities
- b. Fire, rescue, and police stations and emergency vehicle garages
- c. Designated earthquake, hurricane, or other emergency shelters
- d. Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response
- e. Power generation, transmission, and distribution stations, and other public utility facilities required as emergency backup facilities for other *essential facilities*
- f. Structures containing highly toxic materials where the quantity of the material exceeds the maximum allowable quantities
- g. Aviation control towers, air traffic control centers, and emergency aircraft hangars
- h. *Data centers* and other structures having critical national defense functions
- i. Those spaces having a mechanical cooling or electrical design of Rating IV as defined by ANSI/TIA-942
- j. Those spaces classified under NFPA 70, Article 708, Critical Operations Power Systems (COPS)
- k. Those spaces where core clearing and settlement services are performed such that failure to settle pending financial transactions could present systematic risk as described in "The Interagency Paper on Sound Practices to Strengthen Resilience of the Financial System"

**fan brake power:** the power delivered to the fan's shaft. Brake power (bp) does not include the mechanical drive losses (e.g., belts, gears).

**incoming electrical service point:** the point of connection between the facilities of the serving utility and the premises wiring, also known as the point of demarcation between where the serving utility ends and the premises wiring begins, as defined by the National Electrical Code (NFPA 70).

**incoming electrical service segment:** the *incoming electrical service segment* of the *design ELC* shall include all elements of the electrical power chain delivering power to the *UPS*, beginning with the load side of the *incoming electrical service point* supplying the building, continuing through all other intervening transformers, wiring and switchgear, and ending at the manufacturer provided input *terminals* of the *UPS*. Although the mechanical *equipment* is normally powered from the same *incoming electrical service point*, its path and losses are not part of the *ELC* and therefore not part of the *incoming electrical service segment* calculation.

**information technology equipment (ITE):** *ITE* includes computers, data storage, servers, and network/communication *equipment*.

**ITE adds, moves and changes:** the normal and somewhat perpetual additions, moves, and changes to *ITE*, such as a server moving from one *ITE enclosure* to another.

**ITE distribution segment:** the segment of the *design ELC* that includes all elements of the power chain, beginning at the manufacturer provided output load *terminals* of the *UPS segment*, extending to all transformers, wiring, and switchgear, continuing to and including the receptacles to which *ITE* or power distribution strips for connection of multiple pieces of *ITE* to a circuit are intended to be connected. The *ITE distribution segment* shall not include the actual *ITE*, its power cords, or any accessory part of the *ITE*. In cases where power is to be hardwired into self-contained, manufacturer configured *cabinets*, the calculation path shall terminate at the power input *terminals* provided by the manufacturer within that *equipment*. The *ITE distribution segment* used to calculate the *design ELC* shall be the longest path that also contains the largest numbers of *loss*-producing devices, such as transformers, switchgear, and/or panelboards.

**ITE enclosure:** a rack, *cabinet*, or chassis that is designed to mount and enable appropriate ventilation of *ITE*.

**ITE energy:** annual energy used for computer, data storage, and network *equipment* along with supplemental *equipment* represented by the *uninterruptible power supply (UPS)* output.

**ITE room:** a room dedicated for *ITE*.

**kilowatt (kW):** the basic unit of electric power, equal to 1000 W. For alternating current (AC) circuits and single-phase *equipment*, it is the product of the voltage times the ampage times the power factor (PF) of the connected *equipment*.

**loss:** the difference between the power or energy entering a device or *system* segment and the power or energy leaving that device or *system* segment. The *loss* may be measured in

physical units (volts, watts, psi, etc.) or may be calculated as one minus the *efficiency* of the device or *system* segment.

**mechanical switchboard:** the switchboard or *circuit breaker* panel from which submains and/or branch circuits emanate to deliver power to the mechanical elements of the *ITE room cooling equipment*.

**N:** see *redundancy*.

**proposed design:** a computer representation of the actual proposed building design, or portion thereof, used as the basis for calculating the design energy cost.

**redundancy:** deliberate duplication of components, *equipment*, controls, or *systems* and their interconnections to enable continued operation at needed functional capacities during and after the *loss* of the primary components, *equipment*, controls, or *systems* due to failure, maintenance, servicing, or other modification activities.

**N:** base number of capacity components needed to provide design *system* functional capacity.

**N+1, N+2, etc.:** single *system redundancy* having one or more additional capacity components.

**2N, 2N+1 or 2(N+1), etc.:** dual *systems redundancy* having one or more additional capacity components.

**service point:** the point of connection between the facilities of the serving utility and the premises wiring. The *service point* can be described as the point of demarcation between where the serving utility ends and the premises continuation begins. The serving utility generally specifies the location of the *service point* based on the conditions of service.

**skylight:** an area of the building envelope that lets in light that has a slope of less than 60 degrees from the horizontal plane.

**system:** a combination of *equipment* and auxiliary devices (e.g., controls, accessories, interconnecting means, and *terminal* elements) by which energy is transformed so that it performs a specific function, such as HVAC, service water heating, *ITE* power, or lighting.

**telephone exchange:** a telecommunication service facility that provides telecommunication services to the public and that has operations regulated via Title II (Common Carriers) of the Telecommunications Act of 1934 and Chapter 1 of the Code of Federal Regulations (CFR) Title 47 by the Federal Communications Commission (FCC).

**Informative Note:** See Informative Appendix D for additional guidance.

**terminal:** a device by which energy from a *system* is finally delivered (e.g., registers, diffusers, lighting fixtures, faucets), terminating prior to the interface with the *ITE enclosure*.

**uninterruptible power supply (UPS):** a *system* intended to deliver continuous, stable power to the critical load. The majority of modern *UPS systems* are of two fundamental types: (a) "static," in which incoming alternating current (AC) power is rectified to direct current (DC) and then inverted back to AC, with batteries in the DC portion that assume the load when incoming power fails or anomalies occur, and (b) "rotary," in which incoming AC power drives a propulsion

unit that turns a generating device, with a heavy flywheel storing kinetic energy that continues to turn the generating portion when incoming power fails or anomalies occur. Either type can be made up of one or more modules running in parallel to add capacity or *redundancy* or both. DC *UPS systems*, which eliminate the inverter and deliver DC power to the *ITE*, are also used.

***UPS economy mode:*** a mode of *UPS* operation in which power is normally fed to the load without going through power conversions within the *UPS* for the purpose of reducing *loss* during normal operation so as to save energy. Circuitry is incorporated to rapidly switch the load to the rectifier/battery/inverter in the event of a power failure or voltage drop below a preset threshold. Economy mode is normally a configurable option that can be utilized or overridden at user discretion.

***UPS operational design load:*** the load in *kilowatts* at which the *UPS* is intended to operate by design. This will be the *data center ITE design power* plus any other loads, such as *cabinet* door fans or refrigerant pumps, that will be connected to the *UPS*. The *UPS operational design load* is typically less than the *UPS rated capacity*.

***UPS rated capacity:*** the maximum load in *kilowatts* or kilovolt-amps at which an individual *UPS* is designed and specified by the manufacturer to operate on a continuous basis under specified environmental conditions. The *UPS rated capacity* does not include the capacity of any redundant *UPS* components or *systems*.

***UPS segment:*** the *UPS segment* of the *design ELC* shall include the manufacturer provided *UPS system* from the input *terminals* to the output *terminals*, including all transformers, switchgear, rectifiers, inverters, rotary propulsion units, and wiring provided by the manufacturer between those two points. Transformers and switchgear provided by the *UPS* manufacturer but housed in different *cabinets* from the actual *UPS* capacity components shall be considered parts of the *UPS segment* along with associated wiring. Transformers and switchgear functioning as parts of the *UPS* but installed separately and not provided by the *UPS* manufacturer (such as custom-configured bypass) shall not be considered part of the *UPS segment*. All such associated components shall be included with the *incoming electrical service segment* and/or the *ITE distribution segment* in accordance with their specific design logic.

## 4. ADMINISTRATION AND ENFORCEMENT

### 4.1 General

#### 4.1.1 Scope

**4.1.1.1 New *Data Centers*.** New *data centers* shall comply with the standard as described in Section 4.2.

***Informative Note:*** Refer to Figure C-1 for building areas subject to the provisions of Standard 90.4

**4.1.1.2 Additions to Existing *Data Centers*.** An extension or increase in the floor area or height of a *data center* outside of the existing *data center* envelope shall be consid-

ered an addition to an existing *data center* and shall comply with the standard as described in Section 4.2.

**4.1.1.3 Alterations of Existing *Data Centers*.** *Alterations* of existing *data centers* shall comply with the standard as described in Section 4.2.

**4.1.1.4 Replacement of Portions of Existing *Data Centers*.** Portions of a *data center* envelope, heating, ventilating, air conditioning, service water heating, power, lighting, and other *systems* and *equipment* that are being replaced shall be considered *alterations* of existing *data centers* and shall comply with the standard as described in Section 4.2.

**4.1.1.5 Changes in Space Conditioning.** When unconditioned or semiheated spaces in a *data center* are converted to conditioned spaces, such conditioned spaces shall be brought into compliance with the requirements of this standard that apply to the *data center* envelope, heating, ventilating, air conditioning, service water heating, power, lighting, and other *systems* and *equipment* of the space as if the *data center* was new.

**4.1.2 Administrative Requirements.** Administrative requirements relating to permit requirements, enforcement by the authority having jurisdiction, locally adopted energy standards, interpretations, claims of exemption, and rights of appeal are specified by the authority having jurisdiction.

**4.1.3 Alternative Materials, Methods of Construction, or Design.** The provisions of this standard are not intended to prevent the use of any material, method of *construction*, design, *equipment*, or *data center system* not specifically prescribed herein.

**4.1.4 Validity.** If any term, part, provision, section, paragraph, subdivision, table, chart, or referenced standard of this standard shall be held unconstitutional, invalid, or ineffective, in whole or in part, such determination shall not be deemed to invalidate any remaining term, part, provision, section, paragraph, subdivision, table, chart, or referenced standard of this standard.

**4.1.5 Other Laws.** The provisions of this standard shall not be deemed to nullify any provisions of local, state, or federal law. Where there is a conflict between a requirement of this standard and such other law affecting *construction* of the *data center*, precedence shall be determined by the authority having jurisdiction.

**4.1.6 Referenced Standards.** The standards referenced in this standard and listed in Section 12 shall be considered part of the requirements of this standard to the prescribed extent of such reference. Where differences occur between the provision of this standard and referenced standards, the provisions of this standard shall apply. Informative references in Appendix A are cited to acknowledge sources and are not part of this standard.

**4.1.7 Normative Appendices.** The normative appendices to this standard are considered to be integral parts of the mandatory requirements of this standard, which, for reasons of convenience, are placed apart from all other normative elements.

**4.1.8 Informative Appendices.** The informative appendices to this standard and informative notes located within this

standard contain additional information and are not mandatory or part of this standard.

## 4.2 Compliance

### 4.2.1 Compliance Paths

**4.2.1.1 New Data Centers.** New *data centers* shall comply with the provisions of Sections 5, 7, 9, and 10 and one of the following:

- a. Sections 6 and 8
- b. Section 11

**Informative Note:** See Figure C-1 for an illustrative diagram.

**4.2.1.2 Additions to Existing Data Centers.** Additions to existing *data centers* shall comply with the provisions of Sections 5, 7, 9, and 10 and one of the following:

- a. Sections 6 and 8
- b. Section 11

**Exception to Section 4.2.1.2:** Additions that result in less than a 10% increase in area or less than a 10% increase in connected load (*kW*) are excluded.

**4.2.1.3 Alterations to Existing Data Centers.** *Alterations* to existing *data centers* shall comply with the provisions of Sections 5, 7, 8, and 10 and with either Sections 6 and 8 or Section 11, provided such compliance will not result in the increase of energy consumption of the building.

#### Exceptions:

1. *ITE adds, moves, and changes* are excluded.
2. *ITE enclosures* are excluded.
3. A *data center* that has been specifically designated as historically significant by the adopting authority, is listed in The National Register of Historic Places, or has been determined to be eligible for listing by the U.S. Secretary of the Interior, need not comply with these requirements.
4. Where one or more components or portions of an existing *data center* mechanical, electrical, or lighting *system* is being replaced without changing capacities, the annual energy consumption of the *system* in which replacements are made shall not be greater than the annual energy consumption of the existing *system*. Compliance can be demonstrated using manufacturer's published *efficiency* data for the new and existing devices or by comparative calculations of the annual energy consumptions of the existing and revised *systems* performed by a design professional using calculation methods commonly accepted in the industry.

Component or *system* replacements or modifications that result in changes in either capacity or type of technology require compliance with the applicable sections and versions of this standard in accordance with Section 4.2.2.4.

**Informative Note:** Refer to Figures C-3, C-4, and C-5 for guidance on applicability.

### 4.2.2 Compliance Documentation

**4.2.2.1 Construction Details.** Compliance documents shall show all of the pertinent data and features of the *data center, equipment, and systems* in detail sufficient to permit a determination of compliance by the building official and to indicate compliance with the requirements of this standard.

**4.2.2.2 Supplemental Information.** Supplemental information necessary to verify compliance with this standard, such as calculations, worksheets, compliance forms, vendor literature, or other data, shall be made available when required by the building official. Compliance may be documented using mechanical and electrical calculations to complete each required path. If compliance is to be shown for mechanical *systems* only, the designer performs the calculations in Sections 6.2.1.1 or 6.2.1.2. If compliance is to be shown for electrical *systems* only, the designer performs the calculations in Section 8.2.1.1. The calculations in Section 6.2.1.2 can be used to take credit for existing mechanical *system* efficiencies when compliance is to be shown for electrical *systems* only. The calculations in Sections 8.2.1.1 and 6.2.1.2 can be used to take credit for existing electrical *system* efficiencies when compliance is to be shown for mechanical *systems* only.

**Informative Note:** See Informative Appendix C, Figure C-2, for mechanical and electrical compliance paths.

**4.2.2.3 Manuals.** Operation and maintenance information shall be provided to the *data center* owner. This information shall include but not be limited to the following:

- a. Submittal data stating *equipment* size

**4.2.2.4 Version Applicability.** Previous or subsequent versions of Standard 90.4 may apply to *data center* expansions and modifications, depending on how they were designed and occur. The version used for compliance shall be the most current version of the standard or as specified in Table 4.2.2.4.

**Informative Note:** See Informative Appendix C, Figures C-2, C-3, and C-4, for illustrative diagrams.

**4.2.3 Labeling of Material and Equipment.** Materials and *equipment* shall be labeled in a manner that will allow for a determination of their compliance with the applicable provisions of this standard.

**4.2.4 Inspections.** All *data center construction, additions, or alterations* subject to the provisions of this standard shall be subject to inspection by the building official, and all such work shall remain accessible and exposed for inspection purposes until approved in accordance with the procedures specified by the building official. Items for inspection include at least the following:

- a. Wall insulation after the insulation and vapor retarder are in place but before concealment
- b. Roof/ceiling insulation after roof/insulation is in place but before concealment
- c. Slab/foundation wall after slab/foundation insulation is in place but before concealment
- d. Fenestration after all glazing materials are in place
- e. Continuous air barrier after installation but before concealment

**TABLE 4.2.2.4 Compliance Standard for Project Plan Review**

Build Type	Envelope	Mechanical Systems	Mechanical Individual Components	Lighting	Power Systems	Power Individual Components
4.1.1.4 “Replacement of Portions of Existing Data Centers”						
Full build-out	M	M	C	C	M	C
Phase scaled build	M	M	C	C	M	C
Phase modular build	M	M	C	C	M	C
Modular SHELL build	M	M	C	C	M	C
Shell and core build-out	M	M	C	C	M	C
4.2.1.1, “New Data Centers”						
Full build-out	M	M	M	M	M	M
Initial phase scaled build	M	M	M	M	M	C
Initial phase modular build	M	M	M	M	M	C
Initial modular SHELL build	M	M	M	M	M	M
Shell and core build	M	M	M	M	M	M
4.2.1.2, “Additions to Existing Data Centers”						
Phase scaled build	C	M	C	C	M	C
Phase modular build	C	C	C	C	C	C
Modular SHELL build	C	C	C	C	C	C
Core build	C	C	C	C	C	C
4.2.1.3, “Alterations to Existing Data Centers”						
All	M	M	C	C	M	C

(C) = current edition of the standard.

(M) = master plan standard edition—the edition of the standard used to create the original *data center* plan.

**Informative Note:** Refer to Figures C-3, C-4, and C-5 for guidance on applicability.

- f. Mechanical *systems* and *equipment* and insulation after installation but before concealment
- g. Electrical *equipment* and *systems* after installation but before concealment

## 5. BUILDING ENVELOPE

### 5.1 General

**5.1.1 Scope.** This section defines the minimum requirements of the *data center* building envelope.

### 5.2 Compliance Paths

**5.2.1 Compliance.** Provisions of this section shall comply with Section 5 of ASHRAE/IES Standard 90.1 or demonstrate energy *efficiency* improvement as compared to a *data center* designed to comply with Section 5 of ASHRAE/IES Standard 90.1.

## 6. HEATING, VENTILATING, AND AIR CONDITIONING

### 6.1 General

#### 6.1.1 Scope

**6.1.1.1 New Data Centers.** Mechanical *equipment* and *systems* serving the heating, cooling, and ventilating needs of

new *data centers* shall comply with the requirements of this section as described in Section 6.2 or Section 11.

**6.1.1.2 Additions to Existing Data Centers.** Mechanical *equipment* and *systems* serving the heating, cooling, or ventilating needs of additions to existing *data centers* shall comply with the requirements of this section as described in Section 6.2 or Section 11.

**Exception to Section 6.1.1.2:** Where conditioned air is provided to a *data center* addition by using the HVAC *systems* and *equipment*, such *systems* and *equipment* shall not be required to comply with this standard.

**6.1.1.3 Alterations to Heating, Ventilating, Air Conditioning, and Refrigeration (HVACR) in Existing Data Centers**

**6.1.1.3.1** Replacing existing HVAC *equipment* with new HVAC *equipment* shall comply with the specific minimum *efficiency* requirements applicable to that *equipment* in ASHRAE/IES Standard 90.1.

#### Exceptions:

1. For *equipment* that is being modified or repaired but not replaced, provided that such modifications and/or repairs will not result in an increase in the