Delaware Energy Code Update – Commercial (ASHRAE 90.1)

As of December 11, 2020, all permit applications for new buildings, additions, and alterations must meet the provisions of the 2018 International Energy Conservation Code (IECC) or ASHRAE 90.1-2016. The table below provides an overview of the changes between ASHRAE 90.1-2010 and ASHRAE 90.1-2016.

ASHRAE 90.1-2016 Section	Topic	Changes
Chapter 3 – Definitions		
Chapter 3	Definitions	Clerestory replaced with roof monitor Modifies daylighting definitions
Chapter 5 – Building Envelope		
5.1.3	Envelope Alterations	Adds low-e requirements for storm window retrofits Clarifies roof insulation requirements, differentiating between roof recovering (on top of existing roof covering) and replacement of roof covering
5.4.3.2	Fenestration and Doors	Relaxes air leakage requirements for high-speed doors for vehicle access and material transport
5.4.3.4	Vestibules	Add exceptions for semiheated spaces and enclosed elevator lobbies Adds specific vestibule requirements for large spaces
Table 5.5-4	Building Envelope Requirements for Climate Zone 4 (Prescriptive)	Building Envelope Requirements have been updated: • Assembly Maximum U-Factors have decreased for all opaque elements across all building types • Insulation Minimum R-Value have increased for all opaque elements across all building types • Assembly Maximum U-Factors have decreased for all fenestration types
5.5.3.1	Roof Insulation	Requires roof solar reflectance and thermal emittance testing to be in accordance with CRRC-1 Standard
5.5.4.2.3	Minimum Skylight Area	Reduces the area threshold at which skylights and daylighting controls are required
5.5.4.4.1	Fenestration SHGC	Adds exception allowing a greater SHGC for north facing vertical fenestration
5.5.4.5	Fenestration Orientation	Update to how fenestration orientation is calculated
5.5.4.6 (NEW)	VT/SHGC Ratio	Adds requirements and exceptions for Visible Transmittance/SHGC ratios

ASHRAE 90.1-2016 Section	Topic	Changes
Chapter 5 – Building Envelope - Continued		
5.9 (NEW)	Inspection and Verification	Adds section regarding Inspections and Verification with requirements for various envelope components
Chapter 6 – HVAC		
6.2	Compliance Paths	Adds an additional compliance path: "Mandatory Provisions" and "Alternative Compliance Path"
6.4.3.3.3	Optimum Start Controls	Changes optimum start requirement from > 10,000 cfm to any DDC system and adds a requirement that outside air temperature be used in optimum algorithms
6.4.3.3.5 (NEW)	Automatic Control of HVAC in Hotel/Motel Guest Rooms	Adds automatic setback and ventilation control requirements for HVAC equipment in hotels and motels with greater than 50 guest rooms
6.4.3.6	Humidification and Dehumidification	Establishes limits on using electric or fossil fuel to humidify or dehumidify between 30% and 60% RH except certain applications and requires deadband on humidity controls
6.4.3.8	Ventilation Controls for High-Occupancy Areas	Reduces occupancy threshold for demand-controlled ventilation from greater than 40 people per 1000 ft^2 to equal to or greater than 25 people per 1000 ft^2 with exemptions for certain occupancies Reduces the system size and outdoor air thresholds at which energy recovery is required
6.4.3.9	Heated or Cooled Vestibules	Adds control requirements for heating systems in vestibules
6.4.3.10	Direct Digital Control (DDC) Requirements	Eliminates contingency on DDC system existence for setpoint overlap restrictions, humidification and dehumidification controls, VAV fan control setpoint reset, multiple-zone VAV system ventilation
6.4.3.11 (NEW)	Chilled Water Plant Monitoring	Adds requirements for measurement devices to be installed in chilled-water plants for monitoring electric energy use and efficiency
6.4.3.12 (NEW)	Economizer Fault Detection and Diagnostics	Adds requirements for air-cooled DX cooling units where an air economizer is installed to include a fault detection and diagnostics systems with specific capabilities
6.4.4.2.2	Duct Leakage Tests	Update to duct leakage test maximum permitted leakage equation, reducing the duct leakage class from 6 to 4 cfm/100 ft^2, which reduces the maximum allowable leakage
6.4.5 (NEW)	Walk-In Coolers and Walk-In Freezers	Adds mandatory and prescriptive requirements for walk-in coolers and freezers
6.4.6 (NEW)	Refrigerated Display Case	Adds mandatory and prescriptive requirements for refrigerated display cases

ASHRAE 90.1-2016 Section	Topic	Changes
Chapter 6 – HVAC - Continued		
6.5.1.1.3	High-Limit Shutoff	Revises high limit shutoff control types and setpoints for air economizers
6.5.1.1.6	Sensor accuracy	Adds air economizer sensor accuracy requirements
6.5.1.2.1	Design Capacity	Relaxes design requirements for waterside economizers for computer rooms
6.5.1.3	Integrated Economizer Control	Expands on requirements for integrated controls on air economizers
6.5.1.5 (NEW)	Economizer Humidification System Impact	Adds requirements for maintaining inside humidity depending on system type
6.5.2.3	Dehumidification	Reduces design cooling capacity exception for individual fan cooling units from 80,000 Btu/h to 65,000 Btu/h Increases percentage of energy used for reheating from 75% to 90% to come from site-recovered energy or site-solar energy
6.5.2.4	Humidification	Requires humidifiers mounted in the airstream to have an automatic control valve shutting off preheat when humidification is not required, and insulation on the humidification system dispersion tube surface
6.5.2.5 (NEW)	Preheat Coils	Adds requirement for preheat coils to stop heat output whenever mechanical cooling occurs
6.5.2.6 (NEW)	Ventilation Air Heating Control	Adds requirement for ventilation air heating control for units that provide ventilation to multiple zones
6.5.3.1	Fan System Power and Efficiency	Addresses fan power limitation pressure drop adjustment credits and adds deductions from allowed fan power for systems without any central heating or cooling as well as systems with electric resistance heating. Sound attenuation credit is modified to be available only when there are background noise criteria requirements.
6.5.3.1.3	Fan Efficiency	Added new definition (FEG = Fan Efficiency Grade) and requires each fan has an FEG of 67 or higher as defined by AMCA 205-10
6.5.3.2	Fan Control	Section is restructured and expanded, modifying requirement for static pressure sensor location and control requirements for setpoint reset for systems with DDC of individual zones, and adding requirements for fractional horsepower motors ≥1/12 hp to be electronically-commutated motors or have a minimum 70% efficiency in accordance with 10 CFR 4321 and requires adjustable speed or other method to balance airflow
6.5.4.1	Boiler Turndown	Establishes minimum turndown for boilers and boiler plants with design input power of at least 1,000,000 Btu/h
6.5.4.2	Hydronic Variable Flow Systems	Reduces pump flow rates from 50% to 25% of the design flow rate Expands number of exceptions to requirement

ASHRAE 90.1-2016 Section	Topic	Changes
Chapter 6 – HVAC - Continued		
6.5.4.3	Chiller and Boiler Isolation	Requires that fluid flow be shut off, rather than reduced, when chiller or boiler is shut down
6.5.4.4	Chilled- and Hot-Water Temperature Reset Controls	Expands the requirements for fan speed control for both chilled water and unitary direct expansion systems and enhances the requirements for integrated economizer control and defines DX unit capacity staging requirements
6.5.4.7 (NEW)	Chilled-Water Coil Selection	Adds requirements for chilled-water coil selection based on temperature differences of water at design conditions
6.5.5.2	Fan Speed Controls	Increases requirement for fan motor size from 7.5 hp to 5 hp and designates that arrays of fans equaling 5 hp or more, to have controls. Adds requirements for multicell heat-rejection equipment with variable-speed fan drives
6.5.5.4 (NEW)	Tower Flow Turndown	Modified heat rejection equipment (cooling tower) requirements to require that VSD controlled fans operate all fans at the same speed instead of sequencing them, and that open-circuit towers with multiple cells operate all cells in parallel down to 50% of design flow
6.5.6.1	Exhaust Air Energy Recovery	Reduces design supply fan air flow rate for which energy recovery is required for systems that operate more than 8,000 hours per year
6.5.7.1 (NEW)	Transfer Air	Adds requirements for conditioned air delivered to any space with mechanical exhaust
6.5.9	Hot-Gas Bypass Limitation	Reduces the limits on hot gas bypass as a means of cooling capacity control
6.5.10 (NEW)	Door Switches	Adds requirements for door switches to disable or reset mechanical heating or cooling when doors without automatic door closers are left open
6.5.11 (NEW)	Refrigeration Systems	Adds requirements for condensers and compressors that serve refrigeration systems
6.6.1	Computer Room Systems	Added power usage effectiveness (PUE) as an alternative compliance methodology for data centers
6.8	Minimum Equipment Efficiency Tables	Minimum efficiency requirements for various heating and cooling equipment have increased
Service Water Heating		
7.4.3	Service Hot-Water Piping Insulation	Adds insulation requirements for the first 8 ft of branch piping connecting recirculated, heat-traced, or impedance heated piping

ASHRAE 90.1-2016 Section	Topic	Changes
Service Water Heating - Continued		
7.5.3 (NEW)	Buildings with High-Capacity Service Water-Heating Systems	Adds requirement for new buildings with gas water-heating input capacity over 1,000,000 Btu/h or greater to have gas service water-heating equipment with a minimum thermal efficiency of 90%
7.8	Performance Requirements for Water-Heating Equipment	Algorithm for calculating the minimum EF for various water heating equipment has been removed, and instead defers to the DOE for efficiency requirements
Power		
8.4.2	Automatic Receptacle Control	Increases the spaces where plug shutoff control is required. Clarifies the application of this requirement for furniture systems, lowers the threshold for turn off from 30 to 20 minutes, states a labeling requirement to distinguish controlled and uncontrolled receptacles and restricts the use of plug-in devices to comply with this requirement
8.4.3 (NEW)	Electrical Energy Monitoring	Specifies requirements for installation of basic electrical metering of major end uses to provide basic reporting of energy consumption data to building occupant
8.4.4	Low-Voltage Dry-Type Distribution Transformers	Nominal efficiencies established in accordance with 10 CFR 431 test procedure for low-voltage dry- type transformers
Lighting		
9.1.2	Lighting Alterations	Expands exceptions to lighting alterations: (1) increases threshold for exception from 10% to 20% of the connected lighting load, (2) replacements, and (3) routine maintenance
9.2.2.3	Interior Lighting Power	Eliminates the exception for wattage used in spaces where lighting is specifically designed for those with age-related eye conditions or other medical conditions related to the eye, where special lighting or light levels might be needed
9.4.1.1	Interior Lighting Controls	•Changes the criterion for applying automatic daylighting control for sidelighting and toplighting to a controlled lighting power basis and provides characteristics for the required photo controls •Adds control requirements for secondary sidelighting areas •Requires the use of certain lighting controls in more space types •Reduces the amount of time after occupants vacate a space for lights to be automatically reduced or shut off
9.4.1.2	Parking Garage Lighting Control	Reduces time for when no activity is detected from 30 minutes to 20 minutes for parking garage lighting controls

ASHRAE 90.1-2016 Section	Topic	Changes
Lighting - Continued		
9.4.1.3	Special Applications	Modifies requirements for automatic lighting control for guestroom type spaces. Exceptions to this requirement are lighting and switched receptacles controlled by captive key systems.
9.4.1.4	Exterior Lighting Control	Adds requirements for luminaires serving outdoor parking areas with a rated input wattage greater than 78 W and mounting height of 24 feet or less
Table 9.4.2.2	Individual Lighting Power Allowances for Building Exteriors	Includes loading docks as a tradable surface
9.4.3	Functional Testing	Adds more specific requirements for the functional testing of lighting controls, specifically occupancy sensors, automatic time switches and daylight controls
Tables 9.5.1, 9.6.1	Lighting Power Density Allowances	Updates LPDs for Building Area Method and Space-by-Space Method
Table 9.6.3	Control Factors Used in Calculating Add'l Interior Lighting Power Allowance	Modifies table to include continuous dimming in secondary sidelighted areas, which is now based on an installed wattage rather than area of the space. Eliminates the need for effective aperture calculation.
9.7.2.3 (NEW)	Daylighting Documentation	Adds requirement for Daylighting Documentation for submittals