ASHRAE 90.1-2007 - ASHRAE 90.1-2019 Comparison

Reference from ASHRAE 90.1-2019	Change from Current	Fiscal Impact
4.2.5 Verification, Testing, and Commissioning	**Commissioning required.** Verification or functional performance testing (FPT required for building systems, controls, and the building envelope to confirm compliance.	Yes. Current code requires commissioning of the control system for buildings over 50,000 sq ft and references ASHRAE and NEBB commissioning process documents. Additional service and review requirements; improves quality assurance.
5.4.3.1 Continuous Air Barrier	**Continous air barrier required.** The continuous air barrier shall be designed and installed.	Marginal increase in cost, if any. Standard practice today; improves energy performance significantly.
5.4.3.1.1 Whole-Building Air Leakage	Whole-building pressurization testing shall be conducted in accordance with ASTM E779 or ASTM E1827 by an independent third party.	Yes. Additional service and review requirements; improves quality assurance of construciton, and health of indoor envrionment, durability of construction, and retained property value.
5.4.3.2 Loading Dock Weatherseals	Cargo doors and loading dock doors shall be equipped with weatherseals.	Yes. Offers energy cost savings.
Table 5.5-4 and 5.5-5 (both climate zone 4 and 5)	**Roof insulation increased.** Insulation entirely above deck increases from R-20 to R-30. Attic insulation increases from R-38 to R-49.	Yes. Offers energy cost savings.
Table 5.5-4 and 5.5-5 (both climate zone 4 and 5)	**Above grade wall insulation incrases.** Steel-framed goes from R-13 + R-7.5 c.i. to R-13 + R-10 c.i. for climate zone 5 only.	Yes. Offers energy cost savings.
Table 5.5-4 and 5.5-5 (both climate zone 4 and 5)	**Above grade wall insulation incrases.** Wood-framed: cz4: from R-13 to R-13 + R-3.8 or R-20 cz5: from R-13.0 + R-3.8 c.i. to R-13 + R-7.5 c.i. or R-19 + R-5 ci.i.	Yes. Offers energy cost savings.
Table 5.5-4 and 5.5-5 (both climate zone 4 and 5)	**Below grade wall insulation increases.** cz4: from none to R-7.5. cz5: R-7.5 requirement remains unchanged.	Yes. Offers energy cost savings.
Table 5.5-4 and 5.5-5 (both climate zone 4 and 5)	**Unheated slab-on-grade floor insulation increases.** From none required to R-15 in climate zones 4 and 5.	Yes. Offers energy cost savings.
Table 5.5-4 and 5.5-5 (both climate zone 4 and 5)	**Heated slab-on-grade floor insulation increases.** From R-15 to R-20 in climate zones 4 and 5.	Yes. Offers energy cost savings.
Table 5.5-4 and 5.5-5 (both climate zone 4 and 5)	**Opaue door insulation increases.** Swinging goes from U-0.700 down to U-0.370. Nonswining goes from U-1.500 (cz4) and U-0.500 (cz5) to U-0.310.	Yes. Offers energy cost savings.
Table 5.5-4 and 5.5-5 (both climate zone 4 and 5)	**Vertical glazing changes as follows for climae zone 4:** Nonmetal framing: from U-0.40 to U-0.36 Nonmetal framing: from SHGC-0.40 to SHGC-0.36 Metal framing: from U-0.50 to U-0.36 Metal framing: from SHGC-0.40 to SHGC-0.36 Entrance doors: from U-0.85 to U-0.63 Entrance doors: from SHGC-0.40 to SHGC-0.33	Yes. Offers energy cost savings.
Table 5.5-4 and 5.5-5 (both climate zone 4 and 5)	**Vertical glazing changes as follows for climae zone 5:** Nonmetal framing: from U-0.35 to U-0.36 Nonmetal framing: from SHGC-0.40 to SHGC-0.38 Metal framing: from U-0.45 to U-0.36 Metal framing: from SHGC-0.40 to SHGC-0.38 Entrance doors: from U-0.80 to U-0.63 Entrance doors: from SHGC-0.40 to SHGC-0.33	Yes. Offers energy cost savings.
Table 5.5-4 and 5.5-5 (both climate zone 4 and 5)	**Skylight performance increases.** Climate zones 4 and 5: From mostly U-0.69 to U-0.50 From mostly SHGC-0.49 to SHGC-0.40	Yes. Offers energy cost savings.
6.3.2.c. Criteria: Cooling Efficiency	Revsied coolling efficiency mandatory provisions.	Yes. Offers energy cost savings. Included in manufacturers current product or product lines.
6.3.2.e. Criteria: Heating Efficiency	Revised heating efficiency mandatory provisions.	Yes. Offers energy cost savings. Included in manufacturers current product or product lines.
6.4.1 Equipment Efficiencies, Verification, and Labeling Requirements	Minimum equipment efficiencies updated.	Yes. Offers energy cost savings. Included in manufacturers current product or product lines.
6.4.3.4.3 Damper Leakage	Where outdoor air supply and exhaust/relief dampers are required, must comply with maximum damper leakage.	Yes. Offers energy cost savings.
6.4.3.11 Chilled-Water Plant Monitoring	An additional section requires large chilled water plant monitoring.	Yes. Offers energy cost savings. May streamline municipal energy benchmarking requirements.
6.5.1 Economizers	A cooling system with a cooling capacity of greater than 54,000 Btu/h must have an air economizer or a water economizer.	Yes. Offers energy cost savings.
7.8 Performance Requirements for Water-Heating Equipment	Revised performance requirements for water-heating equiment.	Yes. Offers energy cost savings. Included in manufacturers current product or product lines.

8.4.2 Automatic Receptacle Control	At least 50% of all 125V,15 and 20 amp receptacles in all private offices, conference rooms, rooms used primarily for printing and/or copying functions, break rooms, classrooms, and individual workstations.	Yes. Offers energy cost savings.
8.4.3.1 Electrical Energy Monitoring	Measurement devices shall be installed in new buildings to monitor the electrical energy use.	Yes. Offers energy cost savings. May streamline municipal energy benchmarking requirements.
9.1.2 Lighting Alterations	Lighting power density (LPD) requirements are more stringent.	Yes. Offers energy cost savings. Met by LED manufacturers current product or product lines (at minimal/no added cost).
9.1.3 Installed Lighting Power	The luminaire wattage for all interior and exterior applications are more stringent.	Yes. Offers energy cost savings.
9.2.1 Requirements for All Compliance Paths	Revised lighting systems and equipment.	Yes. Offers energy cost savings.
9.4.1.1 Interior Lighting Controls	Revised lighting controls requirments for various building types.	Yes. Offers energy cost savings.
9.4.1.4 Exterior Lighting Controls	Revised requirements. Photosensors required. Lighting must be off during the day by photosensor.	Yes. Offers energy cost savings.
10.4.3 Elevators	Revised elevator requirements for lighting, ventilation power, and standby mode.	Yes. Offers energy cost savings. Included in manufacturers current product or product lines.
10.4.4 Escalators and Moving Walks	Requirements added since 2007 edition.	Yes. Offers energy cost savings.
10.4.5 Air Curtains	Requirements added since 2007 edition.	Yes. Offers energy cost savings.
10.4.6 Whole-Building Energy Monitoring	Requirements added since 2007 edition.	Yes. Offers energy cost savings.
10.4.7 Pumps (Clean Water Pumps)	Requirements added since 2007 edition.	Yes. Offers energy cost savings.

ASHRAE 90.1-2007 - 2021 IECC Comparison

Reference from ASHRAE 90.1-2019	Change from Current	Fiscal Impact
C402.5.1 Air barriers.	**Continuous air barrier required.** The continuous air barrier shall be designed and installed.	Marginal increase in cost, if any. Standard practice today; improves energy performance significantly.
C402.5.3 Buildling thermal envelope testing.	**Envelope air leakage must be tested and meet performance requirement.** Thermal envelope shall be tested for air leakage in accordance with ASTM E779 or ASTM E1827. Shall not exceed 0.40 cfm/sf.	Yes. Offers energy cost savings.
C402.5.8 Loading dock weather seals.	Cargo doors and loading dock doors shall be equipped with weatherseals.	Yes. Offers energy cost savings.
C402.1.3 Insulation component R-value based method.	**Roof insulation increased.** Insulation entirely above deck increases from R-20 to R-30. Attic insulation increases from R-38 to R-49.	Yes. Offers energy cost savings.
C402.1.3 Insulation component R-value based method.	**Above grade wall insulation incrases.** Steel-framed goes from R-13 + R-7.5 c.i. to R-13 + R-10 c.i. for climate zone 5 only.	Yes. Offers energy cost savings.
C402.1.3 Insulation component R-value based method.	**Above grade wall insulation incrases.** Wood-framed: cz4: from R-13 to R-13 + R-3.8 or R-20 cz5: from R-13.0 + R-3.8 c.i. to R-13 + R-7.5 c.i. or R-20 + R-3.8 ci.i.	Yes. Offers energy cost savings.
C402.1.3 Insulation component R-value based method.	**Below grade wall insulation increases.** cz4: from none to R-7.5. cz5: R-7.5 requirement remains unchanged.	Yes. Offers energy cost savings.
C402.1.3 Insulation component R-value based method.	**Unheated slab-on-grade floor insulation increases.** From none required to R-15 in climate zones 4 and 5.	Yes. Offers energy cost savings.
C402.1.3 Insulation component R-value based method.	**Heated slab-on-grade floor insulation increases.** From R-15 to R-15 peimeter and R-5 full slab for both climate zones 4 and 5.	Yes. Offers energy cost savings.
C402.1.4 Assembly U-factor, C-factor or F-factor-based method.	**Opaue door insulation increases.** Swinging goes from U-0.700 down to U-0.370. Nonswining goes from U-1.500 (cz4) and U-0.500 (cz5) to U-0.310.	Yes. Offers energy cost savings.
C402.4 Fenestration.	**Vertical glazing changes as follows for climae zone 4:** Nonmetal framing: from U-0.40 to U-0.36 Nonmetal framing: from SHGC-0.40 to SHGC-0.36 Metal framing: from U-0.50 to U-0.36 Metal framing: from SHGC-0.40 to SHGC-0.36 Entrance doors: from U-0.85 to U-0.63 Entrance doors: from SHGC-0.40 to SHGC-0.33	Yes. Offers energy cost savings.
C402.4 Fenestration.	**Vertical glazing changes as follows for climae zone 5:** Nonmetal framing: from U-0.35 to U-0.36 Nonmetal framing: from SHGC-0.40 to SHGC-0.38 Metal framing: from U-0.45 to U-0.36 Metal framing: from SHGC-0.40 to SHGC-0.38 Entrance doors: from U-0.80 to U-0.63 Entrance doors: from SHGC-0.40 to SHGC-0.33	Yes. Offers energy cost savings.
C402.4 Fenestration.	**Skylight performance increases.** Climate zones 4 and 5: From mostly U-0.69 to U-0.50 From mostly SHGC-0.49 to SHGC-0.40	Yes. Offers energy cost savings.
C403.3 Heating and cooling euipment efficiencies.	Revsied coolling efficiency mandatory provisions.	Yes. Offers energy cost savings.
C403.4 Heating and cooling system controls.	Revsied coolling efficiency mandatory provisions.	Yes. Offers energy cost savings.
C403.5 Economizers	A cooling system with a cooling capacity of greater than 54,000 Btu/h must have an air economizer or a water economizer.	Yes. Offers energy cost savings.
C403.7.7 Shutoff dampers	Outdoor air intake and exhaust opening and stairway and shaft vents shall be provided with Class 1 motorized dampers. The dampers shall have an air leakage rate not greater than 4 cfm/sf of damper surface area.	Yes. Offers energy cost savings.
C404.2 Service water-heating equipment performance efficiency.	Revised performance requirements for water-heating equiment.	Yes. Offers energy cost savings.
C405.11 Automatic receptacle control.	At least 50% of all 125V,15 and 20 amp receptacles in all private offices, conference rooms, rooms used primarily for printing and/or copying functions, break rooms, classrooms, and individual workstations.	Yes. Offers energy cost savings.
C403.4.1.4 Heated or cooled vestibules.	Requirements regarding the heating system for heated vestibules and air curtains with integral heating.	Yes. Offers energy cost savings.

C403.4.4 Part-load controls. (Hydronic systems greater than or equal to 3000,000 Btu/h.)	Various pump requirements beyond what current energy code calls for.	Yes. Offers energy cost savings.
C405.2.1 Occupant sensor controls.	New requirements versus current energy code.	Yes. Offers energy cost savings.
C405.2.2 Time-swtitch controls.	New requirements versus current energy code.	Yes. Offers energy cost savings.
C405.2.3 Light-reduction controls.	New requirements versus current energy code.	Yes. Offers energy cost savings.
C405.2.4 Daylight-responsive controls.	New requirements versus current energy code.	Yes. Offers energy cost savings.
C405.2.5 Specific application controls.	New requirements versus current energy code.	Yes. Offers energy cost savings.
C405.2.6 Manual controls	New requirements versus current energy code.	Yes. Offers energy cost savings.
C405.2.7 Exterior lighting controls.	Requirements beyond what is in current energy code. Photosensors required. Lighting must be off during the day by photosensor.	Yes. Offers energy cost savings.
C405.3 Interior lighting power requirements.	More stringent requirements than what is in the current energy code regarding interior lighting power allowances.	Yes. Offers energy cost savings.
C405.9.1 Elevator cabs.	Scope of requirements not present in current energy code.	Yes. Offers energy cost savings.
C405.9.2 Escalators and moving walks	Scope of requirements not present in current energy code.	Yes. Offers energy cost savings.
C405.12 Energy monitoring	Scope of requirements not present in current energy code. Monitoring required for 25,000 sf and up.	Yes. Offers energy cost savings. May streamline municipal energy benchmarking requirements.
C408.2 Mechanical systems and service water-heating systems commissioning and completion requirements	**Commissioning required (mechanical and water-heating only).** Registered design professional or approved agency shall provide evidence of commissioning and completion regarding the mechanical systems and service water-heating systems. This includes functional performance testing.	Yes. Current code requires commissioning of the control system for buildings over 50,000 sq ft and references ASHRAE and NEBB commissioning process documents. Additional service and review requirements; improves quality assurance.