Section Name	Rule ID	Ruleset Reference	Rule Description	Ruleset Model Type	Evaluation
Design Model and Compliance Calculations	CALC-1	4.2.1.1	Building performance factors shall be from Standard 90.1-2019, Table 4.2.1.1, based on the building area type and climate zone. For building area types not listed in Table 4.2.1.1 "All others." shall be used to determine the BPF.	Proposed Model	Full
Design Model and Compliance Calculations	CALC-2	4.2.1.1	Where a building has multiple building area types, the required BPF shall be equal to the area-weighted average of the building area types.	Proposed Model	Full
Design Model and Compliance Calculations	CALC-3	4.2.1.1	The baseline building regulated energy use shall include energy used for HVAC, lighting, service water heating, motors, transformers, vertical transportation, refrigeration equipment, computer-room cooling equipment, and other building systems, components, and processes.	Baseline Model	Full
Design Model and Compliance Calculations	CALC-4	G1.2.2	The performance of the proposed design is calculated in accordance with provisions of Standard 90.1-2019 Appendix G, where Performance Cost Index = Proposed building performance/Baseline building performance, where both the proposed building performance and the baseline building performance include all end-use load components associated with the building when calculating the Performance Cost Index.	Proposed Model	Full
Design Model and Compliance Calculations	CALC-5	4.2.1.1	The Performance Cost Index (PCI) shall be less than or equal to the Performance Cost Index Target (PCIt) when calculated in accordance with Standard 90.1 2019, Section 4.2.1.1	Proposed Model	Full
Design Model and Compliance Calculations	CALC-6	Table G3.1(1) Baseline Building Performance (a)	The proposed design shall be the same as the baseline design for all data elements identified in the schema hosted at data.standards.ashrae {{https://github.com/open229/ruleset-model-description-schema/blob/main/docs229/ASHRAE229_extra.schema.json}}	Proposed Model	Full
Design Model and Compliance Calculations	CALC-7	Table G3.1(1) Proposed Building Performance (a)	The proposed design shall be the same as the user design for all data elements identified in the schema hosted at data.standards.ashrae {{https://github.com/open229/ruleset-model-description-schema/blob/main/docs229/ASHRAE229_extra.schema.json}}	Proposed Model	Full
Building Envelope	ENV-1	Table G3.1(5) Baseline Building Performance (a)	There are four baseline rotations (i.e., four baseline models differing in azimuth by 90° and four sets of baseline model results) if vertical fenestration area per each orientation differ by more than 5%.	Baseline Model	Full
Building Envelope	ENV-2	Table G3.1(5) Baseline Building Performance (a)	Baseline building must be modeled so that it doesn't shade itself	Baseline Model	Applicability
Building Envelope	ENV-3	Table G3.1(5) Baseline Building Performance (b)	Baseline roof assemblies must conform with assemblies detailed in Standard 90.1-2019, Appendix A	Baseline Model	Applicability
Building Envelope	ENV-4	Table G3.1(5) Baseline Building Performance (b)	Baseline roof assemblies must match the appropriate assembly maximum U-factors in Standard 90.1-2019, Tables G3.4-1 through G3.4-8	Baseline Model	Full
Building Envelope	ENV-5	Table G3.1(5) Baseline Building Performance (b)	Baseline below-grade walls shall conform with assemblies detailed in Standard 90.1-2019, Appendix A	Baseline Model	Applicability
Building Envelope	ENV-6	Table G3.1(5) Baseline Building Performance (b)	Baseline below-grade walls shall match the appropriate assembly maximum C-factors in Standard 90.1-2019, Tables G3.4-1 through G3.4-8	Baseline Model	Full
Building Envelope	ENV-7	Table G3.1(5) Baseline Building Performance (b)	Baseline above-grade wall assemblies must conform with assemblies detailed in Appendix A (Steel-framed A3.3)	Baseline Model	Applicability
Building Envelope	ENV-8	Table G3.1(5) Baseline Building Performance (b)	Baseline above-grade wall assemblies must match the appropriate assembly maximum U-factors in Tables G3.4-1 through G3.4-8	Baseline Model	Full
Building Envelope	ENV-9	Table G3.1(5) Baseline Building Performance (b)	Baseline floor assemblies must conform with assemblies detailed in Appendix A (Floors—Steel-joist (A5.3))	Baseline Model	Applicability
Building Envelope	ENV-10	Table G3.1(5) Baseline Building Performance (b)	Baseline floor assemblies must match the appropriate assembly maximum U-factors in Tables G3.4-1 through G3.4-9	Baseline Model	Full
Building Envelope	ENV-11	Table G3.1(5) Baseline Building Performance (b)	Baseline slab-on-grade assemblies must conform with assemblies detailed in Appendix A (unheated slabs from tables (A6).)	Baseline Model	Applicability
Building Envelope	ENV-12	Table G3.1(5) Baseline Building Performance (b)	Baseline slab-on-grade assemblies must match the appropriate assembly maximum F-factors in Tables G3.4-1 through G3.4-9	Baseline Model	Full
Building Envelope	ENV-13	Table G3.1(5) Baseline Building Performance (b)	Opaque surfaces that are not regulated (not part of opaque building envelope) must be modeled the same U/C/F-factor in the baseline as in the proposed design	Baseline Model	Full
Building Envelope	ENV-14	Table G3.1(5) Baseline Building Performance (c)	For building area types included in Table G3.1.1-1, vertical fenestration areas for new buildings and additions shall equal that in Table G3.1.1-1 based on the area of gross above-grade walls that separate conditioned spaces and semiheated spaces from the exterior.	Baseline Model	Full
Building Envelope	ENV-15	Table G3.1(5) Baseline Building Performance (c)	For building areas not shown in Table G3.1.1-1, vertical fenestration areas for new buildings and additions shall equal that in the proposed design or 40% of gross above-grade wall area, whichever is smaller.	Baseline Model	Full
Building Envelope	ENV-16	Table G3.1(5) Baseline Building Performance (c)	Where a building has multiple building area types, the WWR for the baseline building for each use type shall be based on the values in the table.	Baseline Model	Full

Section Name	Rule ID	Ruleset Reference	Rule Description	Ruleset Model Type	Evaluation
Building Envelope	ENV-17	Table G3.1(5) Baseline Building Performance (c)	The vertical fenestration shall be distributed on each face of the building in the same proportion as in the proposed design	Baseline Model	Full
Building Envelope	ENV-18	Table G3.1(5) Baseline Building Performance (c)	The baseline fenestration area for an existing building shall equal the existing fenestration area prior to the proposed work	Baseline Model	Applicability
Building Envelope	ENV-19	Table G3.1(5) Baseline Building Performance (d)	Vertical fenestration U-factors for residential, non-residential and semiheated spaces in the baseline model must match the appropriate requirements in Table G3.4-1 through G3.4-8 for the appropriate WWR in the baseline RMR.	Baseline Model	Full
Building Envelope	ENV-20	Table G3.1(5) Baseline Building Performance (d)	Vertical fenestration SHGC shall match the appropriate requirements in Tables G3.4-1 through G3.4-8	Baseline Model	Full
Building Envelope	ENV-21	Table G3.1(1), Baseline Building Performance	Fenestration that is not regulated (not part of building envelope) must be modeled with the same area, U-factor and SHGC in the baseline as in the proposed design	Baseline Model	Full
Building Envelope	ENV-22	Table G3.1(5) Baseline Building Performance(d)	Baseline vertical fenestration shall be assumed to be flush with the exterior wall, and no shading projections shall be modeled.	Baseline Model	Full
Building Envelope	ENV-23	Table G3.1(5) Proposed Building Performance a.4	Manual fenestration shading devices, such as blinds or shades, shall be modeled or not modeled the same as in the baseline building design.	Baseline Model	Full
Building Envelope	ENV-24	Table G3.1(5) Baseline Building Performance (e)	If skylight area in the proposed desing is 3% or less of the roof surface, the skylight area shall be equal to that in the proposed design.	Baseline Model	Full
Building Envelope	ENV-25	Table G3.1(5) Baseline Building Performance (e)	If the skylight area of the proposed design is greater than 3%, baseline skylight area shall be decreased by an identical percentage in all roof components in which skylights are located to reach 3%.	Baseline Model	Full
Building Envelope	ENV-26	Table G3.1(5) Baseline Building Performance (e)	Skylight area must be allocated to surfaces in the same proportion in the baseline as in the proposed design; Skylight orientation and tilt shall be the same as in the proposed design.	Baseline Model	Full
Building Envelope	ENV-27	Table G3.1(5) Baseline Building Performance (e)	Skylight U-factors for residential, non-residential and semiheated spaces in the baseline model must match the appropriate requirements in Table G3.4-1 through G3.4-8	Baseline Model	Full
Building Envelope	ENV-28	Table G3.1(5) Baseline Building Performance (e)	Skylight SHGC properties shall match the appropriate requirements in Tables G3.4-1 through G3.4-8 using the value and the applicable skylight percentage.	Baseline Model	Full
Building Envelope	ENV-29	Table G3.1(5) Proposed Building Performance (a)	Manually controlled dynamic glazing shall use the average of the minimum and maximum SHGC and VT.	Proposed Model	Applicability
Building Envelope	ENV-30	Table G3.1(5) Baseline Building Performance (f)	The baseline roof surfaces shall be modeled using a thermal emittance of 0.9	Baseline Model	Full
Building Envelope	ENV-31	Table G3.1(5) Proposed Building Performance (a)(3)	The proposed roof surfaces shall be modeled using the same thermal emittance as in the user model if the aged test data are available, or equal to 0.9 default emittance	Proposed Model	Full
Building Envelope	ENV-32	Table G3.1(5) Baseline Building Performance	The baseline roof surfaces shall be modeled using a solar reflectance of 0.30.	Baseline Model	Full
Building Envelope	ENV-33	Table G3.1(5) Proposed Building Performance (a)(3)	The proposed roof surfaces shall be modeled using the same solar reflectance as in the user model if the aged test data are available, or equal to 0.7 default reflectance.	Proposed Model	Full
Building Envelope	ENV-34	Table G3.1(5) Proposed Building Performance (b)	The infiltration modeling method in the baseline includes adjustment for weather and building operation.	Baseline Model	Full
Building Envelope	ENV-35	Table G3.1(5) Proposed Building Performance (b)	The infiltration modeling method in the proposed includes adjustment for weather and building operation.	Proposed Model	Full
Building Envelope	ENV-36	Table G3.1(5) Baseline Building Performance (h)	The baseline air leakage rate of the building envelope (l75Pa) at a fixed building pressure differential of 0.3 in. of water shall be 1 cfm/ft2. The air leakage rate of the building envelope shall be converted to appropriate units for the simulation program using one of the methods in Section Table G3.1.1.4	Baseline Model	Full
Building Envelope	ENV-37	Table G3.1(5) Proposed Building Performance (b)	The air leakage rate in unconditioned and unenclosed spaces must be the same in the baseline and proposed design	Baseline Model	Full
Building Envelope	ENV-38	Table G3.1(5) Proposed Building Performance (b)	The proposed air leakage rate of the building envelope (l75Pa) at a fixed building pressure differential of 0.3 in. of water shall be 0.6 cfm/ft2 for buildings providing verification in accordance with Section 5.9.1.2. The air leakage rate of the building envelope shall be converted to appropriate units for the simulation program using one of the methods in Section	Proposed Model	Full
Building Envelope	ENV-39	Table G3.1(14) Proposed Building Performance (b)	It is acceptable to use either an annual average ground temperature or monthly average ground temperatures for calculation of heat loss through basement floors.	Baseline Model	Full (missing)
Building Envelope	ENV-40	Table G3.1(5) Baseline Building Performance (b)	U-factor of the baseline door is based on Tables G3.4-1 through G3.4-8 for the applicable door type (swinging or non-swinging) and envelope conditioning category	Baseline Model	Full

Section Name	Rule ID	Ruleset Reference	Rule Description	Ruleset Model Type	Evaluation
Building Envelope	ENV-41	Table G3.1(5) Baseline Building Performance (b)	Opaque roof surfaces that are not regulated (not part of opaque building envelope) must be modeled with the same thermal emittance and solar reflectance in the baseline as in the proposed design	Baseline Model	Full
Lighting	LTG-1	Section G1.2.1(b)	The total proposed building interior lighting power shall not exceed the interior lighting power allowance determined using either Standard 90.1-2019 Table G3.7 or Standard 90.1-2019 Table G3.8.	Proposed Model	Full
Lighting	LTG-2	Table G3.1 (6)(e)	Interior lighting power for spaces in proposed building with hardwired lighting, including hotel/motel guest rooms and dormitory living quarters shall be >= the value prescribed by Standard 90.1-2019 in Table 9.6.1. Interior lighting power for dwelling units shall be >=0.60 W/ft2	Proposed Model	Full
Lighting	LTG-3	Table G3.1 Proposed Building Performance (a)(b)(c)	Where a complete lighting system exists, the actual lighting power for each thermal block shall be used in the model. Where a lighting system has been designed and submitted with design documents, lighting power shall be determined in accordance with Sections 9.1.3 and 9.1.4. Where lighting neither exists nor is submitted with design documents, lighting shall comply with but not exceed the requirements of Section 9. Lighting power shall be determined in accordance with the Building Area Method (Section 9.5.1)	Proposed Model	Full
Lighting	LTG-4	Table G3.1(6) Baseline Building Performance	Where a complete lighting system exists and where a lighting system has been designed and submitted with design documents, the baseline LPD is equal to expected value in Standard 90.1-2019 Table G3.7. Where lighting neither exists nor is submitted with design documents, baseline LPD shall be determined in accordance with Table G3-7 for "Office-Open Plan" space type.	Baseline Model	Full
Lighting	LTG-5	Table G3.1(6) Baseline Building Performance	Baseline building is required to be modeled with automatic shutoff controls in buildings >5000 ft2	Baseline Model	Full
Lighting	LTG-6	Table G3.1(6) Baseline Building Performance	Baseline building shall not be modeled with daylighting control	Baseline Model	Full
Lighting	LTG-7	Table G3.1(6) Proposed Building Performance (h)	Automatic daylighting responsive controls shall be modeled directly in the proposed design or through schedule adjustments determined by a separate daylighting analysis. Modeling and schedule adjustments shall separately account for primary sidelighted areas, secondary sidelighted areas, and toplighted areas	Proposed Model	Full
Lighting	LTG-8	Table G3.1(6) Proposed Building Performance (i)	Proposed building is modeled with additional occupancy sensor controls using occupancy sensor schedule reduction factors specified in Table G3.7. Proposed building has been modeled with 1.25 * occupancy sensor reduction factor (from Table G3.7) for spaces with manual-on and partial-on occupancy sensor controls and with with 30% occupancy sensor	Proposed Model	Full
Lighting	LTG-9	Table G3.1(6) Proposed Building Performance (i)	Proposed building is modeled with other programmable lighting controls through a 10% schedule reduction in buildings less than 5,000sq.ft.	Proposed Model	Full
Baseline HVAC System Selection	HVAC-SYS-1	G3.1.1 (a)-(h)	Baseline HVAC system type shall be determined based on requirements specified in Standard 90.1-2019 Section G3.1.1 (a)-(h)	Baseline Model	Full
Baseline HVAC System Selection	HVAC-SYS-2	G3.1.1 (a)(4)	Baseline system types 1, 2, 3, 4, 9, 10, 11, 12, and 13 shall be modeled as one system per zone and baseline system types 5, 6, 7, and 8, shall be modeled as one system per floor. Systems serving laboratory spaces are an exception, which should be modeled as baseline system types 5 or 7 , with the baseline system serving all laboratory zones in the buidling.	Baseline Model	Full
Baseline HVAC System Selection	HVAC-SYS-3	G3.1.1 (d)	The lab exhaust fan in the baseline building, shall be modeled as constant horsepower reflecting constant-volume stack discharge with outdoor air bypass.	Baseline Model	Applicability
General Baseline HVAC System Requirements	HVAC-GEN-1	G3.1.2.2	HVAC system coil capacities for the baseline building design shall be oversized by 15% for cooling and 25% for heating.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-2	G3.1.2.2	Baseline building plant capacities shall be based on coincident loads.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-3	G3.1.2.2.1	Weather conditions used in sizing runs to determine baseline equipment capacities shall be based either on hourly historical weather files containing typical peak conditions or on design days developed using 99.6% heating design temperatures and 1% dry-bulb and 1% wet-bulb cooling design temperatures.	Baseline Model	Applicability
General Baseline HVAC System Requirements	HVAC-GEN-4	G3.1.2.2.1	For baseline cooling sizing runs in residential dwelling units, the infiltration, occupants, lighting, gas and electricity using equipment hourly schedule shall be the same as the most used hourly weekday schedule from the annual simulation.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-5	G3.1.2.3	Unmet load hours for the proposed design shall not exceed 300 (of the 8760 hours simulated).	Proposed Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-6	G3.1.2.3	Unmet load hours for the baseline design shall not exceed 300 (of the 8760 hours simulated).	Baseline Model	Full

Section Name	Rule ID	Ruleset Reference	Rule Description	Ruleset Model Type	Evaluation
General Baseline HVAC System Requirements	HVAC-GEN-7	G3.1.2.5 and Exception (2)	Minimum ventilation system outdoor air intake flow shall be the same for the proposed design and baseline building design except when any of the 4 exceptions defined in Section G3.1.2.5 are met. Exceptions 2. When designing systems in accordance with Standard 62.1, Section 6.2, "Ventilation Rate Procedure," reduced ventilation airflow rates may be calculated for each HVAC zone in the proposed design with a zone air distribution effectiveness (Ez) > 1.0 as defined by Standard 62.1, Table 6-2. Baseline ventilation airflow rates in those zones shall be calcu-lated using the proposed design Ventilation Rate Procedure calculation with the following change only. Zone air distribution effectiveness shall be changed to (Ez) = 1.0 in each zone having a zone air distribution effectiveness (Ez) > 1.0. Proposed design and baseline build-ing design Ventilation Rate Procedure calculations, as described in Standard 62.1, shall be submitted to the rating authority to claim credit for this exception.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-8	G3.1.2.5 Exception (1)	Demand control ventilation is modeled in the baseline design in systems with outdoor air capacity greater than 3000 cfm serving areas with an average occupant design capacity greater than 100 people per 1000 ft^2.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-9	G3.1.2.6	Air economizers shall not be included in baseline HVAC Systems 1, 2, 9, and 10.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-10	G3.1.2.6	Air economizers shall be included in baseline HVAC Systems 3 through 8, and 11, 12, and 13 based on climate as specified in Table G3.1.2.6. Exceptions: 1. Systems that include gas-phase air cleaning to meet the requirements of Standard 62.1, Section 6.1.2. This exception shall be used only if the system in the proposed design does not match the building design. 2. Where the use of outdoor air for cooling will affect supermarket open refrigerated case-work systems. This exception shall only be used if the system in the proposed design does not use an economizer. If the exception is used, an economizer shall not be included in the baseline building design. 3. Systems that serve computer rooms complying with Section G3.1.2.6.1.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-11	G3.1.2.6.1	For systems that serve computer rooms, if the baseline system is HVAC System 11, it shall include an integrated fluid economizer meeting the requirements of Section 6.5.1.2 in the baseline building design.	Baseline Model	Applicability
General Baseline HVAC System Requirements	HVAC-GEN-12	G3.1.2.7	The baseline system economizer high-limit shutoff shall be a dry-bulb fixed switch with set-point temperatures in accordance with the values in Table G3.1.2.7.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-13	G3.1.2.8.1 and Exception 1	For baseline system types 1-8 and 11-13, system design supply airflow rates shall be based on a supply-air-to-room temperature set-point difference of 20°F or the minimum outdoor airflow rate, or the airflow rate required to comply with applicable codes or accreditation standards, whichever is greater. For systems with multiple zone thermostat setpoints, use the design set point that will result in the lowest supply air cooling set point or highest supply air heating set point	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-14	G3.1.2.8.1	For baseline system types 1-8 and 11-13, if return or relief fans are specified in the proposed design, the baseline building design shall also be modeled with fans serving the same functions and sized for the baseline system supply fan air quantity less the minimum outdoor air, or 90% of the supply fan air quantity, whichever is larger.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-15	G3.1.2.8.2	For baseline system types 9 & 10, the system design supply airflow rates shall be based on the temperature difference between a supply air temperature set point of 105°F and the design space-heating temperature set point, the minimum outdoor airflow rate, or the airflow rate required to comply with applicable codes or accreditation standards, whichever is greater.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-16	G3.1.2.8.2	For zones served by baseline system types 9 & 10, if the proposed design includes a fan or fans sized and controlled to provide non-mechanical cooling, the baseline building design shall include a separate fan to provide nonmechanical cooling, sized and controlled the same as the proposed design.	Baseline Model	Applicability
General Baseline HVAC System Requirements	HVAC-GEN-17	G3.1.2.9	For baseline system 1 and 2, the total fan electrical power (Pfan) for supply, return, exhaust, and relief shall be = CFMs x 0.3, where, CFMs = the baseline system maximum design supply fan airflow rate, cfm	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-18	G3.1.2.9	For baseline systems 3 through 8, and 11, 12, and 13, the system fan electrical power for supply, return, exhaust, and relief shall be Pfan = bhp × 746/fan motor efficiency. Where, bhp = brake horsepower of baseline fan motor from Table G3.1.2.9; fan motor efficiency = the efficiency from Table G3.9.1 for the next motor size greater than the bhp using a totally enclosed fan cooled motor at 1800 rpm	Baseline Model	Applicability
General Baseline HVAC System Requirements	HVAC-GEN-19	G3.1.2.9	For baseline systems 9 and 10 the system fan electrical power (Pfan) for supply, return, exhaust, and relief shall be CFMs × 0.3, where, CFMs = the baseline system maximum design supply fan airflow rate, cfm. If modeling a non-mechanical cooling fan is required by Section G3.1.2.8.2, there is a fan power allowance of Pfan = CFMnmc × 0.054, where, CFMnmc = the baseline non-mechanical cooling fan airflow, cfm for the non-mechanical cooling.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-20	G3.1.2.9	The calculated system fan power shall be distributed to supply, return, exhaust, and relief fans in the same proportion as the proposed design.	Baseline Model	Full

Section Name	Rule ID	Ruleset Reference	Rule Description	Ruleset Model Type	Evaluation
General Baseline HVAC System Requirements	HVAC-GEN-21	G3.1.2.10	Baseline systems with >= 5,000 CFM supply air and >= 70 %OA shall have energy recovery with 50% enthalpy recovery ratio. Exceptions include: 1. Systems serving spaces that are not cooled and that are heated to less than 60°F. 2. Systems exhausting toxic, flammable, or corrosive fumes or paint or dust. This exception shall only be used if exhaust air energy recovery is not used in the proposed design. 3. Commercial kitchen hoods (grease) classified as Type 1 by NFPA 96. This exception shall only be used if exhaust air energy recovery is not used in the proposed design. 4. Heating systems in Climate Zones 0 through 3. 5. Cooling systems in Climate Zones 3C, 4C, 5B, 5C, 6B, 7, and 8. 6. Where the largest exhaust source is less than 75% of the design outdoor airflow. This exception shall only be used if exhaust air energy recovery is not used in the proposed design. 7. Systems requiring dehumidification that employ energy recovery in series with the cooling coil. This exception shall only be used if exhaust air energy recovery and series-style energy recovery coils are not used in the proposed design.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-22	G3.1.2.10	Baseline systems modeled with exhaust air energy recovery shall allow bypass for economizer control where applicable.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-23	G3.1.2.2.1	For cooling sizing runs, schedules for internal loads, including those used for infiltration, occupants, lighting, gas and electricity using equipment, shall be equal to the highest hourly value used in the annual simulation runs and applied to the entire design day. For heating sizing runs, schedules for internal loads, including those used for occupants, lighting, gas and	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-24	Table G3.1 Section 4 & G3.1.2.4	Schedules for HVAC fans that provide outdoor air for ventilation shall run continuously whenever spaces are occupied in the proposed design.	Proposed Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-25	Table G3.1 Section 4 & G3.1.2.4	Schedules for HVAC fans that provide outdoor air for ventilation shall run continuously whenever spaces are occupied in the baseline design.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-26	Table G3.1 Section 4 & G3.1.2.4	HVAC fans shall remain on during unoccupied hours in spaces that have health and safety mandated minimum ventilation requirements during unoccupied hours in the proposed design.	Proposed Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-27	Table G3.1 Section 4 & G3.1.2.4	HVAC fans shall remain on during unoccupied hours in spaces that have health and safety mandated minimum ventilation requirements during unoccupied hours in the baseline design.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-28	Table G3.1 Section 4 & G3.1.2.4	Schedules for HVAC fans that provide outdoor air for ventilation excluding unoccupied hours in spaces that have health and safety mandated minimum ventilation requirements shall be cycled ON and OFF to meet heating and cooling loads during unoccupied hours in the proposed design.	Proposed Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-29	Table G3.1 Section 4 & G3.1.2.4	Schedules for HVAC fans that provide outdoor air for ventilation excluding unoccupied hours in spaces that have health and safety mandated minimum ventilation requirements shall be cycled ON and OFF to meet heating and cooling loads during unoccupied hours in the baseline design	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-30	Section G3.1.2.4 Exception (1)	For Systems 6 and 8, only the terminal-unit fan and reheat coil shall be energized to meet heating set point during unoccupied hours in the baseline design.	Baseline Model	Applicability
General Baseline HVAC System Requirements	HVAC-GEN-31	Table G3.1 Section 4 Exception (3)	HVAC fans shall remain on during unoccupied hours in systems primarily serving computer rooms in the proposed design.	Proposed Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-32	Table G3.1 Section 4 Exception (3)	HVAC fans shall remain on during unoccupied hours in systems primarily serving computer rooms in the baseline design.	Baseline Model	Full
General Baseline HVAC System Requirements	HVAC-GEN-33	Table G3.1 Section 4 Exception (1)	Where no heating and/or cooling system is to be installed, and a heating or cooling system is being simulated only to meet the requirements described in this table, heating and/or cooling system fans shall not be simulated as running continuously during occupied hours but shall be cycled ON and OFF to meet heating and cooling loads during all hours in the proposed design.	Proposed Model	Applicability
General Baseline HVAC System Requirements	HVAC-GEN-34	Table G3.1 Section 4 Exception (1)	Where no heating and/or cooling system is to be installed, and a heating or cooling system is being simulated only to meet the requirements described in this table, heating and/or cooling system fans shall not be simulated as running continuously during occupied hours but shall be cycled ON and OFF to meet heating and cooling loads during all hours in the baseline design.	Baseline Model	Applicability
General Baseline HVAC System Requirements	HVAC-GEN-35	G3.1.2.5 Exception (4)	For baseline systems serving only laboratory spaces that are prohibited from recirculating return air by code or accreditation standards, the baseline system shall be modeled as 100% outdoor air. Rule only applies when baseline outdoor air CFM is modeled as greater than proposed design outdoor air CFM.	Baseline Model	Applicability
General Baseline HVAC System Requirements	HVAC-GEN-36	G3.1.2.10	Baseline systems required to model energy recovery per G3.1.2.10 shall be modeled with a 50% enthalpy recovery ratio.	Baseline Model	Applicability
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-1	G3.1.3.1	For baseline systems 2 and 4, the electric air-source heat pumps shall be modeled with electric auxiliary heat and an outdoor air thermostat. The systems shall be controlled to energize auxiliary heat only when the outdoor air temperature is less than 40°F. The air-source heat pump shall be modeled to continue to operate while auxiliary heat is energized.	Baseline Model	Applicability

Section Name	Rule ID	Ruleset Reference	Rule Description	Ruleset Model Type	Evaluation
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-2	G3.1.3.12	For baseline systems 5-8 and 11, the the supply air temperature shall be reset higher by 5°F under minimum cooling load conditions.	Baseline Model	Full
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-3	G3.1.3.13 and G3.1.3.14	For baseline systems 5-8, the minimum volume setpoint shall be 30% of zone peak airflow, minimum outdoor airflow, or rate required to comply with minium accrediidation standards whichever is larger.	Baseline Model	Full
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-4	G3.1.3.13	Baseline systems 5 and 7 serving lab spaces per Standard 90.1-2019 G3.1.1(c), shall reduce lab exhaust and makeup air during unoccupied periods to 50% of zone peak airflow, the minimum outdoor airflow, or rate required to comply with minimum accreditation standards whichever is larger.	Baseline Model	Applicability
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-5	G3.1.3.14	For baseline systems 6 and 8, fans in parallel VAV fan-powered boxes shall run as the first stage of heating before the reheat coil is energized.	Baseline Model	Applicability
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-6	G3.1.3.14	For baseline systems 6 and 8, fans in parallel VAV fan-powered boxes shall be sized for 50% of the peak design primary air (from the VAV air-handling unit) flow rate and shall be modeled with 0.35 W/cfm fan power.	Baseline Model	Full
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-7	G3.1.3.14	For baseline systems 6 and 8, supply air temperature setpoint shall be constant at the design condition	Baseline Model	Full
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-8	G3.1.3.15	For baseline systems 5-8 and 11 - part load vav fan power shall be modeled using either method 1 or 2 in Standard 90.1-2019 Table G3.1.3.15.	Baseline Model	Full
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-9	G3.1.3.17	For baseline system 11, minimum volume setpoint shall be the largest of 50% of the maximum design airflow rate, the minimum ventilation airflow rate or the airflow required to comply with codes or accreditation standards.	Baseline Model	Applicability
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-10	G3.1.3.17	For baseline system 11, fan volume shall be reset from 100% airflow at 100% load to minimum airflow at 50% load.	Baseline Model	Applicability
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-11	G3.1.3.17	For baseline system 11, supply air temperature shall be reset from minimum supply air temp at 50% cooling load to room temp at 0% cooling load.	Baseline Model	Applicability
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-12	G3.1.3.17	For baseline system 11 in heating mode, supply air temperature shall be modulated to maintain space temperature, and fan volume shall be fixed at minimum airflow	Baseline Model	Applicability
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-13	G3.1.3.18	If proposed design includes humidistatic controls then the baseline shall use mechanical cooling for dehumidification and shall reheat to avoid overcooling.	Baseline Model	Applicability
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-14	G3.1.3.18	If the baseline system does not comply with exceptions in Standard 90.1-2019, Section 6.5.2.3 then only 25% of the system reheat energy shall be included in the baseline building performance	Baseline Model	Applicability
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-15	G3.1.3.18	The dehumidification reheat type in the baseline building shall be the same as the baseline system heating type.	Baseline Model	Applicability
System-Specific Baseline HVAC System Requirements	HVAC-SPEC-16	G3.1.3.19	Systrems 5 - 8, the baseline system shall be modeled with preheat coils controlled to a fixed set point 20°F less than the design room heating temperature setpoint.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-1	G3.1.1.3	For systems using purchased hot water or steam, the heating source shall be modeled as purchased hot water or steam in both the proposed design and baseline building design. If any system in the proposed design uses purchased hot water or steam, all baseline systems with hot water coils shall use the same type of purchased hot water or steam.	Baseline Model	Applicability
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-2	G3.1.1.3.4	For purchased HW/steam in the proposed model, the baseline shall have the same number of pumps as proposed	Baseline Model	Applicability
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-3	G3.1.2.2	When the baseline building is modeled with a hot water or chilled water plant the plant shall be sized based on coincident loads.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-4	G3.1.3.2	When baseline building does not use purchased heat, baseline systems 1,5,7,11,12 shall be modeled with natural draft boilers.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-5	G3.1.3.2	When the baseline building requires boilers, (for baseline system type = 1,5,7,11 and 12), for building area>15,000ft2, two equally sized boilers should be modeled. Else a single boiler shall be modeled.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-6	G3.1.3.2	When the baseline building requires boilers, (for baseline system type = 1,5,7,11 and 12), and is modeled with two boilers, each boiler shall be staged based on load.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-7	G3.1.3.3	When the baseline building requires boilers, (for baseline system type = 1,5,7,11 and 12), the hot water supply temperature (HWST) shall be 180F, and the hot water return temperature (HSRT) shall be 130F	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-8	G3.1.3.4	When the baseline building requires boilers, (for baseline system type = 1,5,7,11 and 12),, HWST for the baseline building shall be reset using an outdoor air dry-bulb reset schedule. 180F at 20F OAT, 150Fat 50F OAT, ramped linearly between 150F and 180F.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-9	G3.1.3.5	When the baseline building is modeled with a hot water plant, served by boiler(s), (for baseline system type = 1,5,7,11 and 12), the hot water pump power shall be 19W/gpm	Baseline Model	Full

Rules Evaluated

Section Name	Rule ID	Ruleset Reference	Rule Description	Ruleset Model Type	Evaluation
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-10	G3.1.3.5	When the baseline building uses boiler)s) or purchased hot water, the hot water pump shall be modeled as riding the pump curve if the hot water system serves less than 120,000 ft^2 otherwise it shall be modeled with a VFD.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-11	G3.1.3.5	When the baseline building users boiler(s) or purchased hot water, the HW loop shall be modeled as primary only	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-12	G3.1.3.5	When the baseline building uses boiler(s) or purchased hot water, the HW Loop is modeled with continuous variable flow	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-13	G3.1.3.5	When the baseline building uses boiler(s) or purchased hot water, the hot water pumping system shall be modeled with a minimum turndown ratio of 0.25.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-14	G3.1.3.4	When the baseline building is modeled with a hot water plant, served by purchased HW system, hot water supply temperature reset is not modeled.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-15	G3.1.3.5	When the baseline building is modeled with a hot water plant, served by purchased HW system, the hot water pump power shall be 14 W/gpm	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-16	G3.1.3.2	Baseline shall have only one heating hot water plant.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-17	G3.1.2.1	All boilers in the baseline building design shall be modeled at the minimum efficiency levels, both part load and full load, in accordance with Tables G3.5.6.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Chilled Water	HVAC-HW-18	G3.1.2.1	For baseline building, fossil fuel systems shall be modeled using natural gas as their fuel source. Exception: For fossil fuel systems where natural gas is not available for the proposed building site as determined by the rating authority, the baseline HVAC systems shall be modeled using propane as their fuel.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-1	G3.1.3.8	For baseline chilled water loop that is not purchased chilled water, baseline chilled water design supply temperature shall be modeled at 44F.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-2	G3.1.3.8	For baseline chilled water loop that is not purchased chilled water, the baseline chilled water design return temperature shall be modeled at 56F.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-3	G3.1.3.9	For baseline chilled water loop that is not purchased chilled water, chilled-water supply temperature shall be reset based on outdoor dry-bulb temperature if loop does not serve any baseline system type-11.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-4	G3.1.3.9	For baseline chilled water loop that is not purchased chilled water and does not serve any computer room HVAC systems, chilled-water supply temperature shall be reset using the following schedule: 44F at outdoor dry-bulb temperature of 80F and above, 54F at 60F and below, and ramped linearly between 44F and 54F at temperature between 80F and 60F.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-5	G3.1.3.9	For baseline chilled water loop that is not purchased chilled water and serves computer room HVAC systems (baseline system type-11), chilled-water supply temperature shall be reset higher based on the HVAC system requiring the most cooling.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-6	G3.1.3.9	For baseline chilled water loop that is not purchased chilled water and serves computer room HVAC systems (baseline system type-11), The maximum reset chilled-water supply temperature shall be 54F.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-7	G3.1.3.10	Baseline chilled water system that is not purchased chilled water, shall be modeled as primary/secondary systems.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-8	G3.1.3.10	For baseline chilled water system with cooling capacity of 300 tons or more, the secondary pump shall be modeled with variable-speed drives.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-9	G3.1.3.10	For baseline chilled water system with cooling capacity of 300 tons or more, the secondary loop shall be modeled with a minimum flow of 25% of the design flow rate.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-10	G3.1.3.10	For baseline chilled water system with cooling capacity less than 300 ton, the secondary pump shall be modeled as riding the pump curve.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-11	G3.1.3.10	For baseline chilled-water system that does not use purchased chilled water, variable-flow secondary pump shall be modeled as 13W/gpm at design conditions.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-12	G3.1.3.11	The heat rejection system shall be a single loop, modeled with a single cooling tower	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-13	G3.1.3.11	The baseline heat rejection loop shall be an axial-fan open circuit cooling tower.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-14	G3.1.3.11	The baseline heat-rejection device shall have a design temperature rise of 10°F.	Baseline Model	Full

Section Name	Rule ID	Ruleset Reference	Rule Description	Ruleset Model Type	Evaluation
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-15	G3.1.3.11	Heat rejection device approach shall be calculated based on the requirements specified in Standard 90.1-2019, Section G3.1.3.11	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-16	G3.1.3.11	The baseline condenser-water design supply temperature shall be calculated using the cooling tower approach to the 0.4% evaporation design wet-bulb temperature, valid for wet-bulbs from 55°F to 90°F.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-17	G3.1.3.11	The baseline heat rejection device shall have an efficiency of 38.2 gpm/hp	Baseline Model	Applicability
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-18	G3.1.3.11	The baseline heat rejection device shall be modeled with variable speed fan control	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-19	G3.1.3.11	The baseline cooling tower shall be controlled to maintain a leaving water temperature, where weather permits, as specified in Table G3.1.3.11	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-20	G3.1.3.11	The baseline condenser loop minimum condenser leaving water temperature shall be modeled as specified in Standard 90.1-2019 Table G3.1.3.11.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-21	G3.1.3.7	The baseline building design's chiller plant shall be modeled with chillers having the type as indicated in Standard 90.1-2019 Table G3.1.3.7 as a function of building peak cooling load.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-22	Table G3.5.3	The baseline chiller efficiencies shall be modeled at the minimum efficiency levels for full load, in accordance with Standard 90.1-2019 Tables G3.5.3.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-23	G3.1.3.10	Each baseline chiller shall be modeled with separate chilled water pump interlocked to operate with the associated chiller.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-24	G3.1.3.10	For baseline chilled-water systems served by chiller(s), the primary pump shall be modeled as constant volume.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-25	G3.1.3.10	For chilled-water systems served by chiller(s) and does not serve baseline System-11, the baseline building constant-volume primary pump power shall be modeled as 9 W/gpm.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-26	G3.1.3.10	For chilled-water systems served by chiller(s) and serves baseline system-11, the baseline building constant-volume primary pump power shall be modeled as 12 W/gpm.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-27	G3.1.3.11	Each baseline chiller shall be modeled with separate condenser-water pump interlocked to operate with the associated chiller.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-28	G3.1.3.11	The baseline building design condenser-water pump shall be modeled as constant volume.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-29	G3.1.3.11	For chilled-water systems served by chiller(s) and does not serve baseline System-11, condenser-water pump power shall be 19 W/gpm.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-30	G3.1.3.11	For chilled-water systems served by chiller(s) and serves baseline System-11, condenser-water pump power shall be 22 W/gpm.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-31	G3.1.3.7	The baseline building design's chiller plant shall be modeled with chillers having the number as indicated in Table G3.1.3.7 as a function of building peak cooling load	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-32	Section G3.1.2.1	The baseline chiller efficiencies shall be modeled at the minimum efficiency levels for part load, in accordance with Tables G3.5.3.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-33	Section G3.1.3.2	Baseline chilled water system that does not use purchased chilled water must only have no more than one CHW plant.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-34	Section G3.1.2.2	For baseline cooling chilled water plant that is served by chiller(s), the capacity shall be based on coincident loads.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-35	G3.1.3.9	Baseline systems served by purchased chilled water shall not be modeled with chilled water reset	Baseline Model	Applicability
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-36	G3.1.1.3.4 and G3.1.3.10	Baseline systems served by purchased chilled water shall be modeled with a chilled water distribution pump	Baseline Model	Applicability
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-37	G3.1.3.10	Baseline systems served by purchased chilled water loop shall be modeled with a distribution pump with a variable speed drive	Baseline Model	Applicability
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-38	G3.1.3.10	Baseline systems served by purchased chilled water loop shall have a minimum flow setpoint of 25%	Baseline Model	Applicability

Rules Evaluated					
Section Name	Rule ID	Ruleset Reference	Rule Description	Ruleset Model Type	Evaluation
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-39	G3.1.3.10	Baseline systems served by purchased chilled water loop shall be modeled with a distribution pump whose pump power is 16W/gpm	Baseline Model	Applicability
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-40	Section G3.1.1.1 & G3.1.1.3.1	For systems using purchased chilled water, the cooling source shall be modeled based on G3.1.1.3 as purchased chilled water in both the proposed design and baseline building design. On-site chillers and direct expansion equipment shall not be modeled in the baseline building design.	Baseline Model	Full
Baseline HVAC-Water Side Requirements: Hot Water	HVAC-CHW-41	Section G3.1.3	Purchased CHW systems must be modeled with only one external fluid loop in the baseline design.	Baseline Model	Applicability

Rules Not Evaluated

Section Name	Ruleset Reference	Rule Description	Ruleset Model Type
Renewable, Recovered, and Purchased Energy	Section G2.4	Section specifies requirements related to accounting for on-site renewable energy, site-recovered energy, calculating annual energy costs	Proposed Model
Design Model	4.2.1.2	When on-site renewable energy generation exceeds the thresholds defined in Section 4.2.1.1, the methodology defined in this section shall be used to calculate the PCI-target.	Proposed Model
Design Model	G1.2.1 (e)	Proposed building systems, controls, or building envelope documented in Section G1.3(c) that do not have criteria in Sections 5 through 10 shall have verification or testing to document proper installation and operation in accordance with Section 4.2.5.	Proposed Model
Design Model	Table G3.1(1) Proposed Building Performance (c)	When the performance rating method is applied to buildings in which energy-related features have not yet been designed (e.g., a lighting system), those yet-to-be-designed features shall be described in the proposed design exactly as they are defined in the baseline building design.	Baseline Model
Design Model	Table G3.1(1)	Where the space classification for a space is not known, the space shall be categorized as an office space.	Proposed Model
Design Model	Table G3.1(1)	Where the baseline building systems and equipment are permitted to be different from the proposed design but are not prescribed in this appendix, the baseline must be determined based on the following, in the order of priority: a. Requirements in Sections 5 through 10 b. Requirements of otehr efficiency or equipment codes or standards applicable to the design of the building systems and equipment.	Baseline Model
Additions and Alterations	Table G3.1 (2) Proposed Building Performance	It is acceptable to predict performance using building models that exclude parts of the existing building, provided that the conditions listed in Table G3.1(2), proposed building performance, are met.	Proposed Model
Space Use Classification	Table G3.1 (3) Proposed Building Performance	Space use classification within each thermal block shall be specified using Section 9.6.1 unless space types are not designated in design in which case Section 9.5.1 may be used.	Proposed Model
Space Use Classification	Table G3.1 (3) Proposed Building Performance	The user may simplify the placement of the various space types within the building model, provided that building total areas for each space type are accurate.	Proposed Model
Schedule	Table G3.1 (4) Proposed Building Design	Temperature Control Setpoints shall be the same for proposed design and baseline building design.	Proposed Model
Schedule	Table G3.1 (4) Proposed Building Design	Humidity Control Setpoints shall be the same for proposed design and baseline building design.	Proposed Model
Schedule	Table G3.1(4) Proposed Building Design Exception 2	Schedules may be allowed to differ between proposed design and baseline building design when necessary to model nonstandard efficiency measures, such as automatic natural ventilation controls, automatic demand control ventilation controls. In no case shall schedules differ where the controls are manual.	Proposed Model
Schedule	Table G3.1(4) Exception 3	Fan schedules shall be modeled identically in the baseline and proposed unless Table G3.1 Section 4 baseline exceptions are applicable.	Proposed Model
Schedule	Section 3 Definitions	A computer room is defined as 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 W/ft2 of conditioned floor area.	Proposed Model
Thermal Blocks-HVAC Zones Designed	Table G3.1 Section 7. Proposed Building Performance	Where HVAC zones are defined on HVAC design drawings, each HVAC zone shall be modeled as a separate thermal block. Exceptions: Different HVAC zones may be combined to create a single thermal block or identical thermal blocks to which multipliers are applied.	Proposed Model
Thermal Blocks-HVAC Zones Designed	Table G3.1 Section 7. Proposed Building Performance	When a thermal block has more than one HVAC zone, each HVAC zone has the same space use classification or all of the zones have peak internal loads that differ by less than 10 Btu/h·ft2 from the average.	Proposed Model

Rules Not Evaluated			
Section Name	**Ruleset Reference**	**Rule Description**	**Ruleset Model Type**
Thermal Blocks-HVAC Zones Designed	Table G3.1 Section 7. Proposed Building Performance	When a thermal block has more than one HVAC zone, each HVAC zone adjacent to glazed exterior walls and glazed semiexterior walls face has the same orientation or their orientations vary by less than 45 degrees.	Proposed Model
Thermal Blocks-HVAC Zones Designed	Table G3.1 Section 7. Proposed Building Performance	Where HVAC zones are defined on HVAC design drawings, each HVAC zone shall be modeled as a separate thermal block. Exceptions: Different HVAC zones may be combined to create a single thermal block or identical thermal blocks to which multipliers are applied.	Proposed Model
Thermal Blocks-HVAC Zones Designed	Table G3.1 Section 7. Proposed Building Performance	When a thermal block has more than one HVAC zone, each HVAC zone has a schedule that differs by 40 or less equivalent full-load hours per week.	Proposed Model
Thermal Blocks- HVAC Zones Not Designed	Table G3.1(8) Proposed Building Performance(a)	When HVAC zones are not defined, Separate thermal blocks are assumed for each interior space located greater than 15' from an exterior or semiexterior wall. Spaces with similar loads, schedules, occupancy and lighting can be grouped.	Proposed Model
Thermal Blocks- HVAC Zones Not Designed	Table G3.1(8) Proposed Building Performance(b)	When HVAC zones are not defined, separate thermal blocks shall be assumed for spaces adjacent to glazed exterior walls or glazed semiexterior walls or within15' of an exrterior or seim-exterior wall. A separate zone shall be provided for each orientation, except that orientations that differ by less than 45 degrees may be considered to be the same orientation. Each thermal block shall include all floor area that is 15 ft or less from a glazed perimeter wall. Floor area within 15 ft of glazed perimeter walls having more than one orientation shall be divided proportionately between different thermal blocks. Spaces with similar loads, schedules, occupancy and lighting can be grouped.	Proposed Model
Thermal Blocks- HVAC Zones Not Designed	Table G3.1(8) Proposed Building Performance(c)	When HVAC zones are not defined, separate thermal blocks shall be assumed for spaces having floors that are in contact with the ground or exposed to ambient conditions from zones that do not share these features.	Proposed Model
Thermal Blocks- HVAC Zones Not Designed	Table G3.1(8) Proposed Building Performance(d)	When HVAC zones are not defined, separate thermal blocks shall be assumed for spaces having exterior ceilings or roof assemblies from zones that do not share these features.	Proposed Model
Thermal Blocks- Multifamily Residential Buildings	Table G3.1 Section 9. Proposed Building Performance	Residential spaces shall be modeled using at least one thermal block per dwelling unit, except that those units facing the same orientations may be combined into one thermal block. Corner units and units with roof or floor loads shall only be combined with units sharing these features.	Proposed Model
Thermal Blocks- Multifamily Residential Buildings	Table G3.1 Section 9. Proposed Building Performance	Separate thermal blocks are modeled for corner dwelling units and dwelling units with floor or roof loads. These dwelling units can be combined when they share similar features.	Proposed Model
HVAC Systems	Table G3.1(10) Baseline Building Performance	The proposed design includes humidification and the baseline building design has been modeled with adiabatic humidification if proposed design does not comply with Standard 90.1-2019 Section 6.5.2.4 and non-adiabatic humidification otherwise.	Baseline Model
HVAC Systems	Table G3.1(10) Baseline Building Performance	For systems serving computer rooms, the baseline building design shall not have reheat for the purpose of dehumidification.	Baseline Model
HVAC Systems	Table G3.1(10) Baseline Building Performance	Baseline HVAC systems using fossil fuel shall be modeled using natural gas. Except where natural gas is not available for the proposed building site, propane shall be used as the heating fuel.	Baseline Model
HVAC Systems	Table G3.1(10) Proposed Building Performance(a)	For HVAC systems designed, mechanical cooling equipment efficiencies shall be adjusted to remove the supply fan energy from the efficiency rating.	Proposed Model
HVAC Systems	G3.1.2.1. Baseline Building Performance	Baseline shall be modeled with the COPnfcooling HVAC system efficiency per Standard 90.1-2019 Tables G3.5.1-G3.5.6. Where multiple HVAC zones or residential spaces are combined into a single thermal block the cooling efficiencies (for baseline HVAC System Types 3 and 4) shall be based on the equipment capacity of the thermal block divided by the number of HVAC zones or residential spaces.	Baseline Model
HVAC Systems	G3.1.2.1. Baseline Building Performance	Where multiple HVAC zones or residential spaces are combined into a single thermal block, baseline HVAC System Types 5 or 6 efficiencies shall be based on the cooling equipment capacity of a single floor	Baseline Model

Rules Not Evaluated

Section Name	Ruleset Reference	Rule Description	Ruleset Model Type
HVAC Systems	Table G3.1(10) Proposed Building Performance(c)	Where no heating system exists or no heating system has been submitted with design documents, the proposed building system type shall be the same system as modeled in the baseline building design and shall comply with but not exceed the requirements of Section 6.	Proposed Model
HVAC Systems	Table G3.1(10) Proposed Building Performance(d)	Except for spaces with baseline system 9 or 10, if no cooling system exists or no cooling system has been submitted with design documents, the proposed building cooling system type shall be the same as modeled in the baseline building design and shall comply with the requirements of Standard 90.1-2019 Section 6.	Proposed Model
HVAC Systems	Table G3.1(10) Proposed Building Performance(b)	For HVAC systems designed, mechanical heating equipment efficiencies shall be adjusted to remove the supply fan energy from the efficiency rating.	Proposed Model
HVAC Systems	Table G3.1(10) Proposed Building Performance(b)	For HVAC systems designed, mechanical preheating equipment efficiencies shall be adjusted to remove the supply fan energy from the efficiency rating.	Proposed Model
HVAC Systems	G3.1.2.1. Baseline Building Performance	Baseline shall be modeled with the heating HVAC system efficiency per Standard 90.1-2019 Tables G3.5.1-G3.5.6 (applies only to the heating efficiency of baseline furnaces and heat pumps). Where multiple HVAC zones or residential spaces are combined into a single thermal block the heating efficiencies (for baseline HVAC System Types 3 and 4) shall be based on the equipment capacity of the thermal block divided by the number of HVAC zones or residential spaces.	Baseline Model
Service Water-Heating Systems	Table G3.1(11) (c) Proposed Building Performance	Where no service water-heating system exists or has been designed and submitted with design documents but the building will have service water-heating loads, a service water-heating system shall be modeled that matches the system type in the baseline building design, serves the same water-heating loads, and shall comply with but not exceed the requirements of Section 7.	Proposed Model
Service Water-Heating Systems	Table G3.1(11) (d) Proposed Building Performance	For buildings that will have no service water-heating loads, no service water-heating system shall be modeled.	Proposed Model
Service Water-Heating Systems	Table G3.1(11) (e) Proposed Building Performance	Where a combined system has been specified to meet both space heating and service water-heating loads, the proposed design shall reflect the actual system type using actual component capacities and efficiencies.	Proposed Model
Service Water-Heating Systems	Table G3.1(11) (f) Proposed Building Performance	Piping losses shall not be modeled for proposed building.	Proposed Model
Service Water-Heating Systems	Table G3.1(11) Baseline Building Performance	The service water heating systems type in the baseline building design shall be as specified in Standard 90.1-2019, Table G3.1.1-2 for each building area type in the proposed design or anticipated to be in the Proposed Design.	Baseline Model
Service Water-Heating Systems	Table G3.1(11) (a) Baseline Building Performance	Each system shall be sized according to the provisions of Standard 90.1-2019, Section 7.4.1.	Baseline Model
Service Water-Heating Systems	Table G3.1(11) (a) Baseline Building Performance	System equipment shall match the minimum efficiency requirements in Standard 90.1-2019, Section 7.4.2.	Baseline Model
Service Water-Heating Systems	Table G3.1(11) (b) Baseline Building Performance	Where no service water-heating system exists or has been specified but the building will have service water-heating loads, one service water-heating system shall be modeled for each anticipated building area type in the proposed design. Each system shall meet the minimum efficiency requirements of Standard 90.1-2019, Section 7.4.2 and be modeled identically to the proposed design.	Baseline Model
Service Water-Heating Systems	Table G3.1(11) (c) Baseline Building Performance	For buildings that will have no service water-heating loads, no service water-heating shall be modeled.	Baseline Model
Service Water-Heating Systems	Table G3.1(11) () Baseline Building Performance	Where a combined system has been specified to meet both space heating and service water-heating loads, the baseline building system shall use separate systems meeting the minimum efficiency requirements applicable to each system individually.	Baseline Model

		Rules Not Evaluated	
Section Name	**Ruleset Reference**	**Rule Description**	**Ruleset Model Type**
Service Water-Heating Systems	Table G3.1(11) (d) Baseline Building Performance	For large, 24-hour-per-day facilities that meet the prescriptive criteria for use of condenser heat recovery systems described in Section 6.5.6.2, a system meeting the requirements of that section shall be included in the baseline building design regardless of the exceptions to Section 6.5.6.2. Exceptions: If a condenser heat recovery system meeting the requirements described in Section 6.5.6.2 cannot be modeled, the requirement for including such a system in the actual building shall be met as a prescriptive requirement in accordance with Section 6.5.6.2, and no heat recovery system shall be included in the proposed design or baseline building design.	Baseline Model
Service Water-Heating Systems	Table G3.1(11) (e) Baseline Building Performance	Service water-heating energy consumption shall be calculated explicitly based upon the volume of service water heating required and the entering makeup water and the leaving service water-heating temperatures. Entering water temperatures shall be estimated based upon the location. Leaving temperatures shall be based upon the end-use requirements.	Baseline Model
Service Water-Heating Systems	Table G3.1(11) (f) Baseline Building Performance	Where recirculation pumps are used to ensure prompt availability of service water-heating at the end use, the energy consumption of such pumps shall be calculated explicitly.	Baseline Model
Service Water-Heating Systems	Table G3.1(11) (g) Baseline Building Performance	Service water loads and use shall be the same for both the proposed design and baseline building design and shall be documented by the calculation procedures described in Section 7.4.1, except when any of the exceptions listed on Table G3.1(11) Baseline Building Performance (g), apply.	Baseline Model
Service Water-Heating Systems	Table G3.1(11) (h) Baseline Building Performance	Gas storage water heaters shall be modeled using natural gas as their fuel. Exceptions: Where natural gas is not available for the proposed building site, as determined by the rating authority, gas storage water heaters shall be modeled using propane as their fuel.	Baseline Model
Service Water-Heating Systems	Table G3.1(11) (i) Baseline Building Performance	Piping losses shall not be modeled for baseline building.	Baseline Model
Receptacles and Other Loads	Table G3.1 Section 12. Proposed Building Performance	Receptacle and process loads, such as those for office and other equipment, shall be estimated based on the building area type or space type category.	Proposed Model
Receptacles and Other Loads	Table G3.1 Section 12. Proposed Building Performance	Where power and other systems covered by Standard 90.1-2019, Sections 8 and 10 have been designed and submitted with design documents, those systems shall be determined in accordance with Sections 8 and 10.	Proposed Model
Receptacles and Other Loads	Table G3.1 Section 12. Proposed Building Performance	When receptacle controls installed in spaces where not required by Standard 90.1 2019, Section 8.4.2 are included in the proposed building design, the hourly receptacle shall be reduced as specified in Standard 90.1-2019, Table G3.1 Section 12, Proposed Building Performance.	Proposed Model
Receptacles and Other Loads	Table G3.1 Section 12. Baseline Building Performance	Baseline Motors shall have the efficiency ratings found in Standard 90.1-2019, Table G3.9.1.	Baseline Model
Receptacles and Other Loads	Table G3.1 Section 12. Baseline Building Performance	When quantifying performance that exceeds the requirements of Standard 90.1 variations of the power requirements, schedules, or control sequences of the equipment modeled in the baseline building design from those in the proposed design shall be approved by the rating authority.	Baseline Model
Modeling Limitations to the Simulation Program	Table G3.1 Section 13. Proposed Building Performance	If the simulation program cannot model a component or system included in the proposed design explicitly, substitute a thermodynamically similar component model that can approximate the expected performance of the component that cannot be modeled explicitly.	Proposed Model
Exterior Conditions	Table G3.1 Section 14. Proposed Building Performance	The effect that structures and significant vegetation or topographical features on the amount of solar radiation being received by a structure shall be adequately reflected in the computer analysis. All elements whose effective height is greater than their distance from a proposed building and whose width facing the proposed building is greater than one-third that of the proposed building shall be accounted for in the analysis.	Proposed Model
Exterior Conditions	Table G3.1 Section 14. Proposed Building Performance	It is acceptable to use either an annual average ground temperature or monthly average ground temperatures for calculation of heat loss through below-grade walls.	Proposed Model

Rules Not Evaluated

Section Name	Ruleset Reference	Rule Description	Ruleset Model Type
Exterior Conditions	Table G3.1 Section 14. Proposed Building Performance	Either an annual water main supply temperature or monthly average water main supply temperatures shall be used for calculating service water heating energy use. If annual or monthly water main supply temperatures are not available from the local water utility, annual average ground temperatures may be used.	Proposed Model
Distribution Transformers	Table G3.1 Section 15. Proposed Building Performance	Low-voltage dry-type distribution transformers shall be modeled if the transformers in the proposed design exceed the efficiency required in Standard 90.1-2019, Table 8.4.4.	Proposed Model
Distribution Transformers	Table G3.1 Section 15. Proposed Building Performance	Low-voltage dry-type distribution transformers shall be modeled only if the proposed design transformers exceed the efficiency requirements of Standard 90.1-2019, Table 8.4.4. If modeled, the efficiency requirements from Standard 90.1-2019, Table 8.4.4 shall be used. The ratio of the capacity to peak electrical load of the transformer shall be the same as the ratio in the proposed design.	Proposed Model
Elevators	Table G3.1 Section 16. Proposed Building Performance.	The cab ventilation fan and lights shall be modeled with the same schedule as the elevator motor.	Proposed Model
Elevators	Table G3.1 Section 16. Baseline Building Performance.	When included in the proposed design, the baseline elevator peak motor power shall be calculated as defined in Standard 90.1 2019, Table G3.1 (16), Baseline Building Performance.	Baseline Model
Elevators	Table G3.1 Section 16. Baseline Building Performance.	When included in the proposed design, the baseline elevator cab ventilation fan shall be 0.33 W/cfm.	Baseline Model
Elevators	Table G3.1 Section 16. Baseline Building Performance.	When included in the proposed design, the baseline elevator cab lighting power density shall be 3.14 W/ft2.	Baseline Model
Elevators	Table G3.1 Section 16. Baseline Building Performance.	When included in the proposed design, the baseline elevator cab lights and ventilation fans shall operate continuously	Baseline Model
Refrigeration	Table G3.1 Section 17. Baseline Building Performance.	Where refrigeration equipment is specified in the proposed design and listed in Standard 90.1-2019, Tables G3.10.1 and G3.10.2, the baseline building design shall be modeled as specified in Standard 90.1-2019, Tables G3.10.1 and G3.10.2 using the actual equipment capacities.	Baseline Model
Refrigeration	Table G3.1 Section 17. Baseline Building Performance.	If the refrigeration equipment is not listed in Standard 90.1-2019, Tables G3.10.1 and G3.10.2, the baseline building design shall be modeled the same as the proposed design.	Baseline Model