Data Types

Data Type	Description	JSON Schema Type	Examples
Integer	A positive or negative whole number (i.e., a number that can be written without a fractional part).	integer	3, 19, -4
Numeric	A number that may include a fractional part with optional leading sign and optional exponent (engineering notation).	number	3.43, 0, -4, 1.03e4
Boolean	True or false.	boolean	true, false
String	A sequence of characters of any length using any (specified) character set.	string	Indirect evaporative cooler
Null	Indicator that no value is provided. Only used in combination with other data types, e.g., 'Number/Null'.	null	null

FloorAreaBasis

Enumerator	Description	Notes
CENTER	Center line of the wall	
NEAR_SIDE	Near side of the wall	
FAR_SIDE	Far side of the wall	

ConditioningType

Enumerator	Description	Notes
HEATED_AND_COOLED	Heated and cooled	
HEATED_ONLY	Heated only	
SEMIHEATED	Semiheated	
UNCONDITIONED	Unconditioned	
PLENUM	Plenum	

SurfaceAdjacentTo

Enumerator	Description	Notes
AMBIENT	Exterior wall or roof which is adjacent to the exterior ambient environments.	
GROUND	Slab-on-grad or below grade surface if adjacent to ground.	
INTERIOR	Interior surface if adjacent to another thermal block.	

SurfaceConstructionInputOptions

Enumerator	Description	Notes
LAYERS	Construction is entered layer-by-layer.	
SIMPLIFIED	Construction is entered by R-value only.	

TransformerType

Enumerator	Description	Notes
DRY_TYPE	Dry Type	
FLUID_FILLED	Fluid Filled	
OTHER	Other	

TransformerPhase

Enumerator	Description	Notes
SINGLE_PHASE	Single Phase	
THREE_PHASE	Three Phase	

DayOfWeek

Enumerator	Description	Notes
SUNDAY	Sunday	
MONDAY	Monday	
TUESDAY	Tuesday	
WEDNESDAY	Wednesday	
THURSDAY	Thursday	
FRIDAY	Friday	
SATURDAY	Saturday	

ASHRAE229

Data Element Name	Description	Data Type	Units	Range	Req	Notes
transformers	Electrical transformers at the building site	[{Transformer}]				Contains a list of transformers that convert electricity from a higher voltage to one used by the building, exterior lighting, and other services at the site.
buildings	Buildings on the site	[{Building}]				Contains a list of buildings on the site (often just one).
calendar	Information on the calendar used with the simulation.	{Calendar}				
schedules	Schedules for internal loads, thermostats, equipment operation and control, and any other need.	[{Schedule}]				Contains a list of schedules used in model.
weather	Information on the local weather conditions used with the simulation.	{Weather}				
overall_simulation_outputs	Outputs from the simluation summed for all buildings in the simulation.	{OverallSimulationOutputs}				

Building

Data Element Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
name	Name of the Building	String			✓	
number_of_floors	Number of floors	Numeric		>=0	✓	
building_segments	Large portions of a building that share a building area type	[{BuildingSegment}]				Contains a list of building segments in the building.
is_new	Indicates whether building is a new construction (true) or existing (false). Projects that include additions will be modeled as two buildings - one new and one existing, as curtain rules such as baseline fenestration area will apply differently to each portion	Boolean			✓	
compliance_path	Indicates the chosen compliance path if the ruleset has multiple compliance paths such as 90.1 Appendix G has code compliance and beyond code					
elevators	Elevators	[{Elevator}]				Contains a list of elevators in the building.
refrigeration_components	Refrigeration	[{Refrigeration}]				Contains a list of refrigeration components in the building.

BuildingSegment

Data Element Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
thermal_blocks	thermal blocks in the building	[{ThermalBlock}]				Contains a list of thermal blocks in the building.
heating_ventilation_air_conditioning_systems	HVAC systems in the building	[{HeatingVentilationAirConditioningSystem}]				Contains a list of HVAC systems in the building.
area_type_vertical_fenestration	Building area classification used for vertical fenestration				✓	The enumeration is based on the standard used.

ThermalBlock

Data Element Name	Description	Data Type	Units	Range	Req	Notes
zones	zones in the building	[{Zone}]				Contains a list of zones in the building.
served_by_heating_ventilation_air_conditioning_systems	HVAC systems serving the thermal block	[String]				Contains a list of IDs of the HVAC systems serving the thermal block - from Unique Identification Number in HeatingVentilationAirConditioningSystem.

Zone

Data Element Name	Description	Data Type	Units	Range	Req	Notes
spaces	Spaces in the building	[{Space}]				Contains a list of spaces in the building.

Space

Data Element Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
name	Name fo the Space	String			✓	
surfaces	Surfaces surrounding the space	[{Surface}]				Contains a list of surfaces that define the space.
floor_area	The floor area of a space within the building, including basements, mezzanine and intermediate-floored tiers, and penthouses with a headroom height of 7.5 ft or greater. It is measured from the exterior faces of walls or from the center-line of walls separating buildings, but excluding covered walkways, open roofed-over areas, porches and similar spaces, pipe trenches, exterior terraces or steps, chimneys, roof overhangs, and similar features.	Numeric	m2	>=0	✓	
floor_area_basis_for_exterior	The basis of the measurement location related to floor area for exterior walls.				✓	
floor_area_basis_for_interior	The basis of the measurement location related to floor area for interior walls.				✓	
conditioning_type	Space conditioning category					
lighting_space_type	Lighting space type classification				✓	The enumeration is based on the standard used.

Data Element Name	Description	Data Type	Units	Range	Req	Notes
ventilations_space_type	Ventilation space type classification				✓	The enumeration is based on the standard used.
infiltration_modeling_method	The software methodology chosen for modeling infiltration	String			✓	
infiltration_equivalent_full_load_hours	Annual sum of hourly fractions of infiltration schedule	Numeric		>=0	✓	
receptacle_control_credit_taken	The receptacle control credit was taken	Boolean				
receptacle_baseline_exception_taken	The excpetion that receptacle power or schedule can be different in the baseline has been taken.	Boolean				
receptacle_power	Peak power consumed by the receptacles.	Numeric	W			
receptacle_schedule_name	Receptacle schedule name	String				
receptacle_control_credit	A multiplier for the fraction of space plug load power applied tothe receptacle controlled credit.	Numeric		>=0		

Surface

Data Element Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
name	Name fo the Space	String			✓	
fenestration_subsurfaces	Fenestration suburfaces that are on the surface	[{Fenestration}]				Contains a list of surfaces that define the space.
tilt	Angle between vertical and the surface outward normal, e.g. 0 = roof, 90 = wall, 180 = downward facing surface (exterior floor)	Numeric	degrees		✓	
azimuth	Clockwise angle between North (0 degrees) and the horizontal projection of the wall's outward normal. 0 = north, 90 = East, 180 = South, 270 = West	Numeric	degrees	>=0	✓	
adjacent_to	Determines whether this is an (a) exterior surface if adjacent to ambient, (b) slab-on-grad or below grade surface if adjacent to ground, or (c) interior surface if adjacent to another thermal block.				✓	
adjacent_space_ID	ID of the adjacent space for interior surface	String			✓	
does_cast_shade	Determines whether the surface is modeled as casting shade on other exterior surfaces	Boolean			✓	
surfaces	Surfaces surrounding the space	[{Surface}]				Contains a list of surfaces that define the space.

Data Element Name	Description	Data Type	Units	Range	Req	Notes
surface_construction_input_option	Identifies whether construction is entered layer-by-layer or simplified (R-value)				✓	
area	area of the surface	Numeric	m2	>=0	✓	
u_factor	suface U-factor	Numeric	W/m2-K	>=0	✓	
c_factor	surface C-factor	Numeric		>=0	✓	
f_factor	surface F-factor	Numeric		>=0	✓	
reflectance	Reflectance	Numeric		>=0	✓	
emittance	Emittance	Numeric		>=0	✓	
reflectivity	Reflectivity	Numeric		>=0	✓	

Fenestration

Data Element Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
name	Name of the fenestration subsurface	String			✓	
area	area of fenestration including glass and framing	Numeric	m2	>=0	✓	
u_factor	fenestration U-factor	Numeric	W/m2-K	>=0	✓	
solar_heat_gain_coefficient	fenestration SHGC	Numeric		>=0	✓	
has_shading_projections	identifies whether fenestration has side fins, overhangs or not flush with wall	Boolean			✓	
has_manual_interior_shades	are there manually-operated interior shading such as blinds, curtains or shades	Boolean			✓	
has_automatic_shades	are there automatic interior shading such as blinds, curtains or shades	Boolean			✓	

Transformer

Data Element Name	Description	Data Type	Units	Range	Req	Notes
name	Transformer Name	String			✓	
type	The type of transformer				✓	
phase	The number of electrical phases				✓	
efficiency	Transformer efficiency	Numeric		>=0	✓	
capacity	Rated Capacity of the Transformer	Numeric	Va	>=0	✓	
peak_load	Annual Peak electric load on the transformer	Numeric	W	>=0	✓	
capacity_ratio	Annual Peak electric load of the transformer divided by the capacity	Numeric		>=0	✓	

Schedule

Data Element Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
name	Name of the Schedule	String			✓	
type	The type of schedule	String			✓	Not an enumerations because we only care that the type assigned by BEM tool matches across RMR
values	Hourly Values of Schedule	[Numeric] [1..8760]			✓	

Calendar

Data Element Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
day_of_week_for_january_1	Day of the Week for January 1				✓	
is_leap_year	The schedules assume it is a leap year	Boolean			✓	
is_daylight_savings_time	The schedules adjust for daylight Savings Time	Boolean			✓	

Weather

Data Element Name	Description	Data Type	Units	Range	Req	Notes
monthly_ground_temperature	Modeled monthly ground temperatures	[Numeric] [1..12]	C		✓	
climate_zone	The designation of the climate zone where the building is located				✓	The enumeration is based on the standard used.

Elevator

Data Element Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
name	Name of the elevator	String			✓	
motor_power	Elevator peak motor power	Numeric	W		✓	
cab_counterweight	elevator car counterweight	Numeric	kg		✓	
cab_weight	weight of elevator car	Numeric	kg		✓	
design_elevator_load	elevator load at which to operate	Numeric	kg		✓	
speed	design speed of the elevator	Numeric	m/s		✓	
cab_area	floor area of elevator cab	Numeric	m2		✓	
cab_lighting_power	lighitng power of cab	Numeric	W		✓	
cab_ventilation_fan_power	ventilation fan power of cab	Numeric	W		✓	
cab_ventilation_fan_flow	airflow of cab ventfan	Numeric	L/s		✓	
cab_motor_schedule	elevator motor operation schedule name	String			✓	
cab_ventilation_fan_schedule	elevator ventilation fan operation schedule name	String			✓	
cab_lighting_schedule	elevator lighting schedule name	String			✓	
cab_motor_schedule_equivalent_full_load_hours	elevator motor operation schedule equivalent full load hours	Numeric		>=0, <=8760	✓	
cab_ventilation_fan_schedule_equivalent_full_load_hours	elevator ventfan operation schedule equivalent full load hours	Numeric		>=0, <=8760	✓	
cab_lighting_schedule_equivalent_full_load_hours	elevator lighitng schedule equivalent full load hours	Numeric		>=0, <=8760	✓	

HeatingVentilationAirConditioningSystem

Data Element Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
sensible_cool_output_capacity	Result from the simulation of the sensible cooling capacity	Numeric	W/m2	>=0	✓	
heat_output_capacity	Result from the simulation of the heating capacity	Numeric	W/m2	>=0	✓	

Refrigeration

Data Element Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
name	Name of the refrigeration component	String			✓	
type	Refrigeration equipment type				✓	
equipment_class	Equipment Class from referenced standard				✓	
energy_per_day	Rated electrical energy use per day	Numeric	kWh		✓	
case_volume	volume of a refrigerated case in cubic meters	Numeric	m3		✓	
total_display_area	display area of a refrigerated case in square meters	Numeric	m2		✓	

OverallSimulationOutputs

Data Element Name	Description	Data Type	Units	Range	Req	Notes
refrigeration_energy_enduse	Annual refrigeration energy end use from simulation output	Numeric	kWh		✓	