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

ConditioningType

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

SpaceFunctionType

Enumerator	Description	Notes
`LABORATORY`	Laboratory	
`KITCHEN`	Kitchen	
`OTHER`	Other	

InfiltrationMethodType

Enumerator	Description	Notes
`WEATHER_DRIVEN`	Weather Driven	
`PRESSURE_BASED`	Pressure Based	
`CONSTANT`	Constant	

SurfaceClassificationType

Enumerator	Description	Notes
`WALL`	Vertical or nearly vertical wall	
`FLOOR`	Floor	
`CEILING`	Ceiling	

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.	
`IDENTICAL`	Surface adjacent to a environment identical to the zone.	
`UNHEATED`	Surface adjacent to a environment that is not heated but enclosed.	

SurfaceConstructionInputOptions

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

FenestrationClassificationType

Enumerator	Description	Notes
`WINDOW`	Window	
`SKYLIGHT`	Skylight	
`DOOR`	Door	

MiscellaneousEquipmentType

Enumerator	Description	Notes
`PLUG`	Plug	
`PROCESS`	Process	
`OTHER`	Other	

TransformerType

Enumerator	Description	Notes
`DRY_TYPE`	Dry Type	
`FLUID_FILLED`	Fluid Filled	
`OTHER`	Other	

ElectricalPhase

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	

FluidLoopTypeOptions

Enumerator	Description	Notes
`HEATING`	Heating	
`COOLING`	Cooling	
`HEATING_AND_COOLING`	Heating and cooling	
`CONDENSER`	Condenser	
`OTHER`	Other	

TemperatureResetTypeOptions

Enumerator	Description	Notes
`NO_RESET`	No Reset	
`CONSTANT`	Constant	
`OUTSIDE_AIR_RESET`	Outside air reste	
`LOAD_RESET`	Load Reset	
`OTHER`	Other	

FluidLoopOperationOptions

Enumerator	Description	Notes
`CONTINUOUS`	Continuous	
`INTERMITTENT`	Intermittent	

PumpSpeedControlOptions

Enumerator	Description	Notes
`FIXED_SPEED`	Fixed speed	
`TWO_SPEED`	Two speed	
`VARIABLE_SPEED`	Variable speed	

PumpFlowControlOptions

Enumerator	Description	Notes
`FIXED_FLOW`	Fixed flow	
`VARIABLE_SPEED`	Variable flow	

PumpSpecificationMethodOptions

Enumerator	Description	Notes
`SIMPLE`	Simple	Specify the electric power input of pump
`DETAILED`	Detailed	Specify the motor nameplate power, design head, impelllor efficiency, motor efficiency

BoilerCombustionOptions

Enumerator	Description	Notes
`NATURAL`	Natural	
`FORCED`	Forced	

BoilerEfficiencyMetricTypeOptions

Enumerator	Description	Notes
`ANNUAL_FUEL_UTILIZATION`	Annual fuel utilization efficiency	
`THERMAL`	Thermal efficiency	
`COMBUSION`	Combustion efficiency	

ChillerCompressorTypeOptions

Enumerator	Description	Notes
`SCREW`	Screw	
`CENTRIFUGAL`	Centrifugal	
`RECIPROCATING`	Reciprocating	
`SCROLL`	Scroll	
`POSITIVE_DISPLACEMENT`	Positive displacement	
`SINGLE_EFFECT_INDIRECT_FIRED_ABSORPTION`	Single-effect indirect-fired absorption	
`DOUBLE_EFFECT_INDIRECT_FIRED_ABSORPTION`	Double-effect indirect-fired absorption	
`SINGLE_EFFECT_DIRECT_FIRED_ABSORPTION`	Single-effect direct-fired absorption	
`DOUBLE_EFFECT_DIRECT_FIRED_ABSORPTION`	Double-effect direct-fired absorption	
`OTHER`	Other	

HeatRejectionTypeOptions

Enumerator	Description	Notes
`AXIAL_COOLING_TOWER`	Axial cooling tower	
`CENTRIFUGAL_COOLING_TOWER`	Centrifugal cooling tower	
`DRY_COOLER`	Dry-cooler	
`EVAPORATIVE`	Evaporative	
`OTHER`	Other	

HeatRejectionResetOptions

Enumerator	Description	Notes
`CONSTANT`	Constant	
`LOAD_RESET`	Load reset	
`OTHER`	Other	

HeatRejectionFanSpeedControlOptions

Enumerator	Description	Notes
`CONSTANT`	Constant	
`TWO_SPEED`	Two Speed	
`VARIABLE_SPEED`	Variable Speed	
`OTHER`	Other	

ExternalFluidSourceTypeOptions

Enumerator	Description	Notes
`CHILLED_WATER`	Chilled water	
`HOT_WATER`	Hot water	
`STEAM`	Steam	

ServiceWaterHeatingEnteringWaterTemperatureInputOptions

Enumerator	Description	Notes
`ANNUAL_MAIN`	Annual main entering water temperature option	
`MONTHLY_MAIN`	Monthly main entering water temperature option	
`ANNUAL_GROUND`	Annual ground entering water temperature option	
`MONTHLY_GROUND`	Monthly ground entering water temperature option	

FuelTypeOptions

Enumerator	Description	Notes
`ELECTRICITY`	Electricity	
`NATURAL_GAS`	Natural gas	
`OTHER`	Other	

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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_rotation_angles`	A list of angles that building simulations are performed and results are provided.	`[Numeric]`	degrees			List of angles that the building has been rotated.
`fluid_loops`	Fluid loops on the site	`[{FluidLoop}]`				Contains a list of fluid loops on the site.
`conditioning_components`	Links to all conditioning components used on the site	`[{Pump},{Boiler}, {Chiller},{HeatRejection}, {DistrictFluidMeter}]`				Contains a list of fluid loops on the site.

Building

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_all_new`	Indicates whether building is completely new construction (true) or existing (false).	`Boolean`				Projects that include additions should be False. Projects with additional instead may be modeled as two buildings - one new and one existing, as curtain rules such as baseline fenestration area will apply differently to each portion.
`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	`<CompliancePathType2019ASHRAE901>`				
`elevators`	Elevators	`[{Elevator}]`				Contains a list of elevators in the building.
`refrigeration_components`	Refrigeration	`[{Refrigeration}]`				Contains a list of refrigeration components in the building.
`open_time`	Time that the building opens.	`Numeric`		`≥1, ≤24`		The general time that the building is first opened during normal weekdays from 1 to 24

Name	Description	Data Type	Units	Range	Req	Notes
close_time	Time that the building closes.	Numeric		≥1, ≤24		The general time that the building is closed during normal weekdays from 1 to 24

BuildingSegment

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.
service_water_heating_systems	Service water heating systems in the building	[{ServiceWaterHeatingSystem}]				Contains a list of service water heating systems in the building.
area_type_vertical_fenestration	Building area classification used for vertical fenestration	<VerticalFenestrationBuildingAreaType2019ASHRAE901>				The enumeration is based on the standard used.
lighting_building_area_type	Building area lighting area type	<LightingSpaceType2019ASHRAE901T951TG38>				

ThermalBlock

Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
name	Name of the thermal block	String			✓	
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.
served_by_service_water_heating_system	A service water heating system serving the thermal block	String				Contains a single ID of the service water heating system serving the thermal block - from Unique Identification Number in ServiceWaterHeatingSystem.

Zone

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name of the Zone	`String`			✓	
`spaces`	Spaces in the building	`[{Space}]`				Contains a list of spaces in the building.

Space

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name of the Space	`String`			✓	
`surfaces`	Surfaces surrounding the space	`[{Surface}]`				Contains a list of surfaces that define the space.
`interior_lighting`	Internal lighting that produce internal gains for a space.	`[{InteriorLighting}]`				
`miscellaneous_equipment`	Miscellaneous equipment loads that produce internal gains for a space.	`[{MiscellaneousEquipment}]`				
`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. This is the floor area that is modeled.	`Numeric`	m2	`≥0`		
`floor_to_ceiling_height`	The height from the floor of the space to the ceiling	`Numeric`	m	`≥0`		
`conditioning_type`	Space conditioning category	`<ConditioningType>`				
`status_type`	Choice of new, existing, addition, or alteration.	`<SpaceStatusType2019ASHRAE901>`				
`space_function`	Generic function for the space.	`<SpaceFunctionType>`				The enumeration is based on the standard used.
`lighting_space_type`	Lighting space type classification	`<LightingSpaceType2019ASHRAE901TG37>`				The enumeration is based on the standard used.
`ventilations_space_type`	Ventilation space type classification	`<VentilationSpaceType2019ASHRAE901>`				The enumeration is based on the standard used.
`service_water_heating_space_type`	Service water heating space type classification	`<ServiceWaterHeatingSpaceType2019ASHRAE901>`				The enumeration is based on the standard used.
`infiltration_modeling_method`	The software methodology chosen for modeling infiltration	`<InfiltrationMethodType>`				
`infiltration_schedule_name`	Infiltration schedule name	`String`				

Surface

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name of the Space	`String`			✓	
`fenestration_subsurfaces`	Fenestration suburfaces that are on the surface	`[{Fenestration}]`				Contains a list of surfaces that define the space.
`classification`	Classification for the surface.	`<SurfaceClassificationType>`				Options for surface being interior or exterior wall, floor, or ceiling.
`area`	area of the surface	`Numeric`	m2	`≥0`		Measured from interior face area. It is the gross area of the wall and includes the area of all subsurfaces.
`tilt`	Angle between vertical and the surface outward normal	`Numeric`	degrees			Example value would be 0 = roof, 90 = wall, 180 = downward facing surface (exterior floor)
`azimuth`	Clockwise angle between North and the horizontal projection of the wall's outward normal.	`Numeric`	degrees	`≥0`		Example values would be 0 = north, 90 = East, 180 = South, 270 = West
`adjacent_to`	Used to classify the conditions on the surface.	`(<SurfaceAdjacentTo>, <AdditionalSurfaceAdjacentToRESNET>)`				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`				
`construction`	Construction description of surface.	`{Construction}`				
`surface_optics`	Optical properties of the surface.	`{SurfaceOptics}`				

Construction

Name	Description	Data Type	Units	Range	Req	Notes
surface_construction_input_option	Identifies whether construction is entered layer-by-layer or simplified (R-value)	<SurfaceConstructionInputOptions>				
layers	List of names of layer descriptions starting from the outside surface	[String]				
insulation_location	The location of the insulation related to the surface	String				
u_factor	suface U-factor	Numeric	W/m2-K	≥0		Includes interior and exterior air films as specified by the referenced standard.
c_factor	surface C-factor	Numeric	W/m2-K	≥0		
f_factor	surface F-factor	Numeric	W/m-K	≥0		
r_value	r-value of the insulation for the surface	Numeric	K-m2/W	≥0		
has_radiant_heating	Includes embedded radiant heating elements	Boolean				
has_radiant_cooling	Includes embedded radiant cooling elements	Boolean				

SurfaceOptics

Name	Description	Data Type	Units	Range	Req	Notes
`absorptance_thermal_exterior`	Thermal absorptance of long wavelength radiation on the exterior surface.	`Numeric`		`≥0`		
`absorptance_solar_exterior`	Thermal absorptance of short wavelength radiation on the exterior surface.	`Numeric`		`≥0`		
`absorptance_visible_exterior`	Thermal absorptance of visible radiation on the exterior surface.	`Numeric`		`≥0`		
`absorptance_thermal_interior`	Thermal absorptance of long wavelength radiation on the interior surface.	`Numeric`		`≥0`		
`absorptance_solar_interior`	Thermal absorptance of short wavelength radiation on the interior surface.	`Numeric`		`≥0`		
`absorptance_visible_interior`	Thermal absorptance of visible radiation on the interior surface.	`Numeric`		`≥0`		

Fenestration

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name of the fenestration subsurface	`String`			✓	
`classification`	Classification for the fenestration being window, skylight, door.	`<FenestrationClassificationType>`				
`is_operable`	Identifies whether fenestration can be opened and closed including by pivoting or sliding.	`Boolean`				
`framing_type`	The material of the framing.	`<FenestrationFrameType2019ASHRAE901>`				
`area`	Area of fenestration including glass and framing	`Numeric`	m2	`≥0`		
`u_factor`	Fenestration U-factor	`Numeric`	W/m2-K	`≥0`		Includes interior and exterior air films as specified by the referenced standard.
`solar_heat_gain_coefficient`	Fenestration SHGC	`Numeric`		`≥0`		
`visible_transmittance`	Fenestration VT	`Numeric`		`≥0`		
`depth_of_overhang`	Distance from the edge of the overhang to the fenestration surface.	`Numeric`	m	`≥0`		
`has_shading_overhang`	Identifies whether fenestration has overhangs	`Boolean`				
`has_shading_sidefins`	Identifies whether fenestration has sidefins	`Boolean`				
`has_manual_interior_shades`	Are there manually-operated interior shading such as blinds, curtains or shades	`Boolean`				
`solar_transmittance_multiplier_summer`	Solar transmittance multiplier for summer	`Numeric`		`≥0`		Often used to account for interior shading such as drapes.
`solar_transmittance_multiplier_winter`	Solar transmittance multiplier for summer	`Numeric`		`≥0`		Often used to account for interior shading such as drapes.
`has_automatic_shades`	Are there automatic interior shading such as blinds, curtains or shades	`Boolean`				

InteriorLighting

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique ID assigned to each interior lighting fixture(s) reported in an RMR	`Numeric`		`>0`		
`name`	Interior lighting fixture name	`String`				
`purpose_type`	Lighting space type classification	`<LightingPurposeType2019ASHRAE901>`				The enumeration is based on the standard used.
`power_per_area`	Total power for lights divided by the area of the space.	`Numeric`	W/m2			When computing the power per area use the area of the entire space.
`lighting_schedule_name`	Lighting schedule name	`String`				
`has_occupancy_control`	Indicates that the lighting has occupancy controls	`Boolean`				
`has_daylighting_control`	Includes daylighting controls	`Boolean`				

MiscellaneousEquipment

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique ID assigned to each interior miscellaneous equipment in an RMR	`Numeric`		`>0`		
`name`	Miscellaneous equipment name	`String`				
`energy_type`	Source of energy for the miscelleous equipment in the space	`<FuelTypeOptions>`				
`peak_usage`	Peak energy usage per hour by the miscelleous equipment in the space.	`Numeric`	W			
`schedule_name`	miscelleous equipment in the space schedule name	`String`				
`sensible_fraction`	Fraction of energy that is a sensible load on the space.	`Numeric`		`≥0, ≤1`		Sensible plus latent do not necessarily add up to 1.0.
`latent_fraction`	Fraction of energy that is a latent load on the space.	`Numeric`		`≥0, ≤1`		Sensible plus latent do not necessarily add up to 1.0.
`miscellaneous_equipment_type`	Type of miscellaneous equipment	`<MiscellaneousEquipmentType>`				
`has_automatic_control`	Indicates that the receptacles have automatic controls	`Boolean`				

Transformer

Name	Description	Data Type	Units	Range	Req	Notes
`name`	Transformer Name	`String`			✓	
`type`	The type of transformer	`<TransformerType>`				
`phase`	The number of electrical phases	`<ElectricalPhase>`				
`efficiency`	Transformer efficiency	`Numeric`		`≥0, ≤1`		Expresses the efficiency of the transformer as a fraction from 0 to 1, where 1 would represent 100% efficiency.
`capacity`	Rated Capacity of the Transformer	`Numeric`	V-A	`≥0`		
`peak_load`	Annual Peak electric load on the transformer	`Numeric`	W	`≥0`		Peak electric load on the transfomer based on an annual simulation with typical weather file.

Schedule

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name of the Schedule	`String`			✓	
`purpose`	The purpose of schedule	`String`				Describe the purpose of the schedule and how it can be used. Not an enumerations. The purpose assigned by BEM tool should match across RMRs. Examples include thermostat, multiplier for lighting, availability for equipment.
`values`	Hourly Values of Schedule	`[Numeric][8760]`				Can also use functions like EFLH(), MAX(), MIN() to determine overall characteristics for the list of schedule values.
`units_of_values`	The units associated witht the values of the schedule	`String`				For certain schedule purposes, the values may be represented by units such as C for temperature or W for power.
`prescribed_schedule`	True if any schedule values have changed from what appears in the schedule library	`<PrescribedSchedules2019ASHRAE901>`				

Calendar

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	`<DayOfWeek>`				
`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

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	`<ClimateZone2019ASHRAE901>`			✓	The enumeration is based on the standard used.

Elevator

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`				

HeatingVentilationAirConditioningSystem

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name of the HVAC system	`String`			✓	
`zones_served`	List of the zones served by the HVAC system	`[{Zone}]`				
`hot_water_loop_name`	Hot water fluid loop name	`String`				
`chilled_water_loop_name`	Chilled water fluid loop name	`String`				
`condenser_water_loop_name`	Condenser water fluid loop name	`String`				
`preheat_loop_name`	Preheat fluid loop name	`String`				
`reheat_loop_name`	Reheat fluid loop name	`String`				
`simulation_result_sensible_cool_capacity`	Result from the simulation of the sensible cooling capacity	`[Numeric]`	W/m2	`≥0`		If multiple values are provided, they correspond to rotated building orientations
`simulation_result_heat_capacity`	Result from the simulation of the heating capacity	`[Numeric]`	W/m2	`≥0`		If multiple values are provided, they correspond to rotated building orientations

FluidLoop

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name of the fluid loop connecting primary and secondary equipment in the plant	`String`			✓	
`type`	Type of loop	`<FluidLoopTypeOptions>`				
`child_loops`	Other fluid loops connected to this one as children.	`[{FluidLoop}]`				
`cooling_or_condensing_design_and_control`		`{FluidLoopDesignAndControl}`				
`heating_design_and_control`		`{FluidLoopDesignAndControl}`				

FluidLoopDesignAndControl

Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
name	Name of the fluid loop design and control.	String			✓	
design_supply_temperature	Design Supply Temperature	Numeric	C			
design_return_temperature	Design Return Temperature	Numeric	C			
is_sized_using_coincident_load	True if the loop is sized based on coincident load	Boolean				
minimum_flow_fraction	Minimum fraction of full flow allowed	Numeric				
operation	Type of operation used by loop	<FluidLoopOperationOptions>				
temperature_reset_type	Type of temperature reset used by loop	<TemperatureResetTypeOptions>				
outdoor_high_for_loop_supply_temperature_reset	Outdoor high for loop supply temp reset	Numeric	C			
outdoor_low_for_loop_supply_temperature_reset	Outdoor low for loop supply temp reset	Numeric	C			
loop_supply_temperature_at_outdoor_high	Loop supply temperature at outdoor high temperature	Numeric	C			
loop_supply_temperature_at_outdoor_low	Loop supply temperature at outdoor low temperature	Numeric	C			

Pump

Name	Description	Data Type	Units	Range	Req	Notes
id	Unique Identification Number	Numeric			✓	
name	Name identifying pump	String			✓	
loop_name	Fluid loop name	String				
specification_method	Options for how the pump is specified	<PumpSpecificationMethodOptions>				
power	Pump power	Numeric	W			Only used when specification_method is set to Simple
motor_nameplate_power	Pump motor nameplate power	Numeric	W			Only used when specification_method is set to Detailed
design_head	Head of the pump at design flow conditions	Numeric	m			Only used when specification_method is set to Detailed
impeller_efficiency	Full load efficiency of the impeller	Numeric		≥0, ≤1		Only used when specification_method is set to Detailed
motor_efficiency	Full load efficiency of the pump motor	Numeric		≥0, ≤1		Only used when specification_method is set to Detailed
speed_control	Options for pump speed control	<PumpSpeedControlOptions>				
flow_control	Flow control options	<PumpFlowControlOptions>				
design_flow	Design Pump Flowrate	Numeric	L/s			
is_variable_speed	True if variable speed drive such a VFD	Boolean				

Boiler

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name identifying boiler	`String`			✓	
`loop_name`	Fluid loop name	`String`				
`design_capacity`	Heating capacity	`Numeric`	W			
`minimum_load_ratio`	Minimum fraction of full load allowed	`Numeric`				
`draft_type`	Combustion option	`<BoilerCombustionOptions>`				
`efficiency_metric_type`	The type of efficiency metric used	`<BoilerEfficiencyMetricTypeOptions>`				
`efficiency_metric`	Annual fuel utilization efficiency (AFUE)	`Numeric`		`≥0, ≤1`		Enter the efficiency value based on the selected efficiency_metric_type
`detailed_performance`	Detailed performance as specified in ASHRAE Standard 205	`UUID`				Reserved for referencing after ASHRAE Standard 205 is published.
`part_load_performance_curve`	Part load performanc curve	`{PartLoadPerformanceCurve}`				
`auxiliary_power`	Auxiliary power	`Numeric`	W			Power for boiler pump, combustion fan, or other auxiliary that operates when boiler operates.
`operation_lower_limit`	Heating load range operation, lower limit	`Numeric`	W			
`operation_upper_limit`	Heating load range operation, upper limit	`Numeric`	W			

Chiller

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name identifying chiller	`String`			✓	
`cooling_loop_name`	Cooling fluid loop name	`String`				
`condensing_loop_name`	Condensing fluid loop name	`String`				No condensing loop name implies air-cooled chiller.
`compressor_type`	Compressor Type	`<ChillerCompressorTypeOptions>`				
`design_capacity`	Chiller Design Cooling Capacity	`Numeric`	W			
`minimum_load_ratio`	Minimum fraction of full load allowed	`Numeric`				
`design_flow_evaporator`	Chiller evaporator design flow	`Numeric`	L/s			
`design_flow_condenser`	Chiller condenser design flow	`Numeric`	L/s			
`full_load_efficiency`	Full Low Efficiency expressed as a coefficient of performance (COP)	`Numeric`	W/W			
`integrated_part_load_value_efficiency`	Integrated part load value efficiency expressed as a coefficient of performance (COP)	`Numeric`	W/W			Can be input by user or computed.
`part_load_performance_curve`	Part load performance curve	`{PartLoadPerformanceCurve}`				
`capacity_performance_curve`	Capacity performance curve	`{TemperatureAdjustmentPerformanceCurve}`				Typically temperature1 is chilled water supply temperature and temperature2 is outside air dry-bulb temperature for air cooled chillers and condenser water temperature for water cooled chillers.
`efficiency_performance_curve`	Efficiency performance curve	`{TemperatureAdjustmentPerformanceCurve}`				Typically temperature1 is chilled water supply temperature and temperature2 is outside air dry-bulb temperature for air cooled chillers and condenser water temperature for water cooled chillers.
`detailed_performance`	Detailed performance as specified in ASHRAE Standard 205	`UUID`				Reserved for referencing after ASHRAE Standard 205 is published.

HeatRejection

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name identifying heat rejection equipment	`String`			✓	
`loop_name`	Fluid loop name	`String`				
`type`	Heat Rejection Type	`<HeatRejectionTypeOptions>`				
`range`	Heat rejection Range	`Numeric`	C			
`approach`	Heat rejection Approach	`Numeric`	C			
`reset_type`	Leaving Temperature reset strategy	`<HeatRejectionResetOptions>`				
`minimum_reset_temperature`	Minimum leaving temperature setpoint	`Numeric`	C			
`fan_power`	Fan Power	`Numeric`	W			
`fan_speed_control`	Fan Speed Control Type	`<HeatRejectionFanSpeedControlOptions>`				
`design_supply_temperature`	Design leaving water temperature	`Numeric`	C			
`design_wetbulb_temperature`	Design wetbulb temperature	`Numeric`	C			0.4% ASHRAE MCWB
`design_water_flowrate`	Design condenser water flow rate	`Numeric`	L/s			

ExternalFluidSource

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name identifying external fluid source	`String`			✓	External fluid source is a method to indicate that it is connected to a district or campus system external to the building.
`loop_name`	Fluid loop name	`String`				
`type`	Type of external fluid source	`<ExternalFluidSourceTypeOptions>`				

PartLoadPerformanceCurve

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name identifying performance curve	`String`			✓	
`coefficient_a`	Coefficient a	`Numeric`				Coefficient a in formulation a + b x (Qpartload/Qrated) + c x (Qpartload/Qrated)^2
`coefficient_b`	Coefficient b	`Numeric`				Coefficient b in formulation a + b x (Qpartload/Qrated) + c x (Qpartload/Qrated)^2
`coefficient_c`	Coefficient c	`Numeric`				Coefficient c in formulation a + b x (Qpartload/Qrated) + c x (Qpartload/Qrated)^2

TemperatureAdjustmentPerformanceCurve

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name identifying performance curve	`String`			✓	
`coefficient_a`	Coefficient a	`Numeric`				Coefficient a in formulation a + b x temperature1 + c x temperature1^2 + d x temperature2 + e x temperature2^2 + f x temperature1 x temperature2
`coefficient_b`	Coefficient b	`Numeric`				Coefficient b in formulation a + b x temperature1 + c x temperature1^2 + d x temperature2 + e x temperature2^2 + f x temperature1 x temperature2
`coefficient_c`	Coefficient c	`Numeric`				Coefficient c in formulation a + b x temperature1 + c x temperature1^2 + d x temperature2 + e x temperature2^2 + f x temperature1 x temperature2
`coefficient_d`	Coefficient d	`Numeric`				Coefficient d in formulation a + b x temperature1 + c x temperature1^2 + d x temperature2 + e x temperature2^2 + f x temperature1 x temperature2

Name	Description	Data Type	Units	Range	Req	Notes
`coefficient_e`	Coefficient e	`Numeric`				Coefficient e in formulation a + b x temperature1 + c x temperature1^2 + d x temperature2 + e x temperature2^2 + f x temperature1 x temperature2
`coefficient_f`	Coefficient f	`Numeric`				Coefficient f in formulation a + b x temperature1 + c x temperature1^2 + d x temperature2 + e x temperature2^2 + f x temperature1 x temperature2

ServiceWaterHeatingSystem

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`loop_name`	Name of service water heating system loop	`String`				
`area_type`	Service Water Heating Loop Area Type	`<ServiceWaterHeatingSpaceType2019ASHRAE901>`				The enumeration is based on the standard used.
`design_flow`	Design Flowrate of service water heating loop	`Numeric`	L/s			
`supply_temperature`	Design supply temperature setpoint of service water heating loop	`Numeric`	C			
`flow_schedule`	service water heating Loop flow schedule name	`String`				
`annual_entering_water_temperature`	Annual service main or annual ground temperature used for service water heating calculations entering water temperature degrees	`Numeric`	C			
`monthly_entering_water_temperature`	Monthly service main or ground temperatures used for service water heating entering water temperature degrees	`[Numeric][1..12]`	C			Arrayed variable with 12 values for monthly entering water temperature
`entering_water_temperature_type`	Method of determining service water heating entering water temperature	`<ServiceWaterHeatingEnteringWaterTemperatureInputOptions>`				
`heater_name`	Service water heating heater name	`String`				
`heater_fuel_type`	Service water heating heater fuel type	`<FuelTypeOptions>`				
`heater_efficiency`	Service water heating heater efficiency	`Numeric`		`≥0`		

ExteriorLighting

Name	Description	Data Type	Units	Range	Req	Notes
id	Unique ID assigned to each exterior lighting fixture(s) reported in an RMR	Numeric		>0		
name	Exterior lighting fixture name	String				
type	The type of exterior lighting fixture none	<ExteriorLightingAreas2019ASHRAE901TableG36>				
area	Area of the exterior functional space.	Numeric	m2	>0		
norminal_wattage	Nominal capacity of exterior lighting fixtures	Numeric	W	>0		
fixture_height	Installation height of exterior fixture	Numeric	m	>0		
power	Total exterior lighting power of all fixtures in a specific functional area	Numeric	W	>0		
designed_power	Total designed exterior lighting power of all fixtures in a specific functional area	Numeric	W	>0		
trade_light_power	Exterior Lighting power for tradable surface	Numeric	W	≥0		
non_trade_light_power	Exterior Lighting power for non-tradable surface	Numeric	W	≥0		
site_zone_type	Site zone type for Sec 9.4.2	<ExteriorLightingZones2019ASHRAE901>				
parking_area	Area of exterior parking space	Numeric	m2	≥0		
tradable_surface_type	Type of tradable surfaces for exterior lighting	<ExteriorLightingAreas2019ASHRAE901TableG36>				
tradable_surface_area	Area of tradable surface	Numeric	m2	≥0		
tradable_surface_linear_footage	Linear feet of tradable surface	Numeric	m	≥0		
has_walkway	If the building has an exterior walkway	Boolean				
tradable_walkway_width_footage	Width of the exterior walkway	Numeric	m	≥0		
tradable_opening_width_footage	Width of an exterior opening	Numeric	m	≥0		
multiplier	Multiplier for exterior lighting specifications	Numeric		>0		

Refrigeration

Name	Description	Data Type	Units	Range	Req	Notes
`id`	Unique Identification Number	`Numeric`			✓	
`name`	Name of the refrigeration component	`String`			✓	
`type`	Refrigeration equipment type	`<RefrigerationType2019ASHRAE901>`				
`equipment_class`	Equipment Class from referenced standard	`<RefrigerationClass2019ASHRAE901>`				
`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

Name	Description	Data Type	Units	Range	Req	Notes
`refrigeration_energy_enduse`	Annual refrigeration energy end use from simulation output	`Numeric`	kWh			
`service_water_heating_annual_enduse_electricity`	Annual electricity energy end_use for SWH loops	`Numeric`	kWh	`≥0`		
`service_water_heating_annual_enduse_fossilfuel`	Annual fossil fuel energy end_use for SWH loops	`Numeric`	J	`≥0`		