

ASHRAE System 7 Sample Guide




The **ASHRAE System 7 Sample Guide** is also available within the **Sample Project – ASHRAE System 7** CHM file that is available within Simergy  .

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ASHRAE Baseline System 7 - VAV with Reheat System

The sample file ASHRAE -7 VAV (referred to as System 7) available with the Simergy installation at C:\Users\Public\Simergy\Samples\Sample_Projects is a "simulation ready" sample file. The sample file contains all the components and input values required, and is an example of a model containing a HVAC system type that contains multiple water loops and an air loop. It is a sample file that new Simergy users as well as experienced EnergyPlus users will find beneficial to review and study. The following is a breakdown of different components within the sample file that is presented by going through each tab on the Simergy Interface. The Simergy Map also displays all of the Libraries and Templates Categories that are used within the sample file and they are mapped to the different interface tabs.

Design Alternatives

Only a Baseline Design Alternative is included with the file and the location selected is Minneapolis, MN
[Simergy ASHRAE System 7 Map](#)

Site

No site objects are included with this file.
[Simergy ASHRAE System 7 Map](#)

Buildings

Create/Edit Building

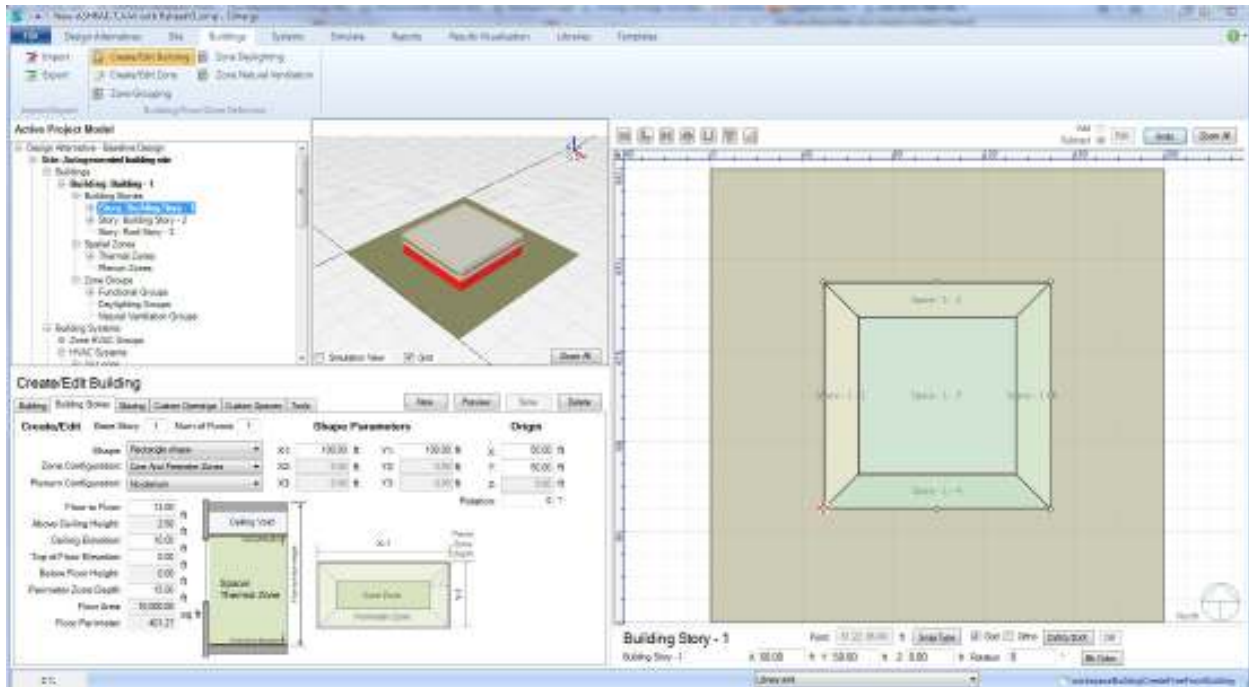
[Simergy ASHRAE System 7 Map](#)

Building

The Building Constructions library entry selected from the drop down list is ASHRAE 90.1 nonRes CZ4-6 (Non-Residential Climate Zone 4-6), which contains the different required construction entries (opaque and fenestration) that are outlined in ASHRAE 90.1-2010. The source for the options available in the drop down list is Templates>Constructions

Building Stories

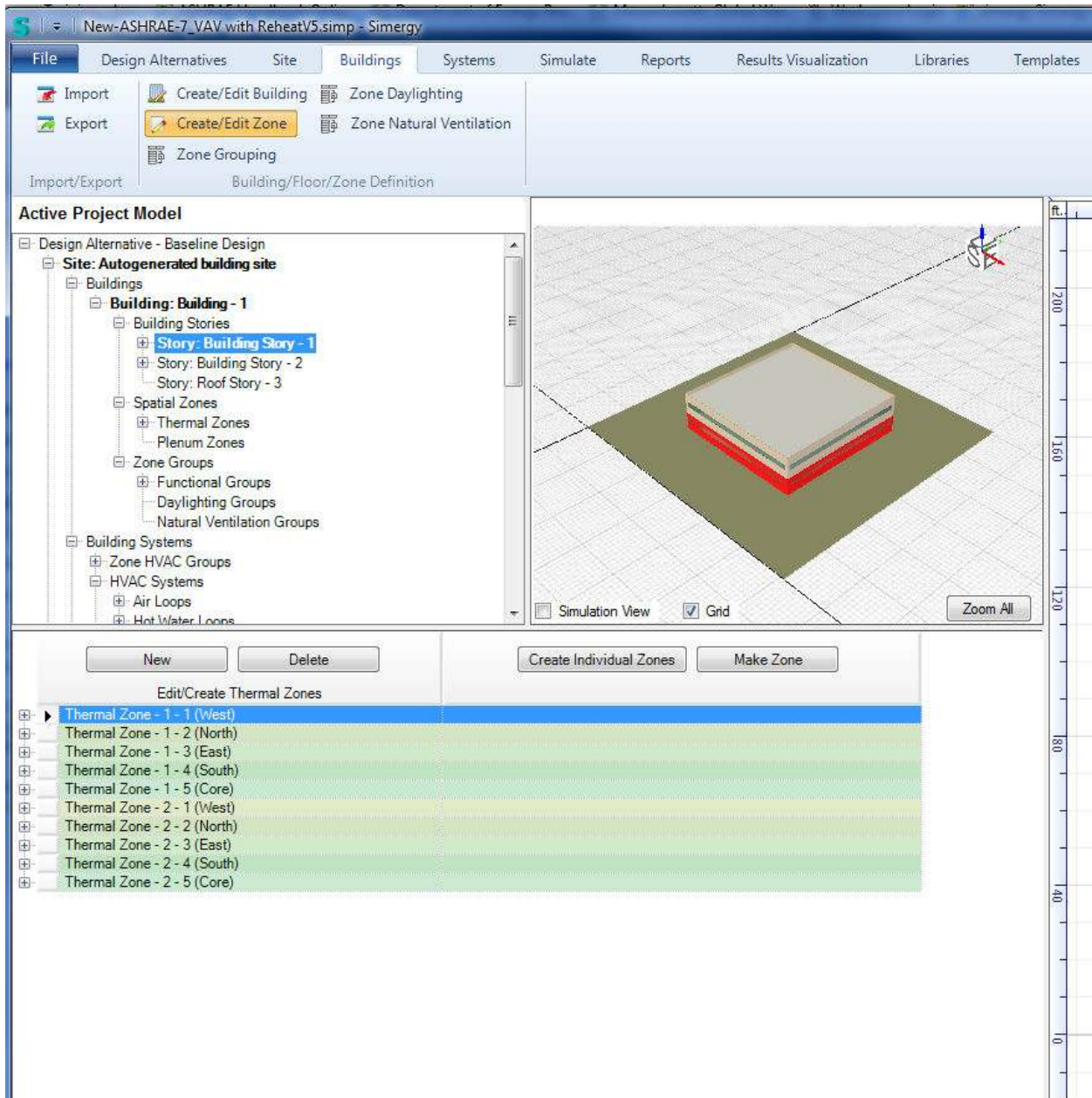
When you first go to this tab it will appear blank, because the geometry has already been created and the program is ready for you to create a new building form. When you highlight one or both of the building stories in the Project Tree, you start to see how the basic geometry was created.



The building geometry is nothing special. A two-story square structure that contains core and perimeter zones. As shown in the image above when one of the floors is highlighted the inputs that were selected to create the geometry are displayed. In addition the window configuration for the model was generated by selecting the default of 30% window to wall ratio and there is only one array (plane) of glazing per floor included (up to three per floor can be included), so in this case there is not anything interesting to see on the other tabs unless changes start to be made to the file.

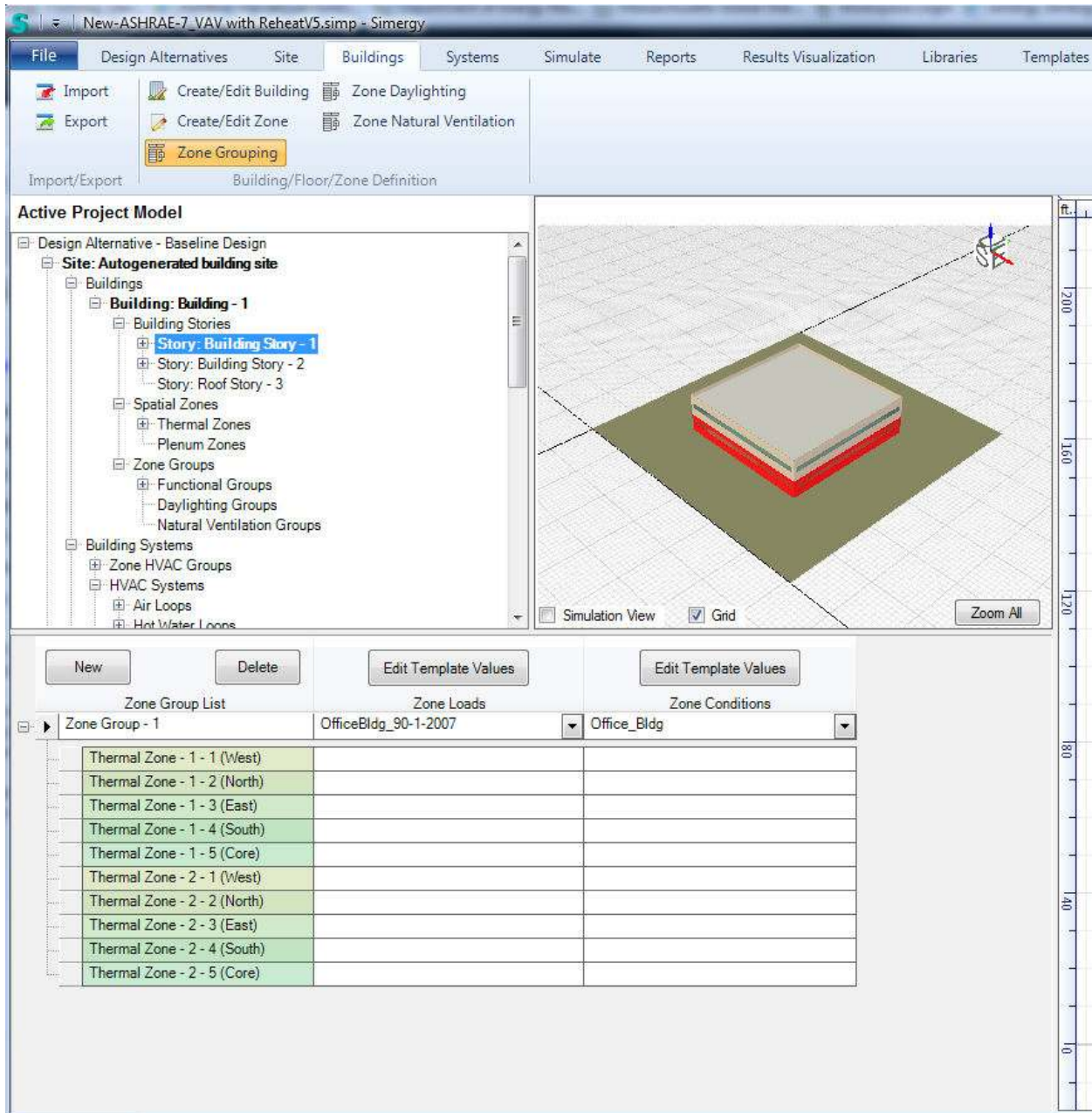
Create/Edit Zone

The two story model with core and perimeter zones means there are ten (10) thermal zones currently incorporated into the model (as shown in the image below). This is workspace where thermal zones can be manipulated, added and assigned. It is typically used to view the current thermal zones in a model and to view the thermal zones that have and have not been assigned on an imported model (whether it is IFC or gbxml).



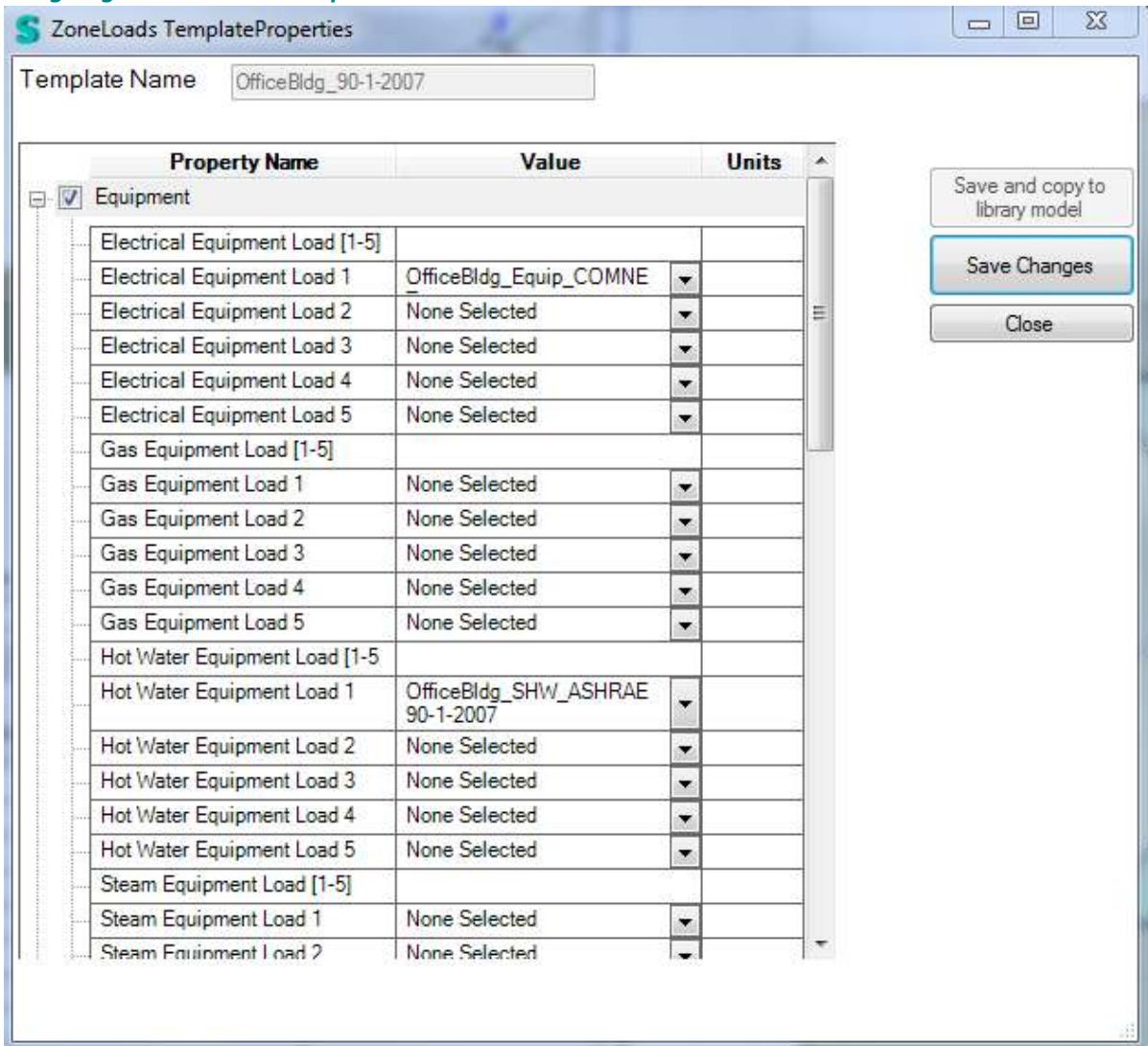
Zone Grouping

The workspace that allows you to build different types of Zone Groups. In this case there is only one Zone Group and all ten zones have been assigned to it, as is shown when the "+" button is selected next to Zone-Group-1.



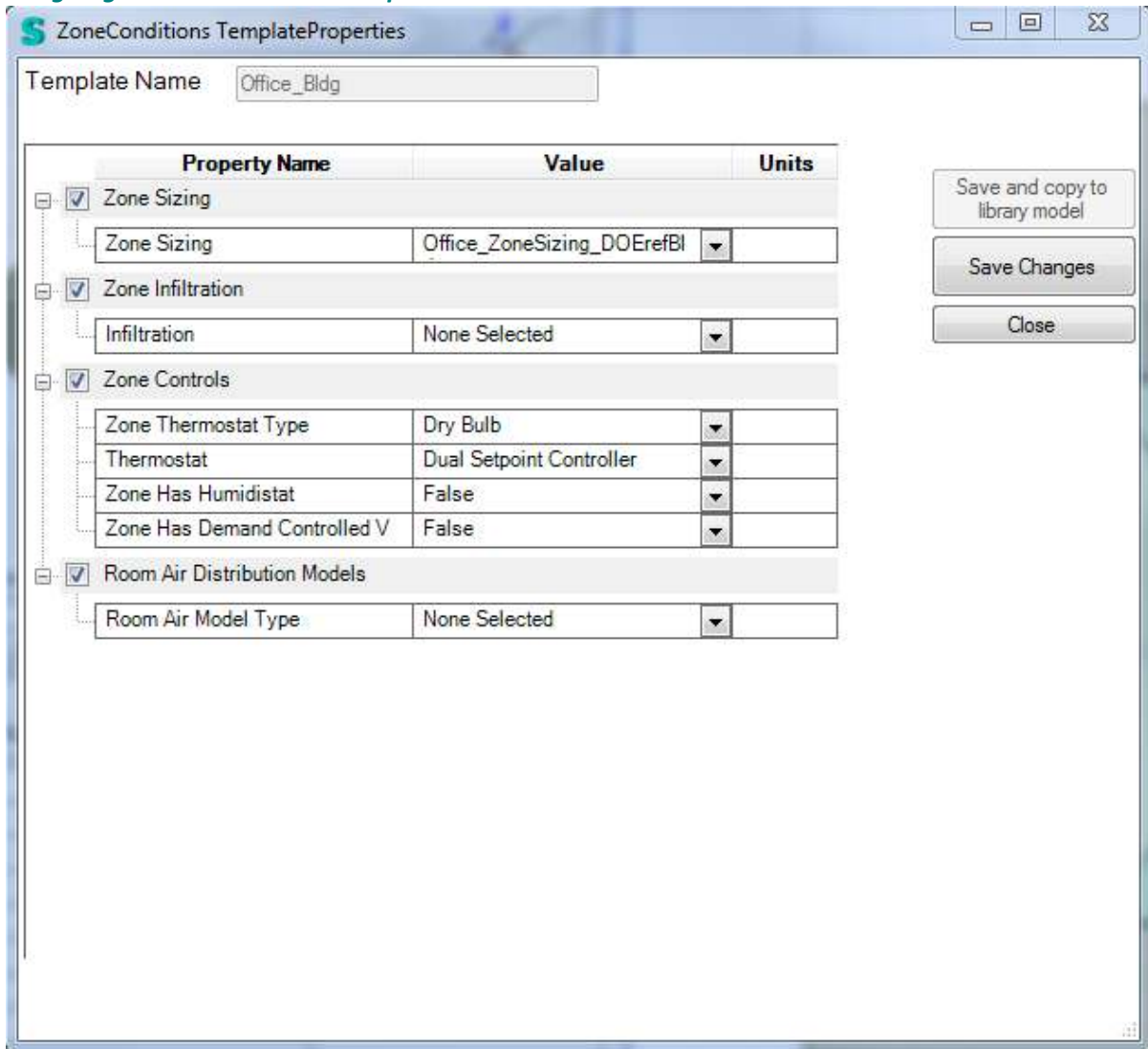
Zone Groups can be a time saver to defining inputs for your model. The key question to answer is what zones will have similar Zone Loads and Zone Conditions entries. If the answer is that they are all similar, then you can get away with one Zone Grouping as shown. Otherwise you can create multiple Zone Groups by selecting New.

Assigning a Zone Loads Template



Clicking Edit Template button displays the library entries that have been selected for each property (row). The properties for Equipment are displayed, but if you could scroll down within the picture you'd see property selections for Lights and People as well. To see a mapping of the property to the value drop down list where the library entries can be viewed and edited, look here.

Assigning a Zone Conditions Template



Clicking Edit Template button displays the library entries that have been selected for each property (row). The properties for Equipment are displayed, but if you could scroll down within the picture you'd see property selections for Lights and People as well. To see a mapping of the property to the value drop down list where the library entries can be viewed and edited, look here.

In this case no Zone Daylighting or Zone Natural Ventilation groups have been set up for the model.

Systems

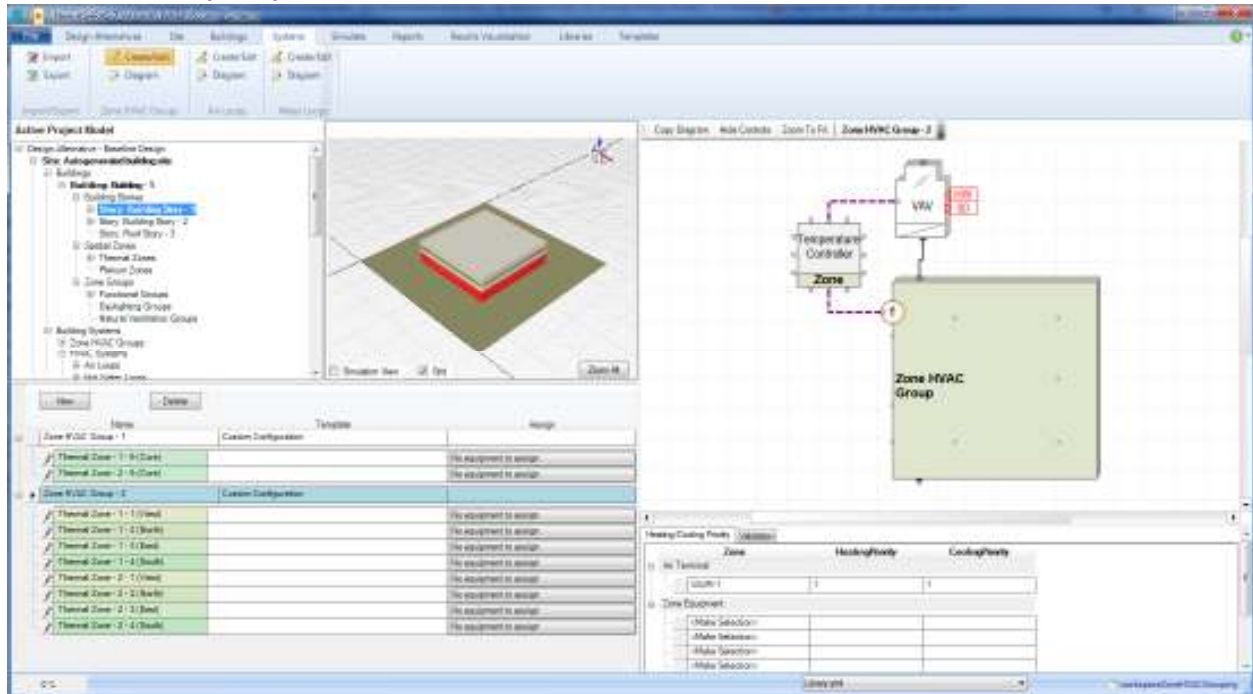
Simergy ASHRAE System 7 Map

Zone HVAC Groups - Create/Edit Workspace

The first destination when the Systems Tab is selected is the Zone HVAC Groups > Create/Edit Workspace. Each Simergy model is required to have at least one Zone HVAC Group, because the demand side for the Air System needs to be defined. The Demand side can either be defined by selecting a Zone HVAC Group template and then dragging that onto the Supply Side or if a Zone HVAC

Group, such as one using an Ideal Loads System (compound object containing multiple components), is set up the Air Loop is not required.

Zone HVAC Group Loop -1



In this case of System 7, two Zone HVAC Groups have been set up. One for the core thermal zones and the other for the perimeter. In this case they just happen to have the same Template assigned to them. However, you'll note that "Custom Configuration" is displayed in the Template column. This indicates that changes have been made to the template after it has been assigned to the model. To view the updated template you will need to change the Source Library to Project Model.siml (lower right of workspace), and then you can go to Template>ZoneHVACGroups to select the template and view the properties.

The Zone HVAC Group Templates included within System 7 are:

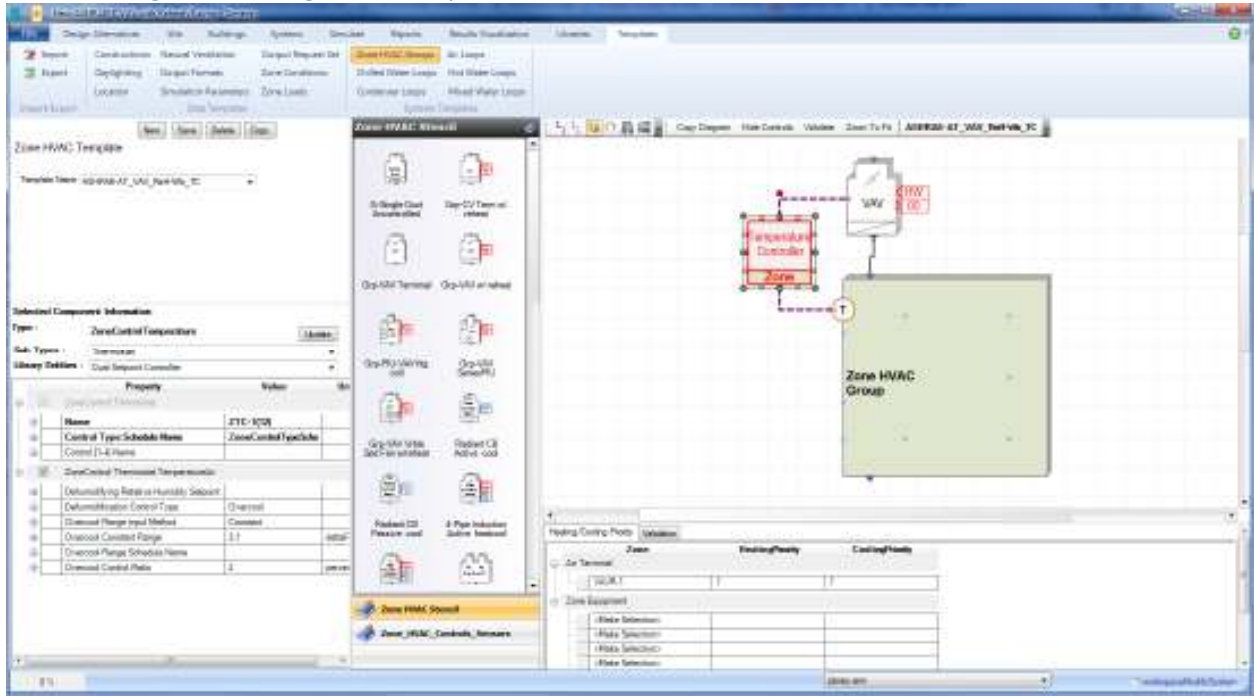
- Zone HVAC Group 1 = Simple Air Terminal Parallel Fan Powered Box, Water Cooling and Heating (ASHRAE-AT_VAV_ReH-Wtr_TC)
- Zone HVAC Group 2 = Simple Air Terminal Parallel Fan Powered Box, Water Cooling and Heating (ASHRAE-AT_VAV_ReH-Wtr_TC)

A common theme in Simergy is that naming conventions for different Template and Library Entries have been set up to provide insight into what is included by just looking at the name.

- *ASHRAE = the input values meet the requirements of ASHRAE 90.1-2010*
- *AT = Air Terminal*
- *VAV = Variable Air Volume*
- *ReH-Wtr = A Reheat coil is included within the VAV box that is sourced by hot water*
- *TC = Temperature Controlled*

Zone HVAC Group - Diagram Workspace

Note: To edit the inputs for the component shapes and/or to add others to the Zone HVAC Group, you will need to go to the Diagram Workspace.



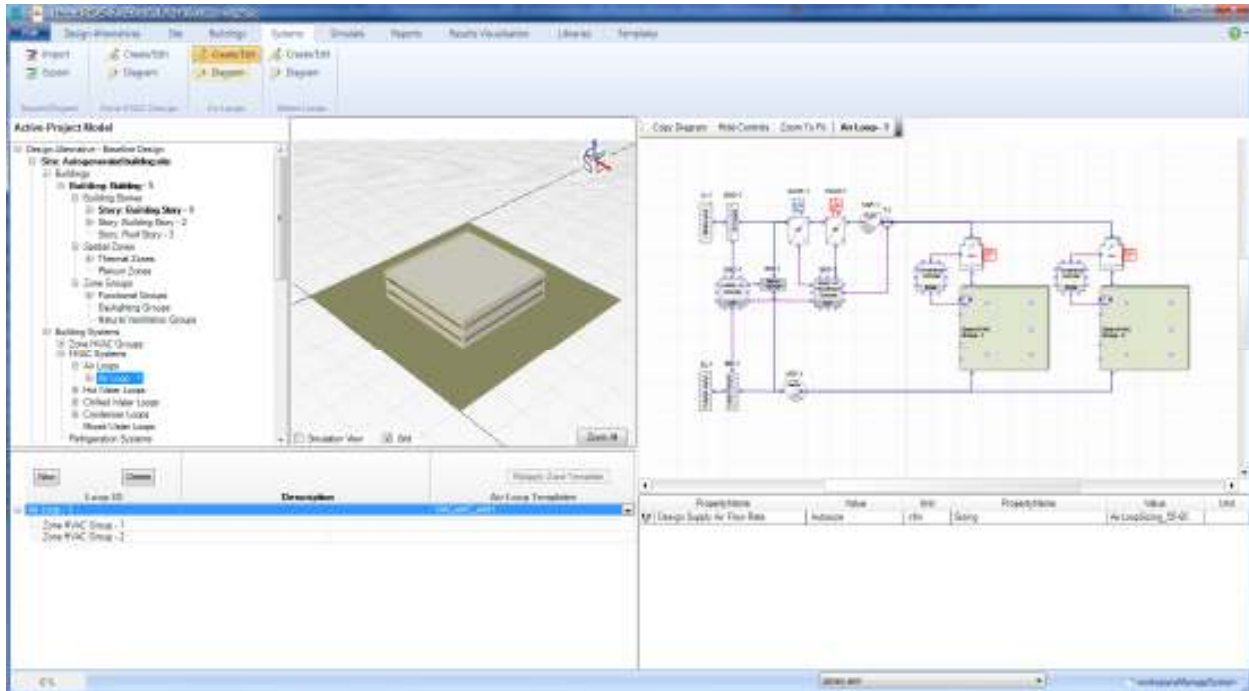
In either workspace the Heating and Cooling Priority can be set by interacting with the table on the bottom right of the workspace. For each model to simulate successfully each component is required to have a library entry associated with it, so that the needed input values are required. All Templates packaged with the Simergy Installation will contain Library Entries. An example is shown in the image above where the "Zone Temperature Controller" has been selected from the 2d view and if you look to the properties table on the lower left you'll see that the Library Entry selected is a Dual Setpoint Controller.

Another common theme to remember is that to run Validation checks, you'll need to be in the Diagram Workspace. See the "Validate" button at the top center of the 2d diagramming section. By selecting the validation check will be completed that will display 'no errors' or 'list the errors' on the table below the 2d diagramming section (note the Validation tab). In addition, the Validation Dashboard that is located on the Design Alternatives and Simulate workspaces will be updated as well.

Air Loops - Create/Edit Workspace

Air Loop -1

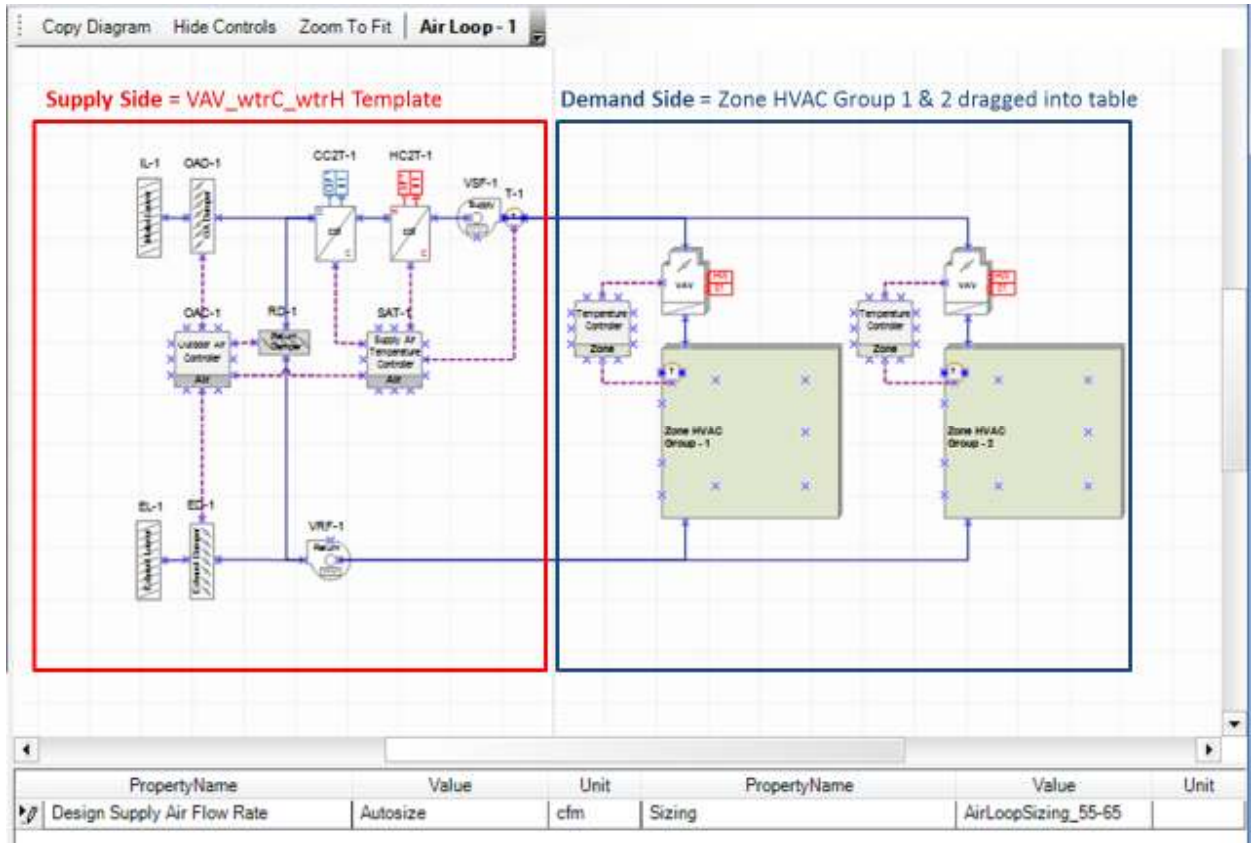
Related Topics: [Air Loop Interactive Diagram](#)



For System 7 there is one Air Loop that has been set up, which is listed in the table (lower left). The Air Loop was created by first by selecting the VAV_wtrC_wtrH Template from the Air Loop Template drop down list to set up the Supply Side of the Air Loop. The Demand Side of the Air Loop was established by highlighting ZoneHVAC Group 1 & 2 in the project tree and then dragging and dropping them into the Air Loop Table.

Naming Convention for Air Loop Templates - VAV_wtrC_wtrH

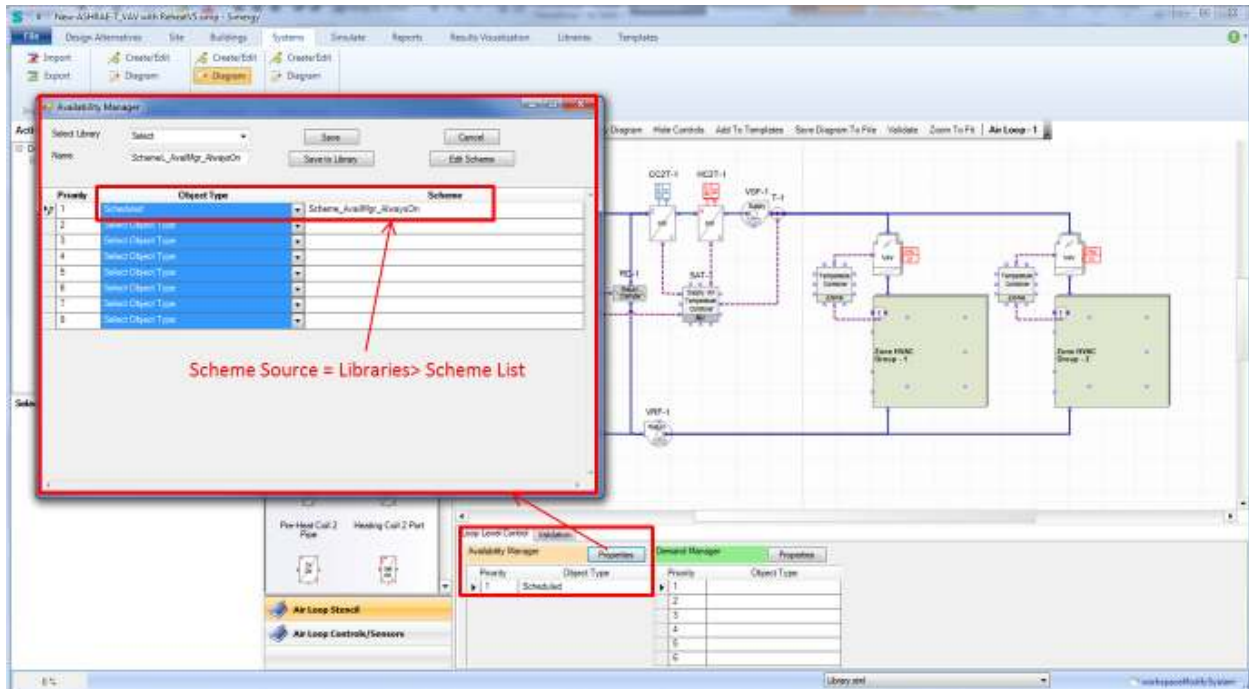
- VAV = Variable Air Volume Loop
- wtrC = Water based Cooling Coil
- wtrH = Water based Heating Coil



The Air Loop Level Properties (table at bottom of image above) display that the Design Supply Air Flow Rate is set to Autosize and the Sizing Property has selected a Library Entry (Air Loop Sizing_55-65) from the Libraries>Controls and Performance Data> Sizing Params category.

Air Loops - Diagram Workspace

Another requirement to run a simulation within EnergyPlus is that an Availability Manager needs to be associated with each Air Loop. In this case the Object Type = Scheduled has been selected and the "Scheme_AvailMgr_AlwaysOn" library entry that was set up in the Libraries>Scheme List area has been selected.



Note: All Air Loop Templates packaged with the Simergy Installation will have Availability Managers assigned to them.

Water Loops - Create/Edit Workspace

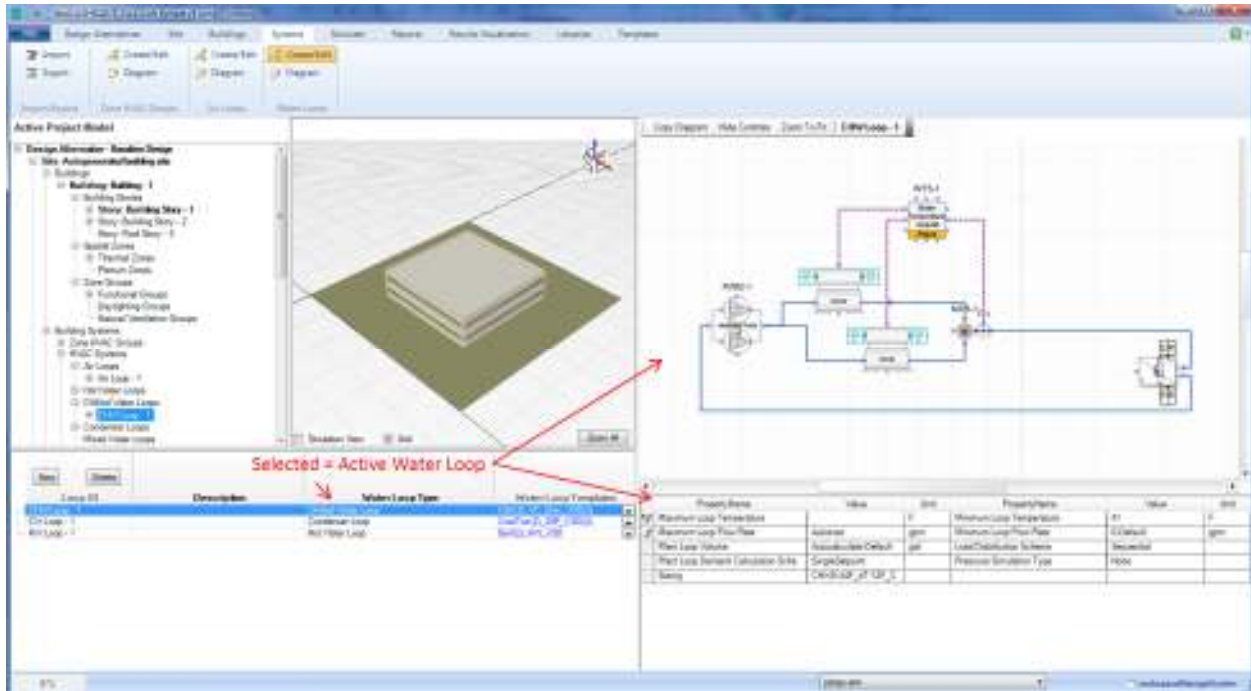
System 7 has three water loops (Chilled Water, Hot Water and Condenser Water) set-up. The Water Loops were set up by selecting "New" to add a new row to the table. Then you select the Water Loop Type from the drop down list, which then populates the Water Loop Templates drop down list with the appropriate options. Next, you guessed it, select the Water Loop Template from the drop down list.

Chilled Water Loop -1

Related Topics: [Chilled Water Loop Interactive Diagram](#)

The Chilled Water Loop Selection = Chlr(2)_VC_Elec_VSD(2)

- *Chlr(2) = Two Chillers*
- *VC = Vapor Compression Chillers*
- *Elec = Electric Vapor Compression Chillers*
- *VSD(2) = Variable Speed Drive Headered Pumps*



Loop Level Parameters

The table outlines the Value selection options and the sources for properties where the selection options are determined by a template or library category. The intent is to assist you to locate where more detailed properties can be found.

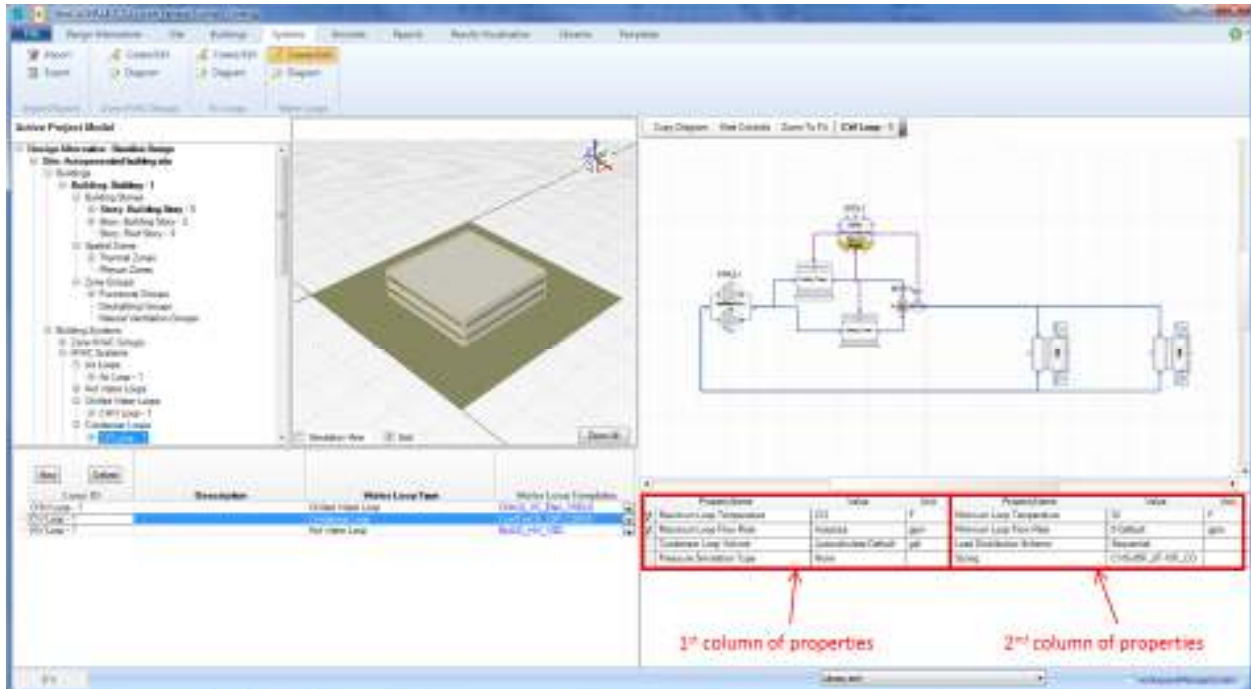
Property Name	Value Source	Units
Maximum Loop Temperature	<input value>	F
Maximum Loop Flow Rate	Autosize or <input value>	gpm
Plant Loop Volume	Autocalculate or <input value>	gal
Plant Loop Demand Calculation Scheme	Single Setpoint or Dual Setpoint Deadband	
Sizing	Libraries>Sizing Params Type = HVAC Design Sub Type = Water Loop Sizing	
Minimum Loop Temperature	<input value>	F
Minimum Loop Flow Rate	Autosize or <input value>	gpm
Load Distribution Scheme	Uniform, Sequential or Optimal	
Pressure Simulation Type	None, LoopFlowCorrection, Pump Power Correction	

Condenser Water Loop -1

Related Topics: [Condenser Water Loop Interactive Diagram](#)

The Condenser Water Loop Selection = CoolTwr(2)_2SP_CSD(2)

- *CoolTwr(2) = Two Cooling Towers*
- *2SP = Two Speed*
- *CSD(2) = Constant Speed Drive Headered Pumps*



Loop Level Parameters

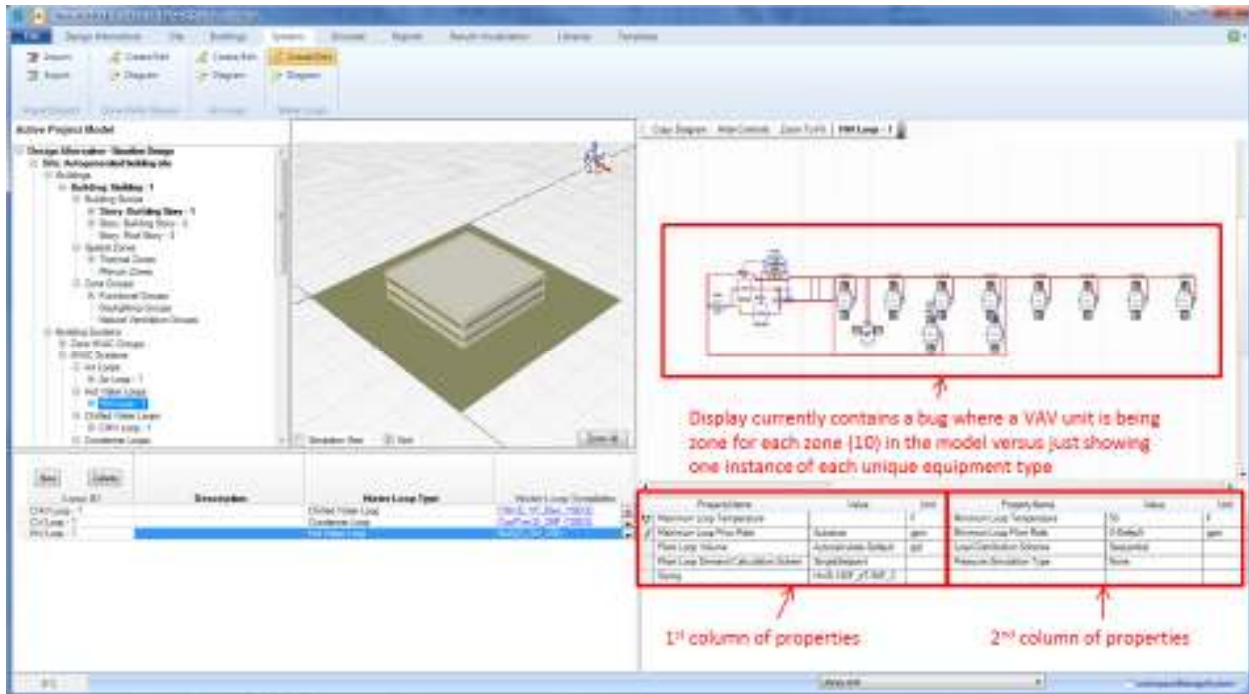
The table outlines the Value selection options and the sources for properties where the selection options are determined by a template or library category. The intent is to assist you to locate where more detailed properties can be found.

Property Name	Value Source	Units
Maximum Loop Temperature	<input value>	F
Maximum Loop Flow Rate	Autosize or <input value>	gpm
Condenser Loop Volume	Autocalculate or <input value>	gal
Pressure Simulation Type	None, LoopFlowCorrection, Pump Power Correction	
Minimum Loop Temperature	<input value>	F
Minimum Loop Flow Rate	Autosize or <input value>	gpm
Load Distribution Scheme	Uniform, Sequential or Optimal	
Sizing	Libraries>Sizing Params Type = HVAC Design Sub Type = Water Loop Sizing	

Hot Water Loop -1

The Hot Water Loop Selection = Boil(2)_HW_VSD

- Boil(2) = Two Boilers
- HW = Hot Water
- VSD = Variable Speed Drive Pumps



Loop Level Parameters

The table outlines the Value selection options and the sources for properties where the selection options are determined by a template or library category. The intent is to assist you to locate where more detailed properties can be found.

Property Name	Value Source	Units
Maximum Loop Temperature	<input value>	F
Maximum Loop Flow Rate	Autosize or <input value>	gpm
Plant Loop Volume	Autocalculate or <input value>	gal
Plant Loop Demand Calculation Scheme	Single Setpoint or Dual Setpoint Deadband	
Sizing	Libraries>Sizing Params Type = HVAC Design Sub Type = Water Loop Sizing	
Minimum Loop Temperature	<input value>	F
Minimum Loop Flow Rate	Autosize or <input value>	gpm
Load Distribution Scheme	Uniform, Sequential or Optimal	
Pressure Simulation Type	None, LoopFlowCorrection, Pump Power Correction	

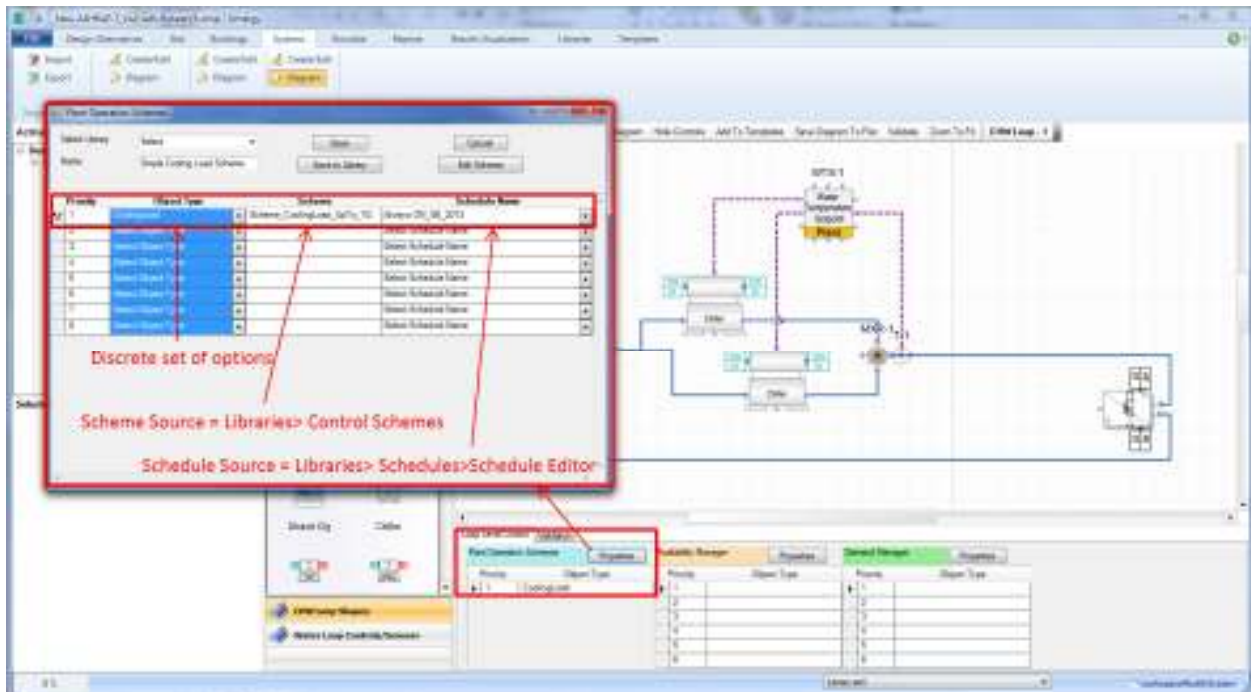
Water Loops - Diagram Workspace

In addition to being able to access the properties for individual components and allowing you to add or delete components or reconfigure the loop diagram, you have access to the Plant Operation Schemes, Availability Managers and/or Demand Managers for each of the loop types.

Chilled Water Loop -1 (Diagram)

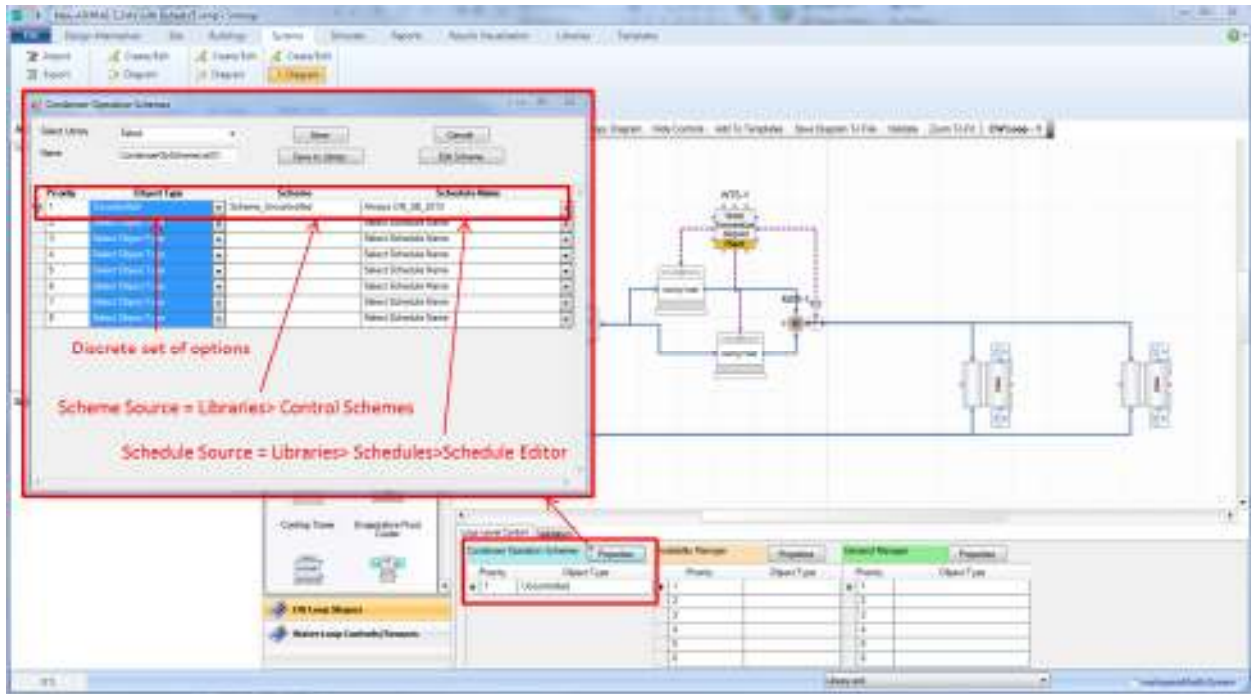
A Plant Operation Scheme for each Chilled Water Loop is required. For this loop the Cooling Load Plant Operation Scheme was set up by selecting "Properties", which displayed the dialog box allowing up to

eight schemes to be associated with the model. Cooling Load was selected from the drop down list and then the Scheme (Scheme_CoolingLoad_UpTo_1G) was selected as well as a schedule (Always ON_SE_2013) for that scheme. The sources for the drop down lists are displayed in the image.



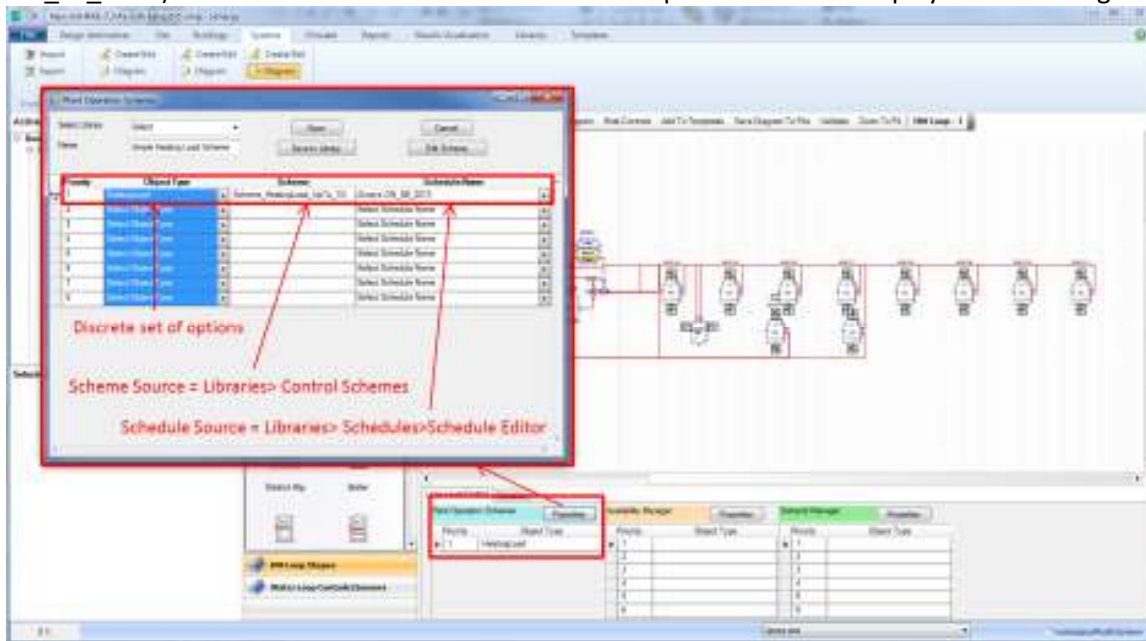
Condenser Water Loop -1 (Diagram)

A Plant Operation Scheme for each Condenser Water Loop is required. For this loop the "Uncontrolled" Plant Operation Scheme was set up by selecting "Properties", which displayed the dialog box allowing up to eight schemes to be associated with the model. Cooling Load was selected from the drop down list and then the Scheme (Scheme_Uncontrolled) was selected as well as a schedule (Always ON_SE_2013) for that scheme. The sources for the drop down lists are displayed in the image.



Hot Water Loop -1 (Diagram)

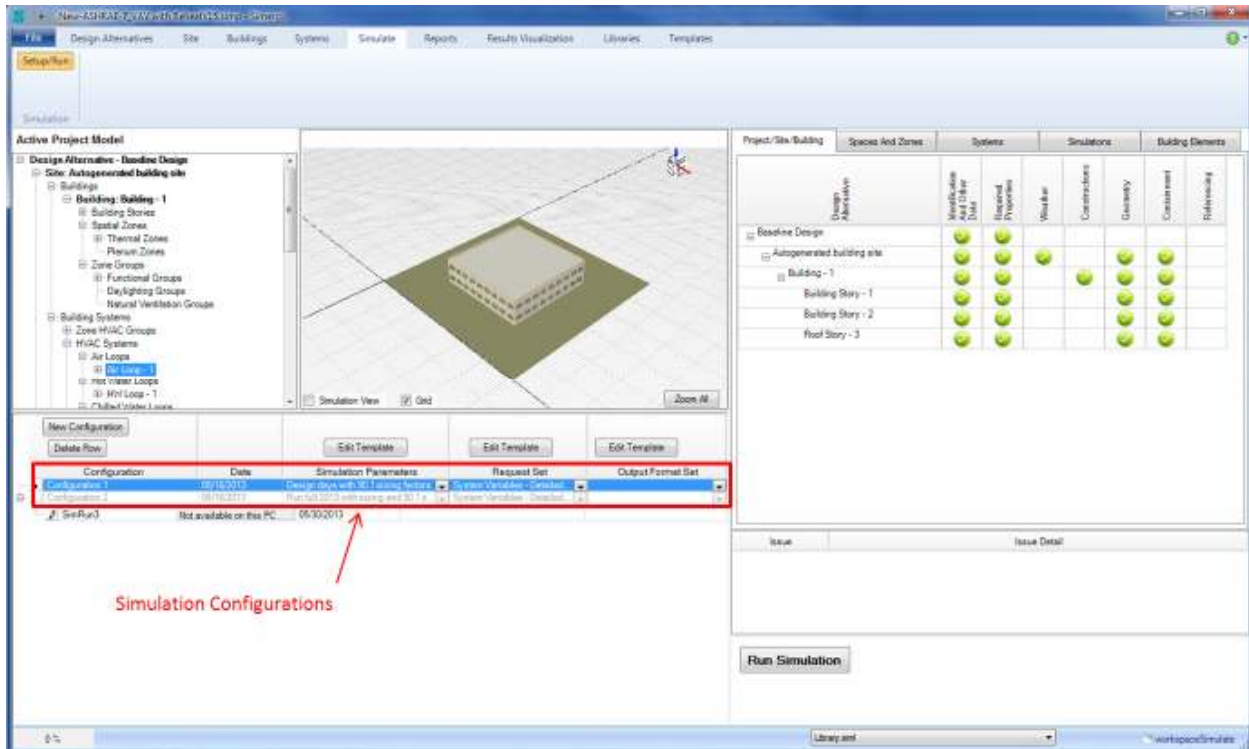
A Plant Operation Scheme for each Hot Water Loop is required. For this loop the Heating Load Plant Operation Scheme was set up by selecting "Properties", which displayed the dialog box allowing up to eight schemes to be associated with the model. Heating Load was selected from the drop down list and then the Scheme (Scheme_HeatingLoad_UpTo_1G) was selected as well as a schedule (Always ON_SE_2013) for that scheme. The sources for the drop down lists are displayed in the image.



Simulate

Simergy ASHRAE System 7 Map

A good habit to get into once you are ready to consider starting to run simulations is to check the different tabs on the "Validation Dashboard" (upper right). It provides an overview of the "integrity of the model", and can assist identifying problem areas that should be addressed before hitting the "Run Simulation" button.



Configurations

Two simulation configurations have been set up for System 7. Simulation configurations can vary based on selections of Simulation Parameters, Request Sets or Output Format Sets

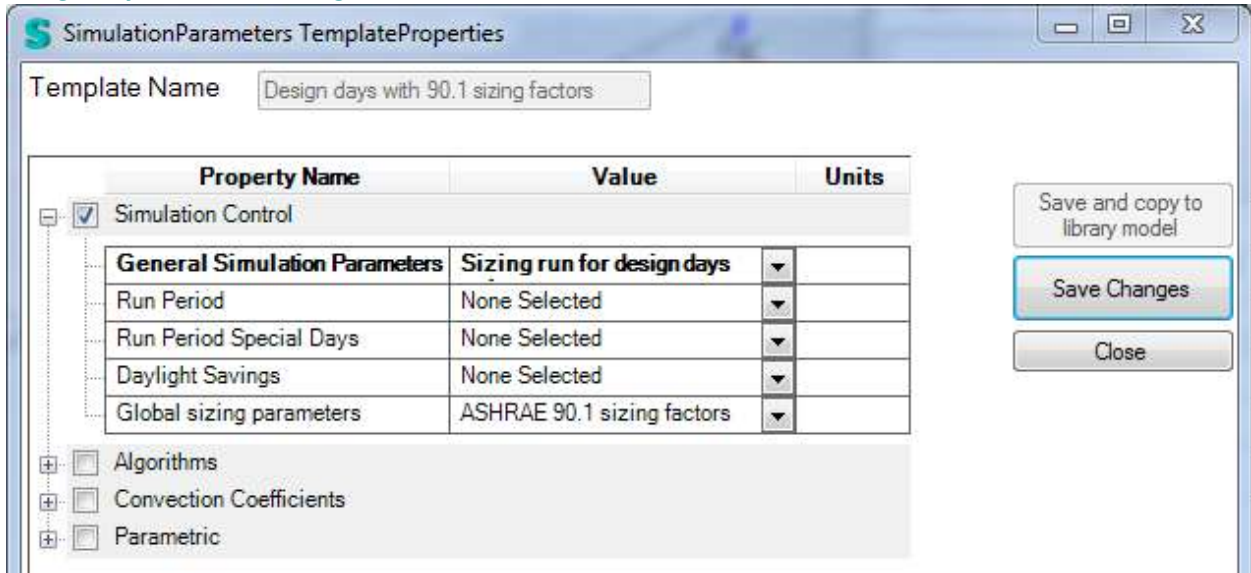
Note: Selecting an Output Format Set is rarely needed, so a majority of the time this field will remain blank.

In this case the difference between the two configurations is the first is to simulate "Design Days with Sizing" and the second is a "Full Year with Sizing" run.

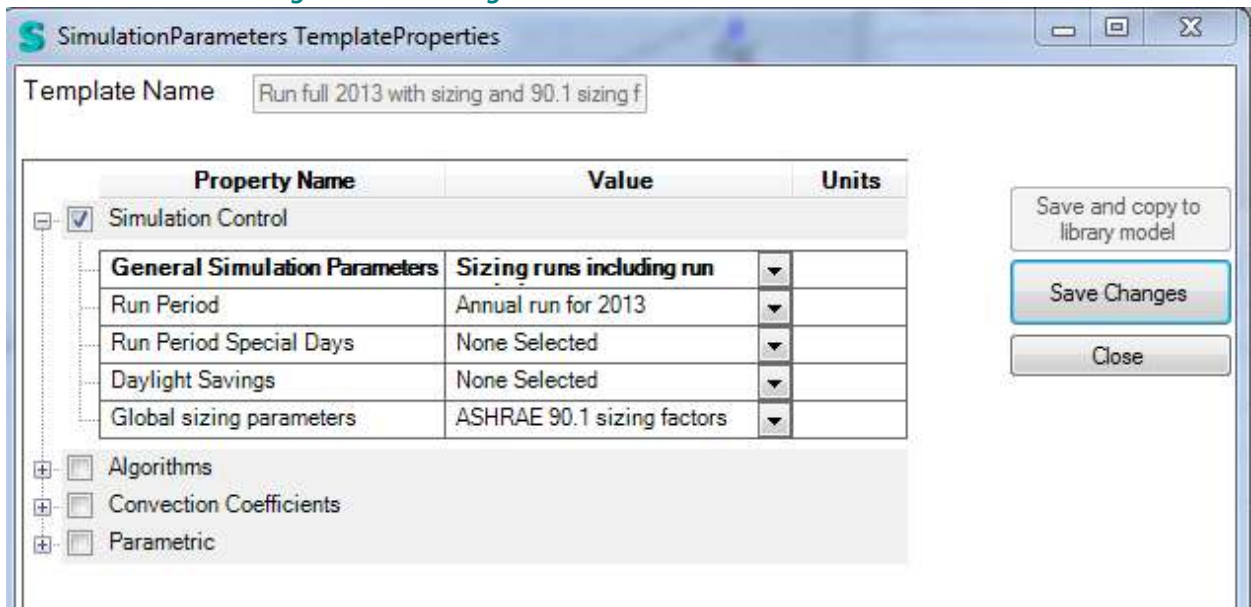
Simulation Parameters

A Simulation Parameters Template is associated with each configuration.

Design days with 90.1 Sizing Factors



Run Full 2013 with sizing and 90.1 Sizing Factors

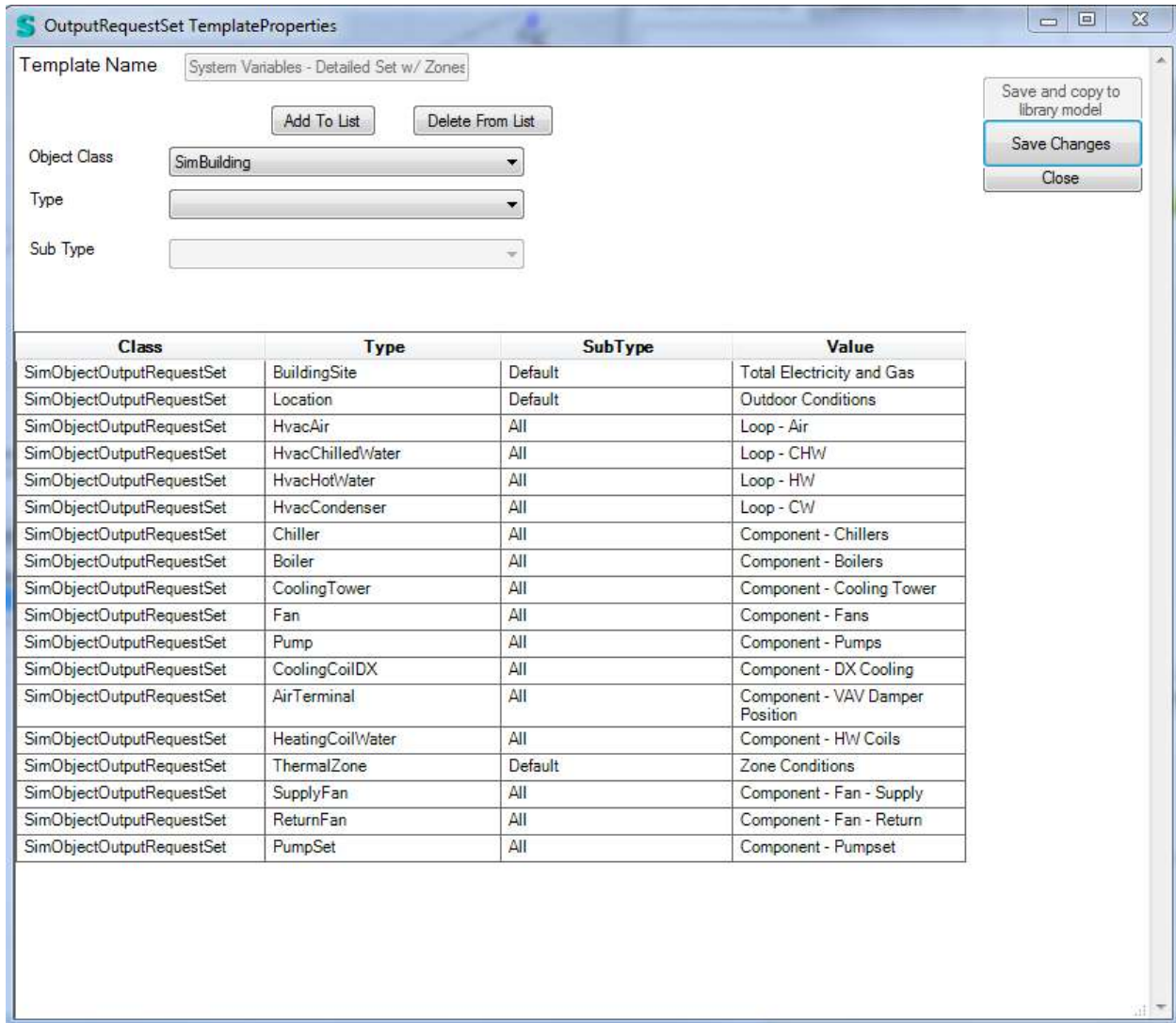


Request Set

Actually the templates selected here are Output Request Set Templates.

System Variables - Detailed Set w/ Zones

From the set packaged with Simergy Version 1, System Variables - Detailed Set w/ Zones is associated with each configuration



Output Format Set

No Output Format Set Templates are included with System 7.

Reports

Simergy ASHRAE System 7 Map

Completed simulation runs are not included with the sample files, but you can run select "Run Simulation" for the two pre-defined configurations to generate them.

Once a simulation has been run "View Results" will appear in the Simulation Configuration table. If you select the button it will take you to the Reports Workspace. As you may recall the Results that are available for a simulation are determined by what Output Variables are included in the Output Request Set selected within the configuration. Typically all of the Request Sets that are included with Simergy contain the Output Variables required for the set of pre-defined Reports. See sections on Reports for additional information

Results Visualization

Simergy ASHRAE System 7 Map

Completed simulation runs are not included with the sample files, but you can run select "Run Simulation" for the two pre-defined configurations to generate them.

In this case once the simulations are complete, rather than selecting the "View Results" button, you should just select "Results Visualization" from the top menu to access the workspace. See sections on Results Visualization for additional information.

Simergy BEM Map for ASHRAE Baseline System 7 Sample File

The following is a map of the sample file Simergy content for "New-ASHRAE-7_VAV with Reheat", which is located at C:\Users\Public\Simergy\Samples\Sample_Projects as part of the Simergy installation. The map displays the templates and libraries that are associated with each of the Simergy interface tabs.

The image map contains hyperlinks to the relevant topics and bookmarks for the System 7 file that are included within this chapter of the Simergy Help.

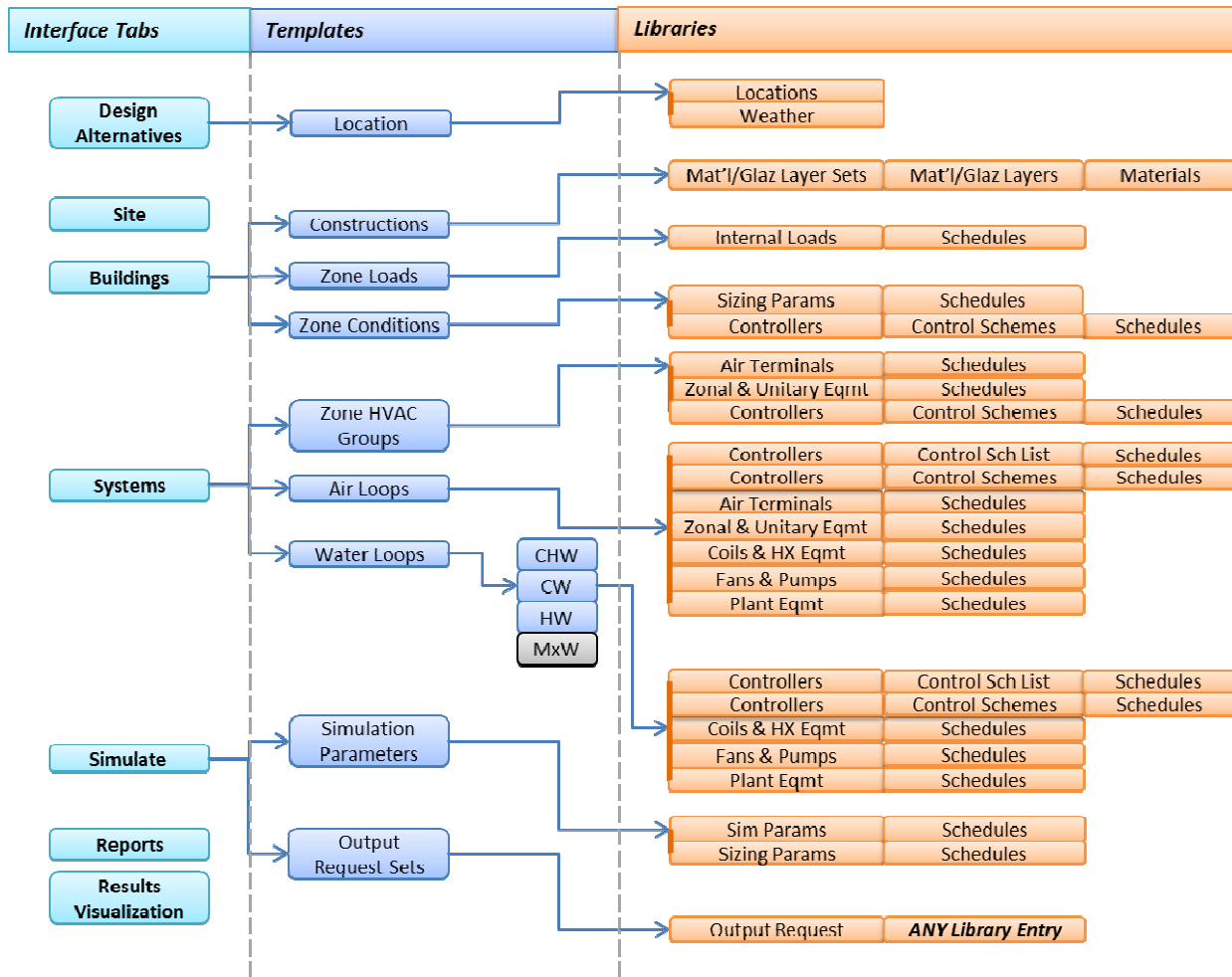


Figure - Interactive Image Map of ASHRAE Baseline System 7 allowing you to investigate the inputs and contents for this sample file as well to enable understanding of the relationships between the different libraries categories and the libraries and templates.

ASHRAE System 7 Templates

The following identifies the different templates that have been included with ASHRAE Baseline System 7 Sample File.

Location

USA MN Minneapolis St Paul Intl Arp

Note: To access this Template the Source Library needs to be changed to Project Model.

PropertyName	Value
<input checked="" type="checkbox"/> Site Properties	
Terrain	Suburbs
SolarDistribution	FullExterior
<input checked="" type="checkbox"/> Weather Property Sky Temperature	
Sky Temperature Calculation Type	None Selected
<input checked="" type="checkbox"/> Weather Station	
IDD Weather Station	None Selected
Weather File Name	USA_MN_Minneapolis-St.Paul.Intl.AP_TMY3.epw
<input checked="" type="checkbox"/> Design Days	
Summer Design Day[0-2]	
Summer Design Day 1	Minneapolis St Paul Intl Arp Ann Clg 1% Condns DB=>MWB
Summer Design Day 2	None Selected
Summer Design Day 3	None Selected
Winter Design Day[0-2]	
Winter Design Day 1	Minneapolis St Paul Intl Arp Ann Htg 99% Condns DB
Winter Design Day 2	None Selected
Winter Design Day 3	None Selected
<input checked="" type="checkbox"/> Utilities	
Utility Cost[0-9]	
Utility Cost 1	None Selected
Utility Cost 2	None Selected
Utility Cost 3	None Selected
Utility Cost 4	None Selected
Utility Cost 5	None Selected
Utility Cost 6	None Selected
Utility Cost 7	None Selected
Utility Cost 8	None Selected
Utility Cost 9	None Selected
Utility Cost 10	None Selected

Building Constructions

ASHRAE 90.1 nonRes CZ4-6

The screenshot shows the 'Template Properties' dialog box with the following data:

PropertyName	Value	Units
Opaque Constructions		
Exterior Wall Construction	Wall-90.1-2007_nonRes CZ4-8	
Exterior Floor Construction	Floor 90.1-2007_nonRes CZ4-	
Interior (Interzone) Floor Construct	Floor-Int_4"Concrete	
Roof Construction	Roof 90.1-2007_nonRes CZ2-8	
Slab-on-grade Construction	None Selected	
Radiant Slab Construction	None Selected	
Underground Wall Construction	None Selected	
Underground Floor Construction	None Selected	
Ceiling Construction	None Selected	
Interior/Partition Wall Construction	Wall-Int_MtlStudGyp-4" /	
Radiant Wall Construction	None Selected	
Raised Floor Construction	None Selected	
Opaque Doors	None Selected	
Fenestration Constructions		
Windows, North	Glaz-Window_ASHRAE 90.1_nonRes&Res CZ4-6	
Windows, South	Glaz-Window_ASHRAE 90.1_nonRes&Res CZ4-6	
Windows, East	Glaz-Window_ASHRAE 90.1_nonRes&Res CZ4-6	
Windows, West	Glaz-Window_ASHRAE 90.1_nonRes&Res CZ4-6	
Exterior Glass Doors	Glaz-Window_ASHRAE 90.1_nonRes&Res CZ4-6	
Skylights	None Selected	
Interior Windows	None Selected	
Interior Glass Doors	None Selected	

Zone Loads

OfficeBldg_90-1-2007

ZoneLoads TemplateProperties

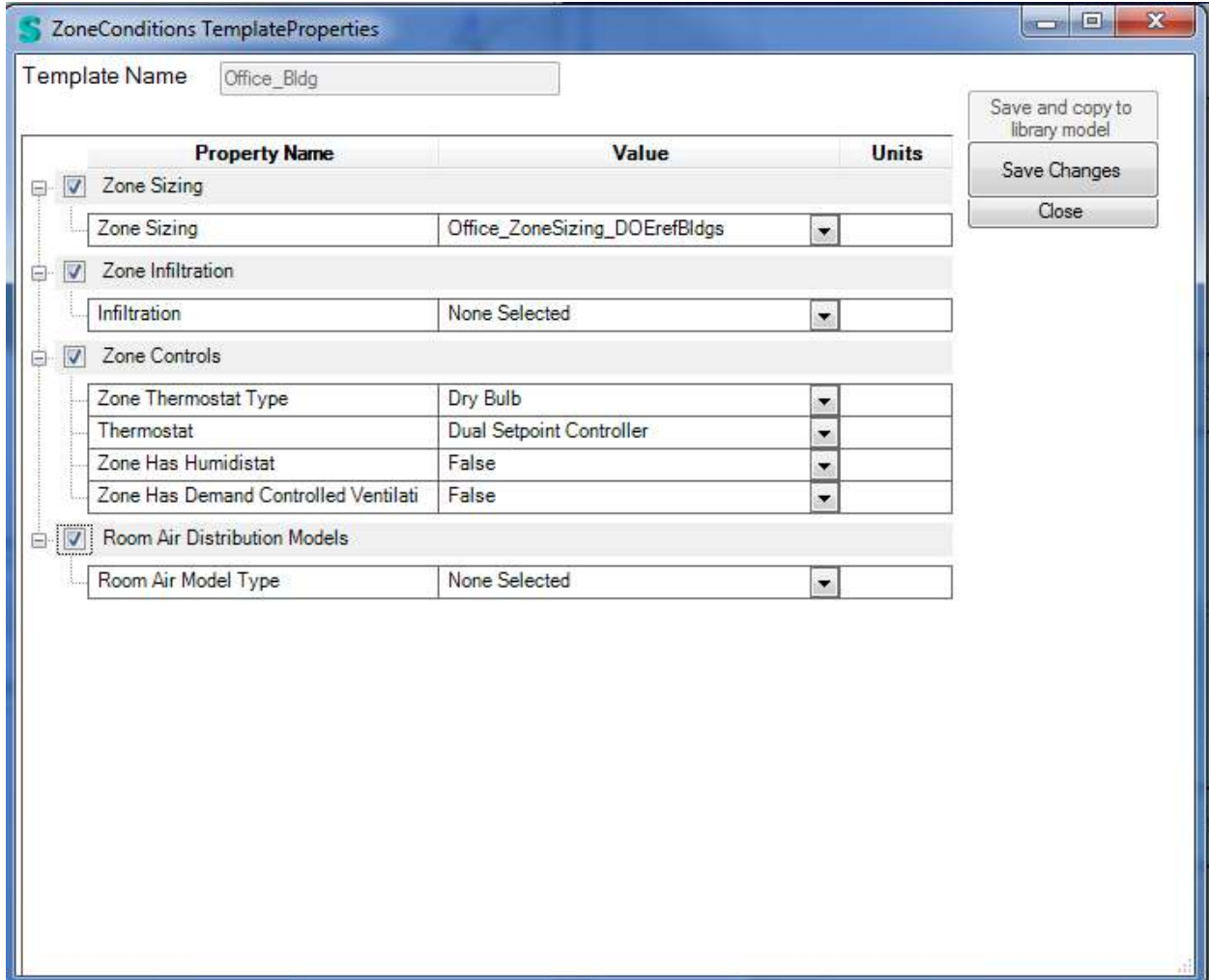
Template Name: OfficeBldg_90-1-2007

Save and copy to library model
Save Changes
Close

Property Name	Value	Units
Equipment		
Electrical Equipment Load [1-5]		
Electrical Equipment Load 1	OfficeBldg_Equip_COMNET	▼
Electrical Equipment Load 2	None Selected	▼
Electrical Equipment Load 3	None Selected	▼
Electrical Equipment Load 4	None Selected	▼
Electrical Equipment Load 5	None Selected	▼
Gas Equipment Load [1-5]		
Gas Equipment Load 1	None Selected	▼
Gas Equipment Load 2	None Selected	▼
Gas Equipment Load 3	None Selected	▼
Gas Equipment Load 4	None Selected	▼
Gas Equipment Load 5	None Selected	▼
Hot Water Equipment Load [1-5]		
Hot Water Equipment Load 1	OfficeBldg_SHW_ASHRAE 90-1-2007	▼
Hot Water Equipment Load 2	None Selected	▼
Hot Water Equipment Load 3	None Selected	▼
Hot Water Equipment Load 4	None Selected	▼
Hot Water Equipment Load 5	None Selected	▼
Steam Equipment Load [1-5]		
Steam Equipment Load 1	None Selected	▼
Steam Equipment Load 2	None Selected	▼
Steam Equipment Load 3	None Selected	▼
Steam Equipment Load 4	None Selected	▼
Steam Equipment Load 5	None Selected	▼
Other Equipment Load [1-5]		
Other Equipment Load 1	None Selected	▼
Other Equipment Load 2	None Selected	▼
Other Equipment Load 3	None Selected	▼
Other Equipment Load 4	None Selected	▼
Other Equipment Load 5	None Selected	▼
People		
People Load [1-5]		
People Load 1	OfficeBldg_Occup_COMNET	▼
People Load 2	None Selected	▼
People Load 3	None Selected	▼
People Load 4	None Selected	▼
People Load 5	None Selected	▼
Lighting		
Lighting Load [1-5]		
Lighting Load 1	OfficeBldg_Ltg_90-1-2007	▼
Lighting Load 2	None Selected	▼
Lighting Load 3	None Selected	▼
Lighting Load 4	None Selected	▼
Lighting Load 5	None Selected	▼

Zone Conditions

Office Bldg



Zone HVAC Groups

ASHRAE-AT VAV ReH-Wtr TC

Air Loops

VAV_wtrC_wtrH

Chilled Water Loops

Chl(2)_VC_Elec_VSD(2)

Condenser Water Loops

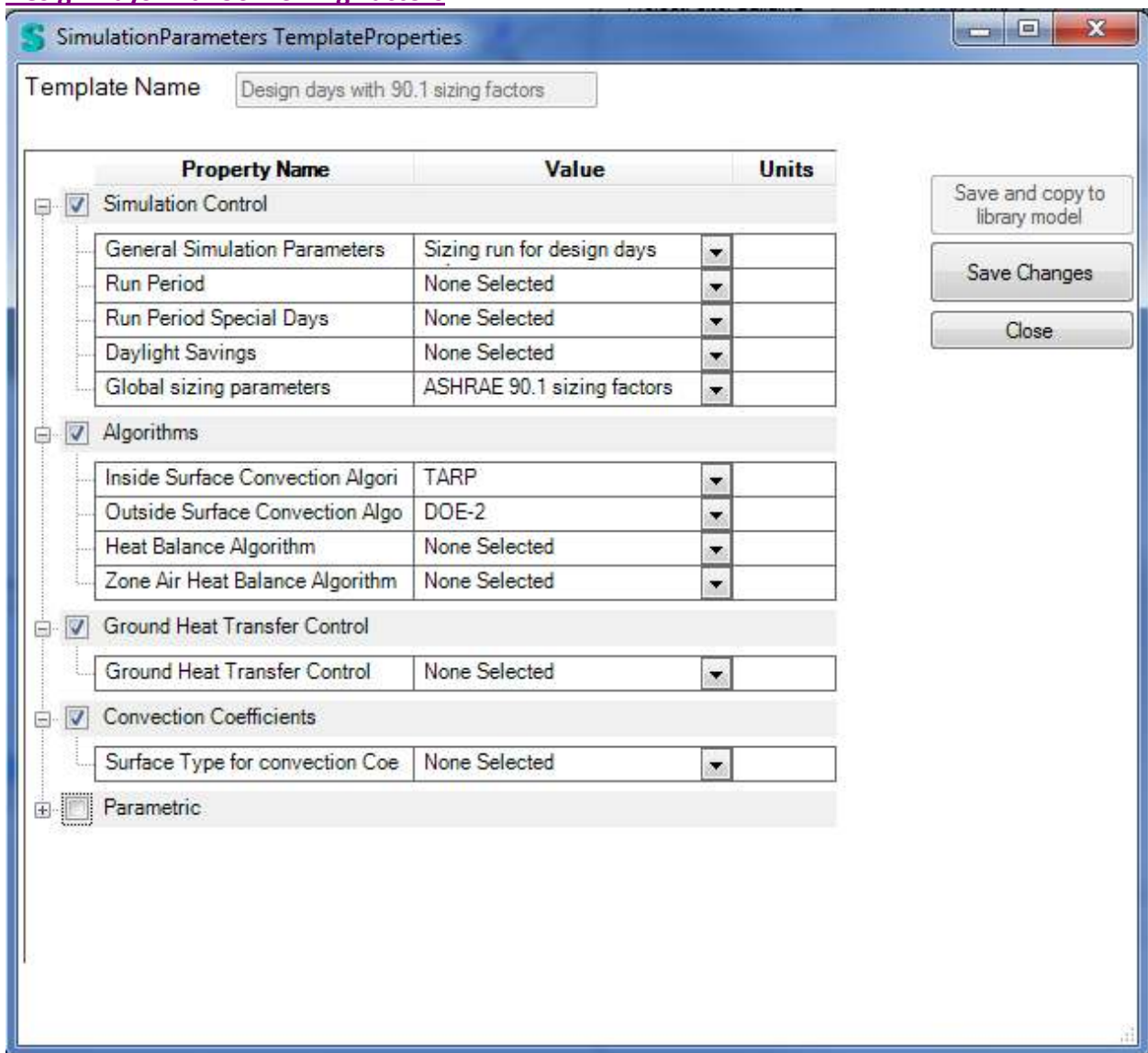
CoolTwr(2) 2SP_CSD(2)

Hot Water Loops

Boil(2) HW_VSD

Simulation Parameters

Design Days with 90.1 Sizing Factors



Run Full 2013 with sizing and 90.1 Sizing Factors

SimulationParameters TemplateProperties

Template Name: Run full 2013 with sizing and 90.1 sizing f

Property Name	Value	Units
Simulation Control		
General Simulation Parameters	Sizing runs including run	
Run Period	Annual run for 2013	
Run Period Special Days	None Selected	
Daylight Savings	None Selected	
Global sizing parameters	ASHRAE 90.1 sizing factors	
Algorithms		
Inside Surface Convection Algori	TARP	
Outside Surface Convection Algo	DOE-2	
Heat Balance Algorithm	None Selected	
Zone Air Heat Balance Algorithm	None Selected	
Ground Heat Transfer Control		
Ground Heat Transfer Control	None Selected	
Convection Coefficients		
Surface Type for convection Coe	None Selected	
Parametric		

Buttons: Save and copy to library model, Save Changes, Close

Output Request Sets

Smpl_OutputRequest

SimClass	SimType	SimSubType	Value
SimObjectOutputRe	Location	Default	Smpl_Environment1
SimObjectOutputRe	Plenum	Default	Smpl_Window1
SimObjectOutputRe	Chiller	ChillerVaporCompr	Smpl_Chiller1
SimObjectOutputRe	HvacMixedWater	FullSystem	Smpl_PlantLoopDemand1
SimObjectOutputRe	ThermalZone	Default	Smpl_ZoneCoolingHeating1
SimObjectOutputRe	Boiler	BoilerHotWater	Smpl_Boiler1
SimObjectOutputRe	BuildingSite	Default	Smpl_ElectricEnduse1
SimObjectOutputRe	HvacAir	FullSystem	Smpl_AirLoop1
SimObjectOutputRe	CoolingCoilDX	CoilAirCoolingDXT	Smpl_DXCooling1
SimObjectOutputRe	People	Default	Smpl_InternalLoad1
SimObjectOutputRe	Chiller	ChillerVaporCompr	ChillerElectricEIR

ASHRAE System 7 Libraries

The following provides a property level image for each of the library entries that have been included with ASHRAE Baseline System 7 Sample File.

Locations

USA MN Minneapolis St Paul Intl Arp

Workspace = Libraries>Locations

Type = Location

Sub Type = Default

Note: To access this Library Entry the Source Library needs to be changed to Project Model.

Locations			
	Property	Value	Unit
<input checked="" type="checkbox"/>	Site:Location0		
	Latitude	44.9	deg
	Longitude	-93.2	deg
	Time Zone	-6	sec
	Elevation	833.33	ft
<input type="checkbox"/>	Site:HeightVariation1		
<input type="checkbox"/>	Site:GroundTemperature:BuildingSurface2		
<input type="checkbox"/>	Site:GroundTemperature:FCfactorMethod3		
<input type="checkbox"/>	Site:GroundTemperature:Shallow4		
<input type="checkbox"/>	Site:GroundTemperature:Deep5		
<input type="checkbox"/>	Site:GroundReflectance6		
<input type="checkbox"/>	Site:GroundReflectance:SnowModifier7		
<input type="checkbox"/>	Site:WaterMainsTemperature8		
<input type="checkbox"/>	Site:Precipitation9		

Weather

Minneapolis St Paul Intl Arp Ann Clg 1% Condns DB=>MWB

Workspace = Libraries>Weather

Type = Design Day

Sub Type = Default

Note: To access this Library Entry the Source Library needs to be changed to Project Model.

Weather

Property	Value	Unit
[-] <input checked="" type="checkbox"/> SizingPeriod:DesignDay0		
Month	7	
Day of Month	21	
Day Type	SummerDesignDay	
Maximum Dry-Bulb Temperature	87.8	F
Daily Dry-Bulb Temperature Range	17.8	deltaF
Dry-Bulb Temperature Range Modifier Type	DefaultMultipliers	
Dry-Bulb Temperature Range Modifier Schedule		
Humidity Condition Type	WetBulb	
Wetbulb or DewPoint at Maximum Dry-Bulb	72.3	F
Humidity Condition Day Schedule Name		
Humidity Ratio at Maximum Dry-Bulb		lb-H2O/lb-air
Enthalpy at Maximum Dry-Bulb		Btu/lb
Daily Wet-Bulb Temperature Range		deltaF
Barometric Pressure	29.03	inHg
Wind Speed	13.42	miles/hr
Wind Direction	180	deg
Rain Indicator	No	
Snow Indicator	No	
Daylight Saving Time Indicator	No	
Solar Model Indicator	ASHRAEClearSky	
Beam Solar Day Schedule Name		
Diffuse Solar Day Schedule Name		
ASHRAE Clear Sky Optical Depth for Beam Irrad	0	
ASHRAE Clear Sky Optical Depth for Diffuse Irra	0	
Sky Clearness	1	

Minneapolis St Paul Intl Arp Ann Htg 99% Condns DB

Workspace = Libraries>Weather

Type = Design Day

Sub Type = Default

Note: To access this Library Entry the Source Library needs to be changed to Project Model.

Weather

Property	Value	Unit
[-] SizingPeriod:DesignDay0		
Month	1	
Day of Month	21	
Day Type	WinterDesignDay	
Maximum Dry-Bulb Temperature	-7.6	F
Daily Dry-Bulb Temperature Range	0	deltaF
Dry-Bulb Temperature Range Modifier Type	DefaultMultipliers	
Dry-Bulb Temperature Range Modifier Schedule		
Humidity Condition Type	WetBulb	
Wetbulb or DewPoint at Maximum Dry-Bulb	-7.6	F
Humidity Condition Day Schedule Name		
Humidity Ratio at Maximum Dry-Bulb		lb-H2O/lb-air
Enthalpy at Maximum Dry-Bulb		Btu/lb
Daily Wet-Bulb Temperature Range		deltaF
Barometric Pressure	29.03	inHg
Wind Speed	8.5	miles/hr
Wind Direction	300	deg
Rain Indicator	No	
Snow Indicator	No	
Daylight Saving Time Indicator	No	
Solar Model Indicator	ASHRAEClearSky	
Beam Solar Day Schedule Name		
Diffuse Solar Day Schedule Name		
ASHRAE Clear Sky Optical Depth for Beam Irradiance	0	
ASHRAE Clear Sky Optical Depth for Diffuse Irradiance	0	
Sky Clearness	0	

Mat'/Glaz Layer Sets

Wall-90.1-2007_nonRes CZ4-8

Workspace = Libraries>Mat'/Glaz Layer Sets

Type = OpaqueLayerSet

Sub Type = Default

Mat'l/Glaz Layer Sets

Property	Value	Unit
Construction0		
Outside Layer	Metal surface-1.5mm	
Layer [2-10]		
Layer 2	Insul_Wall-c.i_90.1-2007 nonRes_CZ4to8	
Layer 3	Insul_Wall-stud_90.1-2007 nonRes_CZ4-8	
Layer 4	Gypsum or plaster board-0.5in	
Layer 5		
Layer 6		
Layer 7		
Layer 8		
Layer 9		
Layer 10		

Floor 90.1-2007 nonRes CZ4-7

Workspace = Libraries>Mat'l/Glaz Layer Sets

Type = OpaqueLayerSet

Sub Type = Default

Mat'l/Glaz Layer Sets

Property	Value	Unit
Construction0		
Outside Layer	Metal surface-1.5mm	
Layer [2-10]		
Layer 2	Insul_Floor_90.1-2007 nonRes_CZ4-7	
Layer 3	Concrete Floor (generic)- 4" / 102mm	
Layer 4		
Layer 5		
Layer 6		
Layer 7		
Layer 8		
Layer 9		
Layer 10		

Floor-Int 4"Concrete

Workspace = Libraries>Mat'l/Glaz Layer Sets

Type = OpaqueLayerSet

Sub Type = Default

Mat'l/Glaz Layer Sets

Property	Value	Unit
Construction0		
Outside Layer	CarpetPad_ 1/4"(6mm)	
Layer [2-10]		
Layer 2	Concrete Floor (generic)- 4" / 102mm	
Layer 3		
Layer 4		
Layer 5		
Layer 6		
Layer 7		
Layer 8		
Layer 9		
Layer 10		

Roof 90.1-2007 nonRes CZ2-8

Workspace = Libraries>Mat'l/Glaz Layer Sets

Type = OpaqueLayerSet

Sub Type = Default

Mat'l/Glaz Layer Sets

Property	Value	Unit
Construction0		
Outside Layer	Built-up Roofing - .375" / 9mm	
Layer [2-10]		
Layer 2	Insul_Roof c.i._90.1-2007 ALL_CZ1-8	
Layer 3	Insul_Roof_90.1-2007 nonRes_CZ2-8	
Layer 4	Metal surface-1.5mm	
Layer 5		
Layer 6		
Layer 7		
Layer 8		
Layer 9		
Layer 10		

Wall-Int MtIStudGyp-4" / 100mm

Workspace = Libraries>Mat'l/Glaz Layer Sets

Type = OpaqueLayerSet

Sub Type = Default

Mat'/Glaz Layer Sets

Property	Value	Unit
Construction0		
Outside Layer	INT-FINISH_GypsumWallBoard_1/2"(12.5 mm)	
Layer [2-10]		
Layer 2	AIRGAP_WallAirSpace_1"(25mm)	
Layer 3	INT-FINISH_GypsumWallBoard_1/2"(12.5 mm)	
Layer 4		
Layer 5		
Layer 6		
Layer 7		
Layer 8		
Layer 9		
Layer 10		

Glaz-Window ASHRAE 90.1 nonRes&Res CZ4-6

Workspace = Libraries>Mat'/Glaz Layer Sets

Type = GlazLayerSet

Sub Type = Default

Mat'/Glaz Layer Sets

Property	Value	Unit
Construction0		
Outside Layer	VERT-GLAZ_90.1_US_CZ-4_NonMetalFrame(U-2.27)	
Layer [2-10]		
Layer 2		
Layer 3		
Layer 4		
Layer 5		
Layer 6		
Layer 7		
Layer 8		
Layer 9		
Layer 10		

Mat'/Glaz Layers

Metal surface-1.5mm

Workspace = Libraries>Mat'/Glazing Layers ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'/Glazing Layers

Property	Value	Unit
MaterialLayer:Opaque0		
Material Name	F08 Metal surface	
Layer Thickness	0.06	in

Insul Wall-ci 90.1-2007 nonRes CZ4to8

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'l/Glazing Layers		
Property	Value	Unit
MaterialLayer:Opaque0		
Material Name	INSUL_InsulationBoard	
Layer Thickness	1.57	in

Insul Wall-stud 90.1-2007 nonRes CZ4-8

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'l/Glazing Layers		
Property	Value	Unit
MaterialLayer:Opaque0		
Material Name	INSUL_Batt_GlassFiber	
Layer Thickness	1.7	in

Gypsum or plaster board-0.5in

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'l/Glazing Layers		
Property	Value	Unit
MaterialLayer:Opaque0		
Material Name	Gypsum or plaster board	
Layer Thickness	0.5	in

Insul Floor 90.1-2007 nonRes CZ4-7

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'l/Glazing Layers		
Property	Value	Unit
MaterialLayer:Opaque0		
Material Name	INSUL_RoofInsulation	
Layer Thickness	8.9	in

Concrete Floor (generic)- 4" / 102mm

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'l/Glazing Layers		
Property	Value	Unit
MaterialLayer:Opaque0		
Material Name	Concrete (generic)	
Layer Thickness	4	in

CarpetPad 1/4"(6mm)

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'l/Glazing Layers		
Property	Value	Unit
MaterialLayer:Opaque0		
Material Name	CarpetPad	
Layer Thickness	0.25	in

Built-up Roofing - .375" / 9mm

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'l/Glazing Layers		
Property	Value	Unit
MaterialLayer:Opaque0		
Material Name	Built-up Roofing	
Layer Thickness	0.37	in

Insul Roof c.i. 90.1-2007 ALL CZ1-8

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'l/Glazing Layers		
Property	Value	Unit
MaterialLayer:Opaque0		
Material Name	INSUL_InsulationBoard	
Layer Thickness	0.8	in

Insul Roof 90.1-2007 nonRes CZ2-8

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'l/Glazing Layers			
	Property	Value	Unit
<input checked="" type="checkbox"/>	MaterialLayer:Opaque0		
	Material Name	INSUL_RoofInsulation	
	Layer Thickness	5.62	in

INT-FINISH GypsumWallBoard 1/2"(12.5 mm)

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'l/Glazing Layers			
	Property	Value	Unit
<input checked="" type="checkbox"/>	MaterialLayer:Opaque0		
	Material Name	INT-FINISH_GypsumBoard	
	Layer Thickness	0	in

AIRGAP WallAirSpace 1"(25mm)

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material Layer

Sub Type = Default

Mat'l/Glazing Layers			
	Property	Value	Unit
<input checked="" type="checkbox"/>	MaterialLayer:Opaque0		
	Material Name	AIRGAP_WallAirSpace	
	Layer Thickness	1	in

VERT-GLAZ 90.1 US CZ-4 NonMetalFrame(U-2.27)

Workspace = Libraries>Mat'l/Glazing Layers ([back to Mat'l/Glazing Layer Sets](#))

Type = Glazing Material Layer

Sub Type = Default

Mat'l/Glazing Layers			
	Property	Value	Unit
<input checked="" type="checkbox"/>	MaterialLayer:Glazing0		
	Material Name	Glaz-OtherMetal_90.1-2007_NonRes&res_CZ4to6	
	Layer Thickness	0	in

Materials

F08 Metal surface

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = Default

Materials

Property	Value	Unit
Material0		
Roughness	Smooth	
Conductivity	314.01	Btu-in/h-ft ² -F
Density	488.44	lb/ft ³
Specific Heat	0.12	Btu/lb-F
Thermal Absorptance	0.9	
Solar Absorptance	0.7	
Visible Absorptance	0.7	

INSUL InsulationBoard

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = Default

Materials

Property	Value	Unit
Material0		
Roughness	MediumRough	
Conductivity	0.21	Btu-in/h-ft ² -F
Density	2.68	lb/ft ³
Specific Heat	0.29	Btu/lb-F
Thermal Absorptance	0.9	
Solar Absorptance	0.7	
Visible Absorptance	0.7	

INSUL Batt GlassFiber

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = Default

Materials

Property	Value	Unit
Material0		
Roughness	MediumRough	
Conductivity	0.25	Btu-in/h-ft2-F
Density	1.2	lb/ft3
Specific Heat	0.23	Btu/lb-F
Thermal Absorptance	0.9	
Solar Absorptance	0.5	
Visible Absorptance	0.5	

Gypsum or plaster board

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = Default

Materials

Property	Value	Unit
Material0		
Roughness	MediumSmooth	
Conductivity	4.02	Btu-in/h-ft2-F
Density	49.94	lb/ft3
Specific Heat	0.26	Btu/lb-F
Thermal Absorptance	0.9	
Solar Absorptance	0.7	
Visible Absorptance	0.7	

INSUL RoofInsulation

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = Default

Materials

Property	Value	Unit
Material0		
Roughness	MediumRough	
Conductivity	0.36	Btu-in/h-ft2-F
Density	16	lb/ft3
Specific Heat	0.2	Btu/lb-F
Thermal Absorptance	0.9	
Solar Absorptance	0.7	
Visible Absorptance	0.7	

Concrete (generic)

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = Default

Materials

Property	Value	Unit
Material0		
Roughness	MediumRough	
Conductivity	10.06	Btu-in/h-ft2-F
Density	129.85	lb/ft3
Specific Heat	0.22	Btu/lb-F
Thermal Absorptance	0.9	
Solar Absorptance	0.7	
Visible Absorptance	0.7	

Carpet Pad

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = No Mass

Materials

Property	Value	Unit
Material:NoMass0		
Roughness	VeryRough	
Thermal Absorptance	0.9	
Solar Absorptance	0.7	
Visible Absorptance	0.8	
R-value per Unit Thickness	1	ft2-h-F/Btu-in

Built-up Roofing

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = Default

Materials

Property	Value	Unit
Material0		
Roughness	VeryRough	
Conductivity	1.08	Btu-in/h-ft2-F
Density	70	lb/ft3
Specific Heat	0.33	Btu/lb-F
Thermal Absorptance	0.9	
Solar Absorptance	0.7	
Visible Absorptance	0.7	

INSUL InsulationBoard

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = Default

Materials			
	Property	Value	Unit
<input checked="" type="checkbox"/>	Material0		
	Roughness	MediumRough	
	Conductivity	0.21	Btu-in/h-ft2-F
	Density	2.68	lb/ft3
	Specific Heat	0.29	Btu/lb-F
	Thermal Absorptance	0.9	
	Solar Absorptance	0.7	
	Visible Absorptance	0.7	

INSUL RoofInsulation

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = Default

Materials			
	Property	Value	Unit
<input checked="" type="checkbox"/>	Material0		
	Roughness	MediumRough	
	Conductivity	0.36	Btu-in/h-ft2-F
	Density	16	lb/ft3
	Specific Heat	0.2	Btu/lb-F
	Thermal Absorptance	0.9	
	Solar Absorptance	0.7	
	Visible Absorptance	0.7	

INT-FINISH GypsumBoard

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = Default

Materials			
	Property	Value	Unit
<input checked="" type="checkbox"/>	Material0		
	Roughness	MediumSmooth	
	Conductivity	1.08	Btu-in/h-ft2-F
	Density	49.94	lb/ft3
	Specific Heat	0.2	Btu/lb-F
	Thermal Absorptance	0.9	
	Solar Absorptance	0.7	
	Visible Absorptance	0.7	

AIRGAP WallAirSpace

Workspace = Libraries>Materials ([back to Mat'/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = AirGap

Materials			
	Property	Value	Unit
[-] <input checked="" type="checkbox"/>	Material:AirGap0		
	Thermal Resistance	0.85	ft2-F-hr/Btu

Glaz-OtherMetal 90.1-2007 NonRes&res CZ4to6

Workspace = Libraries>Materials ([back to Mat'l/Glazing Layer Sets](#))

Type = Opaque Material

Sub Type = AirGap

Materials			
	Property	Value	Unit
[-] <input checked="" type="checkbox"/>	WindowMaterial:SimpleGlazingSystem0		
	U-Factor	0.55	Btu/h-ft2-F
	Solar Heat Gain Coefficient	0.4	
	Visible Transmittance		

Internal Loads

OfficeBldg Equip COMNET

Workspace = Libraries>Internal Loads

Type = Equipment

Sub Type = Electric

Internal Loads			
	Property	Value	Unit
[-] <input checked="" type="checkbox"/>	ElectricEquipment0		
	Schedule Name	ASHRAE 90.1 Office_Ltg&PlugLoads_2013	
	Design Level Calculation Method	Watts/Area	
	Design Level		W
	Watts per Zone Floor Area	0.8	W/ft2
	Watts per Person		W/person
	Fraction Latent	0	
	Fraction Radiant	0.5	
	Fraction Lost	0	
	End-Use Subcategory	General	

OfficeBldg SHW ASHRAE 90-1-2007

Workspace = Libraries>Internal Loads

Type = Equipment

Sub Type = Hot Water

Internal Loads		
Property	Value	Unit
HotWaterEquipment0		
Schedule Name	ASHRAE 90.1 Office_ServiceHotWater_2013	
Design Level Calculation Method	Watts/Person	
Design Level		Btu/h
Power per Zone Floor Area		Btu/h-ft2
Watts per Person	106	Btu/h-person
Fraction Latent	0.2	
Fraction Radiant	0.1	
Fraction Lost	0.5	
End-Use Subcategory	General	

OfficeBldg Occup COMNET

Workspace = Libraries>Internal Loads

Type = People

Sub Type = Default

Internal Loads		
Property	Value	Unit
People0		
Number of People Schedule Name	ASHRAE 90.1 Office_People_2013	
Number of People Calculation Method	Area/Person	
Number of People		
People per Zone Floor Area		person/ft2
Zone Floor Area per Person	149.96	ft2/person
Fraction Radiant	0.3	
Sensible Heat Fraction A/C	0.55	
Activity Level Schedule Name	Office_ActivityLevel_ASHRAE_2013	
Carbon Dioxide Generation Rate	0	ft3-h/min-Btu
Enable ASHRAE 55 Comfort Warnings	No	
Mean Radiant Temperature Calculation Type	ZoneAveraged	
Work Efficiency Schedule Name		
Clothing Insulation Schedule Name		
Air Velocity Schedule Name		
Thermal Comfort Model [1-5] Type		

OfficeBldg Ltg 90-1-2007

Workspace = Libraries>Internal Loads

Type = Lights

Sub Type = Default

Internal Loads

Property	Value	Unit
Lights0		
Schedule Name	ASHRAE 90.1 Office_Ltg&PlugLoads_2013	
Design Level Calculation Method	Watts/Area	
Lighting Level		W
Watts per Zone Floor Area	1	W/ft2
Watts per Person		W/person
Return Air Fraction	0	
Fraction Radiant	0.42	
Fraction Visible	0.18	
Fraction Replaceable	1	
End-Use Subcategory	General	
Return Air Fraction Calculated from Plenum Temperature	No	
Return Air Fraction Function of Plenum Temperature Coeffici	0	
Return Air Fraction Function of Plenum Temperature Coeffici	0	1/R

Sizing Params

ASHRAE 90.1 sizing factors

Workspace = Libraries>Sim Params

Type = Simulation Control

Sub Type = Default

Sizing Params

Property	Value	Unit
Sizing:Parameters0		
Heating Sizing Factor	1.25	
Cooling Sizing Factor	1.15	
Timesteps in Averaging Window		

Office ZoneSizing DOErefBldgs

Workspace = Libraries>Sizing Params

Type = HVAC Design

Sub Type = ZoneSizing

Sizing Params

Property	Value	Unit
Sizing:Zone0		
Zone Cooling Design Supply Air Temperature Input Method		
Zone Cooling Design Supply Air Temperature	55	F
Zone Cooling Design Supply Air Temperature Difference		deltaF
Zone Heating Design Supply Air Temperature Input Method		
Zone Heating Design Supply Air Temperature	100	F
Zone Heating Design Supply Air Temperature Difference		deltaF
Zone Cooling Design Supply Air Humidity Ratio	0.01	lb-H2O/lb-air
Zone Heating Design Supply Air Humidity Ratio	0.01	lb-H2O/lb-air
Design Specification Outdoor Air Object Name	Office_OASpec_62-1-2007	
Zone Heating Sizing Factor		
Zone Cooling Sizing Factor		
Cooling Design Air Flow Method	DesignDay	
Cooling Design Air Flow Rate	0	cfm
Cooling Minimum Air Flow per Zone Floor Area	0	cfm/ft2
Cooling Minimum Air Flow	0	cfm
Cooling Minimum Air Flow Fraction	0	
Heating Design Air Flow Method	DesignDay	
Heating Design Air Flow Rate	0	cfm
Heating Maximum Air Flow per Zone Floor Area	0	cfm/ft2
Heating Maximum Air Flow	0	cfm
Heating Maximum Air Flow Fraction	0	
Design Specification Zone Air Distribution Object Name		

CHWS-44F dt-12F

Workspace = Libraries>Sizing Params

Type = HVAC Design

Sub Type = Water Loop Sizing

EnergyPlus Object = SizingPlant

Sizing Params

Property	Value	Unit
Sizing:Plant0		
Loop Type	Cooling	
Design Loop Exit Temperature	44	F
Loop Design Temperature Difference	12	deltaF

CWS-85F dt-10F

Workspace = Libraries>Sizing Params

Type = HVAC Design

Sub Type = Water Loop Sizing

EnergyPlus Object = SizingPlant

Sizing Params

Property	Value	Unit
Sizing:Plant0		
Loop Type	Condenser	
Design Loop Exit Temperature	85	F
Loop Design Temperature Difference	10	deltaF

HWS-180F dT-50F

Workspace = Libraries>Sizing Params

Type = HVAC Design

Sub Type = Water Loop Sizing

EnergyPlus Object = SizingPlant

Sizing Params			
	Property	Value	Unit
[-]	Sizing:Plant0		
	Loop Type	Heating	
	Design Loop Exit Temperature	180	F
	Loop Design Temperature Difference	50	deltaF

Controllers

Dual Setpoint Controller

Workspace = Libraries>Controllers

Type = ZoneControlTemperature

Sub Type = Thermostat

Controllers			
	Property	Value	Unit
[-]	ZoneControl:Thermostat0		
	Control Type Schedule Name	ZoneControlTypeSched	
[-]	Control [1-4] Name		
	Control Name1	Thermostat-Dual Setpoint Scheduled	
	Control Name2		
	Control Name3		
	Control Name4		
[-]	ZoneControl:Thermostat:OperativeTemperature1		
	Radiative Fraction Input Mode		
	Fixed Radiative Fraction		
	Radiative Fraction Schedule Name		
[-]	ZoneControl:Thermostat:TemperatureAndHumidity2		
	Dehumidifying Relative Humidity Setpoint Schedule Name		
	Dehumidification Control Type		
	Overcool Range Input Method		
	Overcool Constant Range	3.1	deltaF
	Overcool Range Schedule Name		
	Overcool Control Ratio	2	percent/F

Sim Params

Sizing Run for Design Day Only

Workspace = Libraries>Sim Params

Type = Simulation Control

Sub Type = Default

Sim Params			
	Property	Value	Unit
<input checked="" type="checkbox"/>	SimulationControl0		
	Do Zone Sizing Calculation	Yes	▼
	Do System Sizing Calculation	Yes	▼
	Do Plant Sizing Calculation	Yes	▼
	Run Simulation for Sizing Periods	Yes	▼
	Run Simulation for Weather File Run Periods	No	▼
<input checked="" type="checkbox"/>	Version1		
	Version Identifier	7.2	
<input checked="" type="checkbox"/>	ShadowCalculation2		
	Calculation Frequency	20	
	Maximum Figures in Shadow Overlap Calculations	15000	
	Polygon Clipping Algorithm		▼
	Sky Diffuse Modeling Algorithm		▼
<input type="checkbox"/>	ZoneCapacitanceMultiplier:ResearchSpecial3		
<input type="checkbox"/>	ZoneAirContaminantBalance4		
<input checked="" type="checkbox"/>	Timestep5		
	Number of Timesteps per Hour	6	
<input checked="" type="checkbox"/>	ConvergenceLimits6		
	Minimum System Timestep		sec
	Maximum HVAC Iterations	20	
	Minimum Plant Iterations	2	
	Maximum Plant Iterations	8	
<input type="checkbox"/>	ProgramControl7		

Sizing Runs Including Period

Workspace = Libraries>Sizing Params

Type = Simulation Control

Sub Type = Default

Sim Params

Property		Value
<input checked="" type="checkbox"/> SimulationControl0		
Do Zone Sizing Calculation	Yes	▼
Do System Sizing Calculation	Yes	▼
Do Plant Sizing Calculation	Yes	▼
Run Simulation for Sizing Periods	Yes	▼
Run Simulation for Weather File Run Periods	Yes	▼
<input checked="" type="checkbox"/> Version1		
Version Identifier	7.2	
<input type="checkbox"/> ShadowCalculation2		
<input type="checkbox"/> ZoneCapacitanceMultiplier:ResearchSpecial3		
<input type="checkbox"/> ZoneAirContaminantBalance4		
<input checked="" type="checkbox"/> Timestep5		
Number of Timesteps per Hour	6	
<input type="checkbox"/> ConvergenceLimits6		
<input type="checkbox"/> ProgramControl7		

Annual Run for 2013

Workspace = Libraries>Sizing Params

Type = Simulation Control

Sub Type = Run Period

Sim Params

Property		Value
<input checked="" type="checkbox"/> RunPeriod0		
Begin Month	1	
Begin Day of Month	1	
End Month	12	
End Day of Month	31	
Day of Week for Start Day	Tuesday	▼
Use Weather File Holidays and Special Days	Yes	▼
Use Weather File Daylight Saving Period	Yes	▼
Apply Weekend Holiday Rule	No	▼
Use Weather File Rain Indicators	Yes	▼
Use Weather File Snow Indicators	Yes	▼
Number of Times Runperiod to be Repeated	1	
Increment Day of Week on repeat	Yes	▼
Start Year	2013	

Control Schemes

Scheme CoolingLoad UpTo 1GW

Workspace = Libraries>Control Schemes

Type = Control and Sequencing Scheme

Sub Type = Cooling Load

EnergyPlus Objet = PlantEquipmentOperation:CoolingLoad

Control Schemes		
Property	Value	Unit
PlantEquipmentOperation:CoolingLoad0		
Load Range [1-10] Lower Limit	0	Btu/h
Load Range [1-10] Upper Limit	3412000000	Btu/h

Scheme HeatingLoad UpTo 1GW

Workspace = Libraries>Control Schemes

Type = Control and Sequencing Scheme

Sub Type = Cooling Load

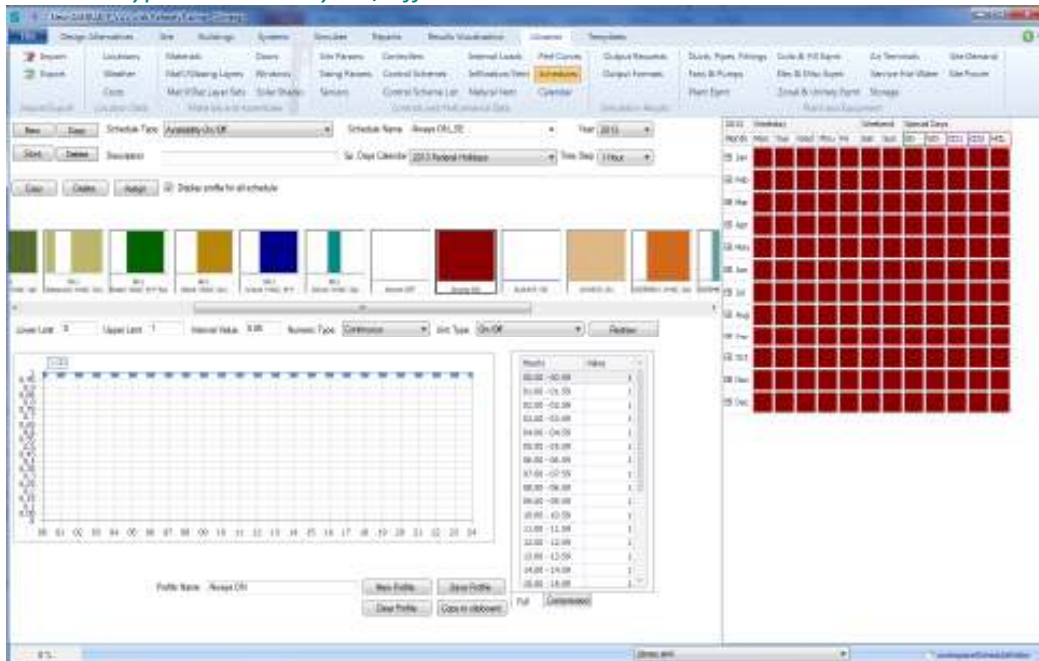
EnergyPlus Objet = PlantEquipmentOperation:HeatingLoad

Control Schemes		
Property	Value	Unit
PlantEquipmentOperation:HeatingLoad0		
Load Range [1-10] Lower Limit	0	Btu/h
Load Range [1-10] Upper Limit	3412000000	Btu/h

Schedules

AlwaysON_SE

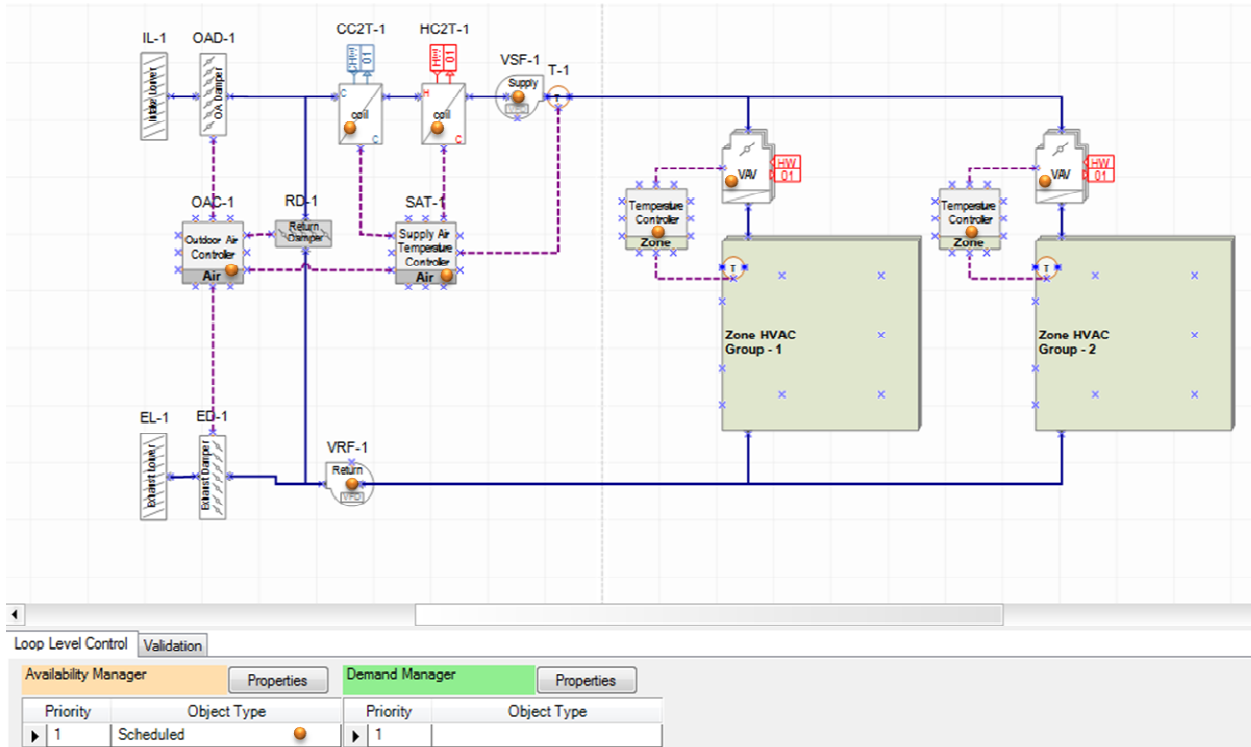
Schedule Type = Availability On/Off



Air Loop System Diagram

The Air Loop Diagram is interactive diagram. Selecting the components with the orange dot will display a pop-up dialog containing the component properties as displayed within the ASHRAE Baseline System 7 Sample File. The other components do not contain properties that influence Simergy simulations.

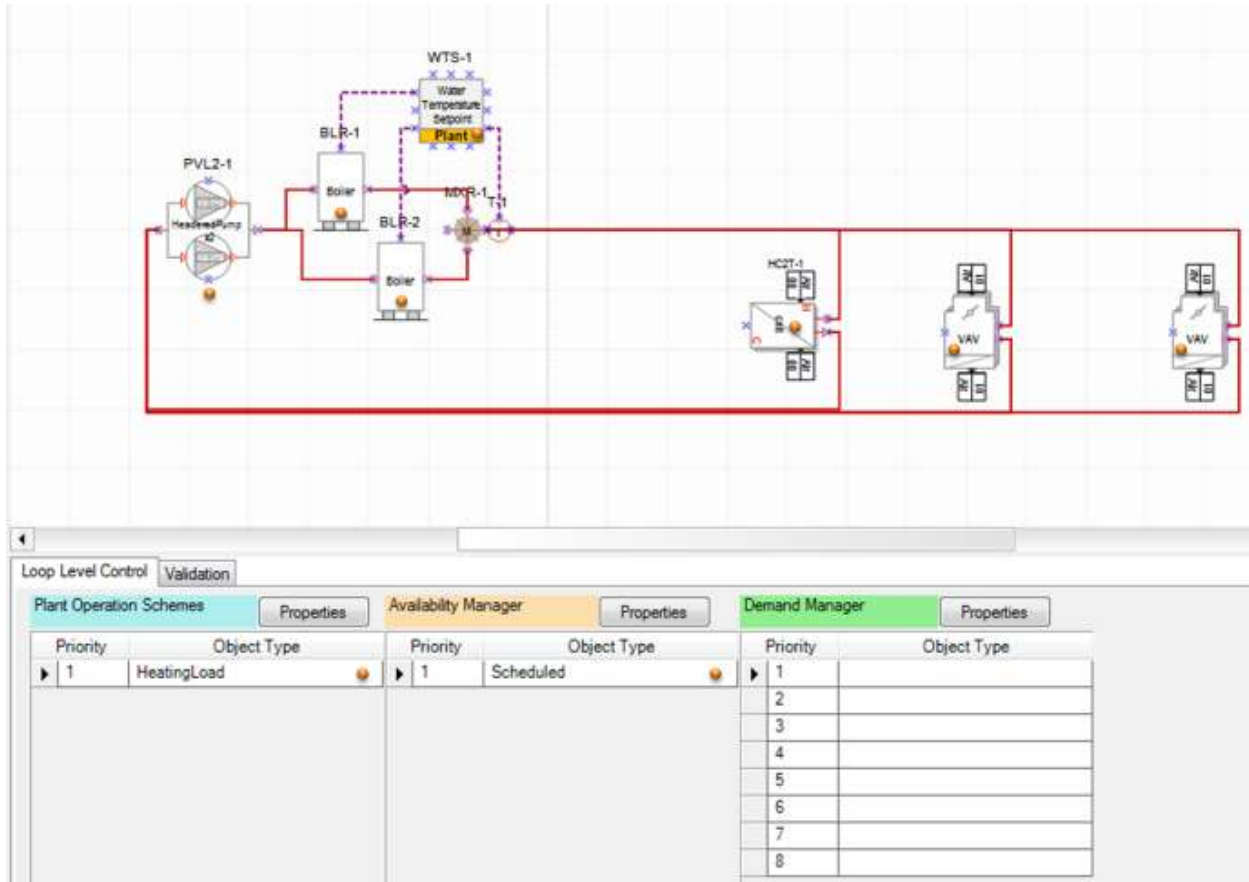
Related Topics: [Air Loop Template](#)



Hot Water Loop System Diagram

The Hot Water Loop Diagram is interactive diagram. Selecting the components with the orange dot will display a pop-up dialog containing the component properties as displayed within the ASHRAE Baseline System 7 Sample File. The other components do not contain properties that influence Simergy simulations.

Related Topics: [Hot Water Loop Template](#)



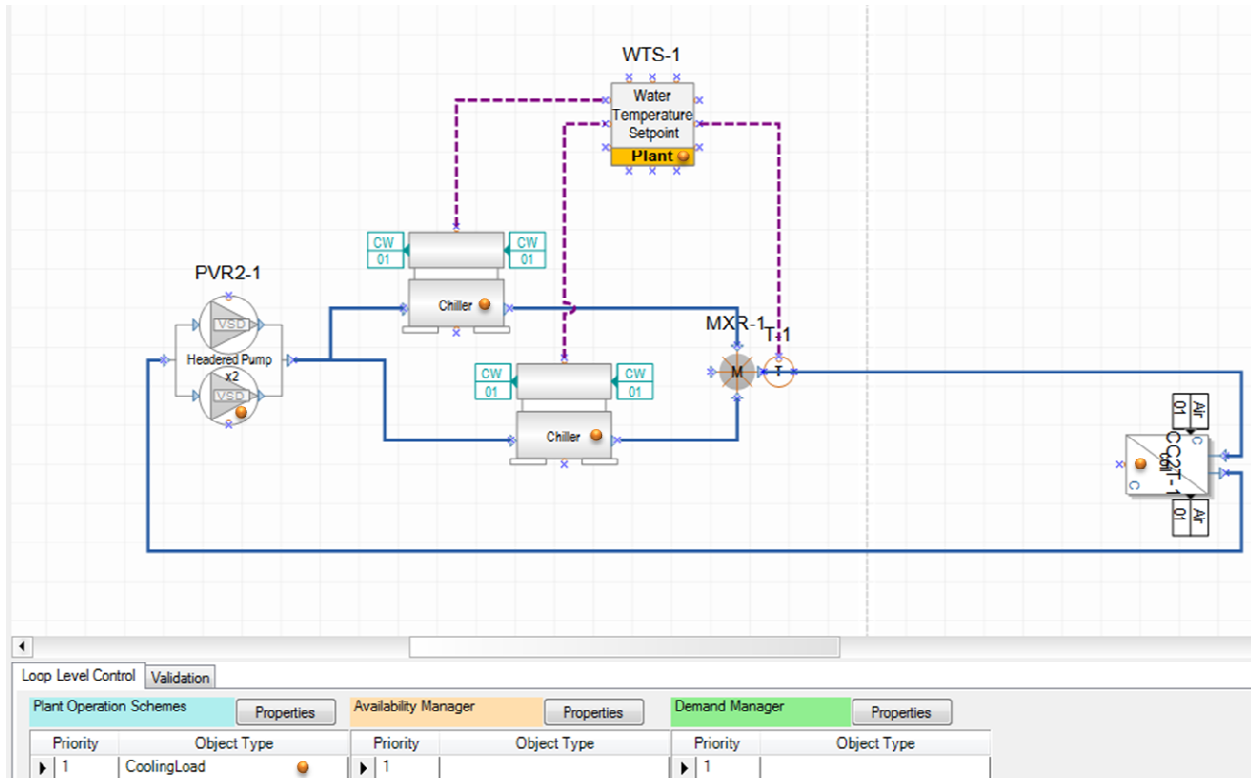
Loop Level Control Validation

Plant Operation Schemes		Availability Manager		Demand Manager	
Priority	Object Type	Priority	Object Type	Priority	Object Type
1	HeatingLoad	1	Scheduled	1	
				2	
				3	
				4	
				5	
				6	
				7	
				8	

Chilled Water Loop System Diagram

The Chilled Water Loop Diagram is interactive diagram. Selecting the components with the orange dot will display a pop-up dialog containing the component properties as displayed within the ASHRAE Baseline System 7 Sample File. The other components do not contain properties that influence Simergy simulations.

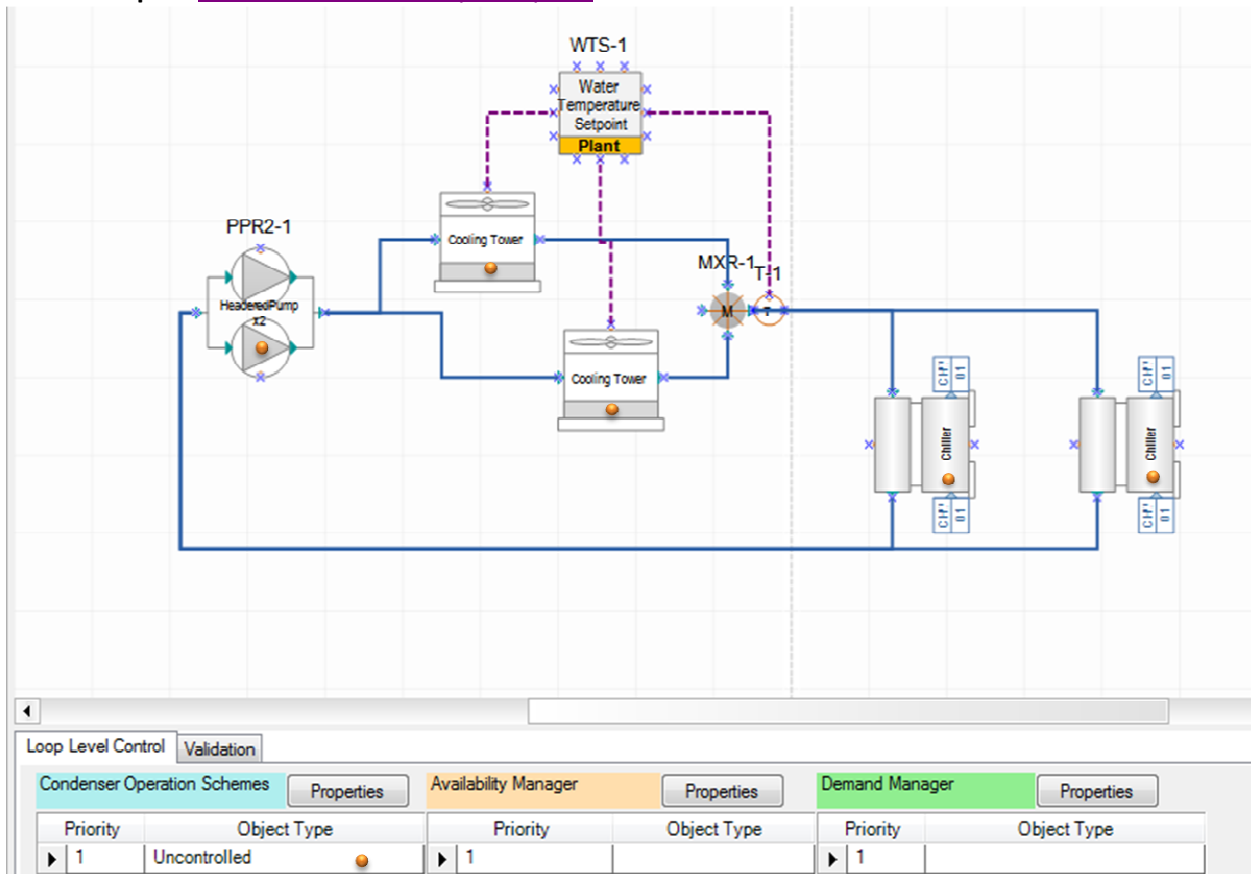
Related Topics: [Chilled Water Loop Template](#)



Condenser Water Loop System Diagram

The Condenser Water Loop Diagram is interactive diagram. Selecting the components with the orange dot will display a pop-up dialog containing the component properties as displayed within the ASHRAE Baseline System 7 Sample File. The other components do not contain properties that influence Simergy simulations.

Related Topics: [Condenser Water Loop Template](#)



Loop Level Controls

Air - Night Cycle - Loop Level Controls

The screenshot shows the 'Availability Manager' window. At the top, there is a 'Select Library Entry' dropdown menu set to '< Select >', a 'Name' text box containing 'SchemeL_AvailMgr_AlwaysOn', and 'Save' and 'Cancel' buttons. Below this is a table with three columns: 'Priority', 'Object Type', and 'Scheme'. The first row has a priority of 1, an object type of 'NightCycle', and a scheme of 'AvailManagerNightCycle_Office_CycleOnAny'. The remaining rows have priorities 2 through 8, with object types set to 'Select Object Type' and empty scheme fields.

Priority	Object Type	Scheme
1	NightCycle	AvailManagerNightCycle_Office_CycleOnAny
2	Select Object Type	
3	Select Object Type	
4	Select Object Type	
5	Select Object Type	
6	Select Object Type	
7	Select Object Type	
8	Select Object Type	

CHW Plant Operation Scheme Loop Level Controls

Priority	Object Type	Scheme	Schedule Name
1	CoolingLoad	Scheme_CoolingLoad_UpTo_1G	ALWAYS ON sched
2	Select Object Type		Select Schedule Name
3	Select Object Type		Select Schedule Name
4	Select Object Type		Select Schedule Name
5	Select Object Type		Select Schedule Name
6	Select Object Type		Select Schedule Name
7	Select Object Type		Select Schedule Name
8	Select Object Type		Select Schedule Name

CW Condenser Operation Scheme

Condenser Operation Schemes

Select Library Entry: < Select > Save

Name: CondenserOpSchemeList(1) Cancel

Priority	Object Type	Scheme	Schedule Name
1	Uncontrolled	Scheme_Uncontrolled	ALWAYS ON sched
2	Select Object Type		Select Schedule Name
3	Select Object Type		Select Schedule Name
4	Select Object Type		Select Schedule Name
5	Select Object Type		Select Schedule Name
6	Select Object Type		Select Schedule Name
7	Select Object Type		Select Schedule Name
8	Select Object Type		Select Schedule Name

Hot Water Plant Operation Scheme Loop Level Controls

Plant Operation Schemes

Select Library Entry: < Select > Save

Name: Simple Heating Load Scheme Cancel

Priority	Object Type	Scheme	Schedule Name
1	HeatingLoad	Scheme_HeatingLoad_UpTo_1GW	ALWAYS ON sched
2	Select Object Type		Select Schedule Name
3	Select Object Type		Select Schedule Name
4	Select Object Type		Select Schedule Name
5	Select Object Type		Select Schedule Name
6	Select Object Type		Select Schedule Name
7	Select Object Type		Select Schedule Name
8	Select Object Type		Select Schedule Name

Hot Water Availability Manager Loop Level Controls

The screenshot shows the 'Availability Manager' window. At the top, there is a 'Select Library Entry' dropdown menu with '< Select >' selected, and a 'Name' text box containing 'AvailMgrSchemeList(1)'. To the right of these are 'Save' and 'Cancel' buttons. Below this is a table with three columns: 'Priority', 'Object Type', and 'Scheme'. The first row is selected and shows '1' in the Priority column, 'Scheduled' in the Object Type column, and 'Scheme_AvailMgr_AlwaysOn' in the Scheme column. The remaining rows (2-8) have 'Select Object Type' in the Object Type column and are empty in the Scheme column.

Priority	Object Type	Scheme
1	Scheduled	Scheme_AvailMgr_AlwaysOn
2	Select Object Type	
3	Select Object Type	
4	Select Object Type	
5	Select Object Type	
6	Select Object Type	
7	Select Object Type	
8	Select Object Type	

Components

Cooling Tower

Selected Component Information

Type : **CoolingTower** Update

Sub Types : TwoSpeed ▼

Library Entities : CoolTwr-2SP ▼

	Property	Value	Unit
<input checked="" type="checkbox"/>	CoolingTower:TwoSpeed		
	Name	CT-1(1)	
	Design Water Flow Rate	Autosize	gpm
	Air Flow Rate at High Fan Speed	Autosize	cfm
	Fan Power at High Fan Speed	Autosize	W
	U-Factor Times Area Value at High Fan Speed	Autosize	Btu/h-F
	Air Flow Rate at Low Fan Speed	Autosize	cfm
	Fan Power at Low Fan Speed	Autosize	W
	U-Factor Times Area Value at Low Fan Speed	Autosize	Btu/h-F
	Air Flow Rate in Free Convection Regime	Autosize	cfm
	U-Factor Times Area Value at Free Convection Air	Autosize	Btu/h-F
	Performance Input Method	UFactorTimesAreaAnd	
	High Speed Nominal Capacity		
	Low Speed Nominal Capacity		
	Free Convection Capacity		
	Basin Heater Capacity	0	Btu/h-F
	Basin Heater Setpoint Temperature	35.6	F
	Basin Heater Operating Schedule Name		
	Evaporation Loss Mode		
	Evaporation Loss Factor	0	percent/
	Drift Loss Percent	0	percent
	Blowdown Calculation Mode		
	Blowdown Concentration Ratio	3	
	Blowdown Makeup Water Usage Schedule Name		
	Supply Water Storage Tank Name		
	Number of Cells	1	
	Cell Control	MinimalCell	
	Cell Minimum Water Flow Rate Fraction	0.33	
	Cell Maximum Water Flow Rate Fraction	2.5	
	Sizing Factor	0.5	

Condenser Water Headered Pumps

Selected Component Information

Type :

Sub Types :

Library Entities :

Property	Value	Unit
<input checked="" type="checkbox"/> HeaderedPumps:Constant		
Name	PPR2-1	
Total Rated Flow Rate	Autosize	gpm
Number of Pumps in Bank	2	
Flow Sequencing Control S	Sequential	
Rated Pump Head	73.01	ftH2O
Rated Power Consumption	Autosize	W
Motor Efficiency	0.92	
Fraction of Motor Inefficienc	0.78	
Pump Control Type	Intermittent	
Pump Flow Rate Schedule		
Zone Name		
Skin Loss Radiative Fractio		

Condenser Water Plant Water Temperature Setpoint Controller

Selected Component Information

Type :

Sub Types :

Library Entities :

Property	Value	Unit
<input checked="" type="checkbox"/> Controller:WaterTemperatu		
Name	WTS-1(3)	
Controller Scheme 1	SchemeL_CW-Temp-70F	

Chiller

Selected Component Information

Type : **Chiller** Update

Sub Types : ChillerVaporCompressionElectric_EIR

Library Entities : Chlr_VP_WC_COMNET

Condenser loop: CW Loop - 1

Property	Value	Unit
Chiller:Electric:EIR		
Name	CH-2(1)	
Reference Capacity	Autosize	Btu/h
Reference COP	3	Btuh/Btu
Reference Leaving Chilled Water Temperat	44	F
Reference Entering Condenser Fluid Tempe	84.9	F
Reference Chilled Water Flow Rate	Autosize	gpm
Reference Condenser Fluid Flow Rate	Autosize	gpm
Cooling Capacity Function of Temperature	WC-Cent-Chiller_EPlusDefault_CAP	
Electric Input to Cooling Output Ratio Fun	WC Screw Default 90.1-2004 EIR_ft	
Electric Input to Cooling Output Ratio Fun	WC-Cent-Chiller_EPlusDefault_EIR-	
Minimum Part Load Ratio	0.1	
Maximum Part Load Ratio	1	
Optimum Part Load Ratio	1	
Minimum Unloading Ratio	0.2	
Condenser Type	WaterCooled	
Condenser Fan Power Ratio	0	Btuh/Btuh
Compressor Motor Efficiency	1	
Leaving Chilled Water Lower Temperature L	35.6	F
Chiller Flow Mode	VariableFlow	
Design Heat Recovery Water Flow Rate	0	gpm
Sizing Factor	0.5	
Basin Heater Capacity	0	Btu/h-F
Basin Heater Setpoint Temperature	35.6	F
Basin Heater Operating Schedule Name	Always OFF_SE_2013(3)	

Chilled Water Headered Pumps

Selected Component Information

Type : **PumpSet** Update

Sub Types : VariableSpeed2

Library Entities :

Property	Value	Unit
HeaderedPumps:VariableSpeed		
Name	PVR2-1	
Total Rated Flow Rate	Autosize	gpm
Number of Pumps in Bank	2	
Flow Sequencing Control Scheme	Sequential	
Rated Pump Head	84	ftH2O
Rated Power Consumption	Autosize	W
Motor Efficiency	0.92	
Fraction of Motor Inefficiencies to Fluid Stream	0.78	
Coefficient 1 of the Part Load Performance Curve	0.0015303	
Coefficient 2 of the Part Load Performance Curve	0.0052081	
Coefficient 3 of the Part Load Performance Curve	1.1086242	
Coefficient 4 of the Part Load Performance Curve	-0.1163556	
Minimum Flow Rate	0	gpm
Pump Control Type	Intermittent	
Pump Flow Rate Schedule Name		
Zone Name		
Skin Loss Radiative Fraction		

Chilled Water Plant Water Temperature Setpoint Controller

Selected Component Information

Type : **SupplyWater** Update

Sub Types : Temperature

Library Entities : Ctlr_CHW_OA-reset_44-54

Property	Value	Unit
Controller:WaterTem		
Name	WTS-1(5)	
Controller Scheme 1	SchemeL_CHW_OA-TReset_54(60)-44(80)	

Cooling Coil

Selected Component Information

Type : **CoolingCoilWater** Update

Sub Types :

Library Entities :

CHW loop:

Property	Value	Unit
<input checked="" type="checkbox"/> Coil:Cooling:Water		
Name	CC2T-1(1)	
Availability Schedule Name	Always ON_SE_201	
Design Water Flow Rate	Autosize-Default	gpm
Design Air Flow Rate	Autosize-Default	gpm
Design Inlet Water Temperature	Autosize-Default	F
Design Inlet Air Temperature	Autosize-Default	F
Design Outlet Air Temperature	Autosize-Default	F
Design Inlet Air Humidity Ratio	Autosize-Default	lb-H2O/lb
Design Outlet Air Humidity Ratio	Autosize-Default	lb-H2O/lb
Type of Analysis	SimpleAnalysis	
Heat Exchanger Configuration	CounterFlow	
Condensate Collection Water Stor		
<input checked="" type="checkbox"/> Controller:WaterCoil		
Name	CC2T-1(1)	
Control Variable	Temperature	
Action	Reverse	
Actuator Variable	Flow	
Controller Convergence Tolerance	Autosize-Default	deltaF
Maximum Actuated Flow	Autosize	gpm
Minimum Actuated Flow	0	gpm

Heating Coil

Selected Component Information

Type : **HeatingCoilWater** Update

Sub Types :

Library Entities :

HotWater loop:

Property	Value	Unit
<input checked="" type="checkbox"/> Coil:Heating:Water		
Name	HC2T-1(1)	
Availability Schedule	Always ON_SE_2013	
U-Factor Times Area	Autosize-Default	Btu/h-F
Maximum Water Flow	Autosize-Default	gpm
Performance Input M	NominalCapacity	
Rated Capacity	Autosize-Default	Btu/h
Rated Inlet Water Te	180	F
Rated Inlet Air Tempe	61.9	F
Rated Outlet Water T	160	F
Rated Outlet Air Tem	90	F
Rated Ratio for Air an	0.5	
<input checked="" type="checkbox"/> Controller:WaterCoil		
Name	HC2T-1(1)	
Control Variable	Temperature	
Action	Normal	
Actuator Variable	Flow	
Controller Convergen	Autosize-Default	deltaF
Maximum Actuated FI	Autosize	gpm
Minimum Actuated FI	0	gpm

Supply Fan

Selected Component Information

Type : **SupplyFan** Update

Sub Types : VariableVolume

Library Entities : SupplyFan-VSD

Property	Value	Unit
Fan:VariableVolume		
Name	VSF-1(1)	
Availability Schedule	Always ON_SE_2013	
Fan Efficiency	0.65	
Pressure Rise	2.79	inH2O
Maximum Flow Rate	Autosize	cfm
Fan Power Minimum	Fraction	
Fan Power Minimum	0.2	
Fan Power Minimum		
Motor Efficiency	0.93	
Motor In Airstream Fr	1	
Fan Power Coefficient	0.0013,0.147,0.9506,-0.0998,0	
End-Use Subcategory	General	

Variable Air Volume Air Terminal Unit with Hot Water Reheat

Selected Component Information

Type : **AirTerminal** Update

Sub Types : VAV_Reheat

Library Entities : AT_VAV-reheat-HW-30%-min

HotWater loop: HW Loop - 1

Property	Value	Unit
AirTerminal:SingleDuct:VAV:Reheat		
Name	VAVR-1(2)	
Availability Schedule Name	Always ON_SE_2013	
Maximum Air Flow Rate	Autosize	cfm
Zone Minimum Air Flow Input Method	Constant	
Constant Minimum Air Flow Fraction	0.3	
Fixed Minimum Air Flow Rate		
Minimum Air Flow Fraction Schedule Nam		
Reheat Coil Name	HeatingCoilWaterAutosi	
Maximum Hot Water or Steam Flow Rate	Autosize	gpm
Minimum Hot Water or Steam Flow Rate	0	gpm
Convergence Tolerance	0.001	
Damper Heating Action	Normal	
Maximum Flow per Zone Floor Area Durin		
Maximum Flow Fraction During Reheat		
Maximum Reheat Air Temperature	105	F
Design Specification Outdoor Air Object N		

Zone Temperature Controller

Selected Component Information

Type : **ZoneControlTemperature** Update

Sub Types : Thermostat

Library Entities : Dual Setpoint Controller

	Property	Value	Un
<input checked="" type="checkbox"/>	ZoneControl:Thermostat		
<input type="checkbox"/>	Name	ZTC-1(3)	
<input type="checkbox"/>	Control Type Schedule Name	Zone Control Type Sche	
<input type="checkbox"/>	Control [1-4] Name		
<input checked="" type="checkbox"/>	ZoneControl:Thermostat:TemperatureAnd		
<input type="checkbox"/>	Dehumidifying Relative Humidity Setpoint		
<input type="checkbox"/>	Dehumidification Control Type	Overcool	
<input type="checkbox"/>	Overcool Range Input Method	Constant	
<input type="checkbox"/>	Overcool Constant Range	3.1	deltaF
<input type="checkbox"/>	Overcool Range Schedule Name		
<input type="checkbox"/>	Overcool Control Ratio	2	percen

Supply Air Temperature Controller

Selected Component Information

Type : **SupplyAir** Update

Sub Types : Temperature

Library Entities : Ctr_SAT_Warmest_55F-65F

	Property	Value	Unit
<input checked="" type="checkbox"/>	Controller:AirTemperatur		
<input type="checkbox"/>	Name	SAT-1(1)	
<input type="checkbox"/>	Controller Scheme List	SchemeL_SAT_Warmest_55F-60F	

Return Fan

Selected Component Information

Type : **ReturnFan**

Sub Types : VariableVolume

Library Entities : ReturnFan-VSD

Property	Value	Unit
[-] <input checked="" type="checkbox"/> Fan:VariableVolume		
Name	VRF-1(1)	
Availability Schedule Na	Always ON_SE_2013	
Fan Efficiency	0.65	
Pressure Rise	1.39	inH2O
Maximum Flow Rate	Autosize	cfm
Fan Power Minimum Flo	Fraction	
Fan Power Minimum Flo	0.2	
Fan Power Minimum Air		
Motor Efficiency	0.93	
Motor In Airstream Fracti	1	
Fan Power Coefficient [1-	0.0013,0.147,0.9506,-0.0998,0	
End-Use Subcategory		

Outdoor Air Controller

Selected Component Information

Type : **OutdoorAir** Update

Sub Types :

Library Entities :

Property	Value	Unit
☑ Controller:OutdoorAir		
Name	OAC-1(1)	
Minimum Outdoor Air Flow	Autosize	cfm
Maximum Outdoor Air Flow	Autosize	cfm
Economizer Control Type	FixedDryBulb	
Economizer Control Action	ModulateFlow	
Economizer Maximum Limit	70	F
Economizer Maximum Limit		
Economizer Maximum Limit		
Electronic Enthalpy Limit Cu		
Economizer Minimum Limit		
Lockout Type	NoLockout	
Minimum Limit Type	ProportionalMinimum	
Minimum Outdoor Air Sched		
Minimum Fraction of Outdoo		
Maximum Fraction of Outdo		
Mechanical Ventilation Cont		
Time of Day Economizer Co		
High Humidity Control	No	
Humidistat Control Zone Na		
High Humidity Outdoor Air F	1	
Control High Indoor Humidit	Yes	
Heat Recovery Bypass Cont	BypassWhenWithinEconomizerLimits	

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