

Task 1

MEAN RADIANT TEMPERATURE

The Mean Radiant temperature of a given surface is the temperature of the equivalent black enclosure with which it would exchange the same radiative flux exchanged with all the other surfaces.

OPERATIVE TEMPERATURE

It is the virtual ambient temperature with which the sum of the radiative thermal and convective linearized flow is exchanged which exchanges with the air and all the other surfaces.

SOLAR RADIATION DENSITY

The solar constant GSC is a flux density measuring mean solar electromagnetic radiation (solar irradiance) per unit area. The solar "constant" is not a physical constant, is an average of a varying value. Its value is 1367 W/m².

SOLAR RADIATION CHARACTERISTICS

Solar radiation is attenuated both in the spectral distribution and in the total radiation. This is due to the dispersion and absorption phenomena.

ATMOSPHERIC ABSORPTION

The absorption of solar radiation is due to the atmospheric components, in particular ozone, water and carbon dioxide, which absorb the incident radiation in absorption bands, consequently modifying its energy spectrum. The stratospheric ozone absorbs almost all the ultraviolet component of solar radiation.

SOLAR ENERGY

The solar radiation depends on:

1. The sun position in the sky (altitude and azimuth angles), which changes daily and seasonally
2. The weather condition
3. The site altitude over the sea level
4. Sunshine hours

Task 2

First we open Open studio to add the weather Data

The screenshot shows the 'Weather File & Design Days' tab in the OpenStudio software. The interface is divided into several sections:

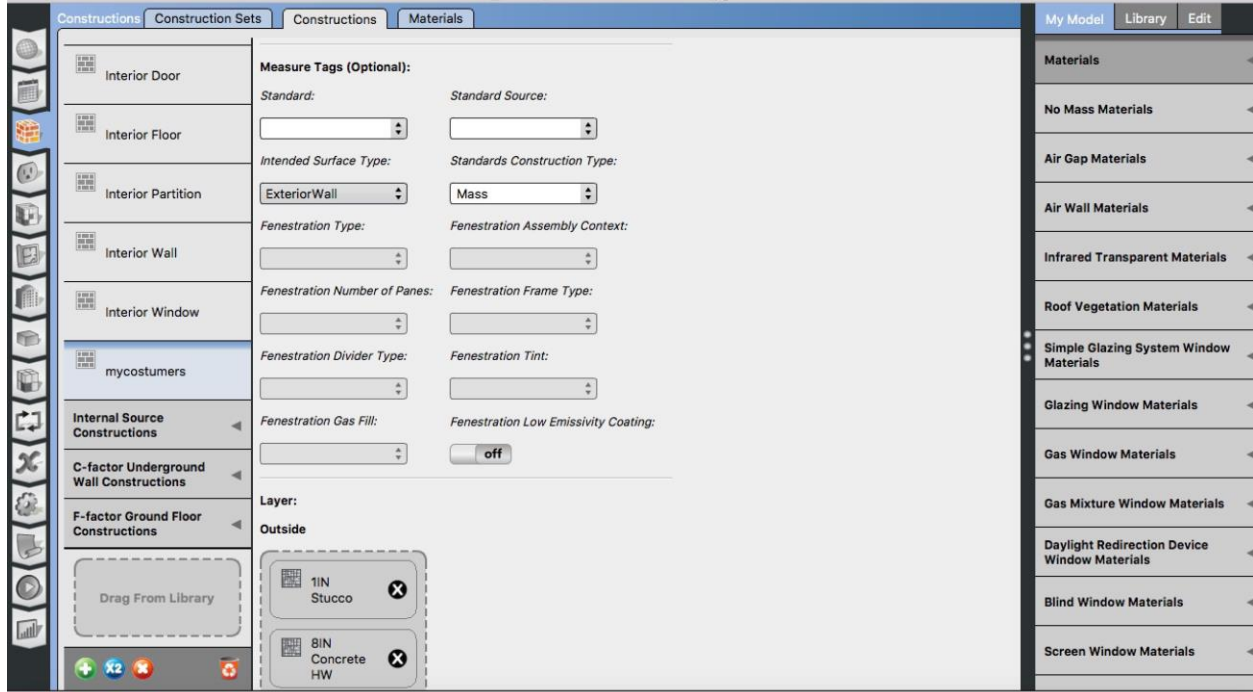
- Weather File:** Includes fields for Name (Piacenza), Latitude (44.92), Longitude (9.73), Elevation (134), and Time Zone (1). A link to download weather files is provided.
- Measure Tags (Optional):** Fields for ASHRAE Climate Zone and CEC Climate Zone.
- Design Days:** A section with a table for design days. The table has columns for Date, Temperature, Humidity, Pressure Wind Precipitation, Solar, and Custom. Below the table are buttons for 'Apply to Selected' for each column.
- Select Year by:** Radio buttons for 'Calendar Year' (set to 2000) and 'First Day of Year' (set to Sunday).
- Daylight Savings Time:** A toggle switch set to 'off'.
- Starts:** Radio buttons for 'Define by Day of The Week And Month' and 'Define by Date' (set to 01/04/09).
- Ends:** Radio buttons for 'Define by Day of The Week And Month' and 'Define by Date' (set to 01/10/09).

Go to the “construction” command to start customize the building, renaming it

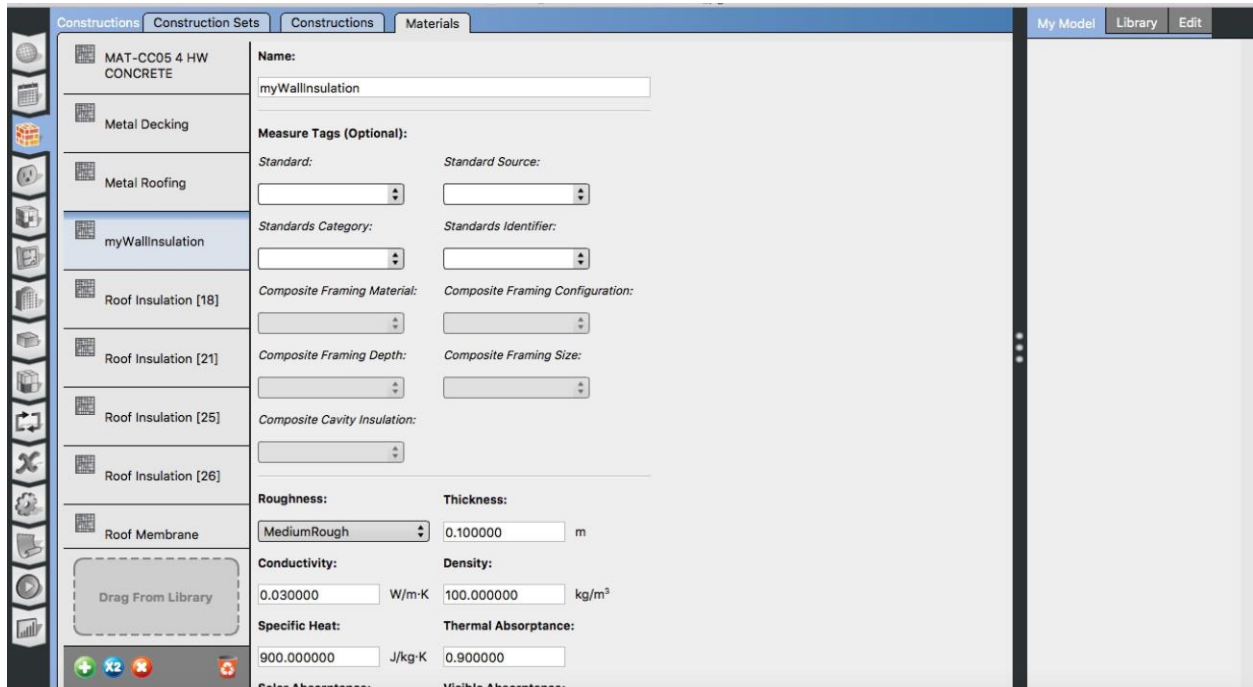
The screenshot shows the 'Construction Sets' tab in the OpenStudio software. The interface is divided into several sections:

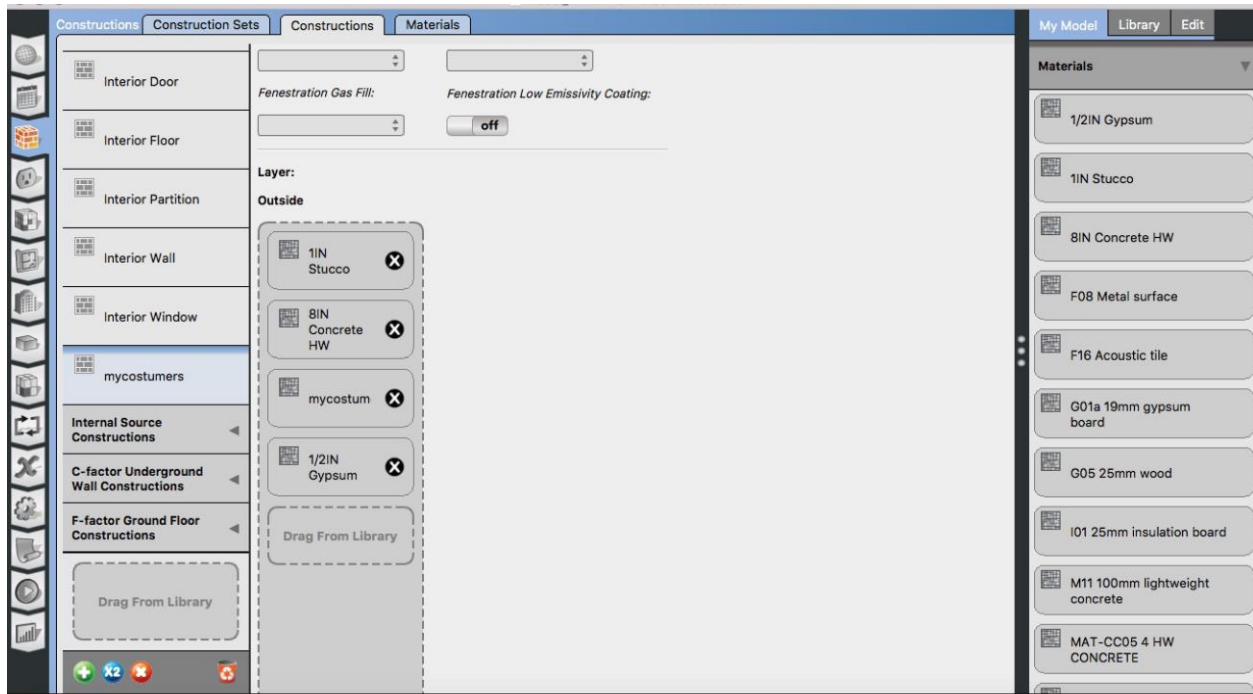
- Left Panel:** A list of construction sets, including '189.1-2009 - CZ1 - Office' and 'myconstructionSet1311'.
- Center Panel:** A detailed view of the 'myconstructionSet1311' construction set. It includes sections for:
 - Exterior Surface Constructions:** Walls (ASHRAE 189.1-200! ExtWall), Floors (ASHRAE 189.1-200! 4in ClimateZoi), and Roofs (ASHRAE 189.1-200! ExtRoof IEAD).
 - Interior Surface Constructions:** Walls (Interior Wall), Floors (Interior Floor), and Ceilings (Interior Ceiling).
 - Ground Contact Surface Constructions:** Walls (ASHRAE 189.1-200! 4in ClimateZoi), Floors (ASHRAE 189.1-200! 4in ClimateZoi), and Ceilings (ASHRAE 189.1-200! 4in ClimateZoi).
 - Exterior Sub Surface Constructions:** Fixed Windows (ASHRAE 189.1-200! ExtWindow), Operable Windows (ASHRAE 189.1-200! ExtWindow), and Doors (Exterior Door).
- Right Panel:** A list of construction sets, including 'Air Wall', 'ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 1', 'ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 2-5', 'ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 7-8', 'ASHRAE 189.1-2009 ExtRoof Metal ClimateZone 6', 'ASHRAE 189.1-2009 ExtWall Mass ClimateZone 1', 'ASHRAE 189.1-2009 ExtWall Mass ClimateZone 2', 'ASHRAE 189.1-2009 ExtWall Mass ClimateZone 3', 'ASHRAE 189.1-2009 ExtWall Mass ClimateZone 4', and 'ASHRAE 189.1-2009 ExtWall Mass ClimateZone 5'.

Start customizing the wall package in the “construction sets” window.

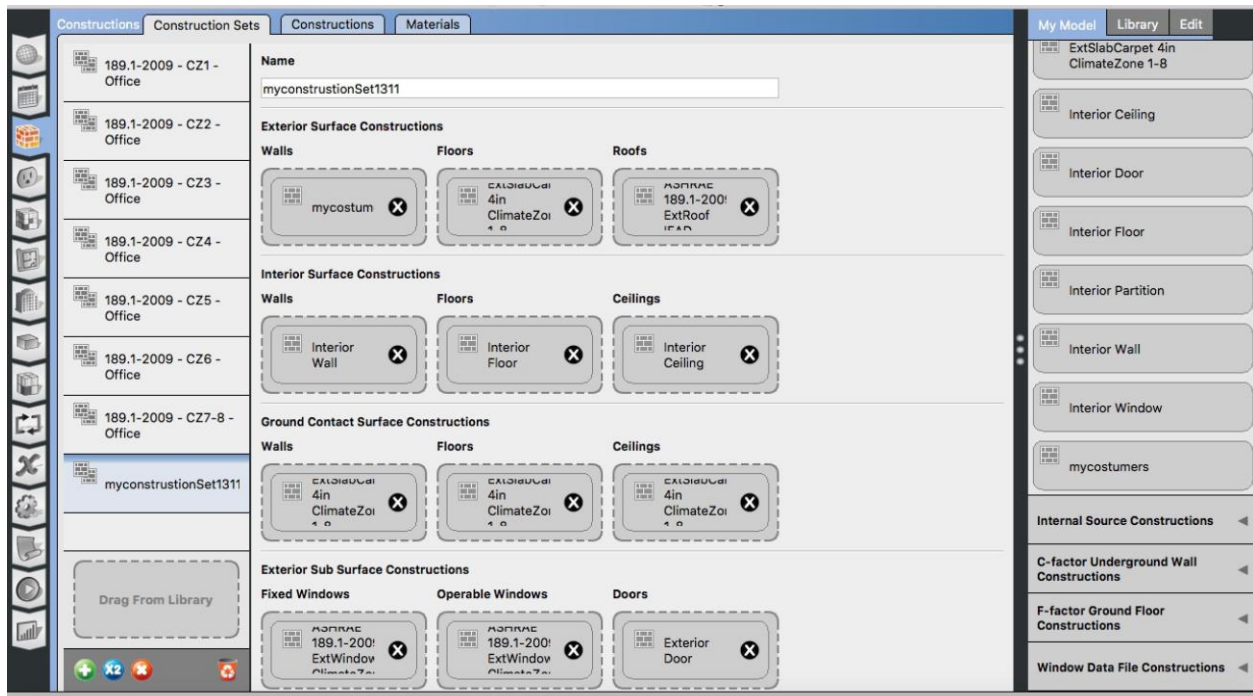


Decide the type of wall insulation and insert it later in the package

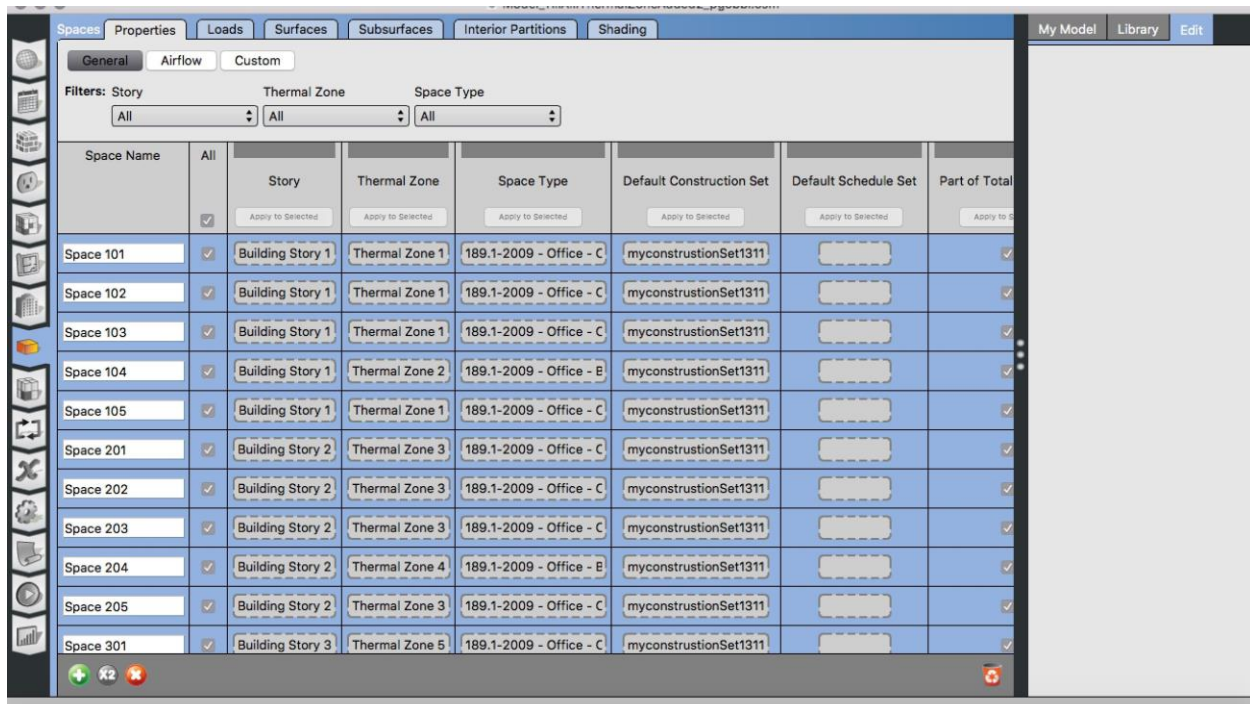




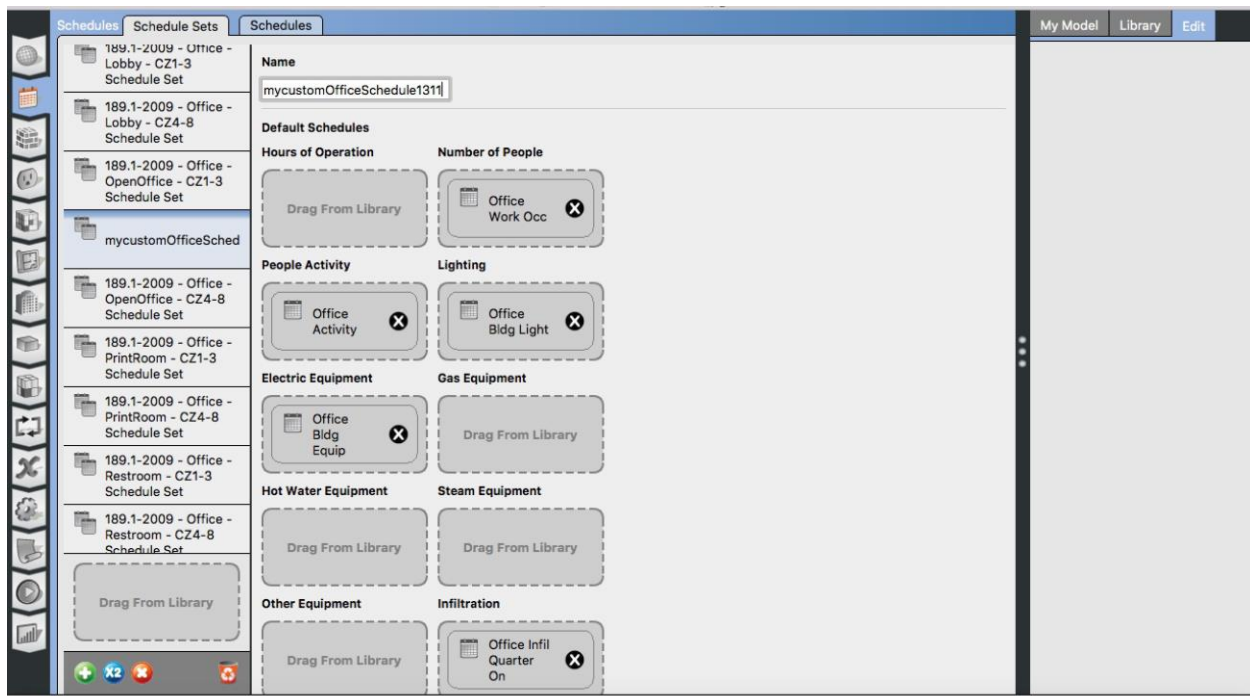
Insert the wall in the building data

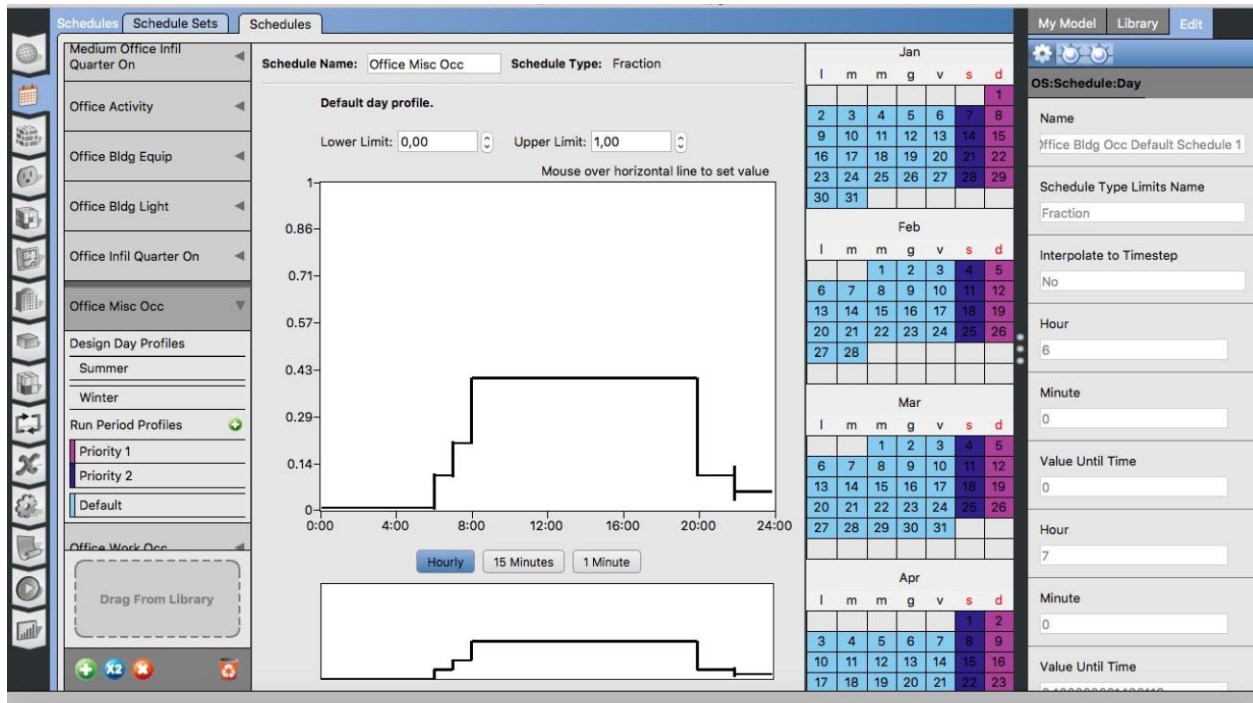


Go to the “space” window and insert the project layer with our modifications applying it to the whole building.



Return to “schedule sets” to enter all the information relating to activities, equipment, est. and their schedules





Go to go to the “loads” command to change other specifications, like people, light, electricity, etc.

The screenshot shows the 'Loads' window in a software interface. The main area displays settings for '189.1-2009 - Office - OpenOffice - CZ1-3 People Definition 1'. The settings include 'Number of People', 'People per Space Floor Area', 'Space Floor Area per Person', 'Fraction Radiant', 'Sensible Heat Fraction', and 'Carbon Dioxide Generation Rate'. The right sidebar contains a list of 'Ruleset Schedules' and 'Constructions'.

Model_1 (Main) | Normalization | Add | Edit | Delete | Save | Print | Help

Loads

109.12008 - Office - WholeBuilding - Md Office - CZ1-3 Electric Equipment Radiation

109.12008 - Office - WholeBuilding - Md Office - CZ4-8 Electric Equipment

109.12008 - Office - WholeBuilding - Sm Office - CZ1-3 Electric Equipment Radiation

109.12008 - Office - WholeBuilding - Sm Office - CZ4-8 Electric Equipment

1mycostumElectricEqu

Gas Equipment Definitions

Steam Equipment Definitions

Other Equipment Definitions

Drag From Library

Name:

1mycostumElectricEquipment

Design Level:

Watts Per Space Floor Area:

Watts Per Person:

Fraction Latent:

Fraction Radiant:

Fraction Lost:

My Model

Library

Edit

Ruleset Schedules

Compact Schedules

Constant Schedules

Year Schedules

Fixed Interval Schedules

Variable Interval Schedules

Constructions

Internal Source Constructions

C-factor Underground Wall Constructions

F-factor Ground Floor Constructions

Window Data File Constructions

109.12008 - Office - WholeBuilding - Md Office - CZ1-3 Electric Equipment Radiation

109.12008 - Office - WholeBuilding - Md Office - CZ4-8 Electric Equipment

109.12008 - Office - WholeBuilding - Sm Office - CZ1-3 Electric Equipment Radiation

109.12008 - Office - WholeBuilding - Sm Office - CZ4-8 Electric Equipment

1mycostumElectricEqu

Gas Equipment Definitions

Steam Equipment Definitions

Other Equipment Definitions

Drag From Library

Name:

1mycostumElectricEquipment

Design Level:

Watts Per Space Floor Area:

Watts Per Person:

Fraction Latent:

Fraction Radiant:

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Constructions

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Window Data File Constructions