

1. Provide a summary of the main concepts that went through about solar radiation

2. Create a pdf file with screenshots of all of the steps we went through in the second lesson on open Studio and explain briefly the reason behind the use of each step

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

Solar radiation is radiant energy emitted by the sun from a nuclear fusion reaction that creates electromagnetic energy. The energy that comes to the earth is modified due to the phenomenon of dispersion and absorption. Solar radiation absorption is due to some atmospheric components which absorb the incident radiation in specific wavelength bands which modifies its energetic spectrum. Solar radiation available on the Earth's surface for conversion in other energy forms (such as solar electrical energy) depends on: the sun's position, the weather condition, the site's sea level, and the daylight hours.

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.

Solar energy: availability

The solar radiation, available on the Earth's surface for conversion in other energy forms, depends on the sun position, the weather condition, the site altitude over the sea level, and the daylight hours.

Absorption of solar radiation

Solar radiation absorption is due to some atmospheric components, especially ozone, water and carbon dioxide. The stratospheric ozone absorbs almost all the ultraviolet component of solar radiation.

Air Mass

The sun to the zenith crosses the minimum thickness of the atmosphere, the sun with an elevated zenith angle crosses a large thickness of the atmosphere.

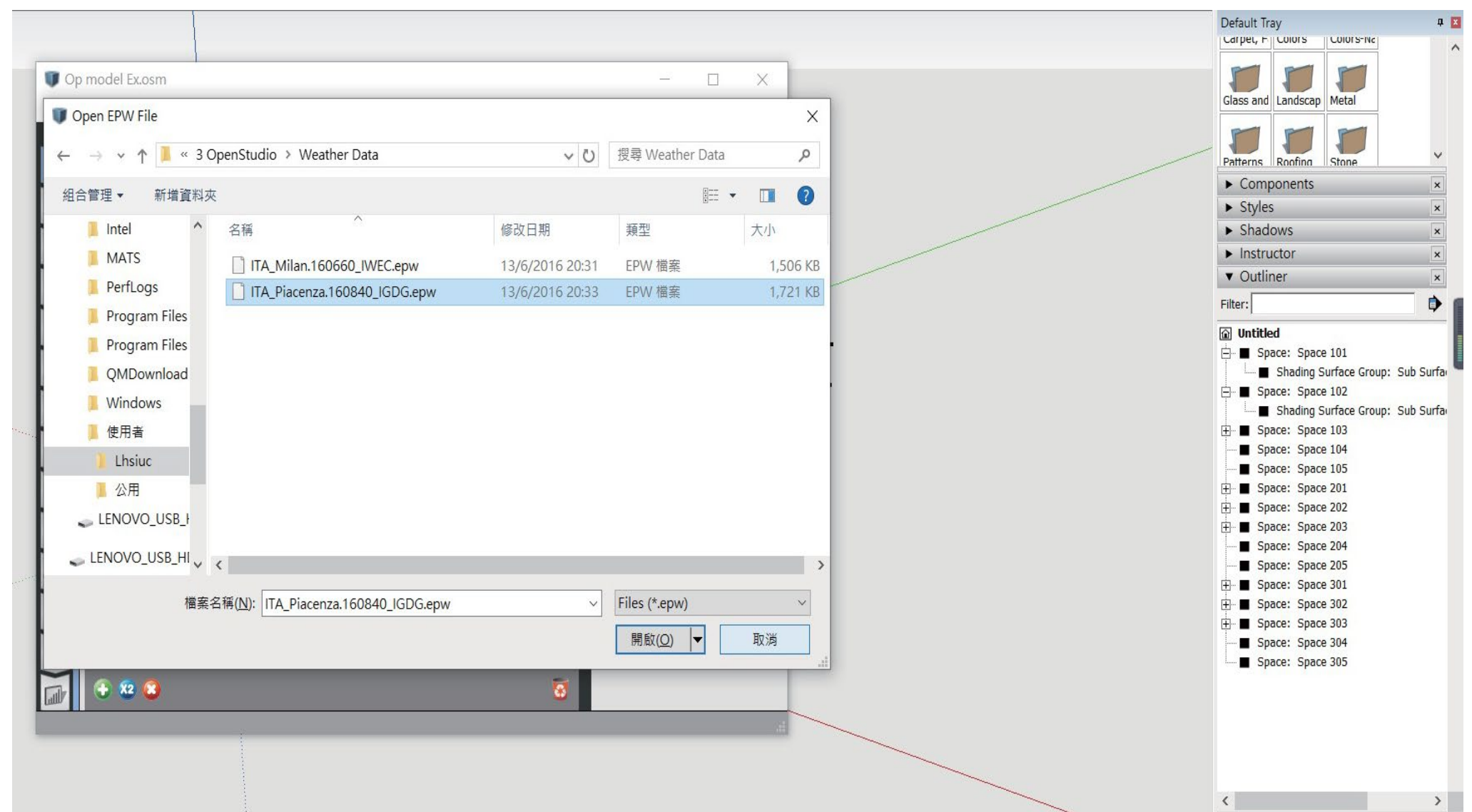
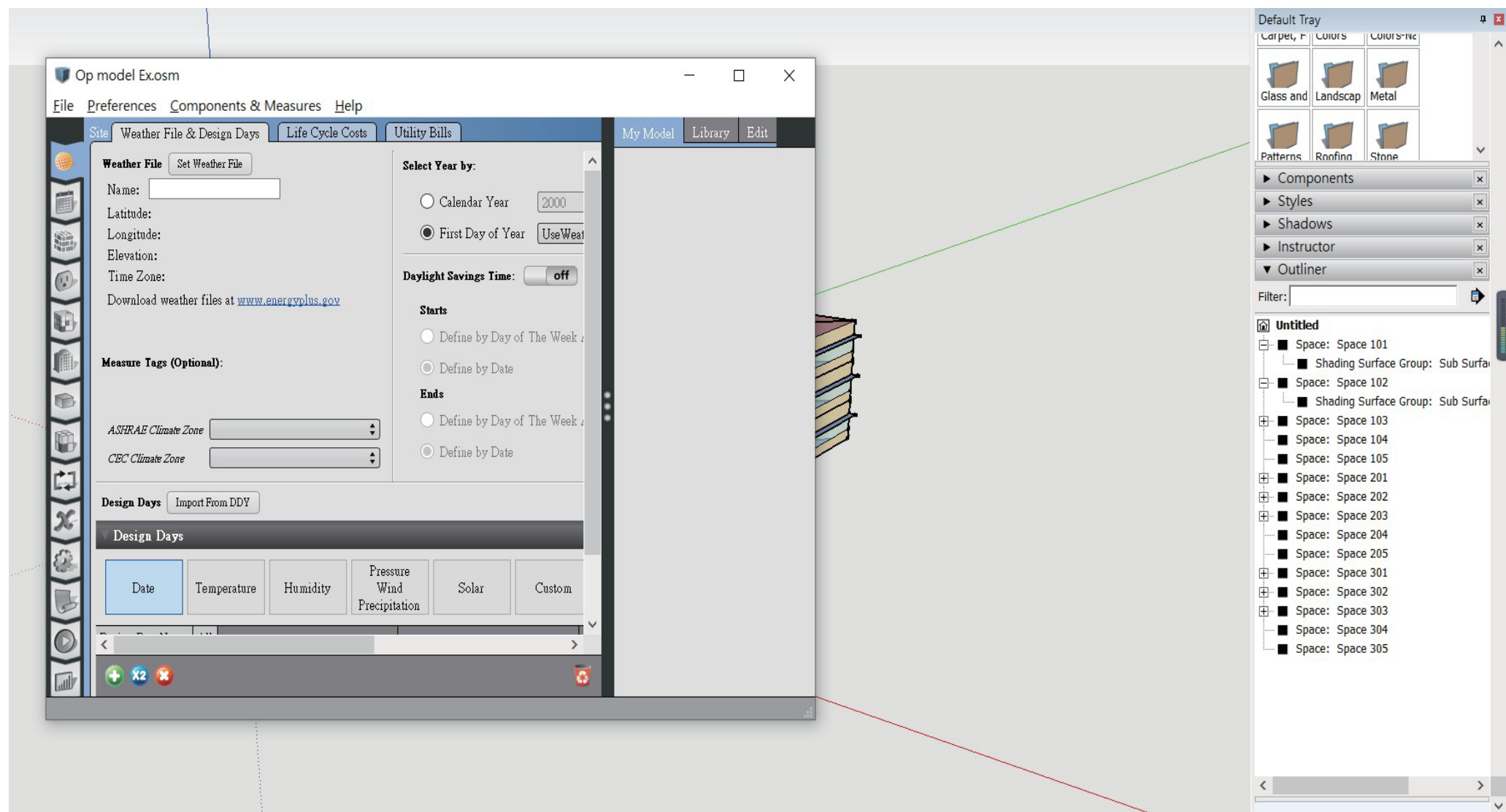
The solar radiation density

The maximum yearly average solar radiation density is the solar constant, which is the solar irradiance, its value is 1367 W/m^2 .

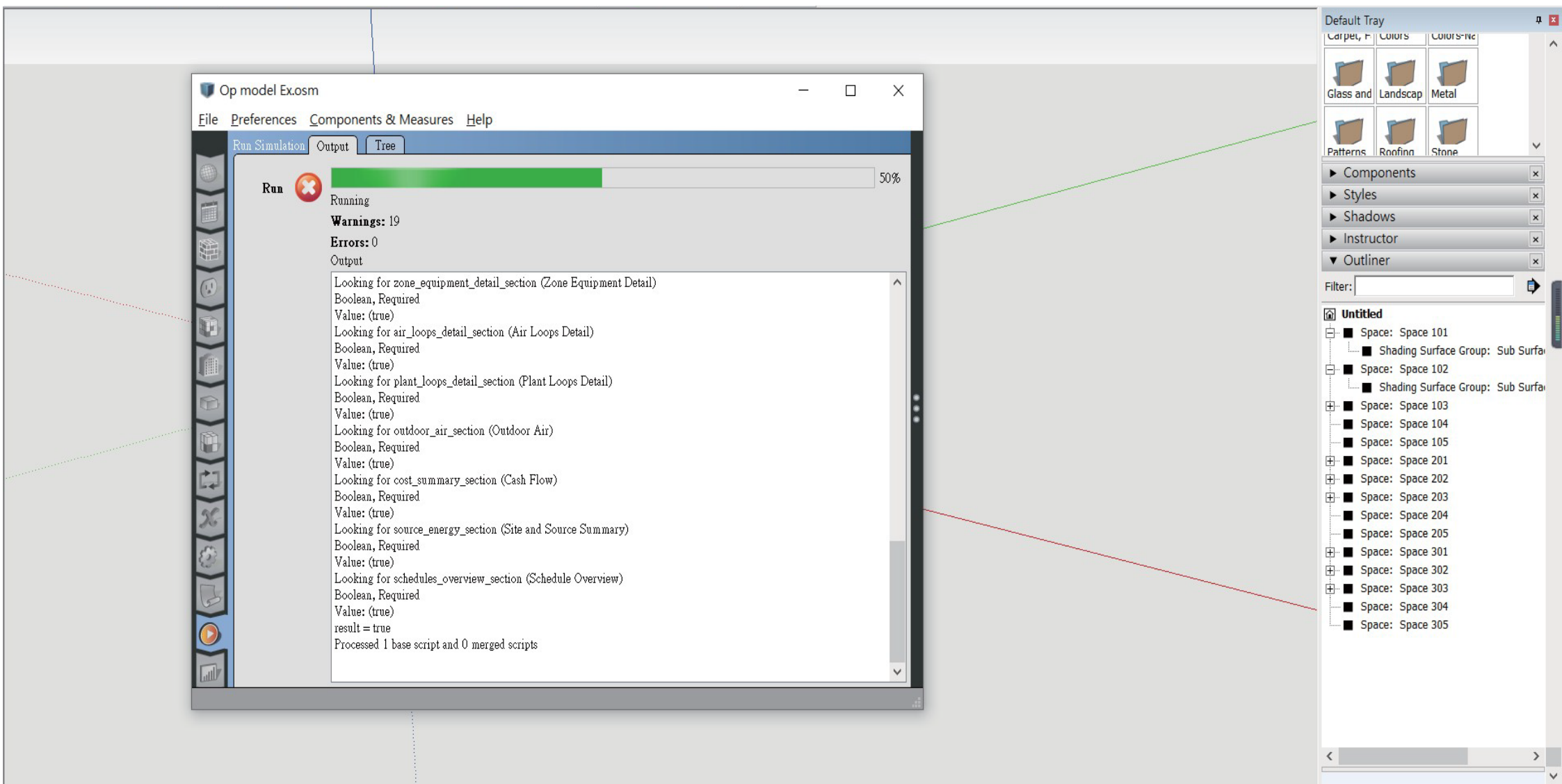
Diffuse and direct beam solar radiation

The solar radiation reaching the Earth's surface can be divided into two types of solar radiation: Direct beam solar radiation and diffuse solar radiation. Diffuse solar radiation does not throw sharp shadows and cannot be focused. The sum of the diffuse and direct beam solar radiation is called global solar radiation.

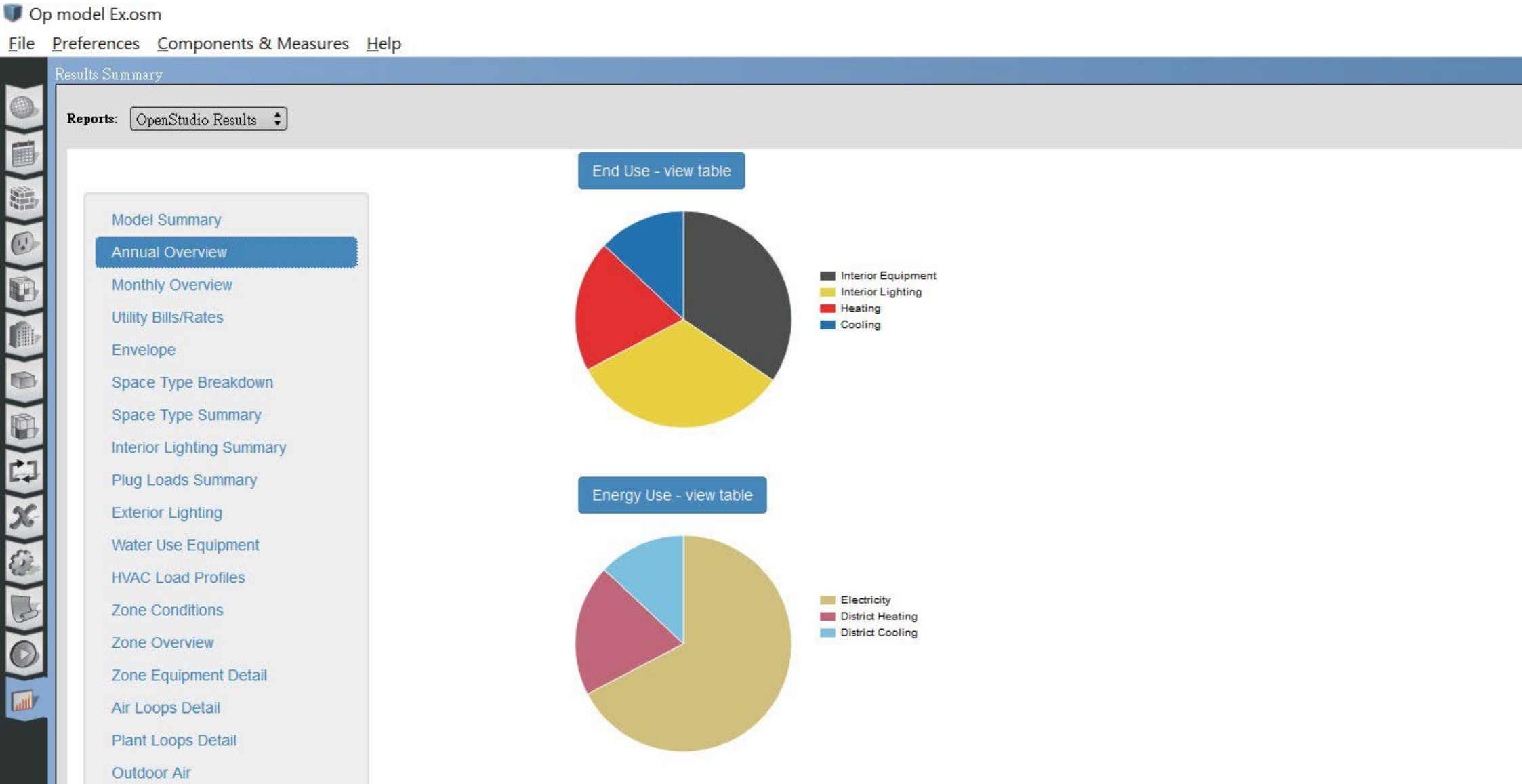
Adding weather data.



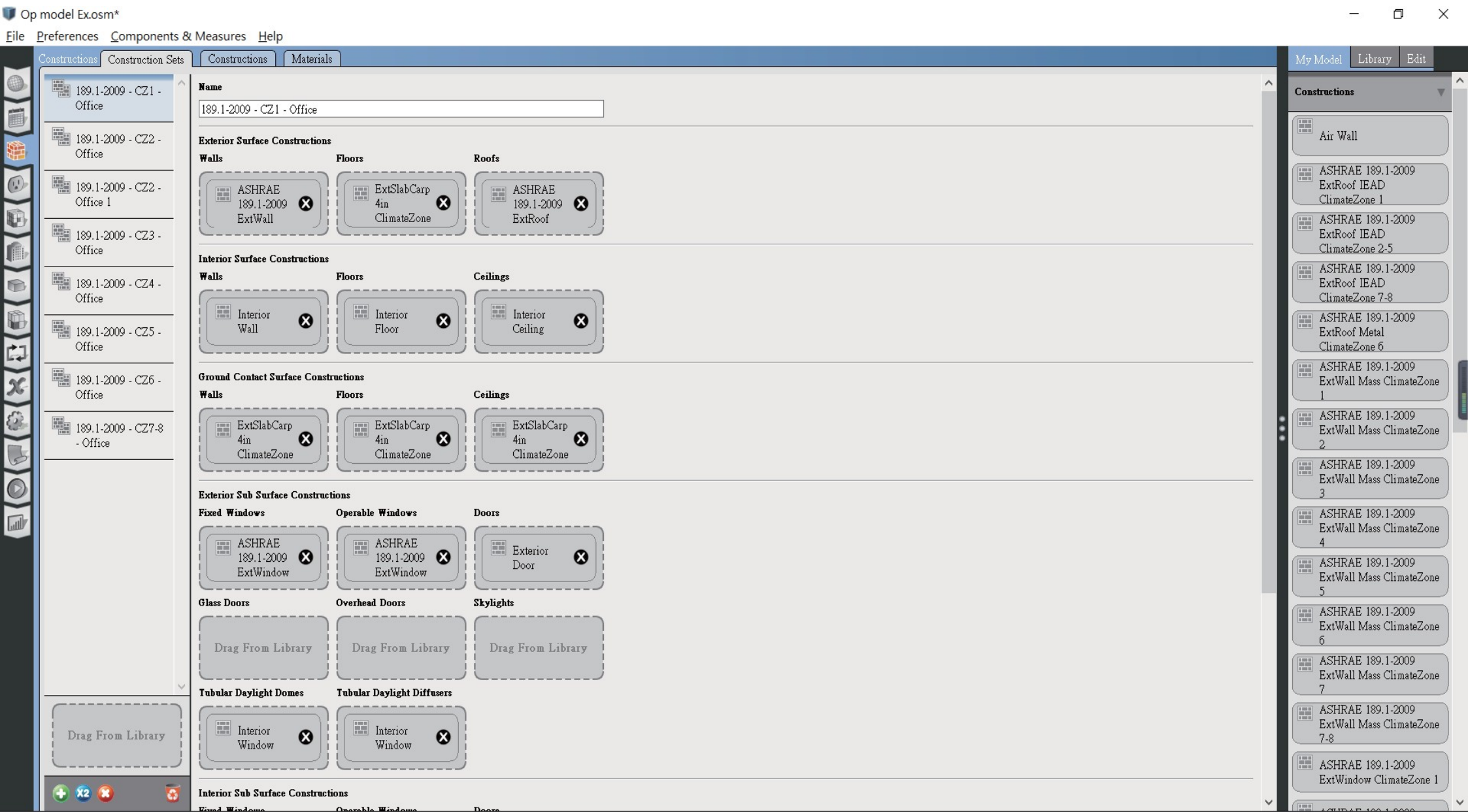
Run the analysis



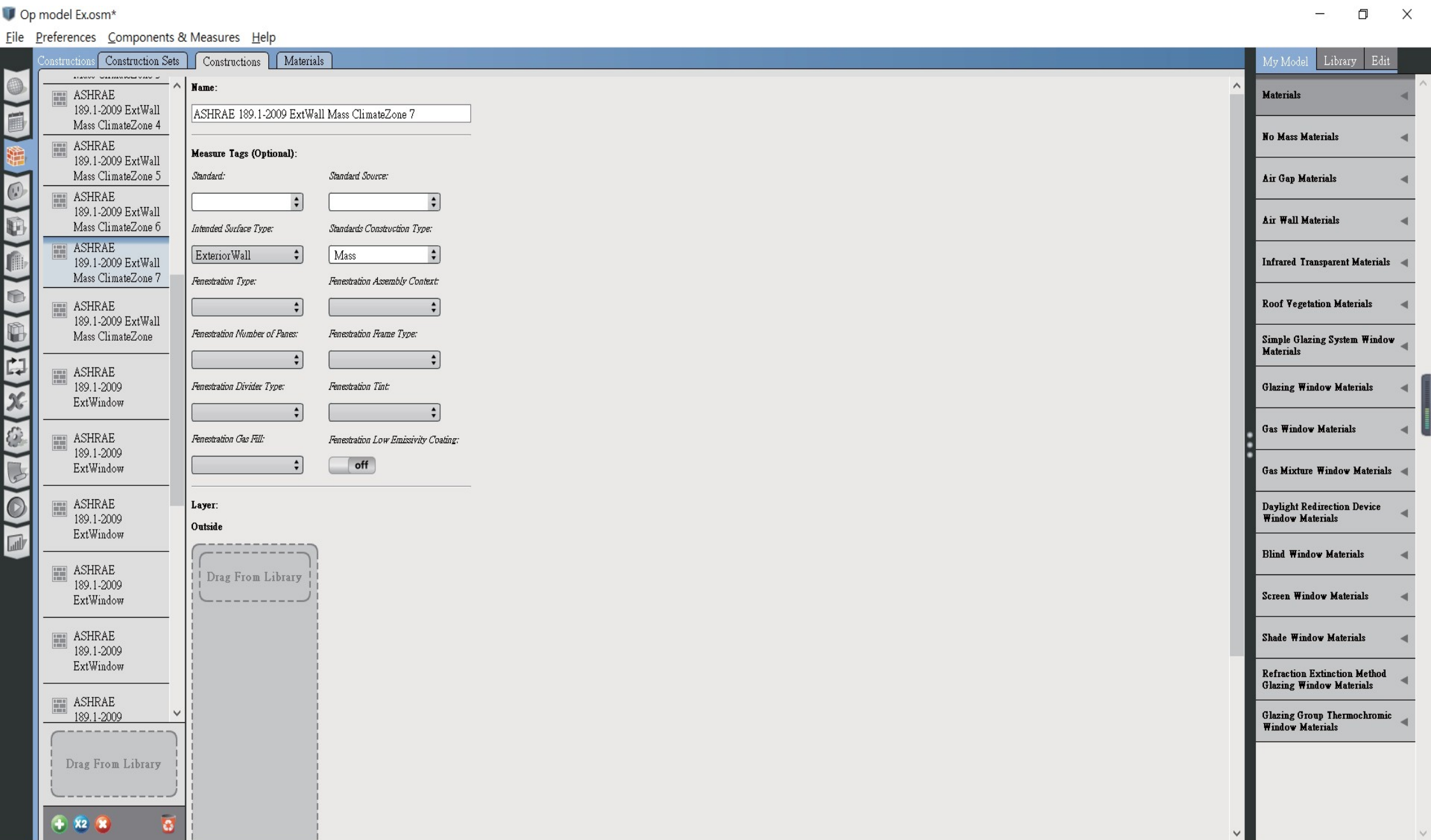
Represented analysis

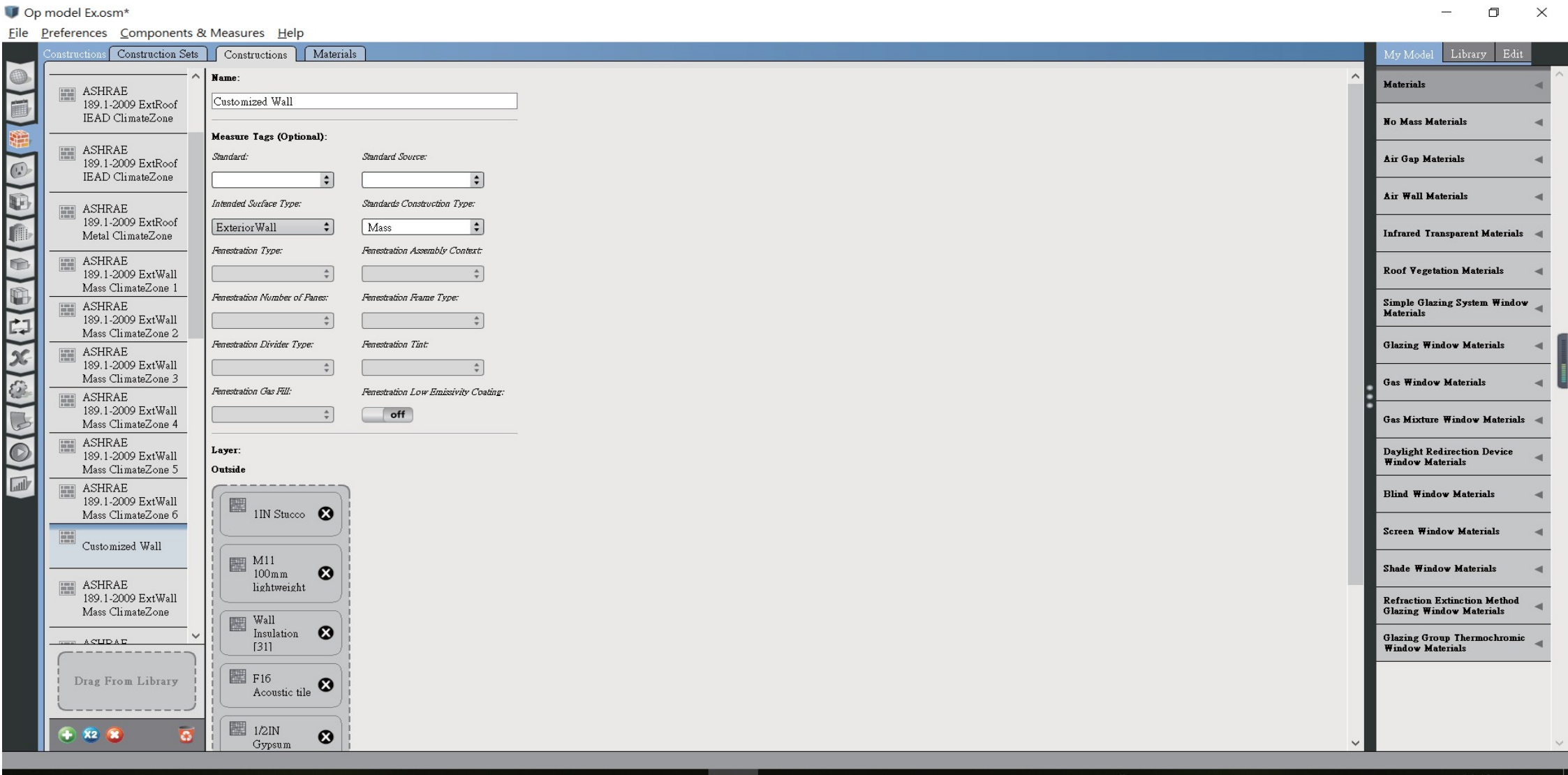


The construction sets

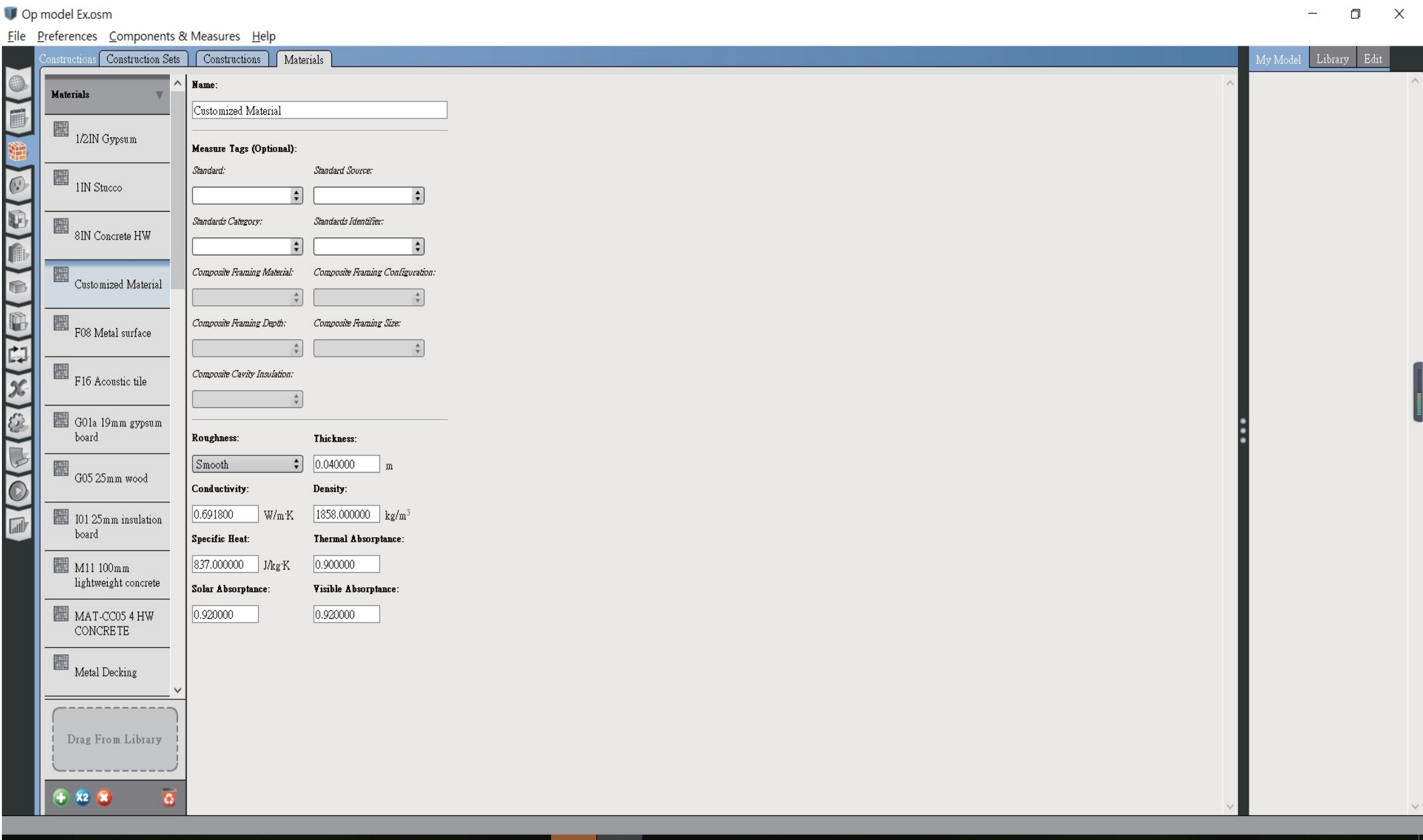


Customizing the walls





Customizing materials



Applying the customized walls to construction

Op model Ex.osm*

FilePreferencesComponents & MeasuresHelp

ConstructionsConstruction SetsConstructionsMaterials

189.1-2009 - CZ1 - Office

189.1-2009 - CZ2 - Office

189.1-2009 - CZ2 - Office 1

189.1-2009 - CZ3 - Office

189.1-2009 - CZ4 - Office

189.1-2009 - CZ5 - Office

189.1-2009 - CZ6 - Office

189.1-2009 - CZ7-8 - Office

Drag From Library

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Name

189.1-2009 - CZ1 - Office

Exterior Surface Constructions

Walls

Floors

Roofs

Customized Wall✖

ExtSlabCarp 4in ClimateZone✖

ASHRAE 189.1-2009 ExtRoof✖

Interior Surface Constructions

Walls

Floors

Ceilings

Interior Wall✖

Interior Floor✖

Interior Ceiling✖

Ground Contact Surface Constructions

Walls

Floors

Ceilings

ExtSlabCarp 4in ClimateZone✖

ExtSlabCarp 4in ClimateZone✖

ExtSlabCarp 4in ClimateZone✖

Exterior Sub Surface Constructions

Fixed Windows

Operable Windows

Doors

ASHRAE 189.1-2009 ExtWindow✖

ASHRAE 189.1-2009 ExtWindow✖

Exterior Door✖

Glass Doors

Overhead Doors

Skylights

Drag From Library

Drag From Library

Drag From Library

Tubular Daylight Domes

Tubular Daylight Diffusers

Interior Window✖

Interior Window✖

Interior Sub Surface Constructions

Fixed Windows

Operable Windows

Doors

My ModelLibraryEdit

ASHRAE 189.1-2009 ExtWall Mass ClimateZone 5

ASHRAE 189.1-2009 ExtWall Mass ClimateZone 6

ASHRAE 189.1-2009 ExtWall Mass ClimateZone 7-8

ASHRAE 189.1-2009 ExtWindow ClimateZone 1

ASHRAE 189.1-2009 ExtWindow ClimateZone 2

ASHRAE 189.1-2009 ExtWindow ClimateZone 3

ASHRAE 189.1-2009 ExtWindow ClimateZone 4-5

ASHRAE 189.1-2009 ExtWindow ClimateZone 6

ASHRAE 189.1-2009 ExtWindow ClimateZone 7-8

Customized Wall

Exterior Door

ExtSlabCarpet 4in ClimateZone 1-8

Interior Ceiling

Interior Door

Interior Floor