

Week 7 Assignment

Question 1

Solar radiation density is indeed solar constant which is the *extraterrestrial solar irradiance*. Its value is 1367 W/m^2 .

Solar radiation is presented as an energy emitted by Sun in the form of electromagnetic waves, with visible and ultraviolet lights and infrared radiation.

Due to *dispersion and absorption phenomena* Solar radiation is modified when crosses the atmosphere to reach the Earth's surface. It is modified both in spectral distribution and in total irradiance.

Global Solar radiation is called sum of **diffuse** and **direct beam Solar radiation**.

Direct solar radiation is radiation that maintained the direction of incidence.

Solar radiation absorption is due to the atmospheric components, including ozone, water and carbon dioxide, which absorb the incident radiation in absorption bands by modifying its energy spectrum.

Solar radiation depends on:

1. The sun position in the sky
2. The weather condition
3. The site altitude over the sea level
4. Sunshine hours



WE ARE NOW DRAGGING AND DROPPING

Name: new 1

Exterior Surface Constructors

Walls Floors Roofs

- ASHRAE 189.1-2009 ExtWall
- ExtSlabCa 4in ClimateZc
- ASHRAE 189.1-2009 ExtRoof

Interior Surface Constructors

Walls Floors Ceilings

- Interior Wall
- Interior Floor
- Interior Ceiling

Ground Contact Surface Constructors

Walls Floors Ceilings

- ExtSlabCa 4in ClimateZc
- ExtSlabCa 4in ClimateZc
- ExtSlabCa 4in ClimateZc

Exterior Sub Surface Constructors

Fixed Windows Operable Windows Doors

- ASHRAE 189.1-2009 ExtWindo
- ASHRAE 189.1-2009 ExtWindo
- 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 Constructors

Fixed Windows Operable Windows Doors

- Interior Window
- Interior Window
- Interior Door

Other Constructors

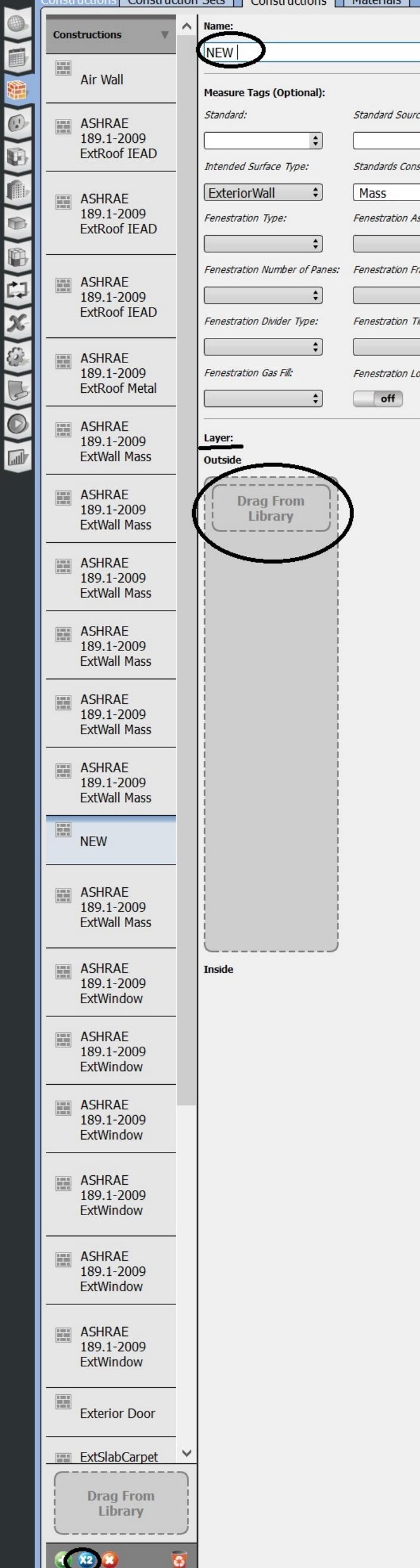
Space Shading Building Shading Site Shading

- Drag From Library
- Drag From Library
- Drag From Library

Interior Partitions

- Interior Partition

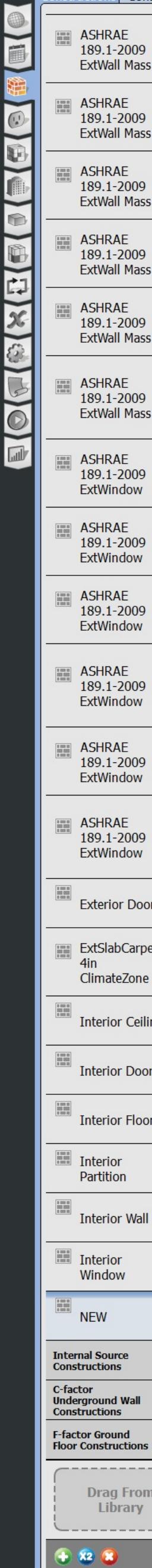
- Constructions**
- Air Wall
 - ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 1
 - ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 2-5
 - ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 7-8
 - ASHRAE 189.1-2009 ExtRoof Metal ClimateZone 6
 - ASHRAE 189.1-2009 ExtWall Mass ClimateZone 1
 - ASHRAE 189.1-2009 ExtWall Mass ClimateZone 2
 - ASHRAE 189.1-2009 ExtWall Mass ClimateZone 3
 - ASHRAE 189.1-2009 ExtWall Mass ClimateZone 4
 - 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
 - Exterior Door
 - ExtSlabCarpet 4in ClimateZone 1-8
 - Interior Ceiling
 - Interior Door
 - Interior Floor
 - Interior Partition
 - Interior Wall
 - Interior Window
 - Internal Source Constructors
 - C-factor Underground Wall Constructors
 - F-factor Ground Floor Constructors
 - Window Data File Constructors



FROM CONSTRUCTION WE CREATE NEW WALL BY
COPYING EXISTING AND CHANGING NAME AND
REMOVING LAYERS

WE NEED TO PAY
ATTENTION THAT LATER W
ADD LAYERS FROM OUTSID
TO INSIDE





Name:
NEW

Measure Tags (Optional):

Standard: Standard Source:

Intended Surface Type: Standards Construction Type:

Fenestration Type: Fenestration Assembly Context:

Fenestration Number of Panes: Fenestration Frame Type:

Fenestration Divider Type: Fenestration Tint:

Fenestration Gas Fill: Fenestration Low Emissivity Coating:

Layer:

Outside

- 1IN Stucco
- M11 100mm lightweial
- F16 Acoustic tile
- 1/2IN Gypsum

Drag From Library

Inside

No Mass Materials

Air Gap Materials

Air Wall Materials

Infrared Transparent Materials

Roof Vegetation Materials

Simple Glazing System Window Materials

Glazing Window Materials

Gas Window Materials

Gas Mixture Window

NEW LAYERS

- Materials
- 1/2IN Gypsum
 - 1IN Stucco
 - 8IN Concrete HW
 - F08 Metal surface
 - F16 Acoustic tile
 - G01a 19mm gypsum board
 - G05 25mm wood
 - I01 25mm insulation board
 - M11 100mm lightweight concrete
 - MAT-CC05 4 HW CONCRETE
 - Metal Decking
 - Metal Roofing
 - Roof Insulation [18]
 - Roof Insulation [21]
 - Roof Insulation [25]
 - Roof Insulation [26]
 - Roof Membrane
 - Wall Insulation [31]
 - Wall Insulation [35]
 - Wall Insulation [36]
 - Wall Insulation [37]
 - Wall Insulation [40]
 - Wall Insulation [42]
 - Wall Insulation [44]

- No Mass Materials
- Air Gap Materials
- Air Wall Materials
- Infrared Transparent Materials
- Roof Vegetation Materials
- Simple Glazing System Window Materials
- Glazing Window Materials
- Gas Window Materials
- Gas Mixture Window



Name:

Measure Tags (Optional):

Standard:

Standards Category:

Composite Framing Material:

Composite Framing Depth:

Composite Cavity Insulation:

Roughness: Thickness: m

Conductivity: W/m·K Density: kg/m³

Specific Heat: J/kg·K Thermal Absorptance:

Solar Absorptance: Visible Absorptance:

NOW WE DUPLICATE
THIS MATERIAL TO MAKE
NEW ONE



NEW MATERIAL

Name:

Measure Tags (Optional):

Standard: Standard Source:

Standards Category: Standards Identifier:

Composite Framing Depth: Composite Framing Size:

Composite Cavity Insulation:

Roughness: Thickness: m

Conductivity: W/m·K Density: kg/m³

Specific Heat: J/kg·K Thermal Absorptance:

Solar Absorptance: Visible Absorptance:

USING THIS TOOL WE DUPLICATE MATERIAL



189.1-2009 - CZ1 - Office
189.1-2009 - CZ2 - Office
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
new 1

Name
189.1-2009 - CZ1 - Office

Exterior Surface Constructors

Walls Floors Roofs

NEW ExtSlabCa 4in ClimateZc ASHRAE 189.1-2009 ExtRoof

Interior Surface Constructors

Walls Floors Ceilings

Interior Wall Interior Floor Interior Ceiling

Ground Contact Surface Constructors

Walls Floors Ceilings

ExtSlabCa 4in ClimateZc ExtSlabCa 4in ClimateZc ExtSlabCa 4in ClimateZc

Exterior Sub Surface Constructors

Fixed Windows Operable Windows Doors

ASHRAE 189.1-2009 ExtWindo ASHRAE 189.1-2009 ExtWindo Exterior Door

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Tubular Daylight Domes Tubular Daylight Diffusers

Interior Window Interior Window

Interior Sub Surface Constructors

Fixed Windows Operable Windows Doors

Interior Window Interior Window Interior Door

Other Constructors

Space Shading Building Shading Site Shading

Drag From Library Drag From Library Drag From Library

Interior Partitions

Drag From Library Interior Partition

WE PUT NEW MATERIAL IN THE WALL IN CONSTRUCTION SET

Air Wall
ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 1
ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 2-5
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Interior Wall
Interior Window
NEW
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F-factor Ground Floor Constructors
Window Data File Constructors