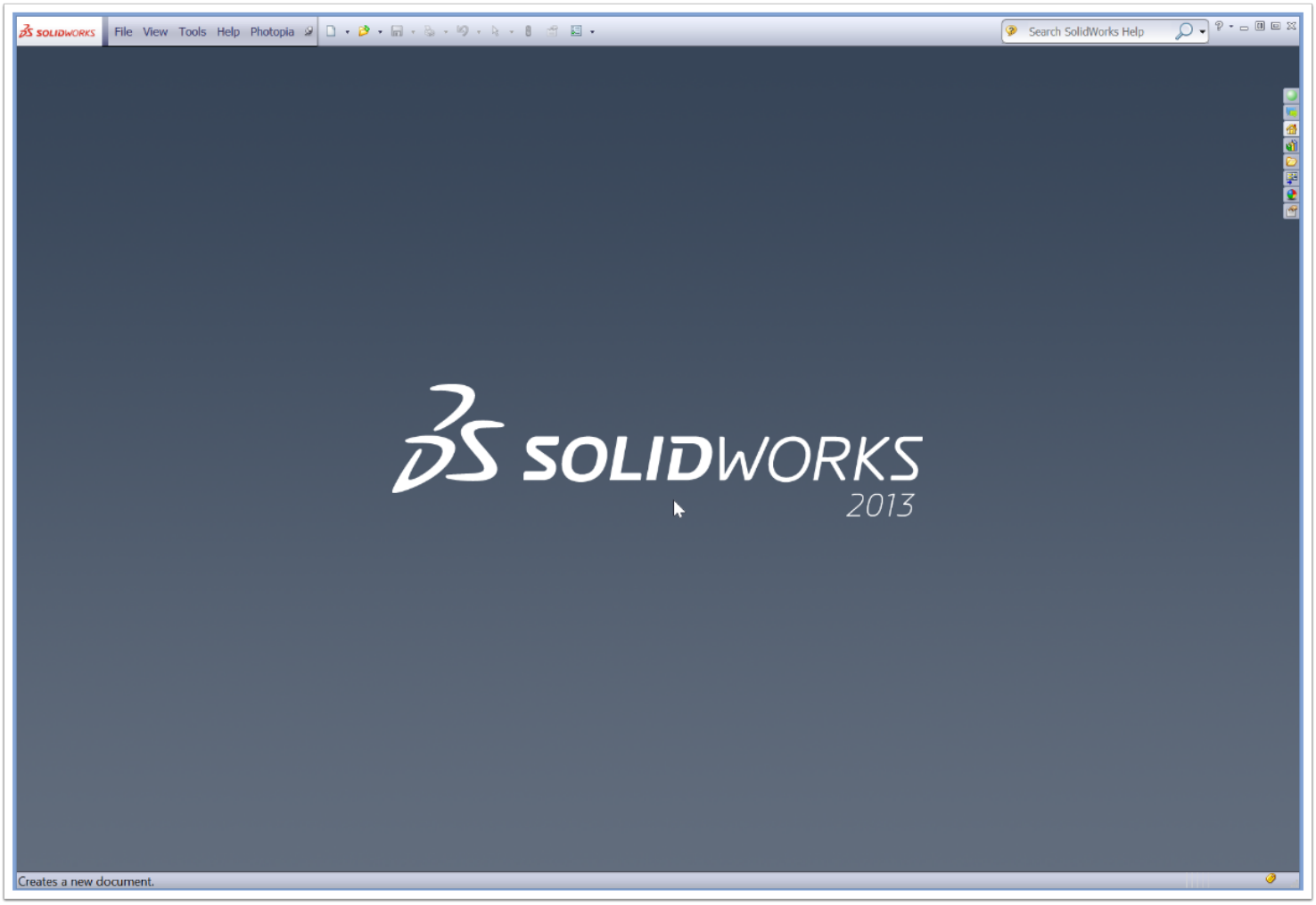
1. Open SOLIDWORKS

We will have part files for all compoents of the device, and then create an assembly with these devices as well as the Photopia daylighting lamps.



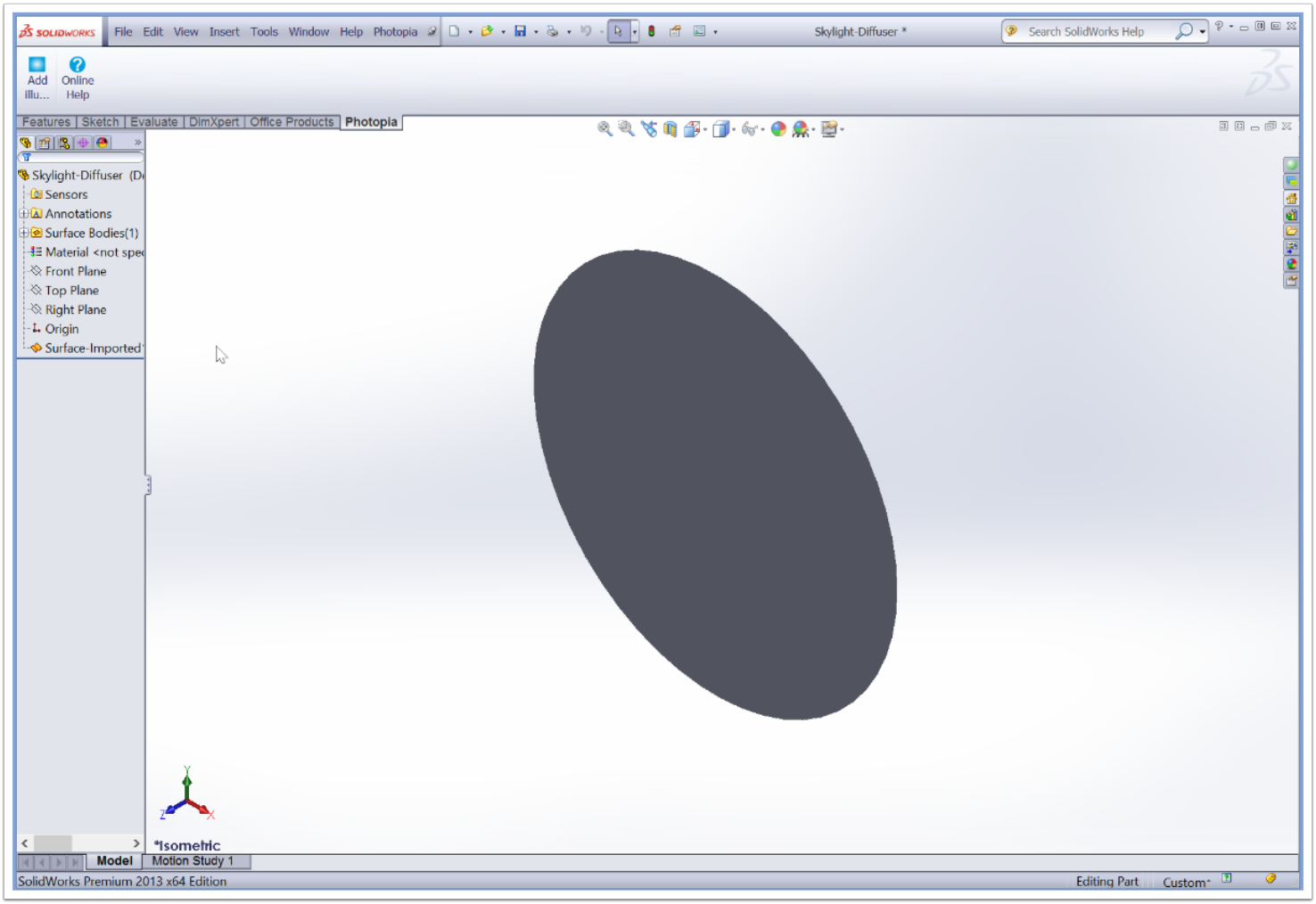
2. Gather Part files for the tube components.

If you're using Solidworks 2015, you may open the following part files:

- LowerMask-2015.SLDPRT
- Skylight-Dome-2015.SLDPRT
- Skylight-Diffuser-2015.SLDPRT
- Skylight-Tube-2015.SLDPRT

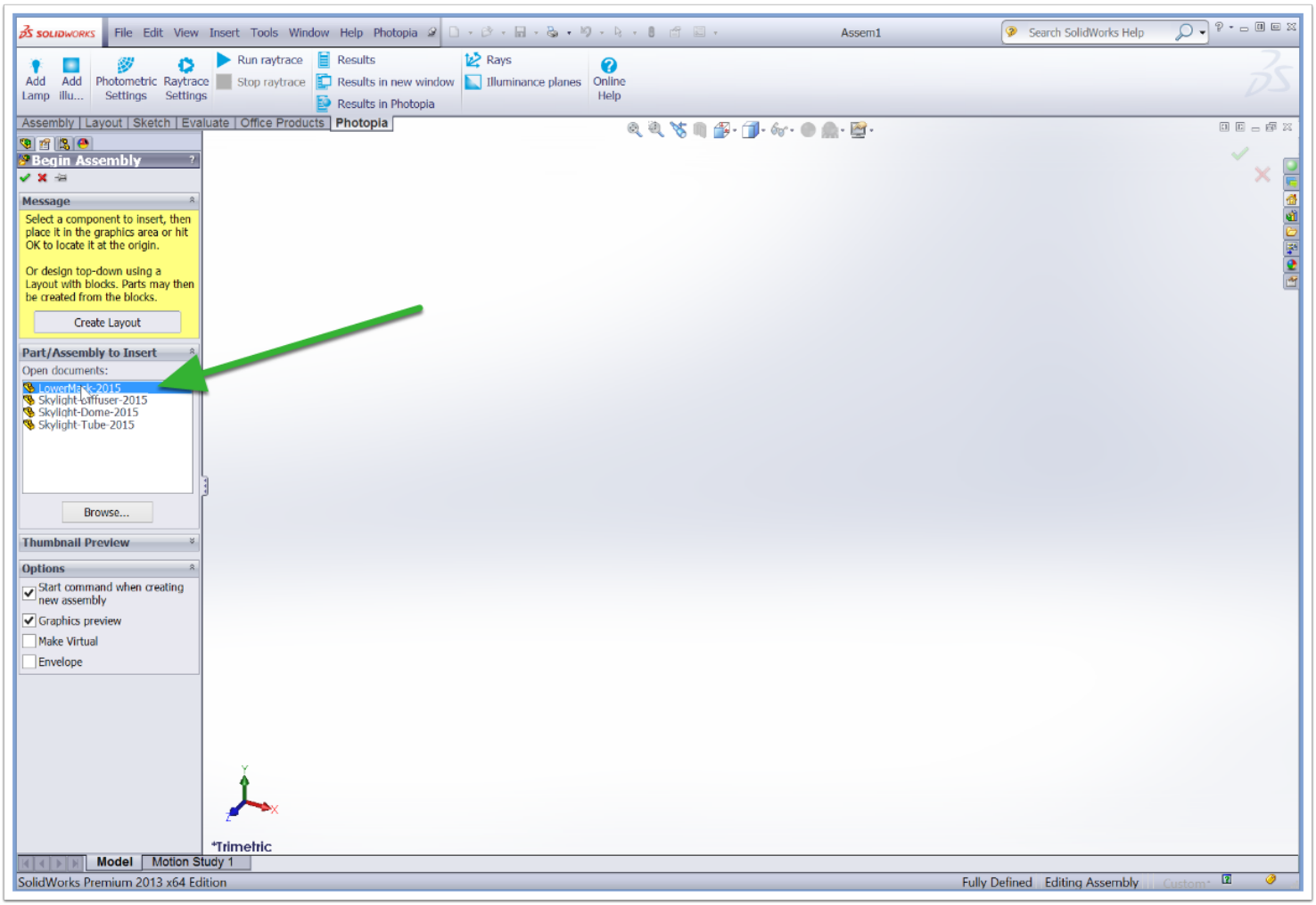
If you're using another version of Solidworks, open the following STEP files and save them to part files:

- LowerMask.stp
- Skylight-Dome.stp
- Skylight-Diffuser.stp
- Skylight-Tube.stp


File Edit View Insert Tools Window Help Photopia
Skylight-Diffuser *
Search SolidWorks Help
Add
Online
Help
Features Sketch Evaluate DimXpert Office Products Photopia
Skylight-Diffuser
Sensors
Annotations
Surface Bodies(1)
Material <not spec
Front Plane
Top Plane
Right Plane
Origin
Surface-Imported
*Isometric
Model
Motion Study 1
SolidWorks Premium 2013 x64 Edition
Editing Part
Custom

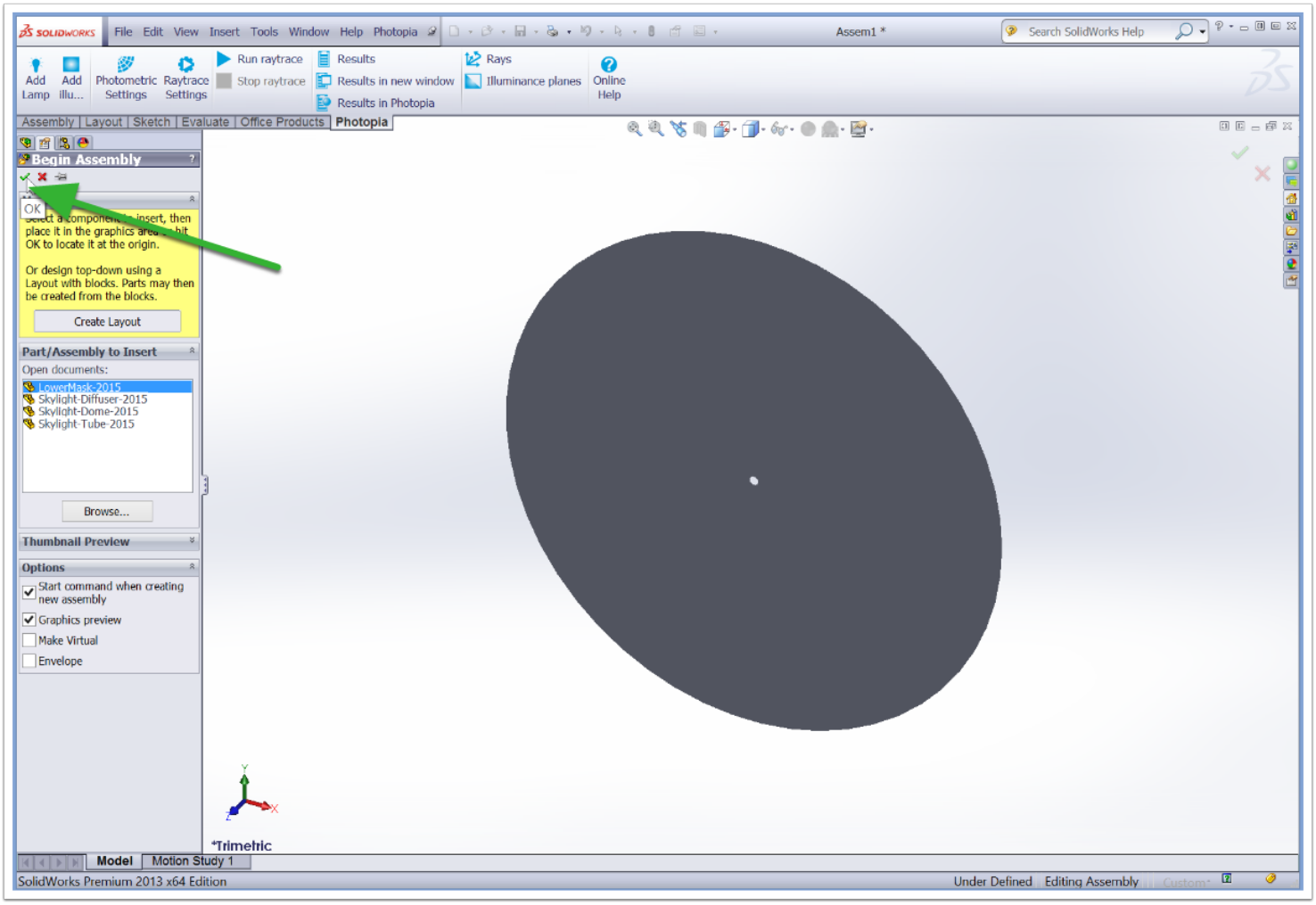
3. Create new Assembly

Create a new assembly by going to File > New > Assembly.



4. Drop in part files

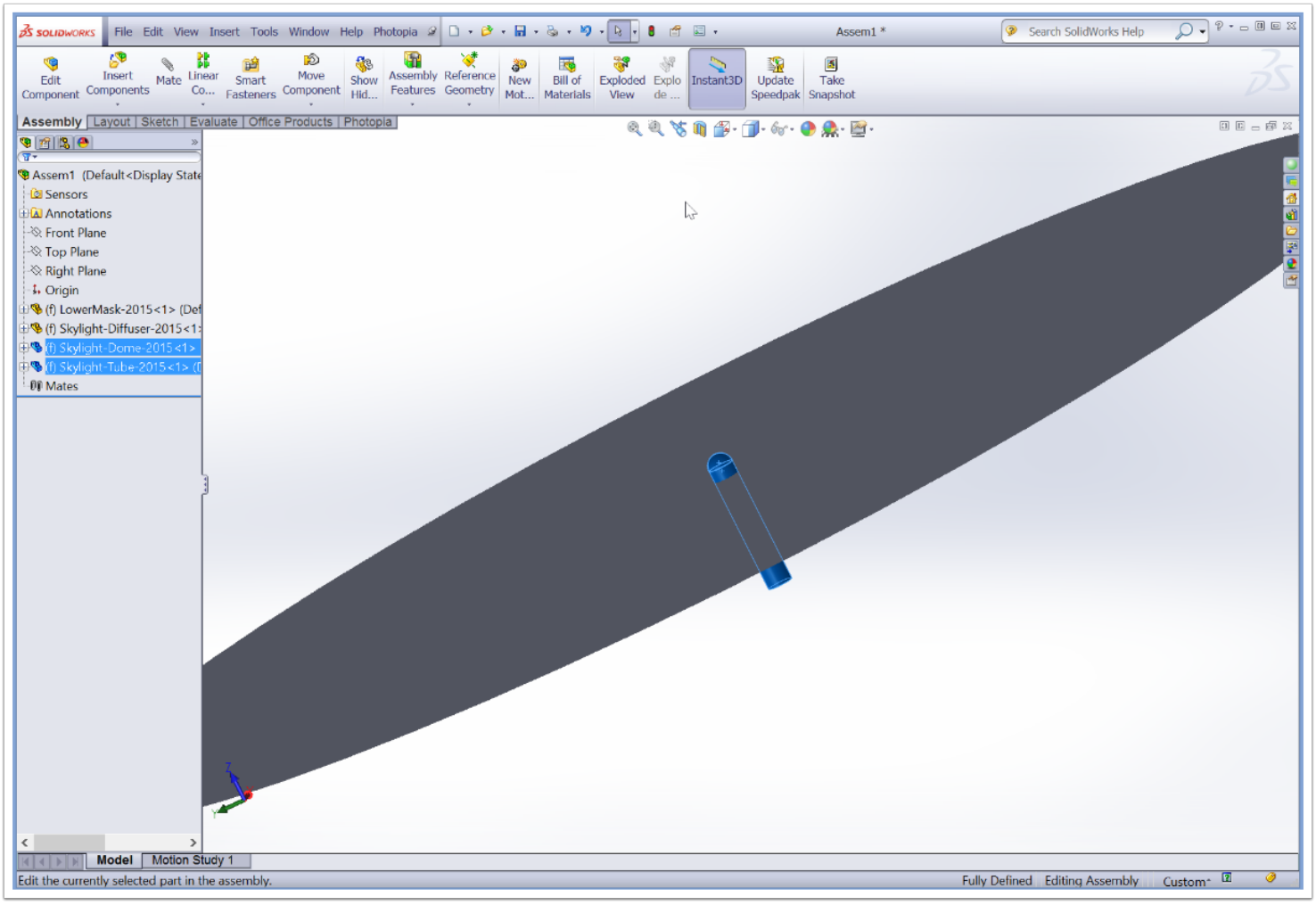
Select a part file in the "Open documents" list, and then hit the green check mark to drop the part in at the default position. Do this for all 4 parts.



5. All Parts Imported

With all parts imported you can see the start of our setup. There is an entrance dome, which the sunlight will enter thru. There is a long tube that the sunlight will bounce down. At the exit there is a flat diffuser which will spread the light more evenly over the space.

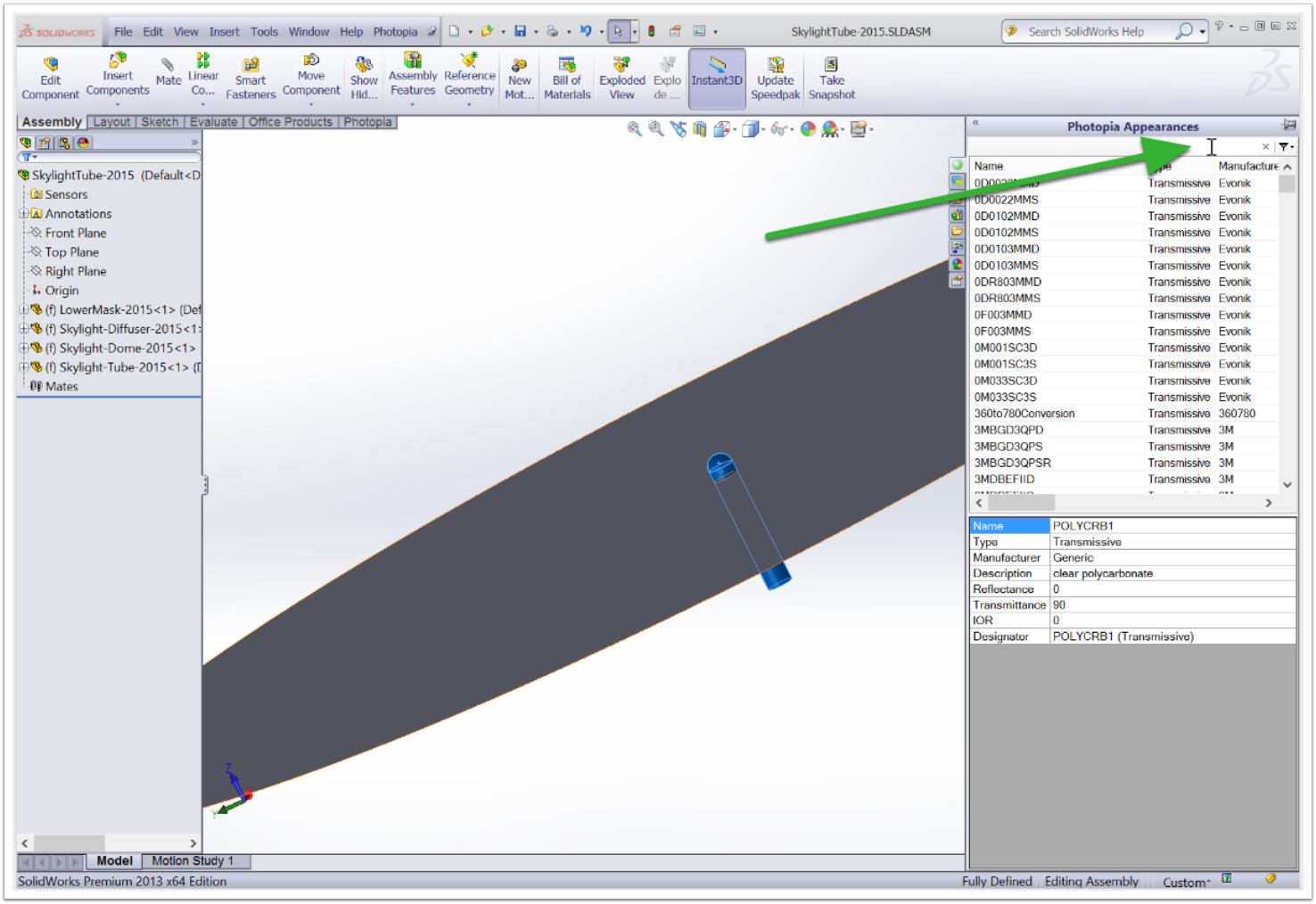
Finally there is a large circular mask. This mask should be greater than 813" in diameter, with just a hole in the center for the tube. This mask will block any light that doesn't make it into the tube from contributing to our output.



6. Assign materials

To assign materials, open the Photopia Appearances Tab. Use the Search box at the top to enter "Polycarb", select the POLYCRB1 Transmissive material, and drag it onto the "Skylight-Dome-2015" Part in the Feature Tree. Since these were imported surfaces, you must drag the appearance onto the "shell_1" entity in the "Surface Bodies" folder for each part.

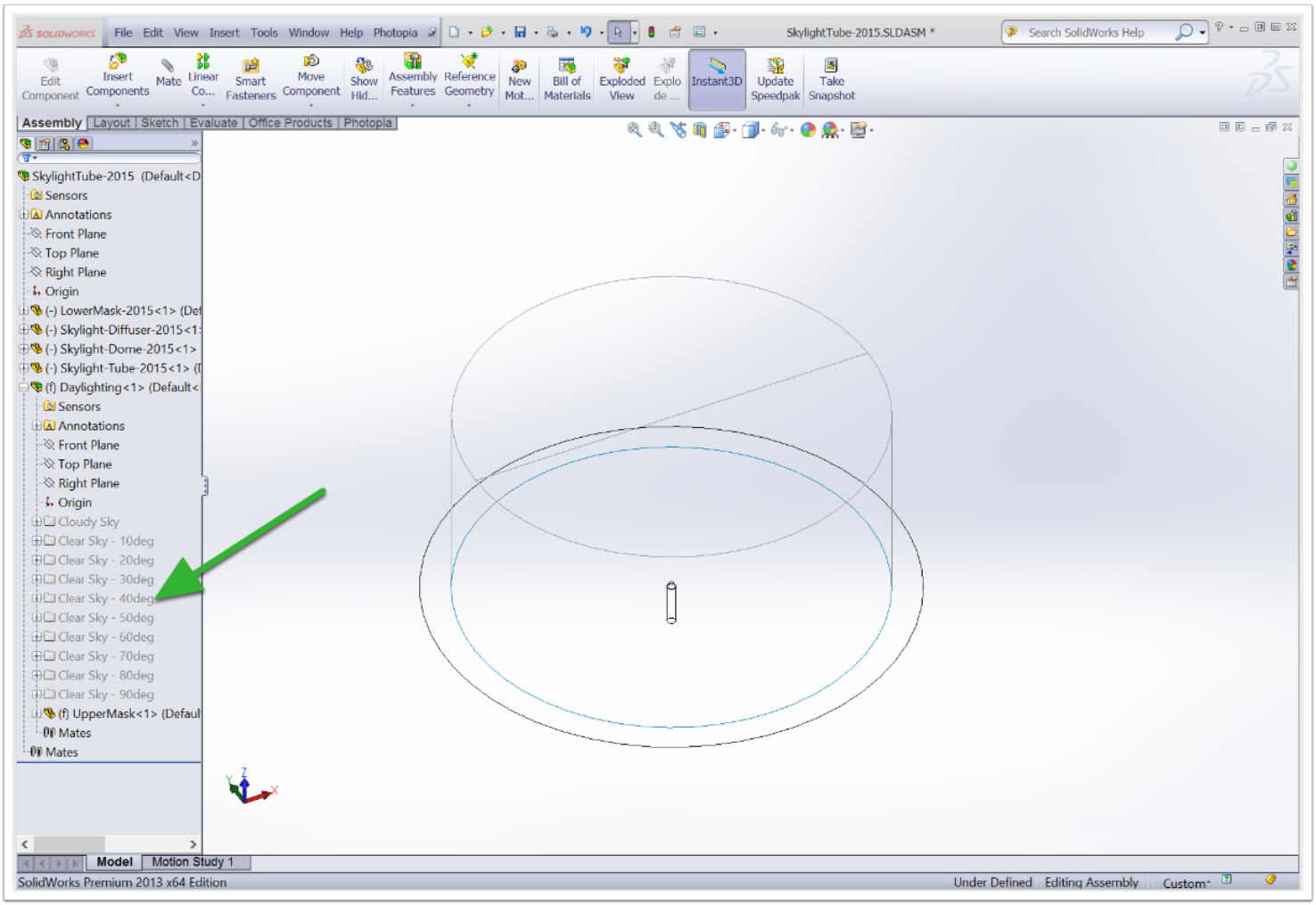
- Skylight-Dome - POLYCRB1 Transmissive
- Skylight-Diffuser - PLSKWK12D Transmissive (Pattern 12 lens)
- Skylight-Tube - ALMIRO04 Reflective (Alanod Miro 4)
- LowerMask - ZERO0000 Reflective



7. Add in Daylighting Assembly

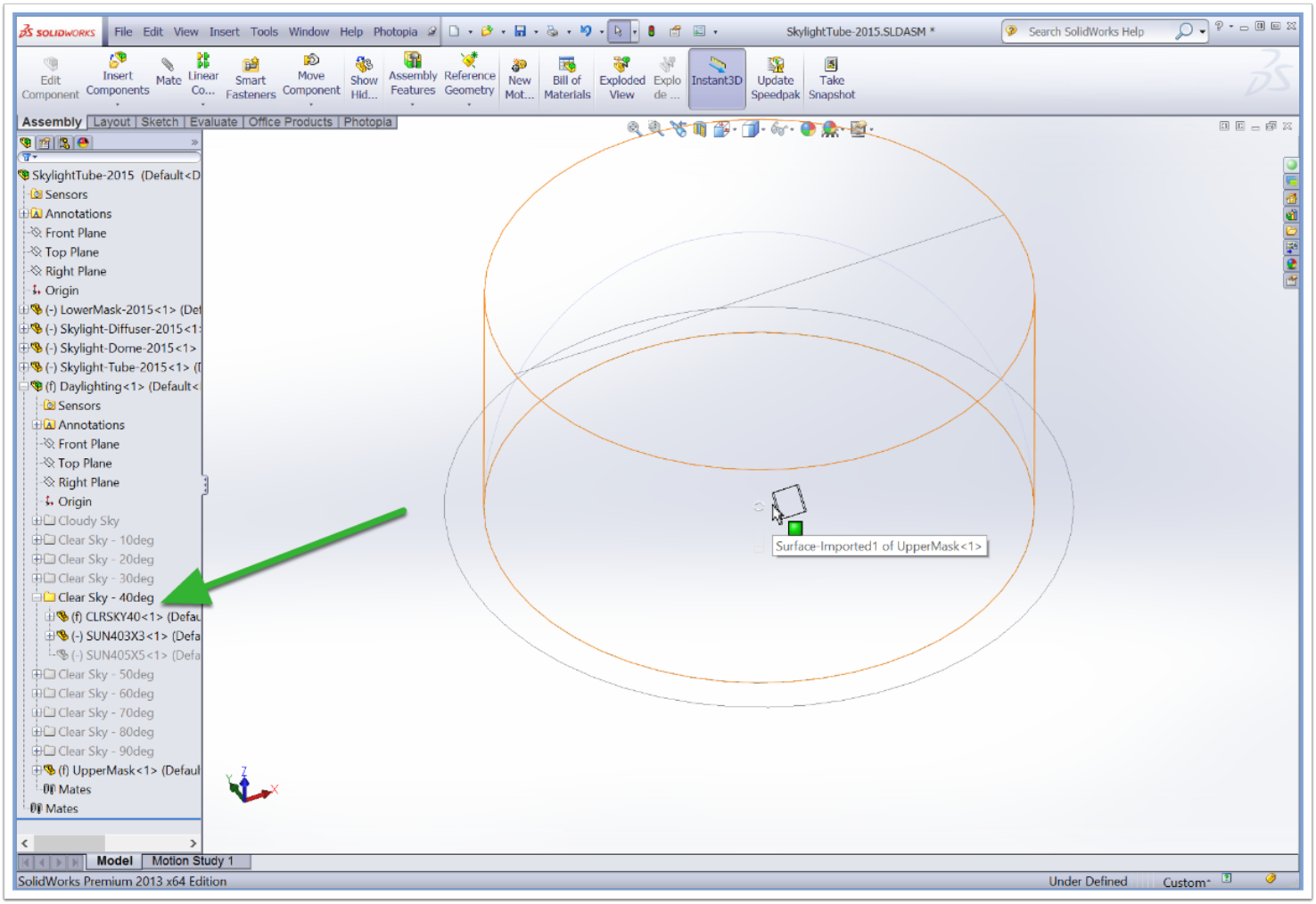
Import the Daylighting Assembly into your assembly. This is found in C:\ProgramData\LTI Optics\Solidworks\Lamps\Daylighting.sldasm.

This assembly has an upper mask, as well as sun and sky models for every 10deg of altitude, organized into folders.



8. Active a sun and sky model

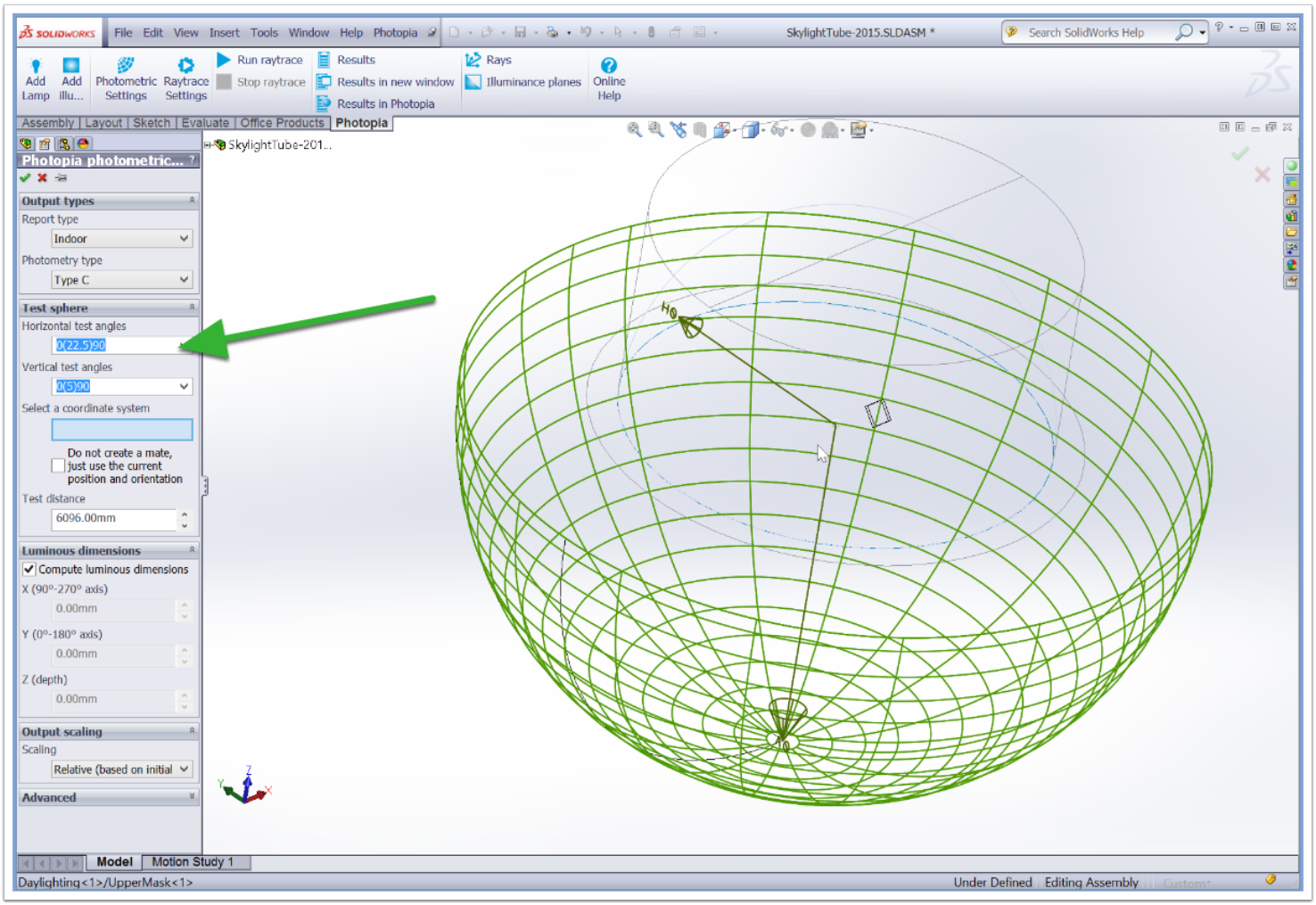
Expand the Clear Sky - 40deg folder. Select the CLRSKY40 and SUN403X3 parts and un-supress them. This will activate the clear sky and a 3'x3' sun patch at the 40deg solar altitude angle.



9. Photometric Settings

Choose Photopia > Photometric Settings.

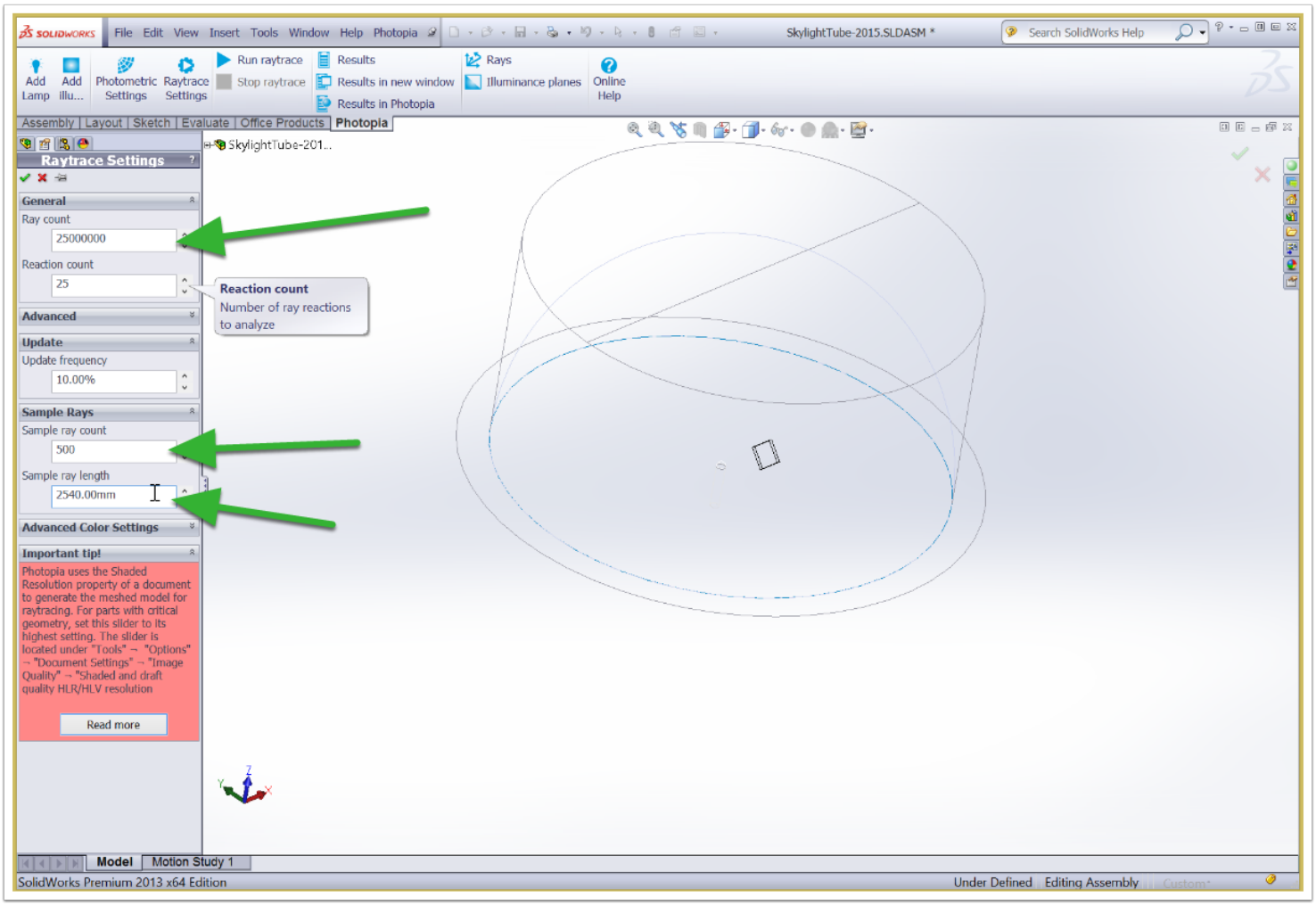
You will see a hemisphere that shows the test zones. Here we can set the test angles, as well as the test distance. For this project we need to change the Horizontal test angles to 0(22.5)180 so that we capture both North and South distributions (the sun is directly South in this simulation).



10. Raytrace Settings

We will increase the Ray Count to 25 million, and may need to increase further after the first raytrace. With the daylighting models, lots of rays get absorbed by the mask, so we need a high ray count so enough rays make it into the skylight tube.

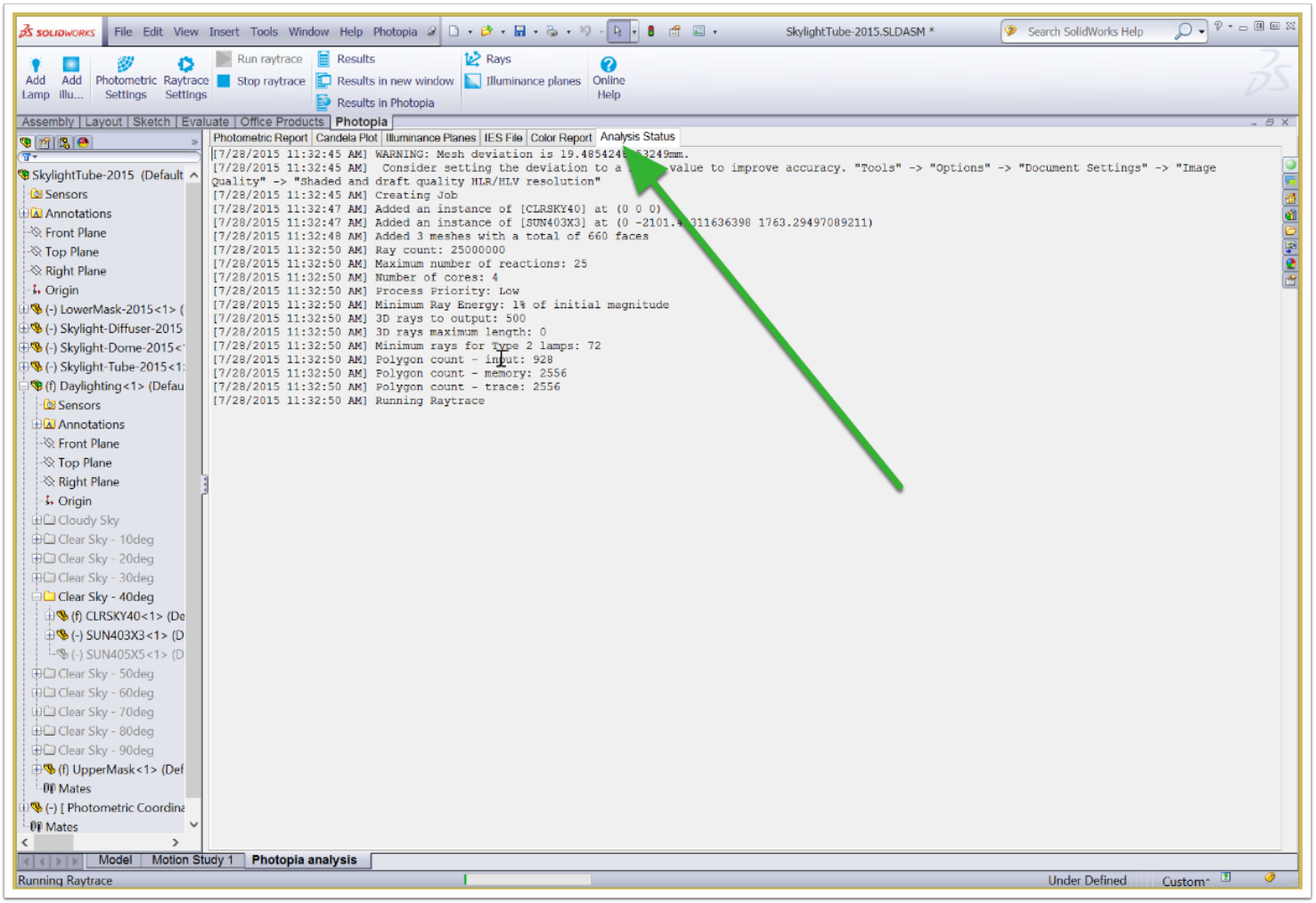
We'll also ask for 500 sample rays that are 254000mm in length.



11. Run Raytrace

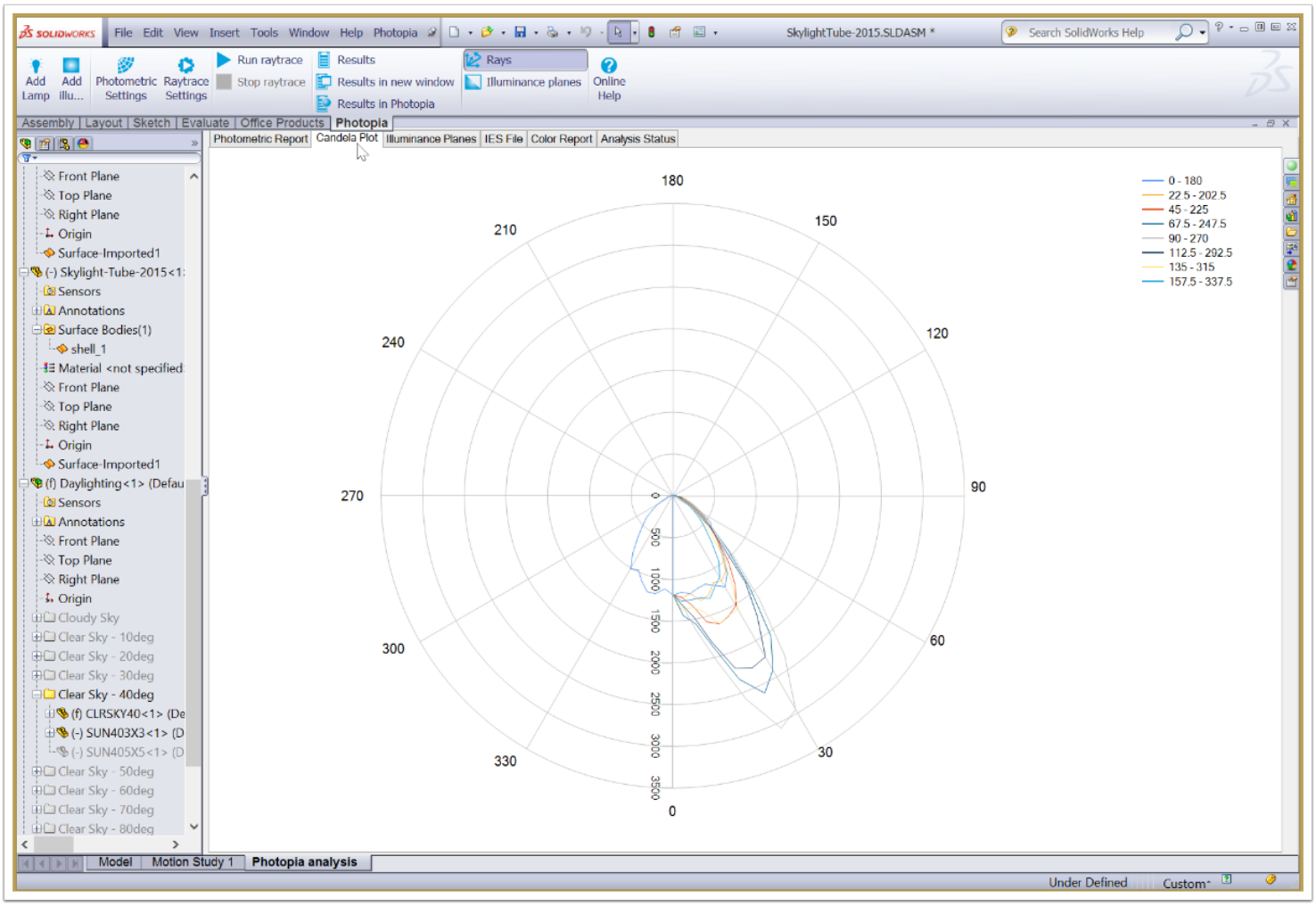
Choose Run Raytrace. We can see the progress by chooing Results > Analysis Status. This will indiate the progress and estimated completion time.

After the first update we can view the Photometric Report and Candela Plot.



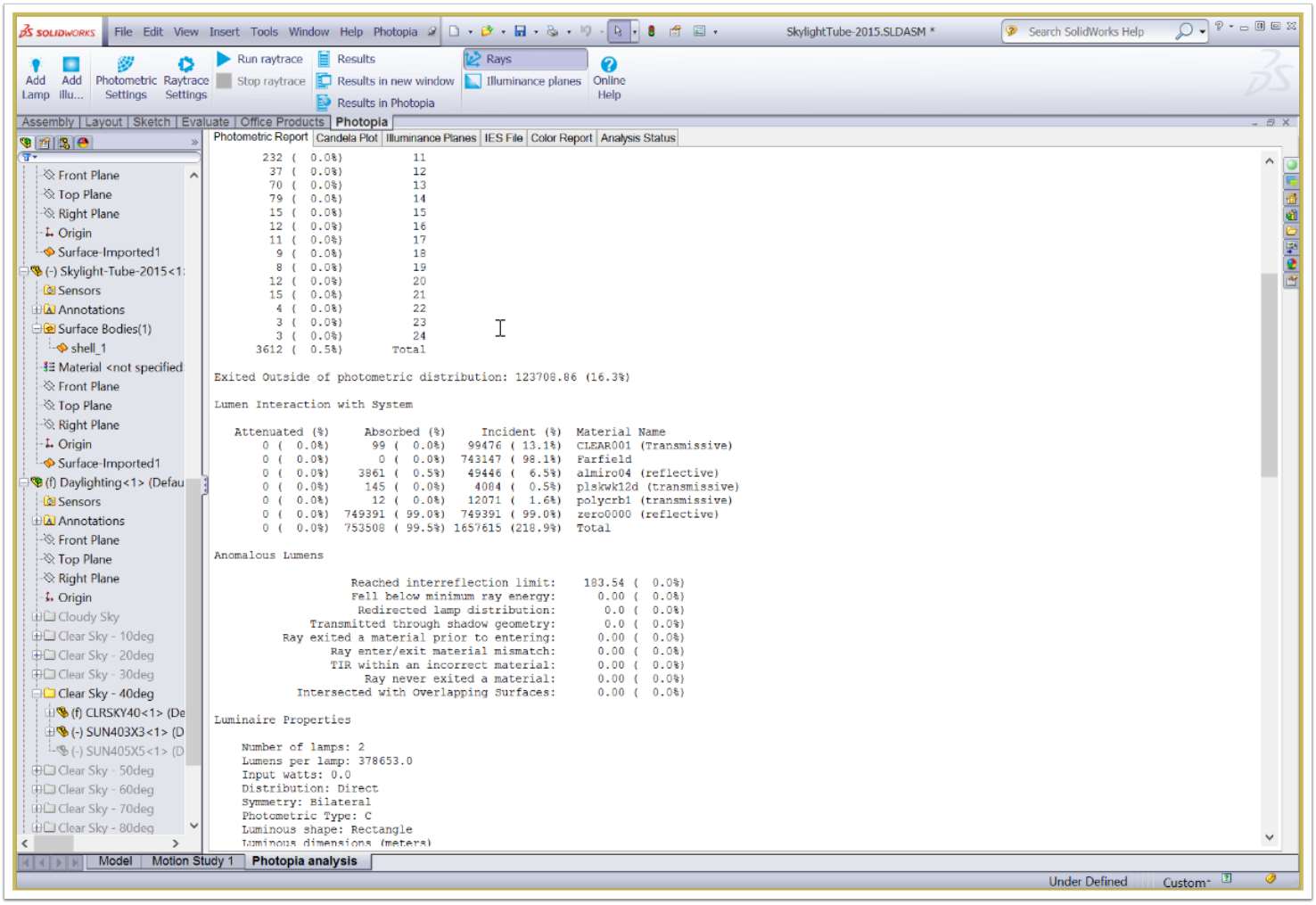
12. Candela Plot

The candela plot shows the distribution of light from the daylight device.



13. Photometric Report

The Photometric Report shows how many lumens exited the system and which materials they interacted with.



14. IES File

You can view and export the IES file to use in other programs for layouts.