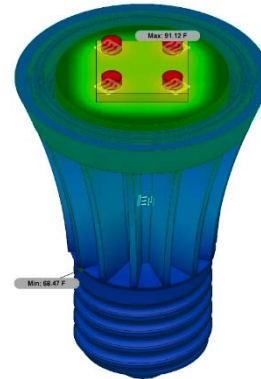


Lesson: Heat transfer

In this lesson, you will develop an effective heat sink design for an LED light bulb by using heat transfer simulation.

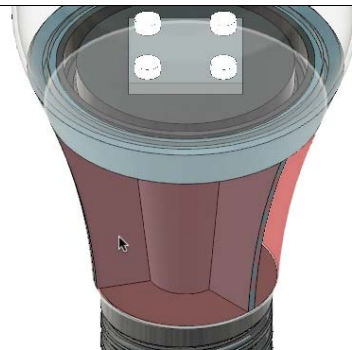
Learning Objectives:

- Set up a heat transfer study.
- Modify design and reanalyze the model.

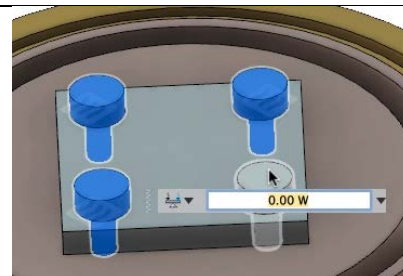


The completed exercise

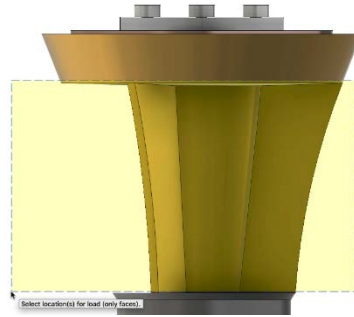
1. Open the file LED Bulb.f3d and save it to your current project. Switch to the Simulation workspace and choose the Thermal study type. There is a shape that was used to trim the cooling fans. Select this body and delete it. In the Browser, select the Globe then in the context menu select Remove. Click Finish Simplify. Using Study Materials, examine the different materials used in the model.



2. Use the Thermal Loads control panel to change the Type to Internal Heat for the four diodes. Apply an internal heat value of 25.00 Watts. Click OK.



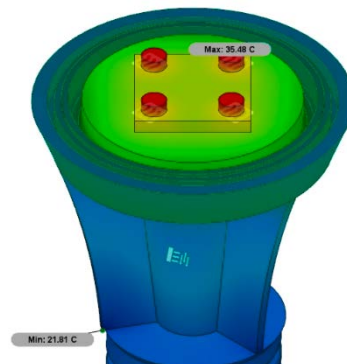
3. Use the Thermal Loads control panel to apply a Convection. Box select the surfaces of the heat sink. Set a convection value of 1000.00 W then change the temperature units to Fahrenheit and set the Temperature Value to 70 degrees.



4. In the Display panel, select the Degrees of Freedom view. Then Generate Automatic Contacts. Note that after the contacts are made then the entire assembly is seen as conducting.



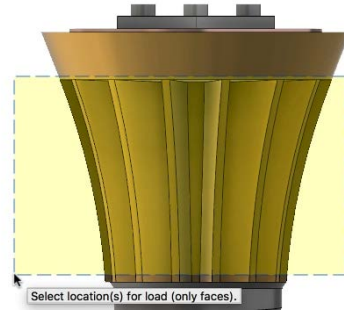
5. Solve the model and run it Locally. Examine the results. Since the goal is to keep the bulb under 80 degrees F so the design needs to be tweaked.



6. Return to the Model workspace. The last item in the timeline is a circular pattern. Double click on the circular pattern and update the Quantity to 14. Click OK to update the model.



7. Return to the simulation workspace. Edit the existing Convection Load and clear the current selection set then reselect the surfaces of the heat sink.



8. Solve the simulation Locally and examine the results. Drag the lower threshold of the temperature scale up to 80 degrees and note that all the external surfaces are all below 80 degrees F.

