Hana Abou Baker

Week 5

Task 1: In your own words (which means in your own words) write a summary of the topics about radiative heat transfer we went through including the definitions of emissivity, absorptivity and reflectivity, the view factor, the heat exchange between two black surfaces, the heat exchange between the two gray surface and finally the definition of radiative resistances

Emissivity:

Those emissivity of the surface of a material will be its viability On emitting vitality Likewise thermal radiation. Emissivity is a surface benefit which characterizes the extent to which radiation an object discharges In a provided temperature contrasted with A black body toward those same temperature.
Thus,

$0 \leq \varepsilon \leq 1$ where ε is the emissivity coefficient.

A surface's emissivity is simply the percentage of the emitting substrate. The remaining layer percentage is reflected.

Absorptivity

It is the quantity of heat penetrating an object or a fabric currently when the temperature is raised. It is the fraction of incident radiation absorbed by the surface. It is calculated by

$\alpha = \frac{Absorbed\ rad}{Irradiation} = \frac{Gabs}{G}$ **the value varies from 0 to 1.**

Reflectivity

It is the fraction of incident radiation reflected by the surface. It is calculated by

$\rho = \frac{Reflected\ rad}{Irradiation} = \frac{Gred}{G}$ **the value varies from 0 to 1.**

What is a view factor?

It is the component of energy leaving a surface which is halted by a subsequent one. It just relies upon geometry and not on the surface properties.

The heat exchange between two black surfaces?

It is the radiation leaving the whole first surface striking to the second surface short the radiation leaving the subsequent whole surface that strikes the main surface.

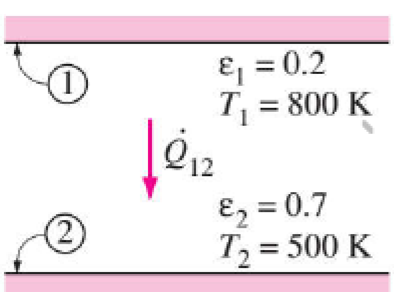
The heat exchange between two grey surfaces?

This system will reflect/absorb a given fraction of the thermal radiation a black body would absorb.

What is radiative resistances?

It is the capacity of a surface to stand up against radiation heat exchange this property depends on geometry and in general warm resistance of the fabric.

Task 2 Solve the last example you solved in the class (radiative heat exchange between two parallel plates) while considering the two emissivity to be 0.1, what can you conclude from the result?



When $\varepsilon_1 = 0.2$; $\varepsilon_2 = 0.7$

$R_{Total} = \frac{1}{0.2} + \frac{1}{0.7} - 1 = 5.43$

$\dot{Q}_{12} = A\sigma\,(T_1^4 - T_2^4) / (1/\epsilon_1) + (1/\epsilon_2) - 1 = \frac{A*(5.67*10^{-8})*(800^4 - 500^4)}{\frac{1}{0.2}+\frac{1}{0.7}-1} = 3625.4*A$ **W**

When $\varepsilon_1 = \varepsilon_2 = 0.1$;

$R_{Total} = \frac{1}{0.1} + \frac{1}{0.1} - 1 = 19$

$\dot{Q}_{12} = \frac{A*(5.67*10^{-8})*(800^4-500^4)}{\frac{1}{0.1}+\frac{1}{0.1}-1} = 1035.8*A$ **W**