Transmissivty τ
Absorbed $\alpha=1-\tau$
Internal heat source of surface = $238 W/m^2$
$\varepsilon\sigma$
Incoming radiation to shell:
σT_s^4
Absorbed by shell is:
$\alpha\sigma T_s^4$
Balance of shell is:
$\sigma T_L^4=\alpha\sigma T_s^4$ or $T_L^4=\alpha T_s^4$
Emission of shell is:
$\varepsilon_L=\sigma T_L^4$ or $\varepsilon_L=\sigma\alpha T_s^4$
$\varepsilon_L=\alpha\varepsilon_s$

Incoming radiation to surface:
238 + Incoming from shell or $238+\varepsilon_L/2$
Absorbed by surface:
$238+\varepsilon_L/2$
Balance of surface:

$\sigma T_s^4=238+\varepsilon_L/2$	substitute for ε_L
$\sigma T_s^4=238+\sigma\alpha T_s^4/2$	solve for T_s
$238=\sigma T_s^4-\sigma\alpha T_s^4/2$	combine left side
$238=(2\sigma T_s^4-\sigma\alpha T_s^4)/2$	factor out T_s^4 and σ
$476=T_s^4\sigma(2-\alpha)$	isolate T_s^4
$476/\sigma(2-\alpha)=T_s^4$	fourth root and sub α

$T_s=(476/\sigma(2-(1-\tau)))$^.25

$$Ts=\sqrt[4]{\left(\frac{476}{\sigma(1+\tau)}\right)}$$

Now let's solve for the total emission, ε_T, at the top:

$\varepsilon_T=\tau\varepsilon_s+\varepsilon_L/2$ $\qquad$ $\sigma T_s^4=238+\varepsilon_L/2$

$\varepsilon_T=\tau\sigma T_s^4+\sigma T_s^4-238$ $\qquad$ factor out σT_s^4

$\varepsilon_T=\sigma T_s^4(\tau+1)-238$ $\qquad$ $Ts=\sqrt[4]{\left(\frac{476}{\sigma(1+\tau)}\right)}$

$\varepsilon_T=\sigma((476/\sigma(1+\tau))^{\cancel{1/4}})^4(\tau+1)-238$

$\varepsilon_T=\sigma(476/\sigma\cancel{(1+\tau)})\cancel{(\tau+1)}-238$

$\varepsilon_T=\cancel{\sigma}(476/\cancel{\sigma})-238$

$\varepsilon_T=476-238$

$\varepsilon_T=238$

Quantity of emission is independent of transmissivity. Once the system reaches steady state the emission out the top will be $238 W/m^2$.