

E-Mail: am_omidvar124@yahoo.com

$(m^2 K/W)$



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Bjarne, Olesen .
Chen Y . []

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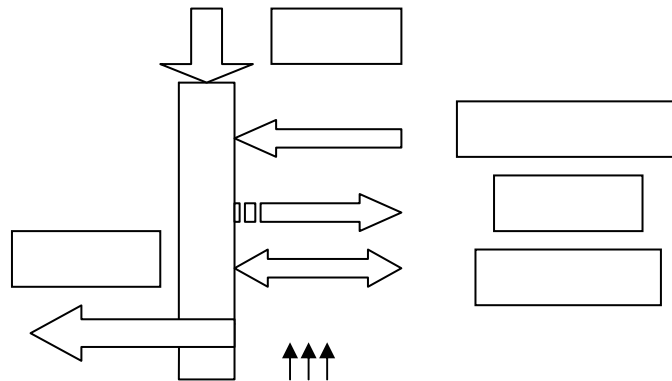
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Hanibuchi Haruo.
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Bjarne, Olesen

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(αG)

$()$

(ϵE_b)

(q_{Conv})

(q_{Cond})

$()$

$[]$

$$\alpha G - \epsilon E_b + q_{conv} - q_{Cond} = 0$$



$$\alpha G - \varepsilon \sigma T_s^4 + h(T_{air} - T_s) - \frac{T_s - T_o}{R_{th}} = 0 \quad ()$$

$$\sigma, \quad T_s, \quad G, \quad \alpha$$

$$R_{th}, \quad T_o, \quad h,$$

$$\sum_{i=1}^6 h(T_{s,i} - T_{air}) = 0 \quad ()$$

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$$\sum_{i=1}^6 hA(T_{s,i} - T_{air}) = \dot{m}_{inf} C_{p,air} (T_{air} - T_{inf}) \quad ()$$

$$T_{inf} \quad \dot{m}_{inf}$$

$$h_{in} A_i (T_{air} - T_i) + \varepsilon (\sigma A_i) \left\{ \sum_{j=1}^6 F_{ij} (T_j^4 - T_i^4) \right\} = \frac{(T_i - T_o) A_i}{(R_{w,i} + \frac{1}{h_e})} \quad i = 1, 2, \dots, 5 \quad ()$$

$$F_{ij}, \quad \varepsilon, \quad A, \quad h_e, \quad h_{in}$$

$$k, \quad L, \quad R_w = \frac{L}{k}, \quad T_o$$

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$$h_{in} A_6 (T_{air} - T_6) + \varepsilon (\sigma A_6) \left\{ \sum_{j=1}^6 F_{6j} (T_j^4 - T_6^4) \right\} + Q = 0 \quad ()$$

$$Q$$

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$$\sum_{i=1}^6 h_{in} A(T_{s,i} - T_{air}) = \dot{m}_{inf} C_{p,air} (T_{air} - T_{inf}) \quad ()$$

$$: [] \quad () \quad h_{in}$$

$$h_{in} = 1.31(T_s - T_{air})^{0.333} \quad (W / m^2 K) \quad \square \quad ()$$



$$h_{in} = 1.52(T_s - T_{air})^{0.333} \quad (W / m^2 K)$$

$L.U$

(9)

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$$f(M, W, I_{cl}, t_a, t_{mrt}, v, P_a) = 0.0$$

$$P_a, v, t_{mrt}, t_a, I_{cl}, W, M$$

$$(M - W) - 3.05 * 10^{-3} * [5733 - 6.99(M - W) - P_a] - 0.42[(M - W) - 58.12] - 1.7 * 10^{-5} * M(5867 - P_a) - 0.0014M(34 - t_a) = 3.96 * 10^{-8} * f_{cl}[(t_{cl} + 273)^4 - (t_{mrt} + 273)^4] - f_{cl}h_c(t_{cl} - t_a) \quad ()$$

$$t_{cl} = 35.7 - 0.028(M - W) - 0.155I_{cl} \{ (M - W) - 3.05 * 10^{-3} * [5733 - 6.99(M - W) - P_a] - 0.42[(M - W) - 58.15] - 1.7 * 10^{-5} * M * (5867 - P_a) - 0.0014M(34 - t_a) \} \quad ()$$

$$f_{cl} = 1 + 0.2I_{cl} \quad : \quad I_{cl} < 0.5clo \quad ()$$

$$f_{cl} = 1.05 + 0.1I_{cl} \quad : \quad I_{cl} > 0.5clo$$

$$1 \text{ } clo = 0.155 \quad (m^2 K / W) : \quad clo$$

- 4- Simple iterative update of coefficient
- 5- Under Relaxation Factor
- 6- Fanger



$$PMV = (0.303e^{-0.036M} + 0.028) \{ (M - W) - 3.05 \cdot 10^{-3} [5733 - 6.99(M - W) - P_a] - 0.42[(M - W) - 58.15] - 1.7 \cdot 10^{-5} M (5867 - P_a) - 0.0014M(34 - t_a) - 3.96 \cdot 10^{-8} * f_{cl} [(t_{cl} + 273)^4 - (t_{mrt} + 273)^4] - f_{cl} h_c (t_{cl} - t_a) \} \quad ()$$

:

$$t_{cl} = 35.5 - 0.028(M - W) - 0.155I_{cl} \{ 3.96 \cdot 10^{-8} * f_{cl} [(t_{cl} + 273)^4 - (t_{mrt} + 273)^4] + f_{cl} h_c (t_{cl} - t_a) \} \quad ()$$

PMV

$$-0.5 < PMV < +0.5, ()$$

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°C

 $(W / m^2 K)$

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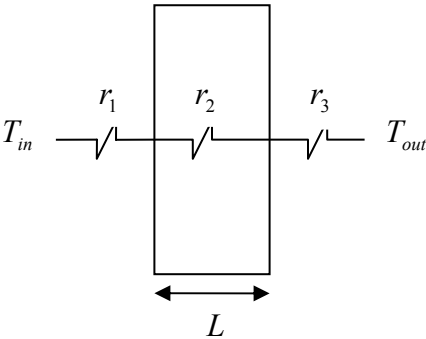
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(Clo)

/ (m/s)

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$$q = \frac{T_{in} - T_{out}}{\sum_{i=1}^3 r_i} \qquad r_1 = \frac{1}{h_i A} \text{ , } r_2 = \frac{L}{kA} \text{ , } r_3 = \frac{1}{h_e A} \qquad (\quad)$$

, (r₂)

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$R_5 \quad R_1$

$T_{surface}$,

$T_{surface} = f(r_2) \qquad r_2$

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$$q = \frac{T_{surface} - T_{out}}{r_2 + r_3} \qquad (\quad)$$

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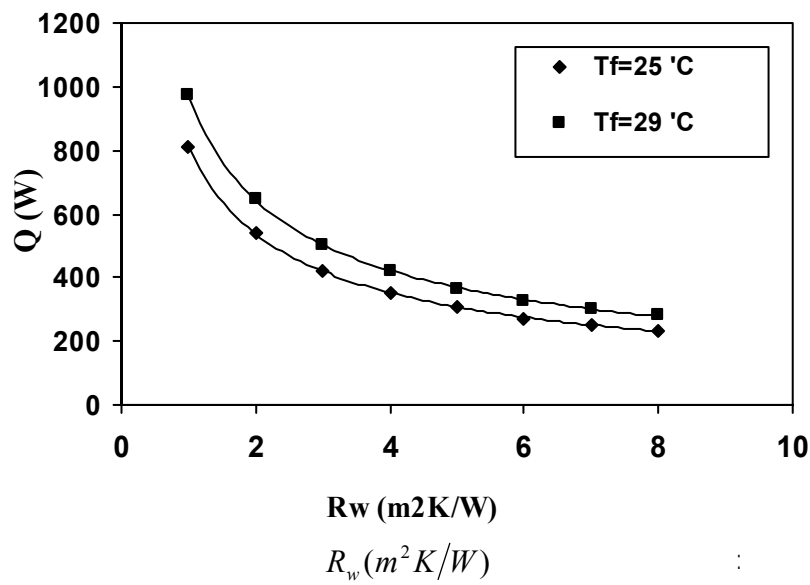
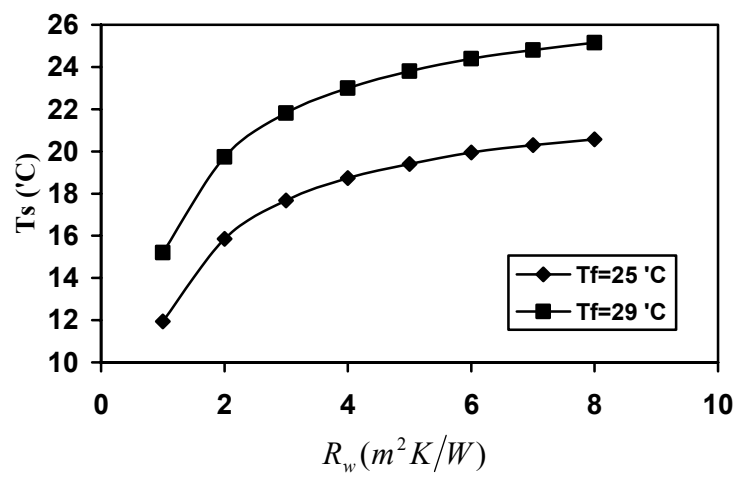
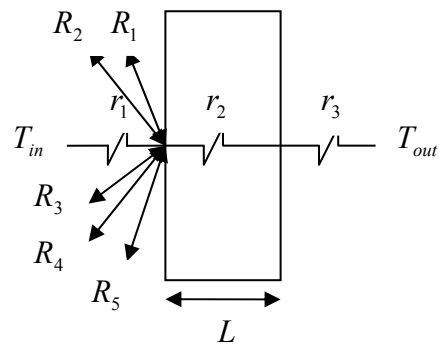
T_s

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$\Delta T \qquad (\quad)$

$\sum r$





$(m^2 K/W)$

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$(m^2 K/W)$	
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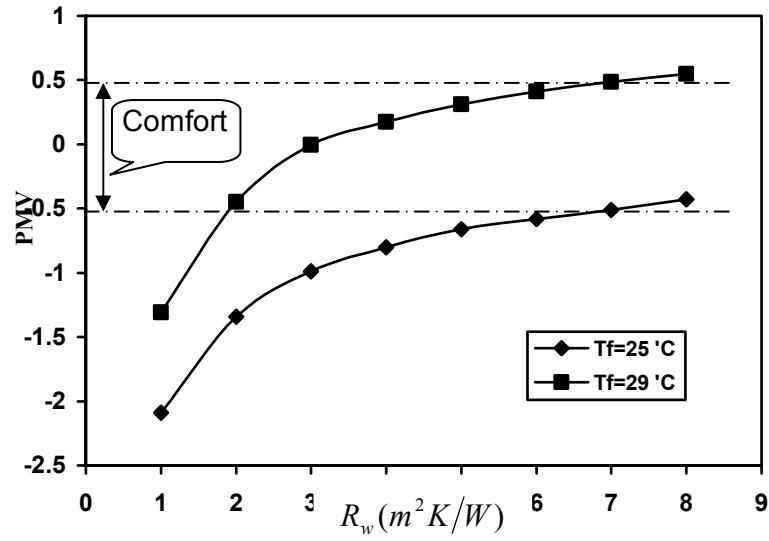
($Clo = 0.155 m^2 K/W$)

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/ (m/s)

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() (b)

$$b = \sqrt{k\rho c}$$

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c ρ k

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$(\frac{kcal}{m^2 \cdot ^\circ C \cdot hr^{0.5}})$	$(^\circ C)$
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	-
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$$(\frac{kcal}{m^2 \cdot ^\circ C \cdot hr^{0.5}})$$

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 $(^\circ C)$

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$$(m^2 K/W)$$



$(m^2 K/W)$

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