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Loading Units:-Standard

$m_i = 520[\![g]\!],\ m_w = 520[\![g]\!],\ T_{wi} = 363[\![K]\!],\ T_{ii} = 273[\![K]\!],\ c = 4190\left[\!\left[\frac{J}{kg \cdot K}\right]\!\right],\ L = 333\left[\!\left[\frac{kJ}{kg}\right]\!\right]$

$$m_i = 520\ [\![g]\!],\ m_w = 520\ [\![g]\!],\ T_{wi} = 363\ [\![K]\!],\ T_{ii} = 273\ [\![K]\!],\ c = 4190\left[\!\left[\frac{m^2}{s^2\,K}\right]\!\right],\ L = 333000\left[\!\left[\frac{m^2}{s^2}\right]\!\right] \quad (1)$$

$Q_{mathi} = L\,m_i$

$$Q_{mathi} = L\,m_i \quad (2)$$

$-c\,m_w\left(T_{fp} - T_{wi}\right) = Q_{mathi}$

$$-c\,m_w\left(T_{fp} - T_{wi}\right) = Q_{mathi} \quad (3)$$

(3)|(2)

$$-c\,m_w\left(T_{fp} - T_{wi}\right) = L\,m_i \quad (4)$$

$isolate\left((4),\ T_{fp}\right)$

$$T_{fp} = -\frac{L\,m_i}{c\,m_w} + T_{wi} \quad (5)$$

$T_f = T_{ii} + \frac{T_{fp} - T_{ii}}{2}$

$$T_f = \frac{1}{2}\,T_{ii} + \frac{1}{2}\,T_{fp} \quad (6)$$

(6)|(5)

$$T_f = \frac{1}{2}\,T_{ii} - \frac{1}{2}\,\frac{L\,m_i}{c\,m_w} + \frac{1}{2}\,T_{wi} \quad (7)$$

(7)|(1)

$$T_f = 318\ [\![K]\!] - \frac{16650}{419}\,\frac{\left[\!\left[\frac{m^2}{s^2}\right]\!\right]}{\left[\!\left[\frac{m^2}{s^2\,K}\right]\!\right]} \quad (8)$$

$evalf\left(rhs\left((8)\right)\right)$

$$318.\ [\![K]\!] - \frac{39.73747017\left[\!\left[\frac{m^2}{s^2}\right]\!\right]}{\left[\!\left[\frac{m^2}{s^2\,K}\right]\!\right]} \quad (9)$$

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