Variables

$h = 150$ [W/(m²*K)]

$k = 50$ [W/(m*K)]

$th = 0.01$ [m]

$W = 0.001$ [m]

$L = 0.02$ [m]

$\theta_b = 10$ [K]

$$\beta = 2 \cdot \frac{h}{k \cdot W}$$

Constant Bessel Function Values

$$A = \mathbf{I}\left(0, \sqrt{\beta} \cdot L\right)$$

$$B = \mathbf{I}\left(1, \sqrt{\beta} \cdot L\right)$$

Temperature Distribution

$x = 0.02$ [m]

$$\theta = \theta_b \cdot \frac{\mathbf{I}\left(0, \sqrt{\beta} \cdot x\right)}{A}$$

Heat Transfer Rate

$$q_{fin} = k \cdot W \cdot th \cdot \theta_b \cdot \sqrt{\beta} \cdot \frac{B}{A}$$

Fin Efficiency

$$\eta_{fin} = \frac{\sqrt{2 \cdot k \cdot W}}{L \cdot \sqrt{h}} \cdot \frac{B}{A}$$

SOLUTION

Unit Settings: SI C kPa kJ mass deg

$A = 1.696$	$B = 1.031$	$\beta = 6000$ [1/(m²)]
$\eta_{fin} = 0.785$	$h = 150$ [W/(m²*K)]	$k = 50$ [W/(m*K)]
$L = 0.02$ [m]	$q_{fin} = 0.2355$ [W]	$th = 0.01$ [m]
$\theta = 10$ [K]	$\theta_b = 10$ [K]	$W = 0.001$ [m]
$x = 0.02$ [m]		

No unit problems were detected.

Parametric Table: Table 2

	x [m]	θ [K]
Run 1	0	5.895
Run 2	0.001053	5.905
Run 3	0.002105	5.935
Run 4	0.003158	5.984
Run 5	0.004211	6.053
Run 6	0.005263	6.143
Run 7	0.006316	6.253
Run 8	0.007368	6.385
Run 9	0.008421	6.539
Run 10	0.009474	6.716
Run 11	0.01053	6.917
Run 12	0.01158	7.142
Run 13	0.01263	7.393
Run 14	0.01368	7.671
Run 15	0.01474	7.978
Run 16	0.01579	8.315
Run 17	0.01684	8.684
Run 18	0.01789	9.086
Run 19	0.01895	9.524
Run 20	0.02	10