

Chapter8_example2

The volumetric thermal expansion coefficients at 295 K and 273 K are respectively 0.00339 and 0.00366

For first guess, the results are:

The Rayleigh Numbers are 8.269×10^7 and 1.396×10^8

The convective coefficients are $2.17 \text{ W}/(\text{sq.m.K})$ and $2.29 \text{ W}/(\text{sq.m.K})$

The heat flux is $24.4 \text{ W}/\text{sq.m}$

The wall temperature calculated is 10.8

The wall temperature calculated is 10.6

For second guess, the results are:

The Rayleigh Numbers are 2.317×10^8 and 3.715×10^8

The convective coefficients are $2.80 \text{ W}/(\text{sq.m.K})$ and $2.92 \text{ W}/(\text{sq.m.K})$

The heat flux is $31.2 \text{ W}/\text{sq.m}$

The wall temperature calculated is 10.9 degree celsius

The wall temperature calculated is 10.7 degree celsius