

TEMP CALC For Node 2

Step 1

- a T air at start= Tair at end of Node 1 = **45.86 Deg c**
- b $dT_{air} = (T_{air} + 273) / ((\text{AbsolutePressure} / (\text{AbsolutePressure} - dp_{\text{Length}} / 10000)) ^ ((k_{\text{Gas}} - 1) / k_{\text{Gas}})) - (T_{air} + 273) = -5.247 \text{ degc}$
- c Hence Tair at end = 45.86-5.247=**40.61 Degc**

Step 2

- a Temp mix begin = Temp mix end of node 1= **77.34 Degc**
- b $d_{\text{heat}} \text{ kj/hr at start} = (\text{Abs}(\text{Suspension}_{dp}) + \text{Product}_{dp} + \text{Gas}_{dp}) * \text{GasVolume} = 990015.20 \text{ kj/hr}$
- c $d_{\text{TempAirHeatMat}} \text{ deg c} = d_{\text{HeatMat}} / (\text{MatSpecHeatCont} * 4.1875 * (d_{\text{PipeMass}} - d_{\text{SedimentMass}}) * 1000) = 11.18 \text{ Degc}$
- d Hence Tempmixend= Temp mix begin+dTempAirHeatMat deg c = 77.34+11.18=**88.52 Deg c**

Step 3

- a TempDifference at start = TempMix start – AmbientTemperature=77.34-50=**27.34 Degc**
- b TempDifference at end= TempMix end – AmbientTemperature=88.52-50=**38.52 Degc**

Step 4

- a $d_{\text{Tempdif}} = -(\text{HeatRestFactPipeWall} * 4.1875 * \text{TempDifference} * 3.141596 * \text{Diameter}(t) * d_{\text{Length}} * dt) / (\text{SpecHeatContMix} * (d_{\text{PipeMass}} - d_{\text{SedimentMass}})) = 0.1032*3600*4.18*3.14*0.254*100*38.52/(80000*1.04)= 57.4 \text{ Degc}$
- b Hence TempMix2 = TempMix1 - dTempdiff = 88.52-57.4= **31.42 Degc**