

➔ Reference: C:\Program Files\MathSoft\Mathcad 2001 Professional\steam\cycle\Rankin.mcd

P := 3200 In := ST_ptdata(P, 1200, 1, 1)

Xh := 20 cy := Rankine_c(In, 6%, Xh, 5%, P)

$$cy = \begin{pmatrix} 1 & 3200 & 3200 & 176.2183 & 20 & 925.70015 \\ 0.05 & 1200 & 1233.92269 & 415.37525 & 367.57035 & 1472 \\ 0.06 & 0.28275 & 0.29093 & 2.77406 & 24.43815 & 1.22767 \\ 0.9453 & 1402.90477 & 1420.09373 & 1133.2888 & 1133.30316 & 1564.80085 \\ 0 & 1570.33545 & 1592.36842 & 1223.74861 & 1223.74861 & 1775.1022 \\ 0.1076 & 1.57485 & 1.588 & 1.588 & 1.82134 & 1.82134 \\ 0.8924 & 1 & 1 & 1 & 1 & 1 \end{pmatrix}$$

$$\text{CycleEff}(cy) = 25.86307\% \quad \frac{\text{CycleWO}(cy) \cdot J \cdot 3600}{cy_{v,ex} \cdot 12 \cdot 12 \cdot 12 \cdot 60 \cdot 550} = 5.75794 \quad \text{HP/cuin @3600RPM}$$

$$\frac{90}{\frac{\text{CycleWO}(cy) \cdot J \cdot 3600}{cy_{v,ex} \cdot 12 \cdot 12 \cdot 12 \cdot 60 \cdot 550}} = 15.63058 \quad \text{Cubic inch displacement to make 90 HP.}$$

SatXh := ST_ptdata(cy_{p,xh}, 0, -1, 1)

$$cy_{h,xh} - \text{SatXh}_h = 1027.48009 \quad \text{Hear of condensation, exhaust point to saturation point at exhaust pressure.}$$

$$\frac{cy_{v,xh}}{cy_{v,co}} = 19.90605$$

$$Xh := 130$$

$$cy := \text{Rankine_c}(\text{In}, 6\%, Xh, 5\%, P)$$

$$cy = \begin{pmatrix} 1 & 3200 & 3200 & 176.3944 & 130 & 3200 \\ 0.05 & 1200 & 1264.56304 & 432.95411 & 420.76974 & 1353.17408 \\ 0.06 & 0.28275 & 0.29819 & 2.84372 & 3.86002 & 0.31862 \\ 0.55574 & 1402.90477 & 1435.54109 & 1141.22923 & 1141.19478 & 1479.96798 \\ 0 & 1570.33545 & 1612.11653 & 1234.05327 & 1234.05327 & 1668.64338 \\ 0.425 & 1.57485 & 1.59955 & 1.59955 & 1.63152 & 1.63152 \\ 0.575 & 1 & 1 & 1 & 1 & 1 \end{pmatrix}$$

$$\text{CycleEff}(cy) = 28.24265\% \quad \frac{\text{CycleWO}(cy) \cdot J \cdot 3600}{cy_{v,ex} \cdot 12 \cdot 12 \cdot 12 \cdot 60 \cdot 550} = 3.66326 \text{ HP/cuin @3600RPM}$$

$$\frac{90}{\frac{\text{CycleWO}(cy) \cdot J \cdot 3600}{cy_{v,ex} \cdot 12 \cdot 12 \cdot 12 \cdot 60 \cdot 550}} = 24.56829$$

Cuin displacement to make 90 HP.

$$\text{SatXh} := \text{ST_pdata}(cy_{p,xh}, 0, -1, 1)$$

$$cy_{h,xh} - \text{SatXh}_h = 915.10325 \quad \text{Hear of condensation, exhaust point to saturation point at exhaust pressure.}$$

$$\frac{cy_{v,xh}}{cy_{v,co}} = 12.11471$$