

➔ 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, 8%, P)

$$cy = \begin{pmatrix} 1 & 3200 & 3200 & 231.87412 & 20 & 714.48114 \\ 0.08 & 1200 & 1233.298 & 471.7818 & 420.87497 & 1472 \\ 0.06 & 0.28275 & 0.29078 & 2.24248 & 26.06276 & 1.59507 \\ 1.22717 & 1402.90477 & 1419.77811 & 1152.92504 & 1152.68759 & 1567.13679 \\ 0 & 1570.33545 & 1591.96441 & 1249.14573 & 1249.14573 & 1778.02823 \\ 0.10414 & 1.57485 & 1.58776 & 1.58776 & 1.8511 & 1.8511 \\ 0.89586 & 1 & 1 & 1 & 1 & 1 \end{pmatrix}$$

$$\text{CycleEff}(cy) = 23.02069\% \quad \frac{\text{CycleWO}(cy) \cdot J \cdot 3600}{cy_{v,ex} \cdot 12 \cdot 12 \cdot 12 \cdot 60 \cdot 550} = 6.36466 \quad \text{HP/cuin @3600RPM}$$

$$\frac{90}{\frac{\text{CycleWO}(cy) \cdot J \cdot 3600}{cy_{v,ex} \cdot 12 \cdot 12 \cdot 12 \cdot 60 \cdot 550}} = 14.14058 \quad \text{Cuin displacement to make 90 HP.}$$

SatXh := ST_ptdata(cy_p, xh, 0, -1, 1)

$$cy_{h,xh} - \text{SatXh}_h = 1052.87721 \quad \text{Hear of condensation, exhaust point to saturation point at exhaust pressure.}$$

Xh := 180

cy := Rankine_c(In, 6%, Xh, 8%, P)

$$cy = \begin{pmatrix} 1 & 3200 & 3200 & 232.37023 & 180 & 3200 \\ 0.08 & 1200 & 1287.17167 & 505.21355 & 494.99093 & 1362.2915 \\ 0.06 & 0.28275 & 0.30348 & 2.34067 & 3.02437 & 0.32068 \\ 0.67448 & 1402.90477 & 1446.90419 & 1167.80587 & 1167.71611 & 1484.52707 \\ 0 & 1570.33545 & 1626.61192 & 1268.45479 & 1268.45479 & 1674.42243 \\ 0.54067 & 1.57485 & 1.6079 & 1.6079 & 1.6347 & 1.6347 \\ 0.45933 & 1 & 1 & 1 & 1 & 1 \end{pmatrix}$$

$$\text{CycleEff}(cy) = 26.60856\% \quad \frac{\text{CycleWO}(cy) \cdot \mathbf{J} \cdot 3600}{cy_{\mathbf{v}, \mathbf{ex}} \cdot 12 \cdot 12 \cdot 12 \cdot 60 \cdot 550} = 3.29158 \text{ HP/cuin @3600RPM}$$

$$\frac{90}{\frac{\text{CycleWO}(cy) \cdot \mathbf{J} \cdot 3600}{cy_{\mathbf{v}, \mathbf{ex}} \cdot 12 \cdot 12 \cdot 12 \cdot 60 \cdot 550}} = 27.3425$$

Cuin displacement to make 90 HP.

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

$$cy_{\mathbf{h}, \mathbf{xh}} - \text{SatXh}_{\mathbf{h}} = 922.26956 \quad \text{Hear of condensation, exhaust point to saturation point at exhaust pressure.}$$