1. $Q_{net,in} - W_{net,out} = h_{02} - h_{01}$

2. $\frac{T_{01}}{T_1} = \left(\frac{P_{01}}{P_1} \right)^{\frac{\gamma-1}{\gamma}}$

3. $h_0 = h + \frac{C^2}{2}$

4. $dh = c_p dT$

5. $\frac{T_0}{T} = 1 + \frac{\gamma - 1}{2} M^2$

6. $\frac{P_0}{P} = \left(1 + \frac{\gamma - 1}{2} M^2 \right)^{\frac{\gamma}{\gamma-1}}$

7. $P_0 = P + \rho \frac{C^2}{2}$

8. $\frac{P}{\rho} = RT$

9. $\dot{m} = \rho A_\perp C = \rho A C_\perp$

10. $M = \frac{C}{(\gamma RT)^{1/2}}$

11. $\dot{m} = P_0 A_\perp M \sqrt{\frac{\gamma}{RT_0}} \left[1 + \frac{\gamma - 1}{2} M^2 \right]^{-\frac{\gamma+1}{2(\gamma-1)}}$

12. $s_2 - s_1 = \bar{c}_p \ln\left(\frac{T_2}{T_1} \right) - R \ln\left(\frac{P_2}{P_1} \right)$

Turbine

13. $\eta_{s,tt} = \frac{h_{01} - h_{02}}{h_{01} - h_{02s}}$

14. $\eta_{s,ts} = \frac{h_{01} - h_{02}}{h_{01} - h_{2s}}$

15. $\frac{T_{02}}{T_{01}} = \left(\frac{P_{02}}{P_{01}} \right)^{\frac{\gamma-1}{\gamma}\eta_{p,tt}}$

16. $\frac{T_{02}}{T_{01}} = \left(\frac{P_2}{P_{01}} \right)^{\frac{\gamma-1}{\gamma}\eta_{p,ts}}$

17. $\eta_{s,tt} = \eta_{p,tt} R_h$

Compressor

18. $\eta_{s,tt} = \dfrac{h_{02s} - h_{01}}{h_{02} - h_{01}}$

19. $\eta_{s,ts} = \dfrac{h_{2s} - h_{01}}{h_{02} - h_{01}}$

20. $\dfrac{T_{02}}{T_{01}} = \left(\dfrac{P_{02}}{P_{01}}\right)^{\frac{\gamma-1}{\gamma}\frac{1}{\eta_{p,tt}}}$

21. $\dfrac{T_{02}}{T_{01}} = \left(\dfrac{P_{2}}{P_{01}}\right)^{\frac{\gamma-1}{\gamma}\frac{1}{\eta_{p,ts}}}$

22. $Rothalpy = I = h - UC_{\vartheta} = h + \dfrac{W^2}{2} - \dfrac{U^2}{2}$

23. $\Delta w_T = U_2 C_{\vartheta 2} + U_1 C_{\vartheta 1}$

24. $\Delta w_C = U_2 C_{\vartheta 2} - U_1 C_{\vartheta 1}$

25. R= $\dfrac{\Delta h_{rot}}{\Delta h_{stage}} = \dfrac{(W_{\vartheta 2} - W_{\vartheta 1})}{2U}$ axial turbine

26. R= $\dfrac{\Delta h_{rot}}{\Delta h_{stage}} = \dfrac{(W_{\vartheta 2} + W_{\vartheta 1})}{2U}$ axial compressor

27. $\psi = \dfrac{\Delta h_0}{U^2}$ stage loading coeff.

28. $\phi = \dfrac{C_x}{U}$ or $\dfrac{C_r}{U}$ flow coeff.

29. *Slip factor* $\sigma = \dfrac{C_{\vartheta}}{C'_{\vartheta}}$, ($C'_{\vartheta}$ theoretical)