Definition of Total Adiabatic Efficiency

The total adiabatic efficiency is the relation between the work of an isentropic compression and the actual input compressor power.
The total adiabatic efficiency is calculated according to the formula:

$$\eta_{ad_{tot}} = \frac{P_1 \cdot \dot{V}_1 \cdot \frac{\kappa}{\kappa - 1}\left[PR^{\frac{\kappa-1}{\kappa}} - 1 \right]}{2\pi \cdot n \cdot M}$$

where P_1 = suction pressure (Pa)

$\dot{V}_1$ = volume flow at suction (m³/min)

κ = specific heat ratio (1.4 for air)

$PR = P_2 / P_1$ (pressure ratio discharge/suction)

n = compressor speed (rev/min)

and

M = input torque (Nm)

Definition of Temperature Efficiency

The Temperature Efficiency is also often called Thermal or Isentropic Efficiency

$$\eta_{temp} = \frac{\left[PR^{\frac{\kappa-1}{\kappa}} - 1 \right] \cdot T_1}{T_2 - T_1}$$

where T_1 = Inlet temperature

T_2 = Outlet temperature