Table 1. Calculation of termodynamic functions

Ideal work gas

Process	W	Q	ΔU	ΔH	ΔS
Isothermal	$nRT\ln(V_1/V_2)=$ $=nRT\ln(p_2/p_1)$	$nRT\ln(V_2/V_1)=$ $=nRT\ln(p_1/p_2)$	0	0	$nR\ln(V_2/V_1)=$ $=nR\ln(p_1/p_2)$
Isobaric	$-nR\Delta T$	$n\int c_{mp}\mathrm{d}T$	$n\int c_{mv}\mathrm{d}T$	$n\int c_{mp}\mathrm{d}T$	$n\int \frac{c_{mp}}{T}\mathrm{d}T$
Isochoric	0	$n\int c_{mv}\mathrm{d}T$	$n\int c_{mv}\mathrm{d}T$	$n\int c_{mp}\mathrm{d}T$	$n\int \frac{c_{mv}}{T}\mathrm{d}T$
Adiabatic	$n\int c_{mv}\mathrm{d}T$	0	$n\int c_{mv}\mathrm{d}T$	$n\int c_{mp}\mathrm{d}T$	0

General expressions

H, S, P and T data are form tables, diagrams or data bases
Look for the necessary data data in Table 2.

Process	W	Q	ΔU	ΔG	ΔA
Isothermal	$\Delta U-T\Delta S=$ $=\Delta H-\Delta(pV)-T\Delta S$	$T\Delta S$	$\Delta H-\Delta(pV)$	$\Delta H-T\Delta S$	$\Delta U-T\Delta S=$ $=\Delta H-\Delta(pV)-T\Delta S$
Isobaric	$-p\Delta V$	ΔH	$\Delta H-p\Delta V$	$\Delta H-\Delta(TS)$	$\Delta U-\Delta(TS)=$ $=\Delta H-\mathrm{p}\Delta(V)-\Delta(\mathrm{T}S)$
Isochoric	0	ΔU	$\Delta H-V\Delta p$	$\Delta H-\Delta(TS)$	$\Delta U-\Delta(TS)=$ $=\Delta H-V\Delta(p)-\Delta(TS)$
Adiabatic	$\Delta U=\Delta H-\Delta(pV)$	0	$\Delta H-\Delta(pV)$	$\Delta H-S\Delta T$	$\Delta U-\mathrm{S}\Delta T=$ $=\Delta H-\Delta(pV)-S\Delta T$