Henry's Law Constant at Another Temperature (van 't Hoff)

Henry's law constant of a gas or volatile compound corrected from one temperature to another with its enthalpy of dissolution by the van 't Hoff relation.

Input parameters

Unit system: SI

Parameter	Value	Unit
Henry's constant at the known temperature (any unit; output in the same unit)	0.42000	
Known temperature	20.000	°C
Enthalpy change of dissolution (positive for volatilisation)	32.000	kJ/mol
Required temperature	10.000	°C

Calculated results

Parameter	Value	Unit
Henry's constant at the required temperature	0.26417	
Ratio	0.62897	
Change per kelvin near T_1	4.4785	%

Notes for this case

• Use constants in volatilisation form (gas over liquid, H = p/x or C_g/C_l): they rise with temperature for most gases and VOCs. For a solubility-form constant (C_l/p) enter the enthalpy with the opposite sign.

Formula and method

$$H_2 = H_1 \exp\left[\frac{\Delta H^\circ}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right)\right]$$

Variables

H_1	Henry's constant at the known temperature (any unit; output in the same unit)	-
T_1	Known temperature	K
ΔH°	Enthalpy change of dissolution (positive for volatilisation)	J/mol
T_2	Required temperature	K
H_2	Henry's constant at the required temperature	-
H_2/H_1	Ratio	-
$\Delta H/\Delta T$	Change per kelvin near T_1	-

Method and standards

Van 't Hoff temperature dependence of Henry's law.

Assumptions and limits

- Constant enthalpy over the temperature range (good within about 0–40 °C).

Report details

Report reference	FCC-3F0X-BEBV (the same inputs always give the same reference)
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Calculator	Henry's Law Constant at Another Temperature (van 't Hoff)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/environmental/drinking-water/henry-constant-temperature

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.