Pt100 / Pt1000 RTD Resistance–Temperature Calculator

Resistance of a Pt100 or Pt1000 platinum RTD at a temperature, and the temperature for a measured resistance, by the IEC 60751 Callendar–Van Dusen equation.

Method: IEC 60751 Callendar–Van Dusen coefficients A; B; …

Input parameters

Unit system: SI

Parameter	Value	Unit
Resistance at 0 °C (100 for Pt100, 1000 for Pt1000)	100.00	Ω
Temperature	200.00	°C
Measured resistance	138.51	Ω

Calculated results

Parameter	Value	Unit
Resistance at the temperature	175.86	Ω
Temperature for the measured resistance	100.01	°C

Notes for this case

- Lead resistance adds to a 2-wire reading (about 2.6 °C per ohm for Pt100); use 3- or 4-wire connection.

Formula and method

$$R(t) = R_0\left[1 + At + Bt^2 + C(t-100)\,t^3\right] \quad (C = 0 \text{ for } t \geq 0\ ^\circ\text{C})$$

Variables

R_0	resistance at 0 °C	Ω
T	temperature	K
R_m	measured resistance	Ω
R_T	resistance at T	Ω
T_m	temperature for R_m	K
t	temperature in °C	°C
A, B, C	IEC 60751 coefficients: 3.9083×10^{-3}, -5.775×10^{-7}, -4.183×10^{-12}	1/°C, 1/°C², 1/°C⁴

Method and standards

IEC 60751 Callendar–Van Dusen equation for industrial platinum resistance thermometers (α = 0.00385); the inverse is solved numerically.

Assumptions and limits

- IEC 60751 standard curve; sensor tolerance class not included.
- The two directions are independent: a measured resistance outside the −200 °C to 850 °C range leaves out only its temperature, with a note.

References

- IEC 60751 Callendar–Van Dusen coefficients A
- B
- C

Report details

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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/instrumentation/temperature/rtd-resistance-temperature

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.