Heat Index (Apparent Temperature) from Temperature and Humidity

Heat index, the 'feels like' temperature in hot humid weather, from air temperature and relative humidity by the US National Weather Service method.

Method: US National Weather Service heat index: Steadman simple form and the Rothfusz regression with NWS adjustments (WPC, heat index equation)

Input parameters

Unit system: SI

Parameter	Value	Unit
Air temperature	35.000	°C
Relative humidity	60.000	%

Calculated results

Parameter	Value	Unit
Heat index	45.050	°C
Simple (Steadman) estimate	36.122	°C
Caution band (0 none, 1 caution, 2 extreme caution, 3 danger, 4 extreme danger)	3.0000	

Notes for this case

• NWS caution bands in °F: 80–90 caution, 91–103 extreme caution, 104–124 danger, 125 and above extreme danger. The regression is not valid far outside the range Steadman studied.

Formula and method

$$HI = -42.379 + 2.04901523T + 10.14333127R - 0.22475541TR - 6.83783 \times 10^{-3}T^2 - 5.481717 \times 10^{-2}R^2 + 1.22874 \times 10^{-3}T^2R + 8.5282 \times 10^{-4}TR^2 - 1.99 \times 10^{-6}T^2R^2$$

Variables

T	Air temperature	K
RH	Relative humidity	-
HI	Heat index	K
HI_s	Simple (Steadman) estimate	K
band	Caution band (0 none, 1 caution, 2 extreme caution, 3 danger, 4 extreme danger)	-

Method and standards

NWS regression in °F and % RH, with the simple formula first.

Assumptions and limits

- Shade, light wind.
- Simple form first: HI_s = ½[T + 61 + 1.2(T − 68) + 0.094R] (°F, %). If the average of HI_s and T is 80 °F or more the regression is used, with the NWS adjustments: subtract (13 − R)/4 · √[(17 − |T − 95|)/17] when R < 13 % and 80 ≤ T ≤ 112 °F; add (R − 85)/10 · (87 − T)/5 when R > 85 % and 80 ≤ T ≤ 87 °F.
- Below about 80 °F, and above about 120 °F, a note says the value is outside the useful or fitted range.

References

• US National Weather Service heat index: Steadman simple form and the Rothfusz regression with NWS adjustments (WPC, heat index equation)

Report details

Report reference	FCC-79RP-3SCQ (the same inputs always give the same reference)
Generated	17 November 2026, 19:46 UTC
Calculator	Heat Index (Apparent Temperature) from Temperature and Humidity
Method last reviewed	12 November 2026
Software release	FireCAD Calc, release of 17 November 2026
Release checks	4 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/hvac/psychrometry/heat-index

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.