Martensite Start Temperature (Andrews Linear)

Martensite start temperature (Ms) of a low-alloy steel from its carbon, manganese, nickel, chromium and molybdenum contents by Andrews' linear formula.

Method: Andrews (1965); J. Iron Steel Inst. 203: Ms (°C) = 539 − 423C − 30.4Mn − 17.7Ni − 12.1Cr − 7.5Mo

Input parameters

Unit system: SI

Parameter	Value	Unit
Carbon (wt %)	0.40000	
Manganese (wt %)	0.75000	
Nickel (wt %)	1.8000	
Chromium (wt %)	0.80000	
Molybdenum (wt %)	0.25000	

Calculated results

Parameter	Value	Unit
Martensite start temperature	303.58	°C

Formula and method

$$M_s(°C) = 539 - 423C - 30.4Mn - 17.7Ni - 12.1Cr - 7.5Mo$$

Variables

C	Carbon (wt %)	-
Mn	Manganese (wt %)	-
Ni	Nickel (wt %)	-
Cr	Chromium (wt %)	-
Mo	Molybdenum (wt %)	-
M_s	Martensite start temperature	K

Method and standards

Andrews linear.

Assumptions and limits

- Low-alloy steels, full austenitisation. Compositions far outside Andrews' data that would give a temperature below absolute zero are rejected.
- Compositions are entered as plain weight-per-cent numbers (0.4 for 0.4 % C), unlike the Andrews critical temperatures calculator, which takes them as percentages; the inputs are kept as they are so saved links keep their meaning.

References

• Andrews (1965)
• J. Iron Steel Inst. 203: Ms (°C) = 539 − 423C − 30.4Mn − 17.7Ni − 12.1Cr − 7.5Mo

Report details

Report reference	FCC-YW74-WFX6 (the same inputs always give the same reference)
Generated	17 November 2026, 19:36 UTC
Calculator	Martensite Start Temperature (Andrews Linear)
Method last reviewed	12 November 2026
Software release	FireCAD Calc, release of 17 November 2026
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/materials/heat-treatment/martensite-start-andrews

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.