



MANUFACTURING AND PRODUCTION

Heat Treatment of Steels and Alloys

3 day course

Classroom, online or in-house

Course overview

Heat treatment changes properties without changing shape or composition, which makes it powerful and makes a mistake invisible until a component fails in service. This course builds the understanding to avoid that. Delegates work through the iron carbon diagram and the transformations behind every treatment, then through the effect of cooling rate through the continuous cooling transformation curves. Annealing, normalising, hardening and tempering are covered with what each achieves and the microstructure each produces. Quenching media and severity are addressed, along with distortion and quench cracking and how section thickness drives both. Hardenability is covered, including the Jominy test and why a large section cannot be through hardened. Surface treatments follow: case hardening, carburising, nitriding and induction hardening. Non ferrous treatments including solution treatment and ageing are addressed. Furnace atmosphere, decarburisation and control are covered. The course closes on hardness testing, on verifying a treatment and on specification interpretation.

What you will learn

- Relate the iron carbon diagram to each heat treatment
- Predict structure from cooling rate using transformation curves
- Apply annealing, normalising, hardening and tempering appropriately
- Select quench media and control distortion and cracking
- Assess hardenability including the effect of section thickness
- Specify case hardening, carburising, nitriding and induction hardening
- Control furnace atmosphere, verify treatment and read a specification

Who should attend

- Heat treatment operators and supervisors
- Metallurgists and materials engineers
- Quality staff verifying treated components
- Design engineers specifying material condition
- Maintenance engineers assessing failed components

Course outline

- 01 A mistake invisible until service
- 02 Iron carbon diagram and transformations
- 03 Cooling rate and transformation curves
- 04 Annealing, normalising, hardening, tempering
- 05 Quench media, distortion and cracking
- 06 Hardenability and section thickness
- 07 Case hardening, nitriding and induction hardening
- 08 Non ferrous ageing, atmosphere control and verification

Upcoming dates



Dates	Venue	Format	Fee per delegate
26 to 28 October 2026	Online	Online	R6,500
18 to 20 November 2026	Maputo, Mozambique	Classroom	USD 995
30 December 2026 to 1 January 2027	Windhoek, Namibia	Classroom	R14,950
22 to 24 February 2027	Kampala, Uganda	Classroom	USD 995

Fees and how to register

This 3 day course is **R6,500** per delegate online, **R14,950** in the classroom in South Africa, Botswana, Namibia, Lesotho and Eswatini, and **USD 995** in the classroom elsewhere in Africa. In-house training is quotation on request. Book 2 or more delegates on this course and save 10%.

To register or request an in-house proposal, visit www.afrisciencegroup.com, email info@afriScience.co.za, or WhatsApp us on **+27 63 479 1136**.

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