

Case Hardening Alloy Steel Bar 6587 Grade Data Sheet

Grade 6587

Steel grade 17CrNiMo6 was registered as a grade in 1991 and is therefore one of the most contemporary grades in the alloy bar market. It is characterised by high case hardness and depth combined with excellent core strength. Recently the grade has been developed further by slightly increasing Carbon and Manganese content and this led to the new designation 18CrNiMo7-6, which is the current official designation for this steel under Euronorm EN 10084, which supersedes DIN17210.

Related Specifications

Grade 6587 low-alloy steel bar complies with both 17CrNiMo6 (DIN17210) and 18CrNiMo7-6 (EN 10084) both described under Material Number 1.6587. The specification of 17CrNiMo6 is practically equivalent to grade X4317 under AS 1444.

Chemical Composition (%)

C	Si	Mn	P	S	Cr	Ni	Mo
0.15 - 0.21	≤ 0.040	0.50 - 0.90	≤ 0.035	≤ 0.035	1.50 - 1.80	1.40 - 1.70	0.25 - 0.35

Conditions of Supply

Normally supplied in the annealed condition with hardness max 229 HB, with typical hardness being in the range 170-200 HB. Bars are supplied peeled to k12 tolerance for bar diameters up to 210mm and peeled to -0/+2mm tolerance for larger diameters.

Heat Treatment

Treatment	Treatment Range (°C)	Cooling
Carburising	880 - 980	Oil (water), hot quench 160-250°C, Salt bath 580-680°C, Case hardening box, Air*
Intermediate Annealing	630 - 650	Air, Furnace
Core Hardening	830 - 870	Oil (water), hot quench 160-250°C*
Case Hardening	780 - 820	Oil (water), hot quench 160-250°C*
Tempering	150 - 200	Air

*The choice of cooling medium depends on the desired final properties and geometry of the section to be case hardened and the effect of the cooling medium, given the hardenability of the steel.

The minimum tempering time is 1 hour, but a tempering period of 1 hour per 25mm of section is recommended. If the steel is to be direct hardened, then in general, a carburising temperature of 950°C is not to be exceeded. After case hardening a typical surface (case) hardness of 62 HRC can be achieved. Gas carburising for 2 hours at 925°C results in 0.8mm case depth, whilst carburising for 24 hours at 925°C results in 3.1mm case depth.

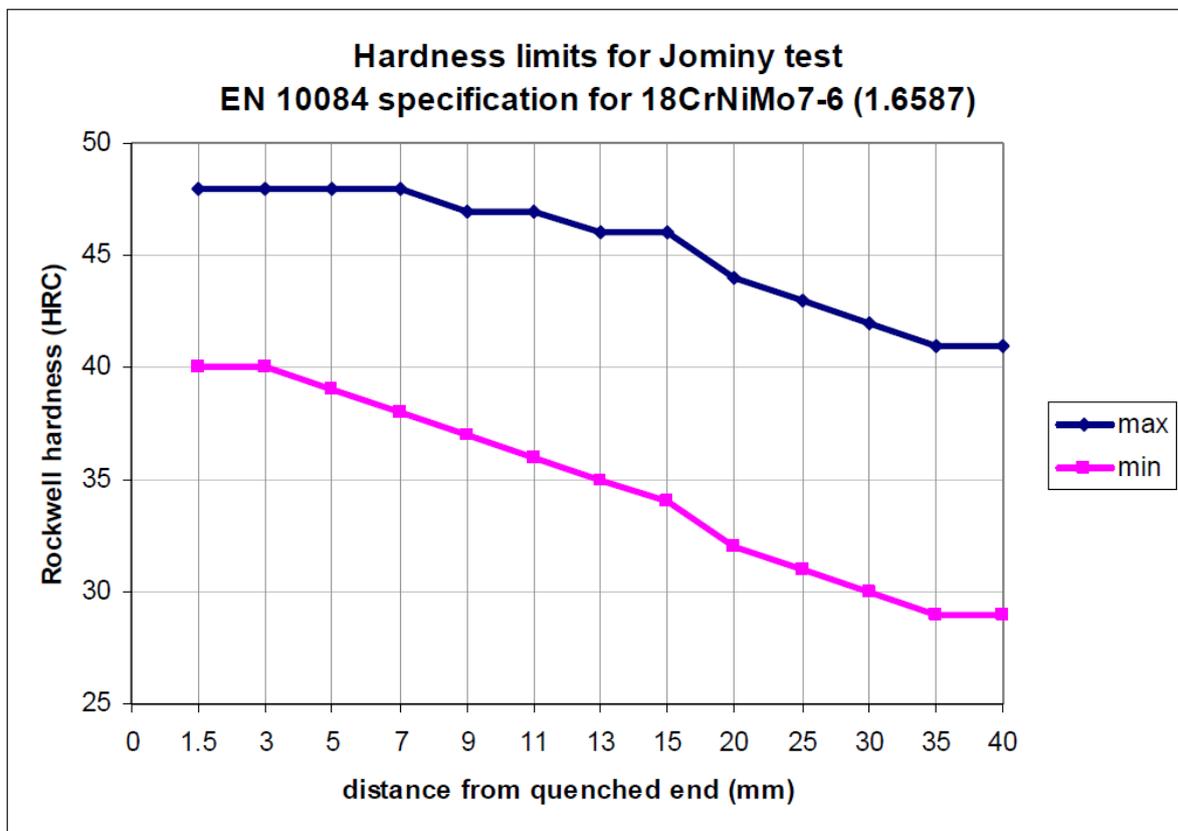
Mechanical Properties after Case Hardening

The following table shows the typical mechanical properties achievable in the core section of various diameters after carburising, hardening and tempering.

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Diameter (mm)	Yield Strength (MPa)	Tensile Strength (MPa)	Elongation (A%)	Impact Value (DVM) J
11	835 min	1180 - 1420	7 min	41 min
30	785 min	1080 - 1320	8 min	41 min
63	685 min	980 - 1270	8 min	-

Hardenability Diagram



Welding

Pre-heat welding area to 250-450°C and maintain this temperature while welding with a low hydrogen electrode. Cool at a maximum rate of 100°C per hour. Weld before carburising.

Applications

Gear parts exposed to highest stresses and wear conditions. Typical components include gears, planetary gears, plate wheels, drive pinions and shafts.

Limitation of Liability

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