

CORUS ENGINEERING STEELS

CASE HARDENING STEEL - 17CrNiMo6 or 18CrNiMo7-6

17CrNiMo6 or 18CrNiMo7-6 is a Chrome – Nickel – Moly carburising steel, generally supplied annealed to HB 229 max. Carburised and heat treated it develops a hard wear resistant case of about Rc 60-63 and a tough strong core with a typical tensile strength range of 900-1300 MPa, in small to fairly large sections.

Typical Applications: Heavy-duty arbors, bushings, bearings, gears, shafts, sprockets, wear pins etc. Or can be used uncarburised with suitable heat treatment for high tensile applications.

Machinability: Now available with improved machinability by calcium injection treatment.

Related specifications:

AS 1444-1996	X4317 or X4317H
EN10084-1995 1.6587 or 1.6587H	18CrNiMo7-6 or 18CrNiMo7-6H
Werkstoff 1.6587	18CrNiMo7-6 / 17CrNiMo6

Typical Chemical Analysis

Carbon	0.18%
Silicon	0.20%
Manganese	0.70%
Chromium	1.65%
Nickel	1.55%
Molybdenum	0.30%

Typical Tensile Strength – Quenched and tempered at 200°C

Section size	Tensile Strength
Up to 16mm	1150 MPa min
Over 16 – 40mm	1080 MPa min
Over 40 – 100mm	900 MPa min

Typical Mechanical Properties – Quenched at 850°C-Tempered at 200°C

Section in mm	25	50	100
Yield Strength - MPa	1050	950	815
Tensile Strength - MPa	1295	1160	1010
Elongation - %	14	15	16
Impact – Izod – J	45	51	53
Hardness – HB	380	340	300

Typical properties for guidance only

Hardenability Test Limits – When supplied to “H” series Standards

Distance from quenched end of test piece – in millimeters													
Hardness range – in Rockwell C													
mm	1.5	3	5	7	9	11	13	15	20	25	30	35	40
Rc	48	48	48	48	47	47	46	46	44	43	42	41	41
Rc	40	40	39	38	37	36	35	34	32	31	30	29	29

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Welding:

Readily welded in the annealed condition with correct procedure, but welding in the case hardened or through hardened condition is not recommended.

Welding procedure:

Low hydrogen electrodes recommended. Pre-heat at 250°C – 350°C and maintain during welding. Cool slowly in ashes, warm dry lime or sand etc, followed when possible with a stress relieve.

Welding details for guidance only

Carburising:

Pack, Salt or Gas carburise at 900°C – 950°C.

Core Refining:

Heat to 830°C – 870°C

Cool in air or quench in oil or into a salt bath held at 150°C – 200°C and then air cool

Case Hardening:

Heat to 780°C – 820°C

Quench in oil

HEAT TREATMENT:**Forging:**

Heat to 1150°C Hold till uniform
Minimum forging temperature 850°C
Cool in ashes, warm dry lime or sand

Annealing:

Heat to 830°C – 850°C
Cool in furnace

Normalising:

Heat to 860°C – 890°C
Cool in still air

Stress Relieving:

Heat to 630°C – 650°C
Cool in still air

Single Refine:

Suitable for fine grained steels only

Direct Quench:

Cool from carburising temperature to 820°C – 830°C and cool in air or quench in oil or into salt bath.

Alternatively cool from carburising temperature to room temperature.

Re-heat to 820°C – 830°C and cool in air or quench in oil or into salt bath.

Tempering:

Tempering at 150°C – 200°C will improve the toughness of the case with minimal effect on its hardness and reduce the possibility of grinding cracks.

Heat treatment details for guidance only