

817M40 – 1.5% Ni-Cr-Mo Steel

Related Specifications

BS970 – 1955 EN24

DIN 34CrNiMo6

W.Nr. 1.6582

AISI 4340

817M40 is a 1.5% Ni-Cr-Mo high hardenability, high tensile strength steel.

It is generally supplied in the Hardened and Tempered condition in the tensile range of 850 – 1000Mpa (T Condition) but can be heat treated to 850 – 1550Mpa dependent on section size (T – Z Condition). It could also be supplied in the annealed condition suitable for pre-heat treatment machining.

This grade is very popular and widely used for many high strength applications where a good combination of strength and impact properties are essential in fairly large components.

This alloy is used in most industry sectors for a wide variety of applications including high strength machine parts, collets, spindles, gears, bolts shafts and couplings etc.

Typical Chemical composition

Carbon	0.40%
Silicon	0.25%
Manganese	0.60%
Phosphorous	<0.040%
Sulphur	<0.040%
Chromium	1.20%
Molybdenum	0.28%
Nickel	1.55%

Mechanical Property Requirements – BS970 Part 3 1991

Condition	Ruling Section	Tensile Strength Mpa	Yield (0.2%) MpA	Elongation %	Izod FTLBS	Charpy J	Hardness HB
T	250	850/1000	635	13	30	35	248-302
U	100	925/1075	740	12	35	42	269-331
V	63	1000/1150	835	12	35	42	293-352
W	29	1075/1225	925	11	30	35	311-375
X	29	1150/1300	1005	10	25	28	341-401
Y	29	1225/1375	1080	10	18	21	363-429
Z	29	1550 Min	1125	5	8	9	444 Min

Forging

Forging Temperature for this material should be 850 – 1200oC

Soak times should be kept to a minimum to avoid heavy scaling, but sufficient time should be given to allow centre to achieve furnace temperature.

After forging pieces should be allowed to cool in still air.

Heat Treatment

Annealing - Heat to 800 - 850°C for a time commensurate with ruling section and furnace cool.

Hardening - Heat to 830 - 860°C for a time commensurate with ruling section and quench in Oil, Water or Polymer.

Note: If water quench is to be used, although not recommended, care must be taken to ensure that all sharp corners are removed prior to heat treatment.

Tempering - Re-heat to 450 - 660°C as required, dependent on final required properties. Hold for a time commensurate with the ruling section and cool in still in air.

Machining

817M40 has good machinability in the quenched and tempered condition, dependent on condition, and operations such as sawing, turning, broaching, milling etc can be accomplished satisfactorily using standard machine tool manufacturers recommended speeds and feeds.

Welding

Welding of 817M40 in the hardened and tempered condition is not advised and should be avoided if possible, as the mechanical properties will be altered in the heat affected zone. If welding is required it should be done using low hydrogen electrodes, while the material is in the annealed condition, and the work piece should be stress relieved (640 - 660°C) immediately after cooling to hand warm, prior to hardening and tempering.

If welding in the quenched and tempered condition, the work piece should be stress relieved at 15°C below the original tempering temperature.

Pre-heat temperature should be at least 370°C