Grade 10.9 Steel

Please be advised that grade 10.9 steel can be made from number of different specific grades and alloys of steel.

Some fasteners may exhibit reduced mechanical properties dependant on their shape.

The full technical information offered is available on standard ISO 898.

Chemical Content %

	Carbon		Phosphorus	Sulphur	Boron	Tempering
	Min %	Max %	Max %	Max %	Max %	Temp (°C)
Carbon steel with additives (e.g. Boron or Mn or Cr) quenched and tempered	0.20e	0.55	0.025	0.025		
Carbon steel quenched and tempered	0.25	0.55	0.025	0.025	0.003	425
Alloy steel quenched and temperedg	0.20	0.55	0.025	0.025		

e - In case of plain carbon boron steel with a carbon content below 0.25 % (cast analysis). the minimum manganese content shall be 0.6 % for property class 8.8 and 0.7 % for property classes 9.8 and 10.9.

f - For the materials of these property classes. there shall be a sufficient hardenability to ensure a structure consisting of approximately 90 % martensite in the core of the threaded sections for the fasteners in the “as-hardened” condition before tempering.

g - This alloy steel shall contain at least one of the following elements in the minimum quantity given: chromium 0.30 %. nickel 0,30 %, molybdenum 0,20 %, vanadium 0,10 %. Where elements are specified in combinations of two, three or four and have alloy contents less than those given above, the limit value to be applied for steel class determination is 70 % of the sum of the individual limit

h - Fasteners manufactured from phosphated raw material shall be dephosphated before heat treatment; the absence of white
phosphorus enriched layer shall be detected by a suitable test method.

I - Caution is advised when the use of property class 12.9/12.9 is considered. The capability of the fastener manufacturer, the service conditions and the wrenching methods should be considered. Environments can cause stress corrosion cracking of fasteners as processed as well as those coated.

Physical Properties

Tensile Strength (Mpa) - Nominal	1000
Tensile Strength (Mpa) - Minimum	1040
Lower yield stength (MPa) - Nominal	-
Lower yield stength (MPa) - Minimum	-

Strees at 0.2% Elongation (Mpa) - Nominal	900
Strees at 0.2% Elongation (Mpa) - Minimum	940
Stress under proof load (Mpa)	830
Proof Strength Ratio	0.88
Elongation after fracture for machine test pieces (%)	9
Percentage reduction of area after fracture for machined test pieces (%)	48
Head soundness	No fracture
Vickers Hardness (HV) - Maximum	380
Vickers Hardness (HV) - Minimum	320
Brinell Hardness (HBW) - Maximum	375
Brinell Hardness (HBW) - Minimum	316
Rockwell hardness (HRB) - Maximum	-
Rockwell hardness (HRB) - Minimum	-
Rockwell hardness (HRC) - Maximum	39
Rockwell hardness (HRC) - Minimum	32