MATERIAL SPECIFICATION FOR ASTM A-453 Gr. 660 CLASS A,B,C FOR ALLOY STEEL BOLTING MATERIAL

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MATERIAL SPECIFICATION FOR ASTM A-453 Gr. 660 CLASS A,B,C FOR ALLOY STEEL BOLTING MATERIAL

1.0 PURPOSE

1.1 It is the purpose of this material specification to list in concise form of the material requirement for ASTM A-453 Grade 660

1.2 This material specification is intended to aid the purchasing department in procuring and the vendor in supplying a material which meets the needs of its intended use, and the quality control department in the inspection and release of incoming material.

2.0 REQUIREMENTS

2.1 The requirements of specification S.E.S. 26-590 shall apply in addition to the following specific requirements.

2.1.1 **Chemical composition**: Chemical composition limits are listed below. An analysis of each heat of steel is made by the manufacturer, preferably from a ladle sample taken at or near the time of pouring. The listed elements shall be reported in weight percent. Reporting of residual elements is not required, but total residuals must not exceed 1%.

ELEMENTS	COMPOSITION RANGE (%)
Carbon (C)	0.08
Manganese (Mn)	2.0 Max
Silicon (Si)	1.0 Max
Sulphur (S)	0.03 Max
Phosphorus (P)	0.04 Max
Chromium (Cr)	13.5 – 16.0
Nickle	24.0 – 27.0
Molybdenum (Mo)	1.0 – 1.5
Vanadium (V)	0.1 – 0.5
Titanium (T_i)	1.9 – 2.3
Aluminium (Al.)	0.35 Max
Boron (B)	0.001 – 0.01

2.1.b) Mechanical Properties: Mechanical property requirements are listed below. Each heat shall be tested and the listed mechanical properties shall be reported.

MECHANICAL PROPERTIES	Size up to 4"
TENSILE STRENGTH, KSI	130
YLELD STRENGTH, KSI	85
ELONGATION IN 2" Gage Length	15 % Min
REDUCTION IN AREA	18 % Min
HARDNESS	24-35 HR_C

2.1.c) Heat Treatment : Heat Treatment temperatures and Time as per below options :

Option I
Solution Anneal 1625º F- 1700ºF (885ºC-926ºC) for 2-4 hours Quench in oil, polymer, water or air cool.
Ageing 1300ºF-1350ºF (704ºC-732ºC) for 14-18 hours Air Cool.

Option II
Solution Anneal 1775ºF - 1825ºF (968ºC-996ºC) for 1-3 hours Quench in oil, polymer, water or air cool.
Ageing 1300ºF-1350ºF (704ºC-732ºC) for 14-18 hours Air Cool.

3. Product Marking: Grade and manufacturer's identification symbols shall be applied to one end of studs 3/8" in diameter and larger and to the heads of bolts ¼" in diameter and larger. If the available area in inadequate, the grade symbol may be marked on one end and the manufacture's identification symbol marked on the other end.

4. DOCUMENTATION REQUIRED:-

Each shipment shall be accompanied by material certifications for each lot of material, certifications must be positively relatable to the lot of material represented
Recheck of Chemical properties to be carried out by Sara Sae.