MATERIAL SPECIFICATION FOR AISI 4340 HIGH TENSILE STEEL 140 KSI (965 MPA) FORGINGS AND BAR STOCK

Rev	Reason of Change	Date	Made By	Reviewed By	Approved By	Status
0	Initial release	17-07-2018	MN	AS	KKD	Released

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1.0 SCOPE

1.1 This specification covers AISI 4340 low alloy steel forgings and bar stock for structural applications. This material is not to be used for (H2S) service. This material is not to be used in any welded applications.

2.0 REQUIREMENTS

2.1 The requirements of specification SES 26-590, SES 26-740 & SES 26-744 shall apply in addition to the following specific requirements.

2.2 Chemical composition: The listed elements shall be reported in weight percent. Reporting of residual elements is not required, but total residuals must not exceed 1%.

	AISI 4340
Carbon	.38 to .43
Manganese	.60 to .80
Phosphorous	.025 max.
Sulfur	.025 max.
Silicon	.15 to .35
Chromium	.70 to .90
Nickel	1.65 to 2.00
Molybdenum	.20 to .30
Hydrogen (melt)	2.0 ppm max.

3.0 Mechanical Properties:

The mechanical properties must be obtained from specimens machined and tested in accordance with ASTM A370. The specimens must be from the same heat as the intended part and heat treated in the same cycle. Shipment requiring more than one heat treatment lot will require specimens and complete identification from each lot. The following minimum requirements must be met:

Tensile strength (psi)	150,000 (1034 MPa)
Yield strength (psi)	140,000 (965 MPa)
Elongation, 2" gauge length, (%)	10
Reduction of area, %	30

Brinell Hardness, (raw) 321-352 HBW
Brinell Hardness, (finished part) 311-352 HBW

4.0 HEAT TREATMENT: -

PROCESS	ATMOSPHERE/MEDIA	TEMPERATURE	TIME AT TEMPERATURE
Normalized	Air	1600 ºF – 1700 ºF (870 ºC – 925 ºC)	30 Minutes / Inch of T, Minimum Time is 30 Minutes.
Still air cool to below 400 degrees F (204 degrees C) before further processing			
Austenitize	Air	1550 ºF - 1650 ºF (840 ºC – 900 ºC)	30 Minutes / Inch of T, Minimum Time is 30 Minutes.
Quench	Oil, Polymer	104 ºF (40 ºC) - 158 ºF (70 ºC)	
Temper	Air	1050 ºF – 1250 ºF (565 ºC – 680 ºC)	1 hour per inch of maximum through thickness. One-hour Minimum.
Second Temper	Air	920 ºF – 1020 ºF (494 ºC – 549 ºC)	1 hour per inch of maximum through thickness. One-hour Minimum.

Note: Maximum holding time shall not exceed Five times (5X) the maximum holding time. In all case, holding time shall not start until parts or materials have reached specified heat treatment temperature. The 5X rule does not apply to the separate QTC (e.g. ER 5")

5.0 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.