MATERIAL SPECIFICATION FOR AISI 4340, 120 KSI YIELD FORGINGS AND BAR STOCK , SUBSEA COMPATIBLE.

Rev	Reason of Change	Date	Made By	Reviewed By	Approved By	Status
0		31-05-2017	MN	AS	KKD	Released

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1.0 PURPOSE

1.1 It is the purpose of this material specification to list in concise form of the material requirement for AISI 4340 bar stock, forgings.

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 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	.035 max.
Sulfur	.040 max.
Silicon	.15 to .35
Chromium	.70 to .90
Nickel	1.65 to 2.00
Molybdenum	.20 to .30

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	130,000 (896 MPa)
Yield strength	120,000 (827 MPa)
Elongation, 2" gauge length	10%
Reduction of area	30%
Brinell hardness (RAW)	277- 321 HBW
Brinell hardness (FINISHED PART)	269- 321 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)	
First Temper	Air	1075 ºF – 1250 ºF (580 ºC – 680 ºC)	1 hour per inch of maximum through thickness. One-hour Minimum.
Second Temper	Air	1050 ºF – 1225 ºF (566 ºC – 666 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.