Sara Sae	SARA SAE ENGINEERING SPECIFICATION	
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MATERIAL SPECIFICATION FOR ASTM-A514 Gr.B

Rev	Reason of Change	Date	Made By	Reviewed By	Approved By	Status
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MATERIAL SPECIFICATION FOR ASTM-A514 Gr.B

1.0 SCOPE

1.1 AISI A514 low alloy steel forgings and wrought shapes heat-treated to 100 KSI minimum yield strength for sour service.

1.2 Product forms covered by this specification are closed die. Open die and ring forgings, bar and mill shapes.

2.0 REQUIREMENTS

2.1 **Chemical composition:** Chemical composition limits are listed below. An analysis of each heat of steel be 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%.

ELEMENT	COMPOSTION	ELEMENT	COMPOSITIO
CARBON (C)	0.21	SILICON **(Si)**	0.20 — 0.35
MANGANESE **(Mn)**	0.75 – 1.00	CHROMIUM **(Cr)**	0.65
PHOSPHORUS **(P)** '	0.025	MOLYBDENUM (Mo)	0.15 — 0.25
SULPHUR (g)	0.025 (max.)		

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

MECHANICAL PROPERTIES	RANGE
TENSILE STRENGTH	1,30,000 PSI (895 MPa) Min.
YLELD STRENGTH	1,00,000 PSI (690 MPa) Min.
ELONGATION IN 2" Gage Length	16 % Min.
REDUCTION IN AREA	35% Min.
BRINELL HARDNESS	235-293 BHN

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2.1.b) Melt practice: The steel shall be made by the electric furnace process with subsequent vacuum treatment (EFVD). Steel made by vacuum induction melting (VIM) vacuum arc remelting (VAC), or electroslag remelting (ESR) shall also be acceptable.

2.1.c) Condition: All product shall be normalized (N) then quenched (Q) and tempered (T)

(N+Q&T), except that normalizing shall not be required for the following:

2.1.c.1 Forgings with a forging reduction of 4:1 or greater;

2.1.c.2 Rolled tubing or extruded tubing with a wall thickness of 3" or less;

2.1.c.3 Bar stock with a diameter of 8" or less;

2.1.d) Impact testing: Impact testing shall be performed at -46 ° C Average 27 joules each set of three specimens with minimum of 20 joules of one specimen. Similarly, no more then one of the three test results shall be below the equired minimum average.

2.1. e) **Heat Treatment:** The material shall be heat treated by the manufacturer to conform to the tensile and hardness requirements of table 2 by heating to not less than 1650°F (900°C), quenching in water or oil and temperingat not less than 1150°F (620°C). The heat-treating temperatures shall be reported on the test certificates.

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