Sara Sae

Engineering Standards/Specifications

Procedure No.

SES 26-707

Title

MATERIAL SPEC, API STUDS AND BOLTS OF MODIFIED AISI 4340 OR 8630 MODIFIED, FOR STANDARD SERVICE

V.P. of Manufacturing	V.P. of Engineering	V.P. of QA/QC	V.P. of Sales/ Marketing	Revision Description	Release Date	Rev. Ltr

Written By	Revised By	

1.0 SCOPE

1.1 This Specification covers the material requirements for high strength studs and door cap screws for standard service. These products shall meet the requirements of API 6A or 16A. This material is not suitable for H_2S service.

2.0 APPLICABLE SPECIFICATION

2.1 AISI 4340 modified and AISI 8630 modified.

3.0 BASIS OF PURCHASE

3.1 Purchase Order shall include the following:

3.1.1 SARA SAE Engineering Specification.
3.1.2 SARA SAE part number or drawing and revision letter.
3.1.3 Specify material: AISI 4340 Mod. or 8630 Mod.

4.0 CHEMISTRY

4.1 The material shall conform to the requirements for chemical composition, in percent by weight as shown below:

	AISI 4340 MOD.	AISI 8630 MOD.
Carbon	.38 to .43	.28 to .33
Manganese	.60 to .85	.60 to .90
Phosphorous	.025 max.	.025 max.
Sulfur	.030 max.	.025 max.
Silicon	.20 to .35	.15 to .35
Chromium	.70 to .90	.70 to .95
Nickel	1.65 to 2.00	.80 to 1.10
Molybdenum	.20 to .30	.40 to .60
Aluminum	--	.035 max.
Vanadium	--	.055 max.
Copper (Residual)	.30 max.	.30 max.

5.0 MECHANICAL PROPERTIES

5.1 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
Yield strength (psi)	135,000
Elongation, 2" gauge length, (%)	15
Reduction of area, %	50
Brinell Hardness, HB	321-363
Rockwell "C" Hardness (HRC)	35-39

6.0 HEAT TREATMENT

6.1 Heat treatment for AISI 4340 Mod. shall consist of austenitizing at 1475° - 1575°F followed by quenching in oil and tempering at 975°F - 1100°F to BHN 321-363.

6.2 Heat treatment for AISI 8630 Mod. Shall consist of austenitizing at 1650°F - 1690°F, followed by quenching in oil and tempering at 1000°F - 1175°F to BHN 321-363.

6.3 If threads are to be produced by thread rolling, heat treatment shall be done in a controlled atmosphere furnace after the threads are rolled.

7.0 MARKING

7.1 Product shall be stamped on one end with 4340M or 8630M and with the manufacturer's identification mark. In addition, a traceability symbol should be stamped on studs traceable back to the heat from which the studs were made and the date of heat treat.

8.0 INSPECTION

8.1 All parts will be 100% hardness inspected when received by SARA SAE, and any part not meeting the hardness requirements of Section 5.1 will be rejected.

9.0 PLATING

9.1 Whenever products covered by the specification are plated using any electrolytic process, such as chrome or cadmium plating, the product shall be heat treated to prevent hydrogen embrittlement. The heat treatment shall be done within two hours of the plating operation and before any other chemical surface treatment is applied to the product.

9.2 The treatment for prevention of hydrogen embrittlement shall consist of baking the products at 350-400°F for 3 to 5 hours and air cooling after baking.

10.0 CERTIFICATION

10.1 A certification shall be provided to the SARA SAE Purchasing Department in an original and copy.

10.2 The following information is mandatory on the certified record:

10.2.1 Mill chemical analysis for each heat.

10.2.2 Statement of the actual values of hardness and mechanical properties as stipulated in Section 5.0.

10.2.3 Certification of heat treatment to include austenitizing temperature, tempering temperature and time, and identification traceable to mill chemistry.

10.2.4 Purchase Order number.

10.3 In the event of a partial shipment or billing, each shipment shall be accompanied by a certification.