MATERIAL DATASHEET, FORGINGS IN AISI 4340

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Summary:

Forgings in AISI 4340.

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1.0 SCOPE

This specification gives the requirements for AISI 4340 low alloy steel for forgings. The materials shall comply with all requirements given in API 6A equipment to PSL level 3 for bodies. This material does not comply with NACE MR 01-75 for sour service.

2.0 MANUFACTURE

Material shall be fully killed and made to a fine grain melting practice. Material shall be produced by either Electric Furnace, Vacuum Arc Remelt or electroslag Remelt followed by Vacuum Degasing.

3.0 COMPOSITION

Specification (this includes check analysis tolerances).

Carbon	0.38-0.43
Manganese	0-65-0.85
Silicon	0.15-0.30
Phosphorus Max.	0.30
Sulphur Max.	0.25
Chromium	0.70-0.90
Nickel	1.65-2.00
Molybdenum	0.20-0.30

4.0 BILLET

The reduction ratio during hot working shall be a minimum or 3:1. The quality of the final product shall comply with API 6A, PSL level 3.

5.0 TEST SAMPLES

The test material shall be a trepanned outlet or a prolongation removed from the production part after final heat treatment has been completed. The specimens for mechanical testing shall be taken from the area representing the heaviest wall thickness of the component for each heat and heat treatment batch. All test samples shall be cut such that the gauge length is located fully within the centre core ¼ t envelope of the test material.

A minimum of two (2) hardness checks shall be made on the test material after heat treatment. Test specimens shall be removed with their center axis at t/4 position of the test material, where t represents the largest thickness.

One test sample per heat treatment batch shall be submitted fro customer verification.

A minimum of three (3) harness measurements shall be conducted on each component after final heat treatment has been carried out. The results shall be reported to the customer for each component.

6.0 MECHANICAL REQUIREMENTS

As represented by test material.

Tensile Strength, Min MPa	900
Yield Strength, 0,2% Offset, MPa	740-900
Elongation, L0 = 5 x d% Min.	18 (L0=gauge length, d=specimen diameter)
Reduction of Area, % Min.	35
Brinell Hardness (BHN) (Finished product)	Max. 321 HB

7.0 NDT

The finished hot worked forging shall pass the NDT requirements as given in API 6A PSL3. Equipment purchased to this specification, which is not listed in API, shall be tested according to API 6A PSL3, Table 605.1

8.0 IMPACT REQUIREMENTS

10 x 10 mm Charpy V-Noth Specimen. Represented by test bars, Specimens shall be perpendicular to the surface.

	Temperature	Min. Average	
Min. Single Value			
		Joule	Joule
Longitudinal	- 30 ° C	42	32
Transverse	- 30 ° C	28	21

9.0 HEAT TREATMENT

1. Heat to 845-900 °C and hold 15 minutes/25 mm of heaviest cross section, but not less than one hour total.
2. Air cool or faster.
3. Heat to 800-845°C and hold 30 minutes/25 mm heaviest cross section.
4. Water quench to below 75 °C
5. Temper at 620-670 ± 10 °C for 30 minutes/25 mm of heaviest cross section.
6. Air cool.

10.0 CERTIFICATION

Certification shall be in accordance with EN 10204 type 3.1 (former 3.1.B)

11.0 REFERENCE SPECIFICATIONS (LATEST EDITION)

- API 6A
- AISI 4340
- EN 10204