MATERIAL DATA SHEET		MDS X04	Rev. 2
TYPE OF MATERIAL: High Strength Low Alloyed Steel Type AISI 4130			
PRODUCT	***STANDARD***	***GRADE***	***ACCEPT. CLASS***	***SUPPL. REQ.***
Forgings	API 6A	60K (AISI 4130)	PSL 3	-
				Page 1 of 2

1. SCOPE	This MDS specifies the selected options in the referred standard and additional requirements which shall be added or supersede the corresponding requirements in the referred standard.
2. MANUFACTURING	The flanges shall be forged to shape. Flanges machined out of bar and or plate are not accepted. Valves with nominal size NPS 4 and smaller may be machined from solid forgings in compliance with the terminology of ASTM A788 on the following conditions: - Purchasers' acceptance shall be obtained in each case. - The forging shall be tested and certified according to this MDS. - When bar or block forgings with reference thickness 100 mm or greater is used, all destructive test specimens shall be taken from the centre of the bar/block. - Supplementary requirement S56 shall apply to all finished products, ref. Item 10 below.
3. HEAT TREATMENT	The flanges shall be austenitised, liquid quenched and tempered. Components shall be placed in such a way as to ensure free circulation around each component during the heat treatment process including quenching.
4. CHEMICAL COMPOSITION	The steel chemistry should comply with the requirements of AISI 4130, but modified in accordance with the requirements PSL 3 of API 6A. The chemical composition shall be agreed.
5. IMPACT TESTING	Charpy V-notch testing at - 46 °C is required. The minimum absorbed energy for full size specimens shall be 42 J average and 30 J single.
6. HARDNESS TESTING	Except when only one forging is produced, a minimum of two forgings shall be hardness tested per batch or continuous run to ensure that forgings are within the hardness limits 237 HB or 22
7. EXTENT OF TESTING	One set of tensile and impact test shall be carried out for each melt, section thickness according to API 6A, PSL 3, and heat treatment load. A test lot shall not exceed 2000 kg.

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8. TEST SAMPLING

Samples for production testing shall realistically reflect the properties in the actual components.

For products forged by the closed die method, the test specimen shall be obtained from a sacrificial product.

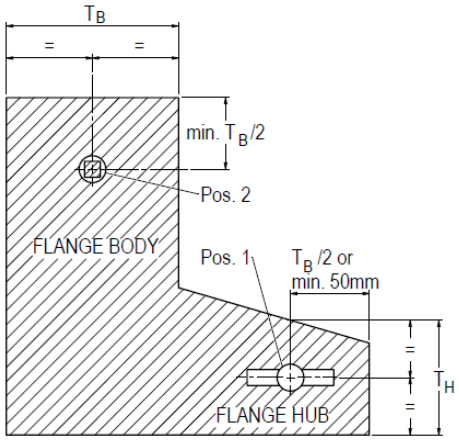

Fig. 1 - Location of test specimens for flanges

For products forged by the open die or by the ring rolling method, the test specimen shall be obtained from a sacrificial forging or from an integral prolongation. For flanges the thickness of the prolongation shall minimum be equal to the hub thickness (T_H) as shown in fig. 1.

Integrated test blocks shall be used for components manufactured by HIP.

Test location flanges: The basic test location is mid-thickness of hub (T_H) in a distance $T_B/2$ or minimum 50 mm from weld end, see fig. 1, position 1.

If test specimens cannot be extracted from position 1 test specimens shall be extracted from flange body position 2.

When prolongations are used test specimens shall be taken in a distance $T_B/2$ or minimum 50mm from the second heat treated surface.

Test location other forgings and HIP products: For forgings having maximum section thickness, $T \leq 50$ mm, the test specimen shall be taken at mid thickness and its mid length shall be at least 50 mm from any second surface or at equal distance from the second surfaces.

For forgings having maximum section thickness, $T > 50$ mm, the test specimens shall be taken at least ¼ T from the nearest surface and mid-length of test specimens at least T or 100 mm, whichever is less, from any second surface. For all forgings sketches shall be established showing type, and size of test samples and location for extraction of test specimens.

NOTE: For closed die forged components and flanges exceeding 80 kg it is recognized that alternative test may be used. Such alternative test sampling shall be qualified and shall comprise comparative testing of sacrificial forgings and the proposed alternative test sample.

9. DIMENSIONAL TOLERANCES

Flanges to MSS SP-44 shall have a maximum wall thickness under tolerance of 0.3 mm for the hub at the welding end.

10. NON DESTRUCTIVE TESTING

NDT shall be carried out after final heat treatment:

- 100 % MT according to ASME VIII, Div.1, App.6, shall be carried out.
- 100 % UT according to ASTM A 388, shall be carried out. The acceptance criteria shall be according to the recording level of ASTM A 388.

11. REPAIR OF DEFECTS

Weld repair is not acceptable.

12. MARKING

The component shall be marked to ensure full traceability to melt and heat treatment lot.

13. CERTIFICATION

The material manufacturer shall have a quality system certified in accordance with ISO 9001 and the system shall have undergone a specific assessment for the relevant materials.

The material certificate shall be issued in accordance with EN 10204 Type 3.1, and shall include the following information:

- Heat treatment condition (For QT condition, austenitisation and tempering temperature and quenching medium shall be stated.)