MATERIAL DATA SHEET		**MDS R14**	**Rev.4**	
TYPE OF MATERIAL: Austenitic Stainless Steel, Type 6Mo				
PRODUCT	***STANDARD***	***GRADE***	***ACCEPT. CLASS***	***SUPPL. REQ.***
Forgings	ASTM A 182	F44 UNS N08367 UNS N08926	-	S56
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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. This MDS is intended for forgings with maximum thickness of 200 mm. For larger thickness special agreements shall be made in each case.
2. QUALIFICATION	Manufacturers and the manufacturing process used for manufacturing of product to this MDS shall be qualified in accordance with NORSOK Standard M-650.
3. STEEL MAKING	The steel melt shall be refined with AOD or equivalent.
4. MANUFACTURING PROCESS	The manufacturing of products according to this MDS shall be carried out according to the M-650 qualified manufacturing procedure. The Hot Isostatic Pressed (HIP) process is an acceptable alternative to forging. 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 12 below.
5. HEAT TREATMENT	The forgings shall be solution annealed followed by water quenching. Components shall be placed in such a way as to ensure free circulation of air and water around each component during the heat treatment process including quenching.
6. TENSILE TESTING	RP0,2 ≥ 300 MPa, RM ≥ 650 MPa, A ≥ 35 %.
7. CORROSION TESTING	Corrosion test according to ASTM G 48 Method A is required. Test temperature shall be 50 °C and the exposure time 24 hours. The corrosion test specimens shall be at the same location as those for mechanical testing. Cut edges shall be prepared according to ASTM G 48. The whole specimen shall be pickled before being weighed and tested. Pickling may be performed for 5 minutes at 60 °C in a solution of 20 % HNO3 + 5 % HF. The acceptance criteria are: - No pitting at 20 X magnification. - The weight loss shall be less than 4,0 g/m2.
8. EXTENT OF TESTING	One set of tensile test and corrosion test shall be carried out for each heat and heat treatment load. The testing shall be carried out on the component with heaviest wall thickness within the load. A test lot shall not exceed 2000 kg for forgings with as forged weight ≤ 50 kg, and 5000 kg for forgings with as forged weight > 50 kg.

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9. 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.

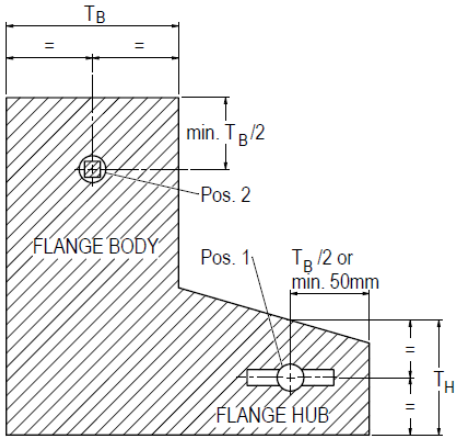

Fig. 1 - Location of test specimens for flanges

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 ≤ 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.

10. NON DESTRUCTIVE TESTING

Supplementary requirement ASTM A 961 S56, penetrant testing, shall apply to 10 % of all forgings (from the lot as defined for mechanical testing) above NPS 2. The testing shall be carried out after final machining and pickling. The acceptance criteria shall be to ASME VIII, Div. 1, Appendix 8.
NDT operators shall be qualified in accordance with EN 473 or equivalent.

11. SURFACE FINISH

White pickled including machined surfaces.

12. REPAIR OF DEFECTS

Weld repair is not acceptable.

13. MARKING

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

14. 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:

- Manufacturer of the starting material for the finished product.
- Steel melting and refining practice.
- Heat treatment condition. (Solution annealing temperature and holding time shall be stated.)