MATERIAL DATA SHEET MDS R16 Rev. 4

TYPE OF MATERIAL: Austenitic Stainless Steel, Type 6Mo

PRODUCT	***STANDARD***	***GRADE***	***ACCEPT. CLASS***	***SUPPL. REQ.***
Castings	ASTM A 351	CK-3MCuN CN-3MN	-	S6

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. 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. MANUFACTURE	The manufacturing of products according to this MDS shall be carried out according to the M-650 qualified manufacturing procedure.
4. STEEL MAKING	The steel melt shall be refined with AOD or equivalent process. Remelting of AOD or equivalent steel in an electric furnace is acceptable. Use of internal scrap is not acceptable.
5. HEAT TREATMENT	Solution annealed at temperature ≥ 1225 ºC. 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. CHEMICAL COMPOSITION	P ≤ 0.030 %
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 specimen 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	Tensile test and corrosion test shall be made for each melt and heat treatment load including any PWHT. A test lot shall not exceed 5 000 kg.
9. TEST SAMPLING	Samples for mechanical testing shall realistically reflect the properties in the actual components. For castings with weight 250 kg or more the test block shall be integrally cast or gated onto the castings and shall not be removed from the castings until after the final quality heat treatment. Thickness of the test block shall be equal to the thickness of the actual components up to a maximum thickness of 100 mm. For flanged components the largest flange thickness is the ruling section. Dimensions of test blocks and location of test specimens within the test blocks are shown in figures 1 and 2 for integral and gated test blocks respectively. The test specimens shall be taken within the cross hatched area and in a distance of T/4 from the ends. During any PWHT the test block shall be tack welded onto the casting.

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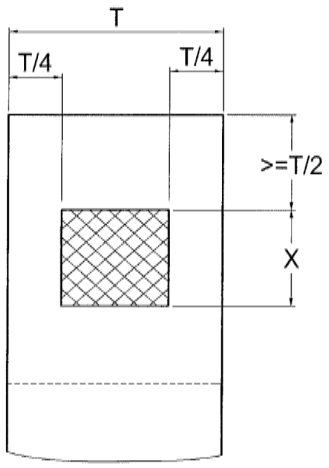

Fig.1 - Integral test block

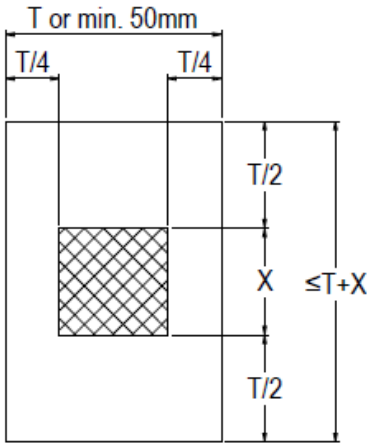

Fig. 2 - Gated test block

10.NON DESTRUCTIVE TESTING

NDT operators shall be qualified in accordance with EN 473 or equivalent.

Liquid penetrant testing:

- Supplementary requirement S6 shall apply to all surfaces (including internal surfaces) of all castings.
- The testing shall be carried out after final machining and pickling.
- The acceptance criteria shall be ASME VIII, Div.1, Appendix 7.

Radiographic testing (RT):

- Castings shall be RT in accordance with ASME VIII div.1 appendix 7.
- The number of castings to be tested per lot shall be according to table below.

Extent of RT based on pressure class and nominal outside diameter:							
Pressure Class:		*≤ 150*	*300*	*600*	*900*	*1500*	*≥ 2500*
Extent of RT	10%	≥ 10”	≥ 10”	≥ 2”	≥ 2”	≥ 2”	≥ 2”
	100%	Not applicable	Not applicable	≥ 20”	≥ 16”	≥ 6”	≥ 6”

- Pilot cast of each pattern shall be 100% RT.
- Castings shall be tested in the critical areas as defined by ASME B16.34, abrupt changes in sections and at the junctions of risers, gates or feeders to the casting.
- When random testing (10%) is specified, minimum one casting in any order shall be tested. If one test fails, two more components shall be tested, and if any of these two fail all items represented shall be tested.

11. SURFACE FINISH White pickled. Shall be carried out after any blasting and shall include finished machined surfaces.

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12. REPAIR OF DEFECTS	ASTM A 703 Supplementary requirement S20 shall apply. Post weld heat treatment (PWHT) is required after all weld repairs. For minor weld repairs, as defined by ASTM A 995, the PWHT may be excluded provided the welding procedure qualification shows that all specified properties, as specified in this MDS, can be fulfilled. Repair welding shall be carried out with Ni-based consumable with enhanced Mo or Cr content compared to the base material. The S content shall not exceed 0,015 %. Welding consumables with matching chemical composition are acceptable provided solution annealing heat treatment after welding. The repair welding procedure shall be qualified in accordance with ASTM A 488 and this MDS. The repair welding procedure qualification shall include the following: - A cast plate shall be used for the test welding. - A macro and corrosion test as specified above shall be carried out. - Change specific make of filler metal (brand name) requires requalification. - All casting with major repairs shall be given a solution heat treatment after welding.
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 certification shall be in accordance with EN 10204 Type 3.1, and shall include the following information: - Steel maufacturer; - Steel melting and refining practice; - Heat treatment condition. (Solution annealing temperature and holding time shall be stated.)