MATERIAL DATA SHEET MDS R12 Rev. 4

TYPE OF MATERIAL: Austenitic Stainless Steel, Type 6Mo

PRODUCT	***STANDARD***	***GRADE***	***ACCEPT. CLASS***	***SUPPL. REQ.***
Welded Pipes	ASTM A 358	UNS S31254 UNS N08367 UNS N08926	Class 1, 3 and 5.	S3

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. STEEL MAKING	Steel melt shall be refined with AOD or equivalent refining.
4. MANUFACTURING PROCESS	The manufacturing of products according to this MDS shall be carried out according to the M-650 qualified manufacturing procedure.
5. HEAT TREATMENT	The pipes shall be solution annealed followed by water quenching. Pipes shall be placed in such a way as to ensure free circulation of air and water around each pipe during the heat treatment process including quenching. Post weld solution annealing is not required of pipes with nominal wall thickness up to 7,11 mm manufactured out of solution annealed plate material and shall be marked as stated in A 358.
6. TENSILE TESTING	$R_{P0,2} \geq 310$ MPa, $R_M \geq 690$ MPa, $A \geq 35$ %.
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 test shall expose the external and internal surfaces and a cross section surface including weld zone in full wall thickness. 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/m^2.
8. EXTENT OF TESTING	Tensile and corrosion testing shall be carried out for each lot defined as follows: - For batch furnace a lot is defined as maximum 60 m pipe of the same heat, size and heat treatment charge. - For continuous heat treatment furnace a lot is defined as maximum 60 m of pipe of the same heat and size and which is heat treated the same day.
9. TEST SAMPLING	Samples for production testing shall realistically reflect the properties in the actual components.
10. WELDING	The PQR/WPQR shall be qualified in accordance with ASME IX or ISO 15614-1 and this MDS: - A matching consumable with enhanced Mo or Cr content compared to the base material shall be used. The S content shall not exceed 0,015 %. - The PQR/WPQR shall be corrosion tested as specified above. The qualification shall be carried out on the same material grade (UNS number) as used in production. Change of specific make (brand name) of welding consumables requires requalification.
11. NON DESTRUCTIVE TESTING	Eddy current testing according to ASTM A 450 is acceptable as replacement for radiography for wall thickness less than 4,0 mm. Supplementary requirement S3, penetrant testing, shall apply according to ASME V Article 6, to the weld area of 10 % of the pipes (same test lot as defined for mechanical testing) delivered. The weld of each examined pipe shall be ground flush in a length of 100 mm prior to penetrant testing. The testing shall be carried out after calibration and pickling. Acceptance criteria shall be to ASME VIII Div. 1 Appendix 8. NDE operators shall be qualified in accordance with EN 473 or equivalent.
12. SURFACE FINISH	White pickled.

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13. REPAIR OF DEFECTS	Weld repair of base material is not acceptable. For repair of welds the same requirements to PQR/WPQR as for production welding shall apply.
14. MARKING	The component shall be marked to ensure full traceability to melt and heat treatment lot.
15. 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: - Steel manufacturer; - Steel melting and refining practice; - Heat treatment condition. (Solution annealing temperature and holding time shall be stated.)