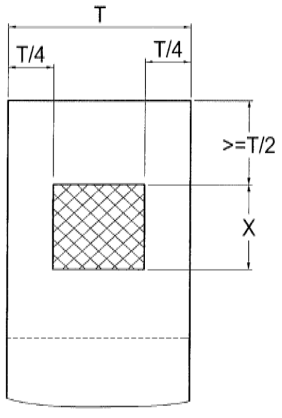
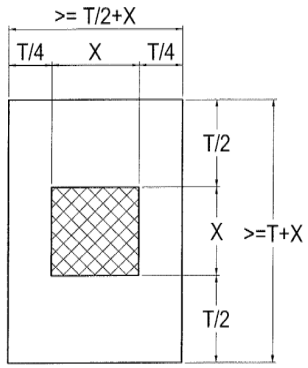
MATERIAL DATA SHEET MDS N02 Rev. 4

TYPE OF MATERIAL: Cast Nickel alloy

PRODUCT	*STANDARD*	*GRADE*	*ACCEPT. CLASS*	*SUPPL. REQ.*
Castings	ASTM A 494	Grade CW6MC (UNS N26625) Grade CX2MW (UNS N26022)		S3 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 products to this MDS shall comply with the requirement of 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. METAL MAKING	The melt shall be refined with AOD or equivalent process. Remelting of AOD or equivalent processed metal in an electric furnace is acceptable. Use of internal scrap is not acceptable.
5. HARDNESS	The hardness shall be maximum 35 HRC.
6. 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/m^2.
7. EXTENT OF TESTING	Tensile test and corrosion test shall be made for each melt and heat treatment load. A test lot shall not exceed 5000 kg.
8. 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.  Fig.1 - Integral test block  Fig. 2 - Gated test block

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9. NON DESTRUCTIVE TESTING

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

Liquid penetrant testing, S3:

- S3 shall apply to all accessible surfaces (including internal surface) 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 ANSI B16.34, abrupt changes in sections and at the junctions of risers, gates or feeders to the casting.
- When spot examination (10%) is specified, minimum one casting in any order shall be examined.
- If one test fails two more components shall be tested, and if any of these two fail all items shall be tested.

10. SURFACE FINISH

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

11. REPAIR OF DEFECTS

Repair welding shall be carried out in accordance with ASTM A 488.

The repair welding procedure shall be qualified in accordance with ASTM A 488 or ISO 11970 and this MDS.

- A cast plate of the same material grade (UNS number), which shall be used.
- A macro and corrosion test as specified above shall be carried out.
- Change of specific make of filler metal (brand name) requires requalification.
- All casting with major repairs shall be given a solution heat treatment after welding.

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 (Solution annealing and annealing temperature shall be stated.)