

MATERIAL DATA SHEET			MDS X01	Rev. 2
TYPE OF MATERIAL: Low alloyed steel Type AISI 4130				
PRODUCT	STANDARD	GRADE	ACCEPT. CLASS	SUPPL. REQ.
Seamless pipes	ASTM A 519	AISI 4130		
Wrought fittings	ASTM A 234	AISI 4130		S2
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. HEAT TREATMENT	Fittings and pipes shall be delivered in the liquid quenched and tempered condition. The tempering temperature shall be minimum 650 °C.			
3. MANUFACTURING PROCESS	Only seamless fittings are acceptable.			
4. CHEMICAL COMPOSITION	The steel shall be produced by open-hearth, basic oxygen, electric-furnace, or vacuum-induction melting (VIM). The steel shall be fully killed. S ≤ 0.015 %; P ≤ 0.025 %			
5. TENSILE TESTING	Minimum yield strength: $R_{eh} \geq 415$ MPa Minimum tensile strength: $R_m \geq 620$ MPa Minimum elongation: $A \geq 18$ % Minimum red. of area: $Z \geq 35$ %			
6. IMPACT TESTING	Charpy V-notch impact testing shall be carried out according to ASTM A 370 for thicknesses $t \geq 6$ mm. Full sized Charpy V-notch specimens shall be used wherever possible. The test specimen shall be taken in the transverse to the major material flow direction, and the notch shall be perpendicular to the surface. The test temperature shall be - 30 °C. The minimum absorbed energy for full size specimens shall be 42 J average and 30 J single. Reduction factors for sub size specimens shall be: 7.5 mm - 5/6 and 5 mm - 2/3.			
7. HARDNESS TESTING	Maximum hardness shall readings shall not exceed 250 Hv10, 237 HB or 22 HRC.			
8. EXTENT OF TESTING	One set of tensile and impact test shall be carried out for each lot. A lot is defined as all products of the same type, nominal size and wall thickness, produced from the same heat and heat treatment load. For pipes heat treated in continuous furnace the maximum lot size shall be 60 m.			
9. TEST SAMPLING	Samples for production testing shall realistically reflect the properties in the actual component. Supplementary requirement S2 shall apply.			
10. NON DESTRUCTIVE TESTING	<p><i>Pipes:</i> All pipes shall be 100% ultrasonically tested with a notch calibration on N5 in accordance with ISO 3183. Acceptance criteria for surface examination by ultrasonic method shall be:</p> <ul style="list-style-type: none"> - Defects, with depths exceeding 5% of the nominal wall thickness or 1.5mm, whichever is the lesser, are not acceptable. - Cracks or linear defects are not acceptable regardless of dimensions. <p><i>Fittings:</i> 100 % magnetic particle testing in accordance with ASME VIII, div. 1, Appendix 6.</p>			
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	<p>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.</p> <p>The material certificate shall be issued in accordance with EN 10204 Type 3.1, and shall include the following information:</p> <ul style="list-style-type: none"> - Heat treatment condition (For QT condition, austenitisation and tempering temperature and quenching medium shall be stated.) 			