

TAM International, Inc.	
AISI 4140, 95 KSI MYS Mechanical Tubing for NACE Sour Service	Specification: ESMA-2002
Reviewed By: Jeff Dinkel	Revision Level: D
Approved By: Greg Fletcher	

1. Scope

- 1.1. This document provides specifications for AISI 4140 mechanical tubing with 95,000 psi minimum yield strength used in TAM products.
- 1.2. Material specified by this document is for sour service and must be in compliance with NACE MR-01-75, latest edition. **Testing shall be in performed per NACE TM-0177, latest revision.**
- 1.3. T95 material made in accordance with API 5 CT requirements is an acceptable material to use. NOTE: If T95 material is used, then the requirements set for by API for this material supersede all the requirements of this specification.

2. References

- 2.1 API 5CT Casing and Tubing
- 2.2 ASTM A519 Standard Specification for Seamless Carbon and Alloy Steel Mechanical Tubing
- 2.3 ASTM 370 Standard Test Methods and Definitions for Mechanical Testing of Steel Products
- 2.4 NACE MR0175 Petroleum and natural gas industries - Materials for use in H2S-containing environments in oil and gas production
- 2.5 NACE TM0177 Laboratory Testing of Metals for Resistance to Sulfide Stress Cracking and Stress Corrosion Cracking in H2S Environments
- 2.6 ASTM E114 Standard Practice for Ultrasonic Pulse-Echo Straight Beam Examination by the Contact Method
- 2.7 ASTM E213 Standard Practice for Ultrasonic Testing of Metal Pipe and Tubing

3. Chemistry

- 3.1. Materials specified by this document shall conform to the following compositional requirements:

<u>ELEMENT</u>	<u>SYMBOL</u>	<u>WEIGHT %</u>
CARBON	(C)	0.25 - 0.35
MANGANESE	(Mn)	0.70 – 1.20
SILICON	(Si)	TRACE
PHOSPHOROUS	(P)	0.020 MAX
SULFUR	(S)	0.010 MAX
MOLYBDENUM	(Mo)	0.025 – 0.85
CHROMIUM	(Cr)	0.80 – 1.50

4. Mechanical Properties

4.1. The mechanical properties of this material shall conform to the following requirements:

Yield Strength	95,000 psi – 110,000KSI Max
Tensile Strength	105,000 psi min
Hardness	25Rc max
Elongation	15% min
Reduction of Area	40% min

4.2. Mechanical testing shall be performed in accordance with the latest revision of ASTM A370 on a prolongation which has undergone the same heat treatment and mechanical processing as the finished product. Testing shall be performed for each heat and lot of raw material.

4.3. Additional testing for sour service (SSCC) shall be performed per NACE TM-0177, Method A, with minimum 80% SMYS.

4.3.1. Tensile test specimens shall be machined from mid-wall locations or full thickness longitudinal strip.

5. Condition

4.4. Material shall be in one of the following heat treat conditions:

4.4.1. Normalized, austenitized, quenched, and tempered

4.4.2. Austenitized, quenched, and tempered

4.5. Material shall be rough machined to size and/or descaled unless otherwise stated on purchase order.

5. Quality

5.1. No repair welding is permitted.

5.2. Material identification number (heat, melt code, etc.) shall be permanently marked on each piece of material, preferable low stress stamps.

5.3. Volumetric examination shall be performed per API 5CT, Table E42 with acceptance from E43 for C95 Material using a 5% Notch reference.

6. Reports

6.1. Material ordered to this specification shall be accompanied by a Material Test Report. Reports shall reference the final condition of the material and shall contain the following minimum information which will be subject to inspection upon receipt:

1. Statement of material condition.
2. Chemical Analysis
3. Mechanical Properties
4. Hardness
5. Material Identification Number
6. Heat Treatment times, temperatures and quench media.

7. Material Acceptance

7.1. All requirements of this specification are subject to verification at the discretion of TAM International.

7.2. TAM Engineering Manager or designee is ultimately responsible for accepting or rejecting material that does not conform to any portion of this specification.

Rev	Date	Description	Prepared By:	Reviewed By / Approved By	Date
A	7/7/2015	New Document	Mark Wyatt	M. Wyatt, T. Young, G. Fletcher	7/15/2015
B	8/29/2015	Add section 1.3	Mark Wyatt	M. Wyatt, T. Young, G. Fletcher	9/10/2015
C	8/10/2016	Update material to 95 KSI min yield, Remove Volumetric Requirements	Jeff Dinkel	M. Coronado, J. Dinkel, G. Fletcher, T. Young	8/22/2016

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