

<b>TAM International, Inc.</b>	
<b>AISI 41XX, 80 KSI MYS Mechanical Tubing for Standard Service</b>	Specification: <b>ESMA-2004</b>
Reviewed By: Mark Wyatt	Revision Level: <b>Rev A</b>
Approved By: Thomas Young	

**1. Scope**

- 1.1. This document provides specifications for AISI 41XX mechanical tubing with 80,000 psi minimum yield strength used in TAM products.
- 1.2. Material specified by this document does not have to be in compliance with NACE MR-01-75.

**2. Chemistry**

- 2.1. 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 - 0.47
MANGANESE	(Mn)	0.70 – 1.00
SILICON	(Si)	0.15 – 0.35
PHOSPHOROUS	(P)	0.035 MAX
SULFUR	(S)	0.040 MAX
MOLYBDENUM	(Mo)	0.015 – 0.25
CHROMIUM	(Cr)	0.80 – 1.10

**3. Mechanical Properties**

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

Yield Strength	80,000 psi min
Tensile Strength	100,000 psi min
Hardness	NA
Elongation	15% min
Reduction of Area	40% min

- 3.2. 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.

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

**4. Condition**

- 4.1. Material shall be in one of the following heat treat conditions:
  - 4.1.1. Normalized, austenitized, quenched, and tempered
  - 4.1.2. Austenitized, quenched, and tempered
- 4.2. Material shall be rough machined to size and/or descaled unless otherwise stated on purchase order.

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**5. Quality**

5.1. Volumetric NDE

5.1.1. The following apply:

5.1.1.1. Sampling

5.1.1.1.1. As far as practical, the entire volume of each part shall be volumetrically inspected after heat treatment or any other thermal treatment for mechanical properties and prior to machining operations that limit effective interpretation of the results of the examination

5.1.1.1.1.1. For quench-and-tempered products, the volumetric inspection shall be performed after heat treatment or any other thermal treatment for mechanical properties

5.1.2. Ultrasonic examination

5.1.2.1.1. Specification/Acceptance Criteria is API 5CT SR-2 9<sup>th</sup> Edition

5.2. No repair welding is permitted.

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

**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	7/30/2015	New Document	Mark Wyatt	M. Wyatt, T. Young, G. Fletcher	8/14/2015