



MATERIAL TEST SHEET
ANGRA 3
COVER SHEET

SPECIFICATION: MS-D2(2)
MTS – 104.03(2) Rev.: 0
Page 1 of 6

TYPE OF SEMI-FINISHED MATERIALS: Fusion welded tube bends, welding ends and reducers of weldable fine grain steel (V = 1.0).
GROUP OF COMPONENT PARTS: 1 or pressure retaining parts.

Rev.
Index:

PERMITTED MATERIALS:

<ul style="list-style-type: none"> Weldable fine grained low carbon structural steels acc. to KTA 3211.1. 	<ul style="list-style-type: none"> ASME – materials as far as fulfilling the requirements of this MTS.
WStE 255 S (Mat. Nr. 1.3131) WStE 285 S (Mat. Nr. (1.3333) WStE 315 S (Mat. Nr. (1.3335) WStE 355 S (Mat. Nr. 1.3137)	

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Material Requirements and Examinations

Item of this MTS

Control and examinations before the start of manufacture.....	A
Examinations prior to welding.....	B
Test on the production weld test coupons and on finished parts.....	C (1-6)
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Heat treatment.....	C2
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- This MTS is only valid in connection with the general part of MS-D2(2).
- Requirements for materials and material manufacturers according to section 5, item 5.1 of MS-D2(2).
- Materials in RC-D2 comply with the requirements according to KTA 3211.1, material group WI, test group A1 and A2.
- The steels shall be normalized, made in particularly killed condition.

REMARK:

19.05.23

19/05/23
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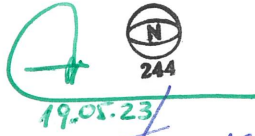
MATERIAL TEST SHEET

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SPECIFICATION: MS-D2(2)

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<p>TYPE OF SEMI-FINISHED MATERIALS: Fusion welded tube bends, welding ends and reducers of weldable fine grain steel (V = 1.0)</p> <p>GROUP OF COMPONENT PARTS: 1 or pressure retaining parts.</p>	<p style="text-align: right;">Rev. Index:</p>		
<p>REQUIREMENT KTA 3211.1, MTS-101.03.1(2) and this MTS ¹⁾</p> <p>(IN THE MATERIALS PROOF SHEET THE N° OF THE SPECIFICATION, THE REQUIREMENT CATEGORY, THE N° OF THIS MATERIAL TEST SHEET AND REVISION WORK SHALL BE ENTERED UNDER ITEM "REQUIREMENTS")</p>	<p>PROOF</p> <p>REPORT OR CERTIFICATION</p>		
<p>NUMBER OF SPECIMENS: This MTS</p> <p>SAMPLING IN ACC. WITH: This MTS</p>	<p style="text-align: center;">TESTING CLASS</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="width: 50px; height: 50px; text-align: center; vertical-align: middle;">D2</td> <td style="width: 50px; height: 50px;"></td> </tr> </table>	D2	
D2			
<p>I. I. = INDEPENDENT INSPECTOR N1 = ETN/FRAMATOME WITNESSING REQUIRED N2 = ETN/FRAMATOME RESERVES RIGHT TO WITNESS TEST C = CONTRACTOR'S INDEPENDENT Q.C. DEPT. ²⁾</p> <p>A CONTROL AND EXAMINATIONS BEFORE THE START OF MANUFACTURE</p> <ol style="list-style-type: none"> 1. A letter of approval issued by the competent Independent Inspector must be available. The conditions laid down in the letter of approval shall be met. Controlled by I.I. 2. A valid procedure qualification test of the manufacturer shall be available. Controlled by I.I. 3. Valid welders' qualification test certificates shall be available. Controlled by I.I. <p>B EXAMINATIONS PRIOR TO WELDING</p> <p>1 Tests and examinations performed on as rolled plates.</p> <p>The full extent of MTS 101.03.1(2) shall be applied completely to the testing and examination of the as-rolled plates.</p> <p>2 Ultrasonic examination of the weld area</p> <p>An UT-examination is to be performed on the weld area, before the preparation of the weld edges. The examined area shall be equal to the thickness of the plate, but at least 50 mm from the edge for $s \geq 6$ mm. The examination shall be performed according to DIN EN 10160, quality class E3.</p>	<p style="text-align: center;">C/I.I.</p>		
<p>REMARK</p> <p>1) In case of doubt KTA 3211.1, MTS-101.03.1(2) and this MTS, this MTS is valid.</p> <p>2) Means manufacturer of the parts.</p>	<div style="text-align: right;">  <p style="font-size: small;">19.05.23</p> <p>Leonardo Solé Vermin Engenheiro Metalúrgico - Matr.: 216988 Superintendência de Engenharia de Projeto SE.N</p> </div>		

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C TEST ON THE PRODUCTION WELD TEST COUPONS AND ON FINISHED PARTS

1 MECHANICAL AND TECHNOLOGICAL REQUIREMENTS

For each heat, dimension, heat treatment lot and welding process, but at least for 50 pieces, one production weld test coupon shall be welded in extension of a longitudinal weld and shall be subjected to the same heat treatment as the final products. The tests shall be carried out after the last heat treatment.

1.1 Mechanical test performed on the weld seam of each production weld test coupon

The measured values of the mechanical properties of base material, weld metal and HAZ shall comply with the corresponding values given in the MTS – 101.03.1(2).

1.1.1 Tensile test at room temperature

Acc. to DIN EN ISO 6892 Part 1.
One specimen with weld in the middle acc. to DIN EN ISO 4136.

1.1.2 Tensile test at elevated temperature

If the design temperature is ≥ 100 °C test shall be carried out acc. to DIN EN ISO 6892 Part 2 at design temperature.

One specimen acc. to DIN EN ISO 4136 (with weld in the middle).

The design temperature has to be stated at the order.

1.1.3 Notched-bar impact tests at ± 0 °C acc. to DIN EN 9016

Specimens and test acc. to DIN EN ISO 148-1. Only if $s \geq 10$ mm.

One set of 3 Charpy V-notch specimens per sampling location:

- sampling acc. to Appendix 1, Fig. 1
- sampling acc. to Appendix 1, Fig. 2 or 4 respectively.

1.1.4 Bend test at room temperature acc. DIN EN ISO 5173, if $s < 10$ mm

- one bend test specimen with fiber under tension in surface layer
- one bend test specimen with fiber under tension in root layer

TESTING CLASS

D2

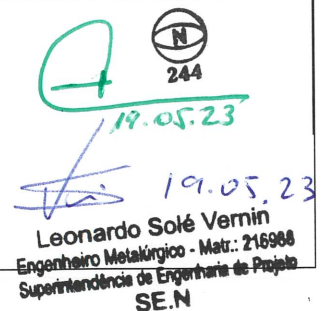
I.I./3.2

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4 MATERIAL IDENTIFICATION

TESTING CLASS

D2

4.1 Marking

Checked by I.I.

The pieces shall be marked as follows:

- Steel grade
- Manufacturer symbol
- Heat number
- Coupon number
- Test stamp of I.I. and/or ETN, if required
- UT-stamp, if required
- Requirement Category
- Test group.

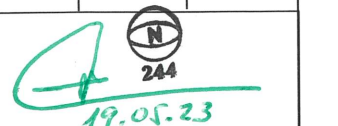
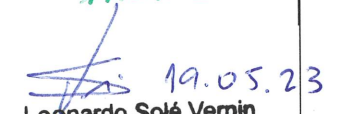
5. RETEST

Acc. to DIN EN 10217-3.

6 REPAIRS

Repairs by welding are not permitted. In special cases an agreement has to be made between C, I.I. and ETN.

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Appendix 1 – Sampling of Charpy V-notch specimens

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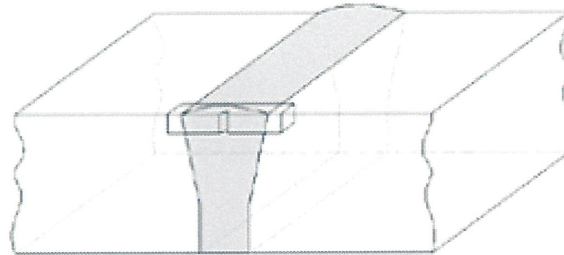


Fig 1

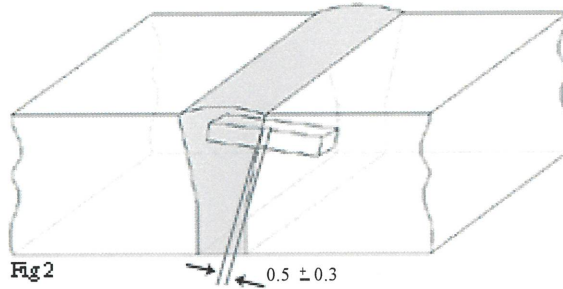


Fig 2

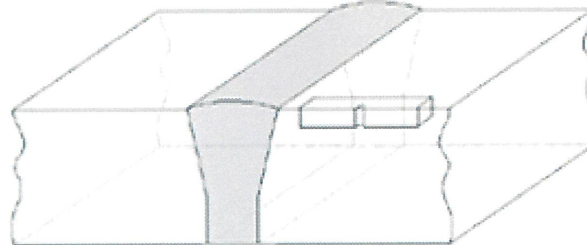


Fig 3

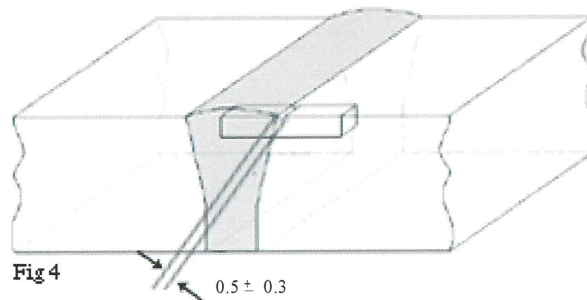
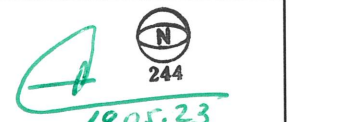
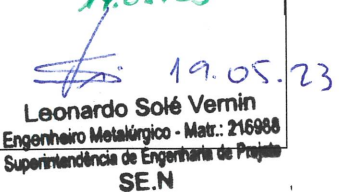


Fig 4

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