

|                                                                                                                                                                                                                                                                                                                                                      |         |                                                                                                                      |     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------------------------------------------------------------------------------------------------------------|-----|
| <b>Type of inspection document :</b><br>Inspection certificate acc. to EN 10204 / 3.1                                                                                                                                                                                                                                                                | A02     | <b>Internal order No.:</b><br>10056964 - 30                                                                          | A08 |
| <b>Purchaser :</b><br>ALLEIMA BENELUX B.V.<br>.<br>AMUNDSENWEG 4<br>5928 LT VENLO<br>THE NETHERLANDS                                                                                                                                                                                                                                                 | A06     | <b>Purchase order No. :</b><br>800758<br><b>Purchaser's reference :</b><br>800758<br><b>Project Id. :</b><br>4003352 | A07 |
| <b>Product :</b><br>Seamless cold finished tube                                                                                                                                                                                                                                                                                                      | B01/B04 | <b>Steel designation :</b><br>3R60 / 3R60                                                                            | B02 |
| <b>Dimension (OD x WT) :</b><br>10,00 x 1,50AW mm                                                                                                                                                                                                                                                                                                    | B09/B10 | <b>Melting process :</b><br>AOD                                                                                      | C70 |
| <b>Technical requirements :</b><br>ASME SA213/SA213M-2021<br>ASTM A213/A213M-2022<br>ASTM A269/A269M-2015a (Reap.2019)<br>EN 10216-5 TC1 2021<br>EN 10305-1 (Only Tolerances-Table 5)<br>PED 2014/68/EU<br>Alleima SPEC S-08921<br>AD 2000 Merkblatt W2 2022<br>AD 2000 W10 - 2019<br>NACE MR0175-2021/ISO 15156-3:2020 NACE MR0103/ISO 17945-1:2016 |         |                                                                                                                      | B03 |
| <b>Supplementary information :</b><br>Manufacturing of stainless steel tubes in grade 3R60 / TP316L / UNS S31603 / 1.4435 from steel origin:<br>Alleima Tube AB, Sweden.<br>The qualified pre-material supplier is mentioned in the section "Extent of material delivery".<br>Tube lenght 6000 mm (-0/+5 mm)                                         |         |                                                                                                                      | B14 |
| The products, covered by this certificate, comply with specification and requirements of the order.                                                                                                                                                                                                                                                  |         |                                                                                                                      | Z01 |
| <b>Originator of the document :</b><br>QA - AC                                                                                                                                                                                                                                                                                                       | A05/Z02 | <b>Inspector's stamp:</b>                                                                                            | Z03 |

**Chemical composition (Heat analysis)**

| Heat   | C<br>[%]  | Si<br>[%] | Mn<br>[%] | P<br>[%]  | S<br>[%]  |
|--------|-----------|-----------|-----------|-----------|-----------|
|        | max 0.030 | max 1.000 | max 2.000 | max 0.040 | max 0.015 |
| 567588 | 0,019     | 0,380     | 1,730     | 0,030     | 0,007     |
| 567705 | 0,023     | 0,370     | 1,490     | 0,030     | 0,008     |

  

| Heat   | Cr<br>[%]     | Ni<br>[%]     | Mo<br>[%]   | N<br>[%]  |
|--------|---------------|---------------|-------------|-----------|
|        | 17.000-18.000 | 12.500-14.000 | 2.500-3.000 | max 0.100 |
| 567588 | 17,200        | 13,130        | 2,610       | 0,047     |
| 567705 | 17,270        | 13,080        | 2,640       | 0,044     |

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**Product check analysis**

| Heat   | Lot        | C<br>[%]  | Si<br>[%] | Mn<br>[%] | P<br>[%]  | S<br>[%]  |
|--------|------------|-----------|-----------|-----------|-----------|-----------|
|        |            | max 0.030 | max 1.000 | max 2.000 | max 0.040 | max 0.015 |
| 567588 | 2092044-11 | 0,019     | 0,400     | 1,790     | 0,032     | 0,007     |
| 567705 | 2092046-11 | 0,023     | 0,370     | 1,540     | 0,030     | 0,007     |

| Heat   | Lot        | Cr<br>[%]     | Ni<br>[%]     | Mo<br>[%]   | N<br>[%]  |
|--------|------------|---------------|---------------|-------------|-----------|
|        |            | 17.000-18.000 | 12.500-14.000 | 2.500-3.000 | max 0.100 |
| 567588 | 2092044-11 | 17,300        | 12,820        | 2,600       | 0,045     |
| 567705 | 2092046-11 | 17,490        | 12,980        | 2,570       | 0,036     |

**Extent of material delivery**

| Heat   | Lot        | Hollow supp. | No. of HTcycles <sup>1)</sup> | Pieces | Total length [m] | Total weight [kg] <sup>2)</sup> |
|--------|------------|--------------|-------------------------------|--------|------------------|---------------------------------|
| 567588 | 2092044-11 | ALLEIMA SE   | 1                             | 205    | 1 230.000        | 391.140                         |
| 567705 | 2092045-11 | ALLEIMA SE   | 1                             | 599    | 3 594.000        | 1 142.892                       |
| 567705 | 2092046-11 | ALLEIMA SE   | 1                             | 614    | 3 684.000        | 1 171.512                       |

Note : <sup>1)</sup> Number of heat treatment cycles performed on the tubes.<sup>2)</sup> Weight quantity is theoretically calculated, it might differ compared to shipping documents.

Chomutov, date : 30.3.2023

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**Flaring test in acc. with ASTM A 1016**

| Heat   | Lot        | ST | Test result<br>[pass/fail] |
|--------|------------|----|----------------------------|
|        |            |    | pass                       |
| 567588 | 2092044-11 |    | pass                       |
| 567588 | 2092044-11 |    | pass                       |
| 567705 | 2092045-11 |    | pass                       |
| 567705 | 2092045-11 |    | pass                       |
| 567705 | 2092046-11 |    | pass                       |
| 567705 | 2092046-11 |    | pass                       |

**Flaring test in acc. with EN 10216-5**

| Heat   | Lot        | ST | Test result<br>[pass/fail] |
|--------|------------|----|----------------------------|
|        |            |    | pass                       |
| 567588 | 2092044-11 |    | pass                       |
| 567705 | 2092045-11 |    | pass                       |
| 567705 | 2092046-11 |    | pass                       |

**Flattening test in acc. with ASTM A 1016**

| Heat   | Lot        | ST | Test result<br>[pass/fail] |
|--------|------------|----|----------------------------|
|        |            |    | pass                       |
| 567588 | 2092044-11 |    | pass                       |
| 567588 | 2092044-11 |    | pass                       |
| 567705 | 2092045-11 |    | pass                       |
| 567705 | 2092045-11 |    | pass                       |
| 567705 | 2092046-11 |    | pass                       |
| 567705 | 2092046-11 |    | pass                       |

**Hardness test (HRB/HRC) in acc. with E18/S-08921/NACE**

| Heat   | Lot        | ST | Hardness<br>[HRB] | Hardness $\leq 22\text{HRC}$<br>[yes/no] |
|--------|------------|----|-------------------|------------------------------------------|
|        |            |    | max 80,000        | yes                                      |
| 567588 | 2092044-11 |    | 76,000            | yes                                      |
| 567588 | 2092044-11 |    | 76,000            | yes                                      |
| 567705 | 2092045-11 |    | 77,000            | yes                                      |
| 567705 | 2092045-11 |    | 77,000            | yes                                      |
| 567705 | 2092046-11 |    | 76,000            | yes                                      |
| 567705 | 2092046-11 |    | 75,000            | yes                                      |

**Intergranular corrosion testing in acc. with ASTM A262E**

| Heat   | Lot        | ST | Test result<br>[pass/fail] |
|--------|------------|----|----------------------------|
|        |            |    | pass                       |
| 567588 | 2092044-11 |    | pass                       |
| 567705 | 2092045-11 |    | pass                       |
| 567705 | 2092046-11 |    | pass                       |

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### Intergranular corrosion testing in acc. with EN ISO 3651-2/A

| Heat   | Lot        | ST | Test result<br>[pass/fail] |
|--------|------------|----|----------------------------|
|        |            |    | pass                       |
| 567588 | 2092044-11 |    | pass                       |
| 567705 | 2092045-11 |    | pass                       |
| 567705 | 2092046-11 |    | pass                       |

### Longitudinal tensile test in acc. with A370 / EN ISO 6892-1

| Heat   | Lot        | ST | Rp0,2<br>[MPa] | Rm<br>[MPa]     | A2"<br>[%] | A5<br>[%]  | Rp1,0<br>[MPa] |
|--------|------------|----|----------------|-----------------|------------|------------|----------------|
|        |            |    | min 220,000    | 515,000-690,000 | min 35,000 | min 40,000 | min 250,000    |
| 567588 | 2092044-11 |    | 280,700        | 558,000         | 58,000     | 64,600     | 312,200        |
| 567705 | 2092045-11 |    | 287,100        | 564,100         | 55,400     | 61,100     | 315,800        |
| 567705 | 2092046-11 |    | 281,300        | 559,100         | 56,000     | 61,700     | 309,600        |

### Microstructure evaluation and Grain size WI-3815/ASTM E112

The structure is free from grain boundary chromium carbide precipitations.

| Heat   | Lot        | ST | G.B.Cr.Carbides<br>[No/Yes] | Grain size<br>[(G)] |
|--------|------------|----|-----------------------------|---------------------|
|        |            |    | No                          | 5,000-14,000        |
| 567588 | 2092044-11 |    | No                          | 5,000               |
| 567705 | 2092045-11 |    | No                          | 5,000               |
| 567705 | 2092046-11 |    | No                          | 5,000               |

### Dimensional check

Test results comply with specified criteria.

### HT - Final heat treatment of straight tubes

Bright annealing at 1150°C with min. 0,25 minute holding time.

Quenched by forced cooled inert gas.

### Inside cleanliness check

Test results comply with specified criteria.

### NDT - Eddy current flaw detection in acc. ASTM E426

Test results comply with specified criteria.

### NDT - Visual inspection

Test results comply with specified criteria.

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**PMI - 100% positive material identification**

Test results comply with specified criteria.

**Statement**

The raw material is free from radioactive contamination.

**Statement**

Material free from mercury and asbestos contamination.

**Statement**

The material have been manufactured within the scope of certified Quality Management System maintained in accordance with EN ISO 9001:2015.

**Straightness check**

Test results comply with specified criteria.