

**CERTIFICATE**

A03/Z02

**No. A/20-898288****Date**

2020-06-17

**Rev****00****Page**

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A02/Z03

INSPECTION CERTIFICATE acc to  
EN 10204 3.1

A06

PROCESSKONTROLL ITEMS AB  
BOX 2088  
444 02 STORA HÖGA  
SWEDEN

INSPECTION STAMP

QA-TUBE

| <b>Customer References</b><br>759659<br><br>003-00991 ITEMS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>A07</b><br><b>Customer order</b><br>2020-06-08 | <b>Sandvik References</b><br><b>Order No.</b> 555248<br><b>Subs No.</b> 685419<br><b>ABSMT No.</b> 300-20917<br><b>Dispatch note</b> 20818/54<br><b>C.Code</b> 15 | <b>A08</b>     |                     |       |       |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------------|-------|-------|--------|------|---|----|-----------------|--------|-------|----|------|-------|--|--------------|--|--|--|--|--|--|--|--|--|--------------|----|------|--|--|--|--|--|--|-------|------|---|----|----|---|---|----|----|----|--------|-------|------|------|-------|-------|-------|-------|------|--|-----------|----------|--|--|--|--|--|--|--------|------|-------|--|--|--|--|--|--|------|---|----|----|---|---|----|----|----|--------|-------|------|------|-------|-------|-------|-------|------|--|----------|--|--|--|--|--|--|--|--------|-------|--|--|--|--|--|--|--|----------------|
| <b>Material description</b><br>SEAMLESS STAINLESS COLD FINISHED<br>HYDRAULIC TUBING<br><br><b>Metallurgical process</b><br>Electric furnace                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>B01/B04</b><br><br><br><b>C70</b>              | <b>Steel/material Designations</b><br><b>Sandvik</b> 3R60<br><b>AISI</b> TP316/TP316L<br><b>EN no</b> 1.4435                                                      | <b>B02</b>     |                     |       |       |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
| <b>Technical requirements</b><br>ASTM A-213-19 AW, ASME SA-213-ED-19 AW, ASTM A-269-15A<br>NACE MR0175/ISO 15156-3:-2015, NACE MR0103/ISO 17945-1:-2015<br>PED 2014/68/EU EN 10216-5 TC1<br>HRB MAX 80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                   |                                                                                                                                                                   | <b>B03</b>     |                     |       |       |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
| <b>EXTENT OF DELIVERY</b><br><table><thead><tr><th>It</th><th>Product designation</th><th>Heat</th><th>Lot</th><th>Pieces</th><th>Kg</th><th>M</th></tr></thead><tbody><tr><td>02</td><td>THT-3R60-20-2.5</td><td>558652</td><td>24869</td><td>15</td><td>97.0</td><td>90.00</td></tr><tr><td></td><td>20.00 X 2.50</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="4"></td><td><b>Total</b></td><td>15</td><td>97.0</td></tr><tr><td colspan="4"></td><td></td><td></td><td>90.00</td></tr></tbody></table><br><b>TEST RESULTS</b><br><b>Chemical composition (weight%)</b><br><table><thead><tr><th>Heat</th><th>C</th><th>Si</th><th>Mn</th><th>P</th><th>S</th><th>Cr</th><th>Ni</th><th>Mo</th></tr></thead><tbody><tr><td>558652</td><td>0.021</td><td>0.38</td><td>1.58</td><td>0.030</td><td>0.009</td><td>17.30</td><td>13.16</td><td>2.63</td></tr><tr><td></td><td><b>Co</b></td><td><b>N</b></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>558652</td><td>0.15</td><td>0.037</td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table><br><b>Chemical composition, product (weight%)</b><br><table><thead><tr><th>Heat</th><th>C</th><th>Si</th><th>Mn</th><th>P</th><th>S</th><th>Cr</th><th>Ni</th><th>Mo</th></tr></thead><tbody><tr><td>558652</td><td>0.018</td><td>0.38</td><td>1.57</td><td>0.031</td><td>0.009</td><td>17.25</td><td>13.12</td><td>2.62</td></tr><tr><td></td><td><b>N</b></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>558652</td><td>0.031</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></tbody></table> |                                                   |                                                                                                                                                                   | It             | Product designation | Heat  | Lot   | Pieces | Kg   | M | 02 | THT-3R60-20-2.5 | 558652 | 24869 | 15 | 97.0 | 90.00 |  | 20.00 X 2.50 |  |  |  |  |  |  |  |  |  | <b>Total</b> | 15 | 97.0 |  |  |  |  |  |  | 90.00 | Heat | C | Si | Mn | P | S | Cr | Ni | Mo | 558652 | 0.021 | 0.38 | 1.58 | 0.030 | 0.009 | 17.30 | 13.16 | 2.63 |  | <b>Co</b> | <b>N</b> |  |  |  |  |  |  | 558652 | 0.15 | 0.037 |  |  |  |  |  |  | Heat | C | Si | Mn | P | S | Cr | Ni | Mo | 558652 | 0.018 | 0.38 | 1.57 | 0.031 | 0.009 | 17.25 | 13.12 | 2.62 |  | <b>N</b> |  |  |  |  |  |  |  | 558652 | 0.031 |  |  |  |  |  |  |  | <b>B07-B13</b> |
| It                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Product designation                               | Heat                                                                                                                                                              | Lot            | Pieces              | Kg    | M     |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
| 02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | THT-3R60-20-2.5                                   | 558652                                                                                                                                                            | 24869          | 15                  | 97.0  | 90.00 |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 20.00 X 2.50                                      |                                                                                                                                                                   |                |                     |       |       |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                   |                                                                                                                                                                   |                | <b>Total</b>        | 15    | 97.0  |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                   |                                                                                                                                                                   |                |                     |       | 90.00 |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
| Heat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | C                                                 | Si                                                                                                                                                                | Mn             | P                   | S     | Cr    | Ni     | Mo   |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
| 558652                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.021                                             | 0.38                                                                                                                                                              | 1.58           | 0.030               | 0.009 | 17.30 | 13.16  | 2.63 |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Co</b>                                         | <b>N</b>                                                                                                                                                          |                |                     |       |       |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
| 558652                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.15                                              | 0.037                                                                                                                                                             |                |                     |       |       |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
| Heat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | C                                                 | Si                                                                                                                                                                | Mn             | P                   | S     | Cr    | Ni     | Mo   |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
| 558652                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.018                                             | 0.38                                                                                                                                                              | 1.57           | 0.031               | 0.009 | 17.25 | 13.12  | 2.62 |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>N</b>                                          |                                                                                                                                                                   |                |                     |       |       |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
| 558652                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.031                                             |                                                                                                                                                                   |                |                     |       |       |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |
| <b>Quality assurance - Sofia Åkesson / Q-Manager</b><br>MTC Service / Certificates                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                   |                                                                                                                                                                   | <b>A05/Z02</b> |                     |       |       |        |      |   |    |                 |        |       |    |      |       |  |              |  |  |  |  |  |  |  |  |  |              |    |      |  |  |  |  |  |  |       |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |           |          |  |  |  |  |  |  |        |      |       |  |  |  |  |  |  |      |   |    |    |   |   |    |    |    |        |       |      |      |       |       |       |       |      |  |          |  |  |  |  |  |  |  |        |       |  |  |  |  |  |  |  |                |

A01

AB SANDVIK MATERIALS TECHNOLOGY Reg No. 556234-6832 VAT No. SE556234683201  
SE-81181 SANDVIKEN SWEDEN www.materials.sandvik mtc\_service.smt@sandvik.com

**Tensile test at room temperature**

|       | Yield strength |       | Tensile strength | Elongation |    |
|-------|----------------|-------|------------------|------------|----|
|       | MPa            | MPa   | MPa              | %          | %  |
| Lot   | Rp0.2          | Rp1.0 | Rm               | A          | 2" |
| 24869 | 274            | 310   | 591              | 54         | 55 |
|       | 276            | 311   | 592              | 50         | 52 |

**Hardness test**

| Lot   | Min | Max |
|-------|-----|-----|
|       | HRB | HRB |
| 24869 | 75  | 78  |

**Following controls/tests have been satisfactorily performed:**

- Flattening test.
- Flaring test
- 100% PMI-test.
- Intergranular corrosion test acc to ASTM A-262 PR.E and EN ISO 3651-2A
- Leak test: Eddy current test acc to EN ISO 10893-1, ASME SA-1016.
- Visual inspection and dimensional control.

**Heat Treatment:**

Solution annealed at a temperature of Min 1040° C and quenched.

**Marking:**

SANDVIK 3R60 ASTM A213/A269 ASME SA213 COLD EN10216-5 TC1 AW EN 1.4435 TP316/3 16L CFA SML NDE 20.00 X 2.50 MM HT 558652 SS LOT 24869 MADE IN SWEDEN \*QA-TUBE \*

The raw material is free from radioactive contamination.

Material free from mercury contamination.

No welding or weld repair.

Approved acc. AD 2000-Merkblatt W0 and certified acc. to Pressure Equipment Directive (2014/68/EU, Annex 1 para 4.3) by TUEV NORD; notified body, reg.no. 0045.

The number of tests are based on the size of the manufacturing lot before cutting to finished lengths.

The delivered products comply with the specifications and requirements of the order.

The material is manufactured according to a Quality system, approved and registered to ISO 9001:2015.

No unauthorized alterations. The contents of this Inspection Certificate may not be modified or revised in any way without the prior written approval of AB Sandvik Materials Technology. Unauthorized alterations to the Inspection Certificate, including introduction of false, fictitious or fraudulent statements or entries, may be punishable by fines, imprisonment, or both. This Inspection Certificate may be copied only in the manner and for the purposes specified in Section 6 of EN 10204:2004. Contravention of this notice will be prosecuted to the fullest extent of applicable law.





# CERTIFICATE

**No. A/20-898288**

**Date**

2020-06-17

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The certificate is produced with EDP and valid without signature.

