



# APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:  
**AMMM00000H4**  
Revision No:  
**3**

This is to certify:

That

**TŘINECKÉ ŽELEZÁRNY, a.s.**

**Průmyslová 1000, Třinec, Czech Republic plant: KLADNO-DŘÍŇ, Třinecká 733, Buštěhrad, Czech Republic**

is an approved manufacturer of  
**Rolled Steel Products**

in accordance with

**DNV rules for classification – Ships**

**DNV class programme CP-0243 – Manufacture of rolled ferritic steel products – Steel rolling mill**

**DNV-OS-E302 – Offshore mooring chain, Edition July 2018 (Amended August 2021)**

**DNV class programme CP-0237 – Manufacture of offshore mooring chain and accessories**

and the following particulars:

|                                    |  |
|------------------------------------|--|
| <b>Products</b>                    | <b>Round bars for machinery applications,<br/>Semis for forging and rolling stock,<br/>Semi-finished products (blooms, billets, round bars) for chain cables</b> |
| <b>Steel type/grades</b>           | <b>Carbon and carbon-manganese,<br/>Alloy,<br/>R3S, R4, R4S, R5 and R6</b>   |
| <b>Steelmaking<br/>Deoxidation</b> | <b>See page 2<br/>Killed</b>   |
| <b>Fine grain elements</b>         | <b>See page 2</b>  |
| <b>Delivery conditions</b>         | <b>See page 2</b>  |
| <b>Max. thickness/diam.</b>        | <b>See page 2</b>  |
| <b>Remarks</b>                     | <b>See particulars of the approval</b>   |

Manufacturer approved by this certificate is accepted to deliver according to DNV GL, DNV and GL rules. Materials to be applied to DNV classed object shall fulfill the material requirements in the applicable DNV class rules.

Issued at **Høvik** on **2022-08-08**

for **DNV**

This Certificate is valid until **2025-04-12**.

DNV local station: **Prague CMC**

Approval Engineer: **Dechun Lou**

**Sondre Løken**  
**Head of Section**

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Form code: AM 311

Revision: 2021-03

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**Particulars of the approval**

| <b>Rolled round bars intended to be machined into components acc. to DNV rules for classification-Ships and DNV CP-0243:</b> |                           |                     |                     |                    |
|--|---------------------------|---------------------|---------------------|--------------------|
| Steel type   | Steelmaking <sup>1)</sup> | Fine grain elements | Delivery conditions | Max. diameter (mm) |
| Carbon and carbon-Manganese  | BOC, VD, CC               | Al or Al+V          | N                   | 300 <sup>2)</sup>  |
| Alloy  | BOC, VD, CC               | Al or Al+V          | QT                  | 300 <sup>2)</sup>  |

Remarks:

<sup>1)</sup> Basic Oxygen Converter; VD: Vacuum Degassing; CC: Continuous Casting.

<sup>2)</sup> Minimum rolling reduction ratio 3.5:1.

| <b>Semi-finished products (Blooms, billets, round bars) intended for forging stock for chain accessories acc. to DNV-OS-E302 and DNV CP-0237:</b> |                           |                     |  |                                   |  |
|---|---------------------------|---------------------|--|-----------------------------------|--|
| Grades <sup>1)</sup>  | Steelmaking <sup>2)</sup> | Fine grain elements | Max. diameter or thickness <sup>3)</sup> | Delivery conditions <sup>3)</sup> | Raw material manufacturer <sup>4)</sup>        |
| R3S, R4, R4S, R5, R6 <sup>5)</sup>  | BOC, VD, CC               | Al                  | NA                                       | NA                                | Trinecke Zelezarny a. s.<br>Trinec-Stare Mesto |

Remarks:

<sup>1)</sup> For approval material specification see Table S1

<sup>2)</sup> Basic Oxygen Converter; VD: Vacuum Degassing; CC: Continuous Casting; IC: Ingot Casting.

<sup>3)</sup> Not applicable.

<sup>4)</sup> The steelmaking is carried out at mother factory Trinecke zelezarny, plant Trinec.

<sup>5)</sup> Special approval R6 for supply chain, see Table S1.

| <b>Table S1 - Specification for chemical composition- intended for steel forgings for chain cables accessories</b> |                           |     |     |     |     |      |      |      |      |     |     |      |      |
|--|---------------------------|-----|-----|-----|-----|------|------|------|------|-----|-----|------|------|
| Grade,   | Max. diam. thickness (mm) |     | C   | Si  | Mn  | P    | S    | Cr   | Ni   | Mo  | Cu  | Al   | N    |
| R3S<br>R4  | 108 <sup>1, 2)</sup>      | Min | .30 | -   | .50 | -    | -    | 1.50 | 1.50 | .20 | -   | .020 | -    |
|  |                           | Max | .38 | .40 | .80 | .025 | .015 | 1.70 | 1.70 | .30 | .25 | .050 | .015 |
|  | 102 <sup>1, 2)</sup>      | Min | .26 | -   | .50 | -    | -    | 1.80 | 1.80 | .30 | -   | .020 | -    |
|  |                           | Max | .34 | .40 | .80 | .025 | .015 | 2.20 | 2.20 | .50 | .25 | .050 | .015 |
| R4S  | 108 <sup>1, 2)</sup>      | Min | .30 | -   | .50 | -    | -    | 1.50 | 1.50 | .20 | -   | .020 | -    |
|  |                           | Max | .38 | .40 | .80 | .025 | .015 | 1.70 | 1.70 | .30 | .25 | .050 | .015 |
|  | 84 <sup>1, 2)</sup>       | Min | .26 | -   | .50 | -    | -    | 1.80 | 1.80 | .30 | -   | .020 | -    |
|  |                           | Max | .34 | .40 | .80 | .025 | .015 | 2.20 | 2.20 | .50 | .25 | .050 | .015 |
| R5   | 108 <sup>1, 2)</sup>      | Min | .30 | -   | .50 | -    | -    | 1.50 | 1.50 | .20 | -   | .020 | -    |
|  |                           | Max | .38 | .40 | .80 | .025 | .015 | 1.70 | 1.70 | .30 | .25 | .050 | .015 |
|  | 84 <sup>1, 2)</sup>       | Min | .26 | -   | .50 | -    | -    | 1.80 | 1.80 | .30 | -   | .020 | -    |
|  |                           | Max | .34 | .40 | .80 | .025 | .015 | 2.20 | 2.20 | .50 | .25 | .050 | .015 |
| R6 <sup>3)</sup>   | 130 <sup>2, 4)</sup>      | Min | .31 | -   | .50 | -    | -    | 1.80 | 2.00 | .40 | -   | .020 | -    |
|  |                           | Max | .34 | .40 | .80 | .025 | .015 | 2.15 | 2.20 | .60 | .25 | .050 | .015 |

Remarks:

<sup>1)</sup> The content of Sn, Sb, As and B may be required. In such cases, the maximum content shall be 0.020 % for Sn, 0.020 % for Sb, 0.030% for As and 0.0007% for B.

<sup>2)</sup> The max. diameter or thickness is not applicable for semi-finished products: billets or round bars, only reference for raw materials purchased by forging manufacturers.

<sup>3)</sup> Special approval R6 for supply chain: Trinecke zelezarny (AMMM00000H4) → PBK ZK (AMMM000002K) → Schmiedestück-Vertrieb Feuerstein GmbH (AMMM0000019).

<sup>4)</sup> The maximum content shall be 0.010 % for Sn, 0.005 % for Sb, 0.015% for As and 0.0007% for B. H<sub>2</sub> ≤ 2ppm, O<sub>2</sub> ≤ 25ppm