

# APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:  
**AMMM00000YT**  
Revision No:  
**2**

This is to certify:

That

**Großenhainer Gesenk- und Freiformschmiede GmbH**  
Öhringer Str. 24-26,  
01558 Großhain,  
Germany

is an approved manufacturer of  
**Steel Forgings**

in accordance with  
**DNV rules for classification – Ships**  
**DNV class programme – DNV-CP-0247 Steel forgings**

and the following particulars:

|                                       |  |
|---------------------------------------|--|
| <b>Application area</b>               | <b>Forgings for hull structures and equipment</b><br><b>Forgings for shafting and machinery</b><br><b>Forgings for gearing</b><br><b>Forgings for boilers, pressure vessels and piping systems</b> |
| <b>Steel type</b>                     | <b>Carbon and carbon-manganese,</b><br><b>Alloy,</b><br><b>See page 2</b>  |
| <b>Forging method</b>                 | <b>Open die forging / closed die forging</b>   |
| <b>Max. weight</b>                    | <b>See page 2</b>  |
| <b>Heat treatment condition</b>       | <b>See page 2</b>  |
| <b>Additional approval conditions</b> | <b>Including grades according to international standards for approved applications, see particulars of the approval</b>  |

Manufacturer(s) approved by this certificate is/are 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 **Hamburg** on **2024-01-10**

This Certificate is valid until **2025-12-31**.

DNV local unit: **Magdeburg**

Approval Engineer: **Christian Wildhagen**



for **DNV**

This document has been digitally signed and will  
therefore not have handwritten signature

Stefan Röhr

**Thorsten Lohmann**  
**Head of Section**

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



## Particulars of the approval

### Forgings for hull structures and equipment

| Steel type | Grade <sup>3)</sup>  | Forging method <sup>1)</sup> | Max. weight [kg] | Heat treatment condition <sup>2)</sup> |
|------------|--|------------------------------|------------------|--|
| C and C-Mn | NV F400UW, NV F440UW, NV F480UW, NV F520UW, NV F560UW, NV F600UW | OD, CD                       | 300              | N, NT, QT                              |
| Alloy      | NV F550AW, NV F600AW, NV F650AW                                  | OD, CD                       | 300              | QT                                     |

### Forgings for shafting and machinery

#### Forgings for gearing

| Steel type | Grade <sup>3)</sup>  | Forging method <sup>1)</sup> | Max. weight [kg] | Heat treatment condition <sup>2)</sup> |
|------------|--|------------------------------|------------------|--|
| C and C-Mn | NV F400U, NV F440U, NV F480U, NV F520U, NV F560U, NV F600U, NV F640U, NV F680U, NV F720U, NV F760U | OD, CD                       | 300              | N, NT, QT                              |
| Alloy      | NV F600A, NV F700A, NV F800A, NV F900A, NV F1000A, NV F1100A                                       | OD, CD                       | 300              | QT                                     |

### Forgings for boilers, pressure vessels and piping systems

| Steel type | Grade <sup>3)</sup>     | Forging method <sup>1)</sup> | Max. weight [kg] | Heat treatment condition <sup>2)</sup> |
|------------|-------------------------|------------------------------|------------------|--|
| C and C-Mn | NV F450H, NV F490H      | OD, CD                       | 300              | N, NT, QT                              |
| Alloy      | NV F0.5Mo, NV F1Cr0.5Mo | OD, CD                       | 300              | N, NT, QT                              |
|            | NV F2.25Cr1Mo           | OD, CD                       | 300              | N, QT                                  |

### Steels acc. other standards

| Grade <sup>3)4)</sup>           | Forging method <sup>1)</sup> | Max. weight [kg] | Heat treatment condition <sup>2)</sup> |
|---------------------------------|------------------------------|------------------|--|
| Steel acc. to EN 10250-2 and -3 | OD, CD                       | 300              | acc. standard                          |
| Steel acc. to EN 10083-2 and -3 | OD, CD                       | 300              | acc. standard                          |
| Steel acc. to EN 10084          | OD, CD                       | 300              | acc. standard                          |

#### Remarks:

- 1) OD: Open die forging  
CD: Closed die forging
- 2) QT: Quenched and tempered  
N: Normalized  
NT: Normalized and tempered
- 3) Incl. equivalent grades in acc. to other standards
- 4) Including pre-material acc. EN 10025