

# APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:  
**AMMM00001CM**  
Revision No:  
**2**

**This is to certify:**

**That**

**Wildauer Schmiede- und Kurbelwellentechnik GmbH**  
**Schmiedestraße, 15745 Wildau,**  
**Germany**

is an approved manufacturer of  
**Steel Forgings**

in accordance with  
**DNV GL rules for classification – Ships**  
**DNVGL-OS-B101 – Metallic materials**

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 crankshafts</b><br><b>Stainless steel forgings</b> |
| <b>Steel type(s)</b>                  | <b>Carbon, Carbon-Manganese,</b><br><b>Alloy,</b><br><b>Martensitic Stainless</b>   |
| <b>Forging method</b>                 | <b>Open die, closed die,</b>  |
| <b>Max. weight</b>                    | <b>continuous grain flow (CGF)</b><br><b>See page 2 ff.</b>   |
| <b>Heat treatment condition</b>       | <b>See page 2 ff.</b>   |
| <b>Additional approval conditions</b> | <b>See page 2 ff.</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 GL classed object shall fulfill the material requirements in the applicable DNV GL class rules.

Issued at **Hamburg** on **2020-10-05**

for **DNV GL**

This Certificate is valid until **2023-05-31**.

DNV GL local station: **Magdeburg**

Approval Engineer: **Christian Wildhagen**

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

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Job Id: **263.11-001862-4**  
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## Particulars of the approval

### Forgings for hull structures and equipment

| Steel type | Grade <sup>4)</sup>  | Forging method <sup>1)</sup> | Max. weight [kg] | Heat treatment condition <sup>2)</sup> |
|------------|--|------------------------------|------------------|--|
| C and C-Mn | VL F400UW, VL F440UW,<br>VL F480UW, VL F520UW,<br>VL F560UW, VL F600UW | OD, CD                       | 5 000            | N, NT, QT                              |
| Alloy      | VL F550AW, VL F620AW,<br>VL F650AW                                     | OD, CD                       | 5 000            | N, NT, QT                              |

### Forgings for shafting and machinery

| Steel type | Grade <sup>4)</sup>  | Forging method <sup>1)</sup> | Max. weight [kg] | Heat treatment condition <sup>2)</sup> |
|------------|--|------------------------------|------------------|--|
| C and C-Mn | VL F400U, VL F440U,<br>VL F480U, VL F520U,<br>VL F560U, VL F600U,<br>VL F640U, VL F680U,<br>VL F720U, VL F760U | OD, CD                       | 5 000            | N, NT, QT                              |
| Alloy      | VL F600A, VL F700A,<br>VL F800A, VL F900A,<br>VL F1000A, VL F1100A   | OD, CD                       | 5 000            | N, NT, QT                              |

### Forgings for crankshafts

| Steel type / grade <sup>3)</sup> | Forging method <sup>1)</sup> | Max. weight [kg] | Heat treatment condition <sup>2)</sup> |
|----------------------------------|------------------------------|------------------|--|
| Alloy                            | CFG                          | 5 000            | QT                                     |

### Stainless steel forgings

| Steel type / grade <sup>5)</sup> | Forging method <sup>1)</sup> | Max. weight [kg] | Heat treatment condition <sup>2)</sup> |
|----------------------------------|------------------------------|------------------|--|
| Martensitic Stainless            | OD, CD                       | 5 000            | QT                                     |

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Remarks:

- 1) OD: Open die forging;  
CD: Closed die forging;  
CGF: continuous grain flow forging according to the TR-method
- 2) QT: Quenched and tempered; N: Normalised; NT: Normalised and tempered
- 3) Steel grades acc. to customer spec. and DNV GL approved drawings
- 4) Including equivalent grades in acc. to other standards
- 5) Stainless steel forgings shall be in accordance with recognized standards, e.g. EN 10222, ASTM A473/A965/A1049 and JIS G 3214. Recognition of other standards is subject to submission to the Society for evaluation

Additional approval conditions:

Test piece sampling for connecting rods according to document 137003-07/Poh dated on 2007-11-20