

# APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:  
**AMMM0000142**  
Revision No:  
**4**

**This is to certify:**

**That**

**BGH Edelstahl Siegen GmbH**  
**Industriestraße 9, 57076 Siegen,**  
**Germany**

is an approved manufacturer of  
**Steel Forgings**

in accordance with  
**DNV GL rules for classification – Ships**

and the following particulars:

<b>Application area</b>	<b>Forgings for hull structures and equipment</b> <b>Forgings for shafting and machinery</b> <b>Forgings for gearing</b> <b>Forgings for boilers, pressure vessels and piping systems</b> <b>Ferritic steel forgings for low temperature service</b> <b>Stainless steel forgings</b>
<b>Steel type(s)</b>	<b>Carbon and carbon-manganese,</b> <b>Alloy,</b> <b>Ferritic Stainless,</b> <b>Austenitic Stainless,</b> <b>Martensitic Stainless,</b> <b>22Cr duplex, 25Cr duplex</b>
<b>Forging method</b>	<b>Open die forging</b>
<b>Max. weight</b>	<b>32 000 kg</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 **2020-05-26**

for **DNV GL**

This Certificate is valid until **2023-02-28**.

DNV GL local station: **Essen**

Approval Engineer: **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 GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") 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.



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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) 6)</sup>
C and C-Mn	VL F400UW, VL F440UW, VL F480UW, VL F520UW, VL F560UW, VL F600UW	OD	32 000	N, NT, QT
Alloy	VL F550AW, VL F600AW, VL F650AW	OD	32 000	QT

### Forgings for shafting and machinery Forgings for gearing

Steel type	Grade <sup>4)</sup>	Forging method <sup>1)</sup>	Max. weight [kg]	Heat treatment condition <sup>2) 6)</sup>
C and C-Mn	VL F400U, VL F440U, VL F480U, VL F520U, VL F560U, VL F600U, VL F640U, VL F680U, VL F720U, VL F760U	OD	32 000	N, NT, QT
Alloy	VL F600A, VL F700A, VL F800A, VL F900A, VL F1000A, VL F1100A	OD	32 000	QT

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

Steel type	Grade <sup>4)</sup>	Forging method <sup>1)</sup>	Max. weight [kg]	Heat treatment condition <sup>2) 6)</sup>
C and C-Mn	VL F450H, VL F490H	OD	32 000	N, NT, QT
Alloy	VL F0.5Mo, VL F1Cr0.5Mo	OD	32 000	NT, QT
	VL F2.25Cr1Mo	OD	32 000	N, QT <sup>6)</sup>

### Ferritic steel forgings for low temperature service

Steel type	Grade <sup>4)</sup>	Forging method <sup>1)</sup>	Max. weight [kg]	Heat treatment condition <sup>2) 6)</sup>
C and C-Mn	VL F450L, VL F490L	OD	32 000	N, NT, QT
Ni	VL F3.5Ni, VL F5Ni, VL F9Ni	OD	32 000	NT, QT

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### Stainless steel forgings

Steel type / grade <sup>5)</sup>	Forging method <sup>1)</sup>	Max. weight [kg]	Heat treatment condition <sup>2) 6)</sup>
Austenitic stainless	OD	32 000	SHT
Ferritic stainless	OD	32 000	A
Martensitic stainless	OD	32 000	QT <sup>6)</sup>
22 Cr Duplex	OD	32 000	SHT
25 Cr Duplex	OD	32 000	SHT

#### Remarks:

- 1) OD: Open die forging
- 2) QT: Quenched and tempered; N: Normalised; NT: Normalised and tempered; SHT: Solution Heat Treated (Solution Annealing); A: Annealed
- 3) Certification of any material applied to classed object shall fulfill the applicable material requirements in the DNV GL class rules
- 4) Incl. 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, provided that supplementary requirements contained herein are also met. Recognition of other standards is subject to submission to the Society for evaluation
- 6) Including approved Direct Quenching Process from forging heat with optional inductive heating and optional tempering qualified by BGH document "Approval Application Report Rev.2, March 2020" for steel forgings/forged steel bars up to max. weight of 8 000 kg and the following maximum heat treatment diameters:  
400 mm for Carbon, Carbon-Manganese, Alloy and Martensitic Stainless grades;  
350 mm for Austenitic Stainless Steel grades;  
300 mm for Duplex Stainless Steel grades

#### Additional approval conditions

- Including 'clean steel forged bars' as pre-material for crankshafts up to maximum diameter 650 mm;
- Including 'clean steel forged bars' as blanks for case hardened gear transmissions and short shafts with "specially approved forging process" up to maximum diameter 650 mm;
- Including Premium Clean Steel according to customer specification PR DL for application in forged crankshafts;
- Including forgings in following grades:  
1.3964 acc. to SEW 390 / BWB WL 1.3964-2, -3  
1.6780 (HY-80) acc. to MIL-S-23009C / BWB WL 1.6780-2, -3  
1.6782 (HY-100) acc. to MIL-S-23009C / BWB WL 1.6782-2, -3