

APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM0000142
Revision No:
2

This is to certify:

That
BGH Edelstahl Siegen GmbH
Siegen, Germany

is an approved manufacturer of
Steel Forgings

in accordance with
DNV GL rules for classification – Ships

and the following particulars:

Application area	Forgings for hull structures and equipment Forgings for shafting and machinery Forgings for gearing Forgings for boilers, pressure vessels and piping systems Ferritic steel forgings for low temperature service Stainless steel forgings
Steel type(s)	Carbon, Carbon-Manganese, Alloy, Ferritic Stainless, Austenitic Stainless, Martensitic Stainless, 22Cr duplex, 25Cr duplex
Max. weight	32 000 kg
Heat Treatment Condition	See page 2 ff.
Additional approval conditions	See page 2 ff.

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 **2019-08-15**

for **DNV GL**

This Certificate is valid until **2020-02-29**.

DNV GL local station: **Essen**

Approval Engineer: **Gordon Stieb**

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Thorsten Lohmann
Head of Section



Job Id: **263.11-003538-4**
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Particulars of the approval

Forgings for hull structures and equipment

Steel type	Grade ⁴⁾	Forging method ¹⁾	Max. weight [kg]	Heat treatment condition ²⁾
C and C-Mn	VL F400UW, VL F440UW, VL F480UW, VL F520UW, VL F560UW, VL F600UW	OD, CD, RR	32 000	N, NT, QT
Alloy	VL F550AW, VL F600AW, VL F650AW	OD, CD, RR	32 000	QT

Forgings for shafting and machinery Forgings for gearing

Steel type	Grade ⁴⁾	Forging method ¹⁾	Max. weight [kg]	Heat treatment condition ²⁾
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, CD, RR	32 000	N, NT, QT
Alloy	VL F600A, VL F700A, VL F800A, VL F900A, VL F1000A, VL F1100A	OD, CD, RR	32 000	QT

Forgings for boilers, pressure vessels and piping systems

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

Ferritic steel forgings for low temperature service

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

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Stainless steel forgings

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

Remarks:

- 1) OD: Open die forging; CD: Closed die forging; RR: Ring rolling
- 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

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