

APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM00001FM
Revision No:
2

This is to certify:

That
Schmiedewerke Gröditz GmbH
Riesaer Straße 1, 01609 Gröditz,
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:

Application area	Forgings for hull structures and equipment, Forgings for shafting and machinery, Forgings for crankshafts, Forgings for gearing, Forgings for boilers, pressure vessels and piping systems, Stainless steel forgings
Steel type	Carbon and carbon-manganese, Alloy, Austenitic stainless, Martensitic stainless Ferritic-austenitic (duplex) stainless
Forging method	Open die forging, continuous grain flow forging
Max. weight	See page 2
Heat treatment condition	See page 2
Additional approval conditions	See page 2

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 **2020-12-01**

for **DNV GL**

This Certificate is valid until **2023-06-30**.

DNV GL local station: **Hamburg**

Approval Engineer: **Christian Wildhagen**

Thorsten Lohmann
Head of Section

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Particulars of the approval

Forgings for hull structures and equipment

Steel type	Grade ³⁾	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/RR	45 000	N, NT, QT
Alloy	VL F550AW, VL F600AW, VL F650AW	OD/RR	45 000	QT

Forgings for shafting and machinery Forgings for gearing

Steel type	Grade ³⁾	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/RR	45 000	N, NT, QT
Alloy	VL F600A, VL F700A, VL F800A, VL F900A, VL F1000A, VL F1100A	OD/RR	45 000	QT

Forgings for crankshafts

Steel type/grade ⁴⁾	Forging method ¹⁾	Max. weight [kg]	Heat treatment condition ²⁾
Alloy	OD + CGF	45 000	QT

Forgings for boilers, pressure vessels and piping systems

Steel type	Grade ³⁾	Forging method ¹⁾	Max. weight [kg]	Heat treatment condition ²⁾
C and C-Mn	VL F450H, VL F490H	OD/RR	45 000	N, NT, QT
Alloy	VL F0.5Mo, VL F1Cr0.5Mo	OD/RR	45 000	NT, QT
	VL F2.25Cr1Mo	OD/RR	45 000	N, 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/RR	45 000	SHT
Martensitic stainless	OD/RR	45 000	SHT
22 Cr duplex	OD/RR	45 000	SHT

Remarks:

- 1) OD: Open die forging; CGF: Continuous grain flow forging
- 2) QT: Quenched and tempered; N: Normalised; NT: Normalised and tempered
SHT: Solution Heat Treated (Solution Annealing)
- 3) Incl. equivalent grades in acc. to other standards
- 4) Material grades according to DNVGL approved drawings
- 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

Batch testing is accepted for quenched and tempered ring rollings/forgings with mass up to 1 000 kg each