

APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM00001H9
Revision No:
2

This is to certify:

That

Forgiatura A. Vienna S.r.l.
Via Ospiate 46/48, 20017 Rho, Mi,
Italy

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 shafting and machinery, Forgings for crankshafts, Forgings for gearing, Forgings for boilers, pressure vessels and piping systems, Ferritic steel forgings for low temperature service, Stainless steel forgings
Steel type	Carbon and carbon-manganese, Alloy, Austenitic stainless, Martensitic stainless, Ferritic stainless Ferritic-austenitic (duplex) stainless
Forging method	See page 2
Max. weight	100 000 kg
Max. diameter / section	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 **2020-10-02**

for **DNV GL**

This Certificate is valid until **2023-09-30**.

DNV GL local station: **Italy/Malta CMC**

Approval Engineer: **Andreas Koch**

Thorsten Lohmann
Head of Section

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Particulars of the approval

Forgings for shafting and machinery Forging for gearing

Steel type	Grade ³⁾	Forging method ^{1) 5)}	Max. weight [kg]	Max. wall thickness [mm]	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	CD, OD, RR	100 000	9 500	N, NT, QT
Alloy	VL F600A, VL F700A, VL F800A, VL F900A, VL F1000A, VL F1100A	CD, OD, RR	100 000	9 500	QT

Forgings for crankshafts

Steel type	Grade ³⁾	Forging method ^{1) 5)}	Max. weight [kg]	Max. wall thickness [mm]	Heat treatment condition ²⁾
Alloy	VL F600A	CD, OD, RR	100 000	9 500	NT, QT

Forgings for boilers, pressure vessels and piping systems

Steel type	Grade ³⁾	Forging method ^{1) 5)}	Max. weight [kg]	Max. wall thickness [mm]	Heat treatment condition ²⁾
C and C-Mn	VL F450H, VL F490H	CD, OD, RR	100 000	9 500	N, NT, QT
Alloy	VL F0.5Mo, VL F1Cr0.5Mo	CD, OD, RR	100 000	9 500	NT, QT
	VL F2.25Cr1Mo	CD, OD, RR	100 000	9 500	N, QT

Ferritic steel forgings for low temperature service

Steel type	Grade ³⁾	Forging method ^{1) 5)}	Max. weight [kg]	Max. wall thickness [mm]	Heat treatment condition ²⁾
C and C-Mn	VL F450L, VL F490L	CD, OD, RR	100 000	9 500	N, NT, QT
Alloy	VL F3.5Ni, VL F5Ni, VL F9Ni	CD, OD, RR	100 000	9 500	NT, QT

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Stainless steel forgings

Steel type / grade ⁴⁾	Forging method ^{1) 5)}	Max. weight [kg]	Max. thickness [mm]	Heat treatment condition ²⁾
Austenitic stainless	CD, OD, RR	100 000	9 500	SHT
Martensitic stainless	CD, OD, RR	100 000	9 500	acc. standard
Ferritic stainless	CD, OD, RR	100 000	9 500	acc. standard
22Cr duplex stainless	CD, OD, RR	100 000	9 500	SHT
25Cr duplex stainless	CD, OD, RR	100 000	9 500	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)
- ³⁾ Incl. equivalent grades in acc. to other standards
- ⁴⁾ 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.
- ⁵⁾ Max. outer diameter 9 500 mm for rolled rings

Special conditions:

For forging, heat treatment, testing and certification:
Forgiatura A. Vienna S.r.l. Via Ospiate 46/48, 20017 Rho MI, Italy

For heat treatment and NDT testing:
Forgiatura A. Vienna S.r.l. Via Alfeo snc, 26040 Cella Dati CR, Italy