

APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM00000D3
Revision No:
4

This is to certify:

That

Deutsche Edelstahlwerke Specialty Steel GmbH & Co. KG
Oberschlesienstrasse 16, 47807 Krefeld, Germany

is an approved manufacturer of
Steel Forgings

in accordance with
DNV GL rules for classification – Ships
DNV GL rules for classification – Naval vessels

and the following particulars:

Product	Open die forgings (incl. forged bars)
Application area	Forgings for hull structures and equipment Forgings for shafting and machinery Forgings for crankshafts Forgings for gearing Stainless steel forgings
Steel type	Carbon and carbon-manganese, Alloy, Austenitic stainless, Martensitic stainless, Ferritic stainless, Austenitic-ferritic (Duplex) stainless
Forging method	Open die forging
Max. weight	See particulars of the approval
Max. diameter / thickness	See particulars of the approval
Heat treatment condition	See particulars of the approval
Additional approval conditions	See particulars of the approval

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 **2020-09-04**

for **DNV GL**

This Certificate is valid until **2023-06-19**.

DNV GL local station: **Essen**

Approval Engineer: **Christian Wildhagen**

Thorsten Lohmann
Head of Section

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Job Id: **263.11-004410-8**
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Particulars of the approval

Forgings for hull structures and equipment

Steel type	Grade ²⁾	Max. thickness [mm]	Max. Weight [kg]	Heat treatment Condition ¹⁾
C and C-Mn	F400UW, F440UW, F480UW, F520UW, F560UW, F600UW	1 100	30 000	N, NT, QT
Alloy	F550AW, F600AW, F650AW	1 100	30 000	QT

Forgings for shafting and machinery

Steel type	Grade ²⁾	Max. thickness [mm]	Max. Weight [kg]	Heat treatment Condition ¹⁾
C and C-Mn	F400U, F440U, F480U, F520U, F560U, F600U, F640U, F680U, F720U, F760U	1 100	30 000	N, NT, QT
Alloy	F600A, F700A, F800A, F900A, F1000, F1100A	1 100	30 000	QT

Forgings of liquid quenched and tempered structural steels (bars)

Steel type	Grade ²⁾	Max. Diameter [mm]	Max. length [m]	Max. Weight [kg/m]	Heat treatment condition ¹⁾
C and C-Mn	VL-M550S, VL-M700S	200	11 000	1 500	QT
	15NiCrMo10-6 acc. WL 1.6780-2 16NiCrMo12-6 acc. WL 1.6782-2	200	11 000	1 500	QT
	HY-80 acc. MIL-S-21952D HY-100 acc. MIL-S-21952D	200	11 000	1 500	QT

Forgings of non-magnetizable steels (bars)

Steel type	Grade ²⁾	Max. Diameter [mm]	Max. length [m]	Max. Weight [kg/m]	Heat treatment condition ¹⁾
Non-magnetizable	1.3964.9 acc. WL 19364-2	160	11 000	1 500	SHT
	1.3964 acc. SEW 390	250	11 000	1 500	SHT

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Steels acc. other standards

Steel type	Grade ²⁾	Max. thickness [mm]	Max. Weight [kg]	Heat treatment Condition ¹⁾
C and C-Mn	acc. EN 10083-2	1 100	30 000	N, NT, QT
	acc. EN 10250-2			
	acc. EN 10084			
	acc. ISO 683-1			
	acc. ISO 683-3			
Alloy	acc. EN 10083-3	1 100	30 000	QT
	acc. EN 10250-3			
	acc. EN 10084			
	acc. ISO 683-2			
	acc. ISO 683-3			
	18CrNiMo7-6 acc. EN 10084 ³⁾⁴⁾⁵⁾			
Austenitic stainless	acc. EN 10088-3	1 100	30 000	SHT
	acc. EN 10222-5			
Duplex	acc. EN 10088-3	1 100	30 000	SHT
	acc. EN 10222-5			
Ferritic	acc. EN 10088-3	1 100	30 000	A
Martensitic	acc. EN 10088-3	1 100	30 000	QT
	acc. EN 10222-5			

Remarks:

- 1) QT: Quenched and tempered
 N: Normalized
 NT: Normalized and tempered
 SHT: Solution Heat Treated (Solution Annealing)
 A: Annealed
- 2) Incl. equivalent grades in acc. to other standards
- 3) Clean steel forgings of grade 18CrNiMo7-6 acc. to EN 10084 are qualified for approved applications (see pt. 2 and 3). Special requirements for clean steel forgings are given in DNV GL rules Pt. 2, Ch. 2, Sec.6, [1.6.10].
- 4) Subject to special approval, blanks cut from forged bars of clean steel forgings with max. Ø575 mm are approved for further processing to gears acc. to DNV GL Class Guideline No. DNVGL-CG-0036, and classed to "high grade".
- 5) Subject to special approval, forged bars of clean steel forgings are approved for further processing to crankshafts acc. to DNV GL Class Guideline No. DNVGL-CG-0037, and classed to "super clean forged steel".