

APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM000014N
Revision No:
2

This is to certify:

That

Georgsmarienhütte GmbH
Georgsmarienhütte, Niedersachsen, Germany

is an approved manufacturer of
Steelmaking and Rolled Steel Products

in accordance with
DNV GL rules for classification – Ships
DNVGL-OS-E302 – Offshore mooring chain, Edition July 2015

and the following particulars:

Product	Rolled bars intended to be machined into components, Round bars for chain cable, Semi-finished products; Ingots for chain cables
Grades	See page 2
Steelmaking	Electric arc furnace, continuous or ingot cast
Deoxidation	Killed
Fine grain elements	See page 2
Delivery conditions	As rolled
Max. diameter	See page 2

Manufacturer approved by this certificate is 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 **Høvik** on **2017-07-19**

This Certificate is valid until **2020-07-02**.

DNV GL local station: **Essen**

Approval Engineer: **Gorka Lozano**

for **DNV GL**



Digitally Signed By: Gran, Terje
Location: DNV GL Høvik, Norway
Signing Date: 27.07.2017, on behalf of

Hanne Anita Hjerpetjønn
Head of Section



Job Id: **263.11-003978-4**
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Particulars of the approval

Rolled steel products:

Rolled bars intended to be machined into components¹⁾²⁾				
Steel type	Steelmaking	Fine grain elements	Delivery conditions	Max. diameter (mm)
Carbon and carbon-manganese	EAF, IC	Al	*)	280
	EAF, CC	Al	*)	110
Alloy	EAF, IC	Al	*)	280
	EAF, CC	Al	*)	110

EAF: electric arc furnace IC: ingot casting CC: continuous casting *) as rolled or according standard / DNV GL Rules

¹⁾ Minimum rolling reduction ratio 6:1

²⁾ Sampling, inspection and testing requirements shall be according to RU SHIP Pt.2 Ch.2 Sec.6

Round bars for chain cable				
Grades	Steelmaking	Fine grain elements	Delivery conditions	Max. diameter (mm)
VL K1, VL K2	EAF, IC	Al	*)	200
	EAF, CC	Al	*)	100
VL K3	EAF, IC	Al or Al+V	*)	130
	EAF, CC	Al or Al+V	*)	100

EAF: electric arc furnace IC: ingot casting CC: continuous casting *) as rolled or according standard / DNV GL Rules

Semi-finished products:

Ingots for offshore mooring chain cables		
Grades	Steelmaking	Fine grain elements
R5, R4, R3S	EAF, IC	Al

EAF: electric arc furnace IC: ingot casting

1) For approved material specification see table S1.