



APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM000020C
Revision No:
2

This is to certify:

That

Saarstahl AG

Bismarckstrasse 57-59, 66330 Völklingen, Germany

is an approved manufacturer of
Steelmaking and Rolled Steel Products

in accordance with

DNVGL-OS-E302 – Offshore mooring chain, Edition July 2018
DNV GL rules for classification – Ships

and the following particulars:

Products	Round bars for anchor chain cables and offshore mooring chain cables, Semi-finished products (billets, blooms and round bars) for rolling or forging stock, Round bars intended to be machined into components acc. to EN 10025-2
Steel types	Carbon and carbon-manganese, Alloy
Steelmaking	Basic oxygen convertor, Continuous casting
Deoxidation	Killed
Fine grain elements	See page 2
Delivery conditions	See page 2
Max. thickness/diam.	See page 2
Remarks	See particulars of approval

Manufacturer approved by this certificate is accepted to deliver according to DNV GL, DNV and GL rules. Materials to be applied to DNV classed object shall fulfill the material requirements in the applicable DNV class rules.

Issued at **Høvik** on **2021-04-06**

for **DNV**

This Certificate is valid until **2023-04-30**.

DNV local station: **Essen**

Approval Engineer: **Dechun Lou**

Sondre Løken
Head of Section

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



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Particulars of the approval:

Table 1 Round bars intended for anchor chain cables and offshore mooring chain cables				
Grade	Steelmaking ¹⁾	Fine grain elements	Delivery conditions ²⁾	Max. diameter (mm)
VL K1	BOC, CC	Al+Nb	AR	100
VL K2	BOC, CC	Al+Nb	AR	100
VL K3	BOC, CC	Al+Nb	AR	100
R3 ³⁾	BOC, CC	Al+Nb	AR	100

Remarks:

¹⁾ BOC: Basix Oxygen Converter; CC: Continuous Casting.

²⁾ AR: As Rolled.

³⁾ For approval specification see Table S1.

Table S1 Specification for chemical composition, bars for offshore mooring chain															
Grade,	dia.		C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Al	V	Nb	N
	(mm)														
R3	100	Min	.26	.25	1.70	-	-	.05	.05	-	-	.020	-	.02	-
		Max	.29	.35	1.90	.025	.012	.15	.15	.05	.25	.040	.05	.04	0.012

Remarks:

¹⁾ The impurity elements of Sn, Sb, As and B may be required determined. In such cases, the maximum content shall be 0.020 % for Sn, 0.015% for Sb, 0.030% for As and 0.001 % for B.

Table 2 Semi-finished products (billets, blooms, round bars) for rolling or forging stock				
Steel types	Steelmaking ¹⁾	Fine grain elements	Delivery conditions ²⁾	Max. diameter (mm)
Carbon and carbon-manganese	BOC, CC	acc. to standards	AC or AR	See ³⁾
Alloy				

Remarks:

¹⁾ BOC: Basix Oxygen Converter; CC: Continuous Casting.

²⁾ AC: As Cast; AR: As Rolled.

³⁾ As cast: max. 265x340 mm²; As rolled: Billets max. 200x200 mm², round bars max. diameter 180mm

Table 3 Round bars intended to be machined into components acc. to EN 10025-2				
Steel type	Steelmaking ¹⁾	Fine grain elements	Delivery conditions	Max. diameter (mm)
Carbon and carbon-manganese	BOC, CC	acc. to standards	acc. to standards	Round bars: 100
				Square bars: 85x85

Remarks:

¹⁾ BOC: Basix Oxygen Converter; CC: Continuous Casting.