



APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM0000174
Revision No:
2

This is to certify:

That

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

is an approved manufacturer of
Steelmaking

in accordance with
DNV-OS-E302 – Offshore mooring chain, Edition July 2022

and the following particulars:

Product	Semi-finished products; Ingots, blooms and billets for chain cables
Grades	R3, R3S, R4, R4S and R5
Steelmaking	Electric arc furnace, Ingot casting or continuous casting
Deoxidation	Killed
Fine grain elements	See page 2
Remarks	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 classed object shall fulfill the material requirements in the applicable DNV class rules.

Issued at **Hamburg** on **2023-09-08**

for **DNV**

This Certificate is valid until **2026-06-19**.

DNV local unit: **Essen**

Approval Engineer: **Christian Wildhagen**

Thorsten Lohmann
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.



Particulars of the approval

Ingots, blooms and billets for chain cables

Grade ¹⁾	Steelmaking ²⁾	Fine grain elements
R3	EAF, VD, IC or CC	Al
R3S		
R4		
R4S		
R5		

Remarks:

¹⁾ Specification for chemical composition according to table S1

²⁾ EAF: Electric Arc Furnace; VD: Vacuum degassing; IC: Ingot Casting; CC: Continuous Casting.

Table S1 - Specification for chemical composition ¹⁾ – Ingots, blooms and billets for chain cables												
Grade		C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Al	N
R3, R3S R4, R4S R5	Min.	.30	-	.50	-	-	1.50	1.50	.20	-	.020	-
	Max.	.38	.40	.80	.025	.015	1.70	1.70	.30	.25	.050	.015
R3, R3S R4, R4S R5	Min.	.26	-	.50	-	-	1.80	1.80	.30	-	.020	-
	Max.	.34	.40	.80	.025	.015	2.20	2.20	.50	.25	.050	.015

Remarks:

¹⁾The content of Sn, Sb, As and B may be required determined. In such cases, the maximum content shall be 0.030 % for Sn, 0.030% for As, 0.020 % for Sb and 0.0007 % for B.