



APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM000012W
Revision No:
3

This is to certify:

That

REINOSA FORGINGS & CASTINGS, S.L.
Calle Alejandro de Calonge 1, 39200 Reinosa, Cantabria, Spain

is an approved manufacturer of
Steel Forgings

in accordance with
DNVGL-OS-E302 – Offshore mooring chain, Edition July 2018

and the following particulars:

Product	Forgings for chain cable accessories
Grades	R3, R3S, R4, R4S, R5
Max. thickness	See page 2
Delivery condition	See page 2
Remarks	Including steelmaking, 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 classed object shall fulfill the material requirements in the applicable DNV class rules.

Issued at **Høvik** on **2021-08-31**

for **DNV**

This Certificate is valid until **2023-12-31**.

DNV local station: **Area NB/CMC Iberia**

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.



Particulars of the approval

Steelmaking and semi-finished products: Ingots and billets for chain cables		
Grade ¹⁾	Steelmaking ²⁾	Fine grain elements
R3, R3S, R4, R4S, R5	EAF, VD, IC	Al+V
R4S, R5	EAF, VD, IC	Al+V or V

Remarks:

- ¹⁾ Specification for chemical composition according to table S1
- ²⁾ EAF: Electric Arc Furnace; VD: Vacuum Degassing; IC: Ingot Casting

Forgings for chain cables accessories		
Grade ¹⁾	Max. thickness (mm)	Delivery condition ²⁾
R3 R3S	260	Hydrogen degassed ³⁾
R4	310	
R4S	307	
R5	307	

Remarks

- ¹⁾ Specification for chemical composition according to table S1.
- ²⁾ Intermediate heat treatment.
- ³⁾ Final heat treatment will be carried out by the chain cable supplier.

Table S1 - Specification for chemical composition ¹⁾ - Forgings for chain cables accessories														
Grade, thickness (mm)			C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Al	V	N
R3 R3S	260	Min.	.18	.15	0.85	-	-	0.90	0.50	.20	-	.015	.04	-
		Max.	.24	.35	1.20	.020	.015	1.25	0.70	.35	.25	.040	.10	.015
R4	310	Min.	.21	.20	1.20	-	-	1.00	0.95	.50	-	.015	.09	-
		Max.	.24	.35	1.40	.020	.008	1.10	1.15	.65	.25	.040	.12	.015
R4S	307	Min.	.21	.15	0.50	-	-	1.40	2.50	.40	-	-	.08	.007
		Max.	.25	.35	0.80	.015	.015	1.80	3.00	.60	.25	.035	.12	.010
R5	307	Min.	.21	.15	0.50	-	-	1.40	2.50	.40	-	-	.08	.007
		Max.	.25	.35	0.80	.015	.015	1.80	3.00	.60	.25	.035	.12	.010

Remarks:

- ¹⁾ The content of Sn, Sb and As may be required determined. In such cases, the maximum content shall be 0.030 % for Sn, 0.025% for As, 0.005 % for Sb and 0.001% for B.