

APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM000000A
Revision No:
3

This is to certify:

That
SIDENOR ACEROS ESPECIALES, S.L.
Basauri, Reinosa and Azkoitia plants
Basauri, Bizkaia, Spain

is an approved manufacturer of
Steelmaking and Rolled Steel Products

in accordance with
DNV GL rules for classification – Ships
Offshore Standard DNVGL-OS-B101
DNVGL-OS-E302 Offshore Mooring Chain

and the following particulars:

Product	Round bars for chain cables, Rolled round bars intended to be machined into components, Semi-finished products; ingots, blooms and billets for forging and rolling stock
Grades	See page 2
Steelmaking	See page 2
Deoxidation	Killed
Fine grain elements	See page 2
Delivery conditions	See page 2
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 **2016-12-06**

for **DNV GL**

This Certificate is valid until **2019-04-19**.

DNV GL local station: **Bilbao**

Approval Engineer: **Gorka Lozano**

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Hanne Anita Hjerpetjønn
Head of Section

Job Id:
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Particulars of the approval

Rolled round bars ¹⁾²⁾ intended to be machined into components (as a substitute for forged bars), Semi-finished products for forging or rolling stock				
Steel types	Steelmaking ³⁾	Fine grain elements	Delivery conditions ⁴⁾	Max. diameter (mm)
Carbon and carbon-manganese	EAF, IC or CC	Al or Al+V	N ⁵⁾	220 ⁵⁾
Alloy	EAF, IC or CC	Al or Al+V	QT ⁵⁾	220 ⁵⁾

Remarks:

- 1) Minimum rolling reduction ratio 6:1
- 2) Sampling, inspection and testing requirements shall be according to Pt. 2 Ch. 2 sec. 5
- 3) EAF: Electric Arc Furnace; IC: Ingot Casting; CC: Continuous Casting.
- 4) N: Normalised; QT: Quenched and Tempered.
- 5) Not applicable for semi-finished products.

Round bars for chain cables				
Grade ⁵⁾	Max. diameter (mm)	Steelmaking ¹⁾	Fine grain elements	Delivery condition ²⁾
R3	185	EAF, VD, IC	Al+V	AR
	78	EAF, VD, CC ³⁾		
	150	EAF, VD, CC ⁴⁾		
	203	EAF, VD, CC ⁴⁾		
R3S	185	EAF, VD, IC	Al+V	AR
	78	EAF, VD, CC ³⁾		
	150	EAF, VD, CC ⁴⁾		
	186.5	EAF, VD, CC ⁴⁾		
R4	185	EAF, VD, IC	Al+V	AR
	78	EAF, VD, CC ³⁾		
	191	EAF, VD, CC ⁴⁾		
R4S	185	EAF, VD, IC	Al+V	AR
	78	EAF, VD, CC ³⁾		
	174	EAF, VD, CC ⁴⁾		
R5	230	EAF, VD, IC	Al+V	AR
	78	EAF, VD, CC ³⁾		
	174	EAF, VD, CC ⁴⁾		

Remarks:

- 1) EAF: Electric Arc Furnace; VD: Vacuum Degassing; IC: Ingot Casting; CC: Continuous Casting.
- 2) AR: As Rolled; HA: Annealed for Hydrogen diffusion.
- 3) Dimensions of billet: 185 x 185 mm
- 4) Dimensions of bloom: 300 x 400 mm or 350 x 470 mm.
- 5) Specification for chemical composition according to table S1

Ingots, blooms and billets for chain cables

