



Marine & Offshore
Division

Certificate number: 37274/A2 BV

File number: MAT 73226-2013

Product code: 9019I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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APPROVAL CERTIFICATE for MATERIALS

This certificate is issued to

SIDENOR ACEROS ESPECIALES, S.L.
Azkoitia - SPAIN

for the type of product

ROUND BARS FOR OFFSHORE MOORING CHAIN CABLE

Round bars for offshore mooring chain cables in steel grades QR3, QR3S, QR4 and QR5

Requirements:

Bureau Veritas Rules on Materials and Welding for the Classification of Marine Units

This certificate is issued to attest that BUREAU VERITAS did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 10 Jan 2019

For BUREAU VERITAS,
At BV MADRID, on 10 Apr 2017,
Montserrat Espin



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with BUREAU VERITAS. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of BUREAU VERITAS Marine & Offshore Division available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against BUREAU VERITAS for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

Round bars for offshore chain cables.

Steel grade	Delivery condition
QR3;QR3S (1)	As rolled with thickness up to 155mm
QR4 (1)	As rolled with thickness up to 116mm
QR5 (2)	As rolled with thickness up to 86mm

(1) Steelmaking in Electric Arc Furnace, Continous Casting, blooms sizes 350×470mm and 300×400mm are manufactured by Sidenor Basauri. Minimum Reduction ratio is 5.

(2) Steelmaking in Electric Arc Furnace, LF Refining and Vacuum Degassing, Continous Casting for blooms size 400×300mm/470×350mm are manufactured by Sidenor Basauri. Minimum Reduction ratio is 20.66.

2. DOCUMENTS AND DRAWINGS :

Chemical composition (%) specification (Ref.MPSR3 Rev.01 & Ref.MPR3 Rev.13) on ladle of steel grade QR3 for chains diameter 155mm max.:

Element	C	Mn	Si	P	S	Ni (1)	Mo (2)	Cr	Al	Cu
min	0.23	1.60	0.20	-	-	-	-	-	0.010	-
max	0.27	1.90	0.35	0.020	0.020	0.40	0.08	0.35	0.040	0.25
Element	Sn	V	Ti	As	Sb	B	N2(ppm)	O2 (ppm)	H2(ppm)	Others
min	n.s.*	0.05	-	n.s.*	n.s.*	-	-	-	-	-
max	n.s.*	0.10	0.015	n.s.*	n.s.*	0.002(3)	150	25(4)	1.1	n.s.*

(1) Ni content up to 0.55% as per Ref.MPR3 Rev.13 for chains made at Vicinay Deusto site only; (2) Mo content up to 0.13% for diameter above 140mm; (3) B content up to 0.002% for diameter above 140mm; (4) O2 content up to 25ppm as per Ref.MPR3 Rev.13 for chains made at Vicinay Deusto site only; * n.s. means not specified.

Chemical composition (%) specification (Ref.MPSR3S Rev.01&Ref.MPR3S Rev.13) on ladle of steel grade QR3S for chains diameter 155mm max.:

Element	C	Mn	Si	P	S	Ni	Mo	Cr	Al	Cu
min	0.23	1.60	0.20	-	-	0.40	0.08	0.20	0.010	-
max	0.27	1.90	0.35	0.020	0.020	0.55	0.13	0.35	0.040	0.25
Element	Sn	V	Ti	As	Sb	B (1)	N2(ppm)	O2 (ppm)	H2(ppm)	Others
min	n.s.*	0.08	-	n.s.*	n.s.*	-	-	-	-	-
max	n.s.*	0.10	0.015	n.s.*	n.s.*	0.0015	150	25(2)	1.1	n.s.*

(1) B content up to 0.0015% as per Ref.MPR3S Rev.13 for chains made at Vicinay Deusto site only; (2) O2 content up to 25ppm as per Ref.MPR3S Rev.13 for chains made at Vicinay Deusto site only; * n.s. means not specified.

Chemical composition (%) specification (Ref.MPSR4 Rev.01 & Ref.MPR4 Rev.15) on ladle of steel grade QR4 for chains diameter 116mm max.:

Element	C (1), (2)	Mn (3)	Si	P	S	Ni	Mo	Cr	Al	Cu
min	0.18	0.85	0.15	-	-	0.50	0.20	0.90	0.015	-
max	0.24	1.20	0.35	0.020	0.015	0.80	0.40	1.25	0.040	0.25
Element	Sn	V	Ti	As	Sb	B	N2(ppm)	O2 (ppm)	H2(ppm)	Others
min	-	0.04	-	-	-	-	-	-	-	-
max	0.030	0.10	0.015	0.025	0.005	0.0015	150	25	1.1	n.s.*

(1) C content as per Ref.MPSR4 Rev.01 for chains made at Vicinay Sestao site only: 0.18-0.21% for Ø<80mm, 0.21-0.24 for

80mm<Ø<120mm, 0.22-0.24 for Ø>119mm; (2) C content as per Ref.MPR4 Rev.15 for chains made at Vicinay Deusto site only: 0.18-0.21% for Ø<81mm, 0.21-0.24% for Ø>80mm; (3) Mn content: 0.85-0.95% for Ø<80mm, 0.95-1.10 for 80mm<Ø<120mm, 1.10-1.20 for Ø>119mm;* n.s. means not specified.

Chemical composition(%) specification (Ref.MPSR5 Rev.01 & Ref.MPR5 Rev.05) on ladle of steel grade QR5 for chains diameter 86mm max.:

Element	C (1)	Mn(2)	Si	P	S	Ni	Mo	Cr	Al	Cu
min	0.18	1.20	0.20	-	-	0.95	0.50	1.00	0.015	-
max	0.24	1.40	0.35	0.020	0.008	1.15	0.65	1.10	0.040	0.25
Element	Sn	V	Ti	As	Sb	B	N2(ppm)	O2 (ppm)	H2(ppm)	Others
min	-	0.09	-	-	-	n.s.*	-	-	-	-
max	0.030	0.12	0.015	0.025	0.005	-	150	25	1.1	n.s.*

(1) C content: 0.21-0.24% for Ø>120mm; (2) Mn content 1.00-1.40% as per Ref.MPR5 Rev.05 for chains made at Vicinay Deusto site only;* n.s. means not specified.

As per following documents issued by GSB Acero, Legazpi Plant:

- "Approval of Grade R3/R3S chain steel bar, diameter 155mm" dated 27/09/ 2000, "Approval of Grade R3/R3S chain steel bar" dated 12/03/1999, "Approval of Grade R4 chain steel bar"dated 12/01/1999,

As per following documents issued by Gerdau Sidenor -Azkoitia Plant:

- Document named "Technology & quality special steel" No. R5-RED.86 Rev.0 dated 09/05/2012,
- Document named "Final inspection of steel round bars 86mm in R5 steel grade which destination is Vicinay Cadenas" No. IT/AN VIC-R5-86 Rev.1 dated 09/05/2012,
- Document named "Azkoitia plant facilities involved - No.A-BV 001-Rev.00" dated 14/04/2015,
- Document named "Azkoitia plant facilities involved - No.A-BV 002-Rev.00" dated 14/04/2015.

3. TEST REPORTS :

As per following reports issued by GSB Acero, Legazpi Plant:

- "Approval of Grade R3/R3S chain steel bar, diameter 155mm"dated 27/09/2000.
- "Approval of Grade R3/R3S chain steel bar" dated 12/03/1999, "Approval of Grade R4 chain steel bar" dated 12/01/1999.

As per following documents issued by Gerdau Sidenor:

- R5 steel approval report No. R5/0112 dated 25/01/2012 issued by Reinoso Plant,
- Inspection certificates Ref.1589908-64114, Ref. PD2012 1517 CO44068 dated 08/05/2012 issued by Azkoitia Plant.

4. APPLICATION / LIMITATION :

As per Bureau Veritas Rules for Classification. Round bars used for the fabrication of chain cables at Vicinay Cadenas S.A. (Bilbao)- Deusto and Vicinay Sestao sites.

5. PRODUCTION SURVEY REQUIREMENTS :

The round bars are to be supplied by Sidenor Aceros Especiales, S.L. (Azkoitia) in compliance with the type and the requirements described in this certificate. This type of product is within the category IBV of Bureau Veritas Rule Note NR320. BV product certificate is required.

6. MARKING OF PRODUCT :

As per Bureau Veritas Rules for Classification.

7. OTHERS :

This certificate replaces approvals from No.08760/A0 BV to No.08760/C0 BV, No.37274/A0 BV and No.37274/A1 BV.

*** END OF CERTIFICATE ***