

Sidenor

MILL TEST CERTIFICATE

Basauri Plant

ISO 9001; ISO-TS 16949; ISO 14001 Y OHSAS 18001



Product Made in Spain

CUSTOMER:HOWCO METALS MANAGEMENT PTE LTD	WORKS REFERENCE:1772231
REFERENCE:HOU-115006	SALES ORDER:276696-15
PRODUCT NR:	HEAT NUMBER:630162
MASTER REFERENCE:197936	ROLLED:11.01.2015

REQUIRED PRODUCT

9%Cr 1%Mo ROUND BARS TURNED Q+T+STRESS RELIEVED 2.75" SPECIFICATION'S TOLERANCE
3.000/8.000 mm NORMAL

EXPEDITION

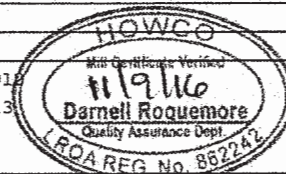
DELIVERY:0080492077 WEIGHT (KG):4.896

BUNDLES:2

UNITS:25

MADE ACCORDING TO

SAE-AMS 2301 K 08.2010 ; HOWCO HG001 2 20.02.2014 ; HOWCO HG 9CR BAR 3 18.06.2014
EN ISO 9001 2008/AC:2009 29.07.2009 ; API SPEC 6A 20th ED.+ER1&2+AD12.3 . .03.2013
NACE MR0175/ISO 15156-1 2nd EDITION 15.10.2009
NACE MR0175/ISO 15156-2 2nd EDITION 15.10.2009 ; EN 10204 :2004 OCT. 2004 3.1



CHEMICAL ANALYSIS OF HEAT

U: % HEAT NUMBER:630162

	C	Mn	Si	P	S	Cr	Ni	Mo	Cu	Ti	B
Min.	0,090	0,300	0,250			8,000		0,900			
Max.	0,150	0,600	1,000	0,020	0,010	10,000	0,500	1,100	0,250		
cer.	0,100	0,436	0,669	0,011	0,002	8,563	0,153	0,967	0,101	0,0010	0,0015
Nb											
Min.											
Max.											
cer.	0,0010										

INCLUSIONS (MICROINCLUSIONS)

Standard (ASTM E452013. . . 2013) ; Type/method (A Tabla I-r) ; A(t):1 ; A(h):0 ; B(t):1,5 ; B(h):0
C(t):0 ; C(h):0 ; D(t):1 ; D(h):0,5

INCLUSIONS (MACROINCLUSIONS)

Standard (SAE-AMS 2301K08.2010) ; Severity(1):Mean value 0,1 ; Severity(2):Individual value 0,25
Frequency(1):Mean value 0,1 ; Frequency(2):Individual value 0,25

MECHANICAL PROPERTIES AS SUPPLIED (CONDITIONS)

Temperature of: (1):Austenitizing 1.796 °F ; Time: (1):240 Minutes ; Cooling: (1):Water
Temperature media at the start: (1):82 °F ; Temperature media at the finish: (1):95 °F
Temperature of: (2):Tempering 1.301 °F ; Time: (2):240 Minutes ; Cooling: (2):Air
Temperature of: (3):Stress Relieved 1.202 °F ; Time: (3):360 Minutes

MECHANICAL PROPERTIES AS SUPPLIED (TEST)

Sample:Supply section (bar prolongation) ; Specimen Test location:At 1/2 radius
Specimen Test:0,5" X 2 1/4" ; Standard(1) (ASTM A370201415.05.2014)
Standard(2) (ASTM E8/E8M2013A01.07.2013) ; Tensile direction (Longitudinal):Longitudinal
Ts (95/120 KSI):107 KSI ; Ys (Rp(0,2%) 80/95 KSI):Rp(0,2%) 83 KSI ; EL (4d >= 20 %) :4d 26,8 %
Z (>= 40 %) :72,9 % ; Standard (ASTM E2307-AE12007)
Notch impact direction (Longitudinal):Longitudinal ; Notch Impact sample type (CHARPY-V):CHARPY-V
Notch Impact Temp. (14 °F):14 °F ; K(1):90 Ft.Lb ; K(2):93 Ft.Lb ; K(3):88 Ft.Lb
K (average) (>= 30 Ft.Lb):90,33 Ft.Lb ; K (single) (>= 25 Ft.Lb):88 Ft.Lb
Lateral expansion:1.19-1.22-1.17 mm ; Shear value:70-70-70 %
Surface hardness (217/237 HBW):229-235 HBW
Hardness at (at 1/2 radius of the bar HBW):at 1/2 radius of the bar 222-227 HBW

ADDITIONAL TESTS

Structure:DELTA FERRITE < 5% ; Standard (ASTM E112201301.10.2013) ; Grain size:7 ; Radiactivity:FREE

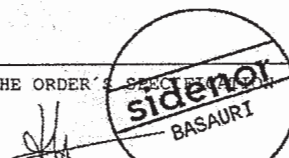
TECHNOLOGY & QUALITY CERTIFIES THAT THE PRODUCT FULL FILLS THE ORDER'S SPECIFICATIONS

APPROVED BY:Miren Begoña Hernandez

SIGN:

DATE:09.11.2016

Page 1 of 2



Customer PO#	Sales Order#	Howco Disp Cert#	Date	Authorized by	Page No.	Total Pages
203252	2057643-2	2057643-2	Apr 14 2017	Jaron Kubala	1	2

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NON DESTRUCTIVE TESTS

Surface defects standard (API SPEC 6A20*ED.+ER1&2+AD12.3. .03.2013)
 U.T. standard(1) (ASTM A388-A388M-...2011) ; U.T. type/method(1) (FBH) ; 1/8"
 U.T. standard(2) (API SPEC 6A20*ED.+ER1&2+AD12.3. .03.2013) ; U.T. type/method(2) (FBH)
 U.T. standard(3) (API SPEC 6A20*ED.+ER1&2+AD12.3. .03.2013) ; U.T. type/method(3) (PSL3)
 ULTRASONIC INSPECTION 100% : O.K. ; ULTRASONIC INSPECTION 100% : O.K.
 ULTRASONIC INSPECTION 100% : O.K. ; CRACKS CONTROL 100%:OK

ADDITIONAL INFORMATION

Reduction ratio:51,4 ; INGOT CAST 465 X 465 mm.
 THERMAL TREATMENT TEMPERATURE CONTROL IN ACCORDANCE WITH "API 6A appendix M"
 TREATMENT TEMPERATURE MEASURED WITH ATMOSPHERIC THERMOCOUPLE
 TREATMENT OF THE MATERIAL IN CONVENTIONAL FURNACE
 MATERIAL ACCORDING TO NACE MR0175/ISO 15156 & "80 Ksi/HT 22" ;
 The mill supply chain controls have taken into account Dodd Frank Act requirements regarding conflict minerals.

Material melted and manufactured 100% in Spain through the Electric Arc Furnace and Vacuum Degassing route.
 Steel not exposed to Mercury, or to any other metal alloy that is liquid, at ambient temperatures during processing or while in Sidenor's possession.
 Steel is free from Uranium or any other harmful radioactive contamination.
 Steel products were not repaired by welding.
 100% anti mix test performed by spectrometry.

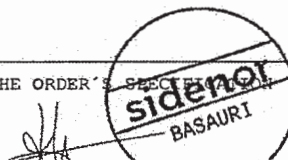
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Page 2 of 2



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Certificate of Conformance



Houston Plating & Coatings, LLC.
Houston Plating & Coatings, LLC.
Electroless Nickel Plating / Spray Coatings

6325 Cameron St.
Scott, LA 70583
Phone: (713) 946-8920
Fax: (713) 946-8487
www.houstonplating.com

Customer:	P. O. Number:	Order No:
B & T OILFIELD PRODUCTS	603386	553831

We certify that all the parts listed were prepared and processed to conform 100% to drawing specifications, applicable standards, Engineering Specifications, and QA Procedures. Any deviations are reported in detail below:

Part or Drawing No:	Customer Ref:	Quantity:
DFTS-02313-01		24
RLEM-02188-09		20
XLEM-02313-09		75
XLEM-01875-09		99
XLEM-02750-09		75

Process Date: 7/11/2017

Expiration Date: N/A

Process Required: QPQ- Liquid Nitriding

To Spec: HPC Proc 11.0 Rev 8

Manufacture HEF

Batch No: 071117

Cure Time/Temp: 1075° FOR 120 MIN


DFT: N/A

ENPMils: N/A

Notes:

KQ500: 750°F FOR 30 MIN.
VISUAL INSPECTION: PASS

Quality, Assurance Manual Rev: 14 Date: 04/2015

DATE: 7/11/2017 SIGNATURE: 

Country of Origin: U.S.A.

Alberto Landois