

MILL TEST CERTIFICATE

Basauri Plant

ISO 9001 - ISO/TS 16949

1.87 BAKER FEMALE ADAPTER 9CR



Product Made in Spain

CUSTOMER: HOWCO METALS MANAGEMENT PTE LTD	WORKS REFERENCE: 1772234
REFERENCE: HOU-115006	SALES ORDER: 276696-12
PRODUCT NR:	HEAT NUMBER: 630108
	ROLLED: 05.12.2014
	MASTER REFERENCE: 197913

REQUIRED PRODUCT			
9%Cr 1%Mo ROUND BARS TURNED Q+T+STRESS RELIEVED 2" SPECIFICATION'S TOLERANCE			
3.000/8.000 mm RANDOM			
EXPEDITION	DELIVERY: 0080492077	WEIGHT (KG): 4.534	BUNDLES: 2
			UNITS: 38

MADE ACCORDING TO	
SAE-AMS 2301 K 08.2010 ; HOWCO HG001 2 20.02.2014 ; HOWCO HG 9CR BAR 3 18.06.2012	
EN ISO 9001 2008/AC:2009 29.07.2009 ; API SPEC 6A 20*ED.+ER1&2+AD12.3 . .03.2013	
NACE MR0175/ISO 15156-2 2*EDICION 15.10.2009	
NACE MR0175/ISO 15156-1 2*EDICION 15.10.2009 ; EN 10204 :2004 OCT. 2004 3.1	



CHEMICAL ANALYSIS OF HEAT										U:% HEAT NUMBER: 630108		
	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.	0,105	0,475	0,628	0,012	0,005	8,573	0,159	0,977	0,135	0,0010	0,0013	
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 ; B(h):0	
C(t):0 ; C(h):0 ; D(t):1 ; D(h):0	
INCLUSIONS (MACROINCLUSIONS)	
Standard (SAE-AMS 2301K08.2010) ; Severity(1):Mean value 0,1 ; Severity(2):Individual value 0,2	
Frequency(1):Mean value 0,1 ; Frequency(2):Individual value 0,2	

MECHANICAL PROPERTIES AS SUPPLIED (CONDITIONS)	
Temperature of: (1):Austenitizing 1.796 °F ; Time: (1):120 Minutes ; Cooling: (1):Oil	
Temperature media at the start:(1):86 °F ; Temperature media at the finish:(1):100 °F	
Temperature of: (2):Tempering 1.319 °F ; Time: (2):120 Minutes ; Cooling: (2):Air	
Temperature of: (3):Stress Relieved 1.220 °F ; Time: (3):360 Minutes	
MECHANICAL PROPERTIES AS SUPPLIED (TEST)	
Sample:Supply section (bar prolongation) ; Specimen Test location:At 1/2 radius 0,5" X 2 1/4"	
Specimen Test ; Standard(1) (ASTM A370201415.05.2014) ; Standard(2) (ASTM E8/E8M2013A01.07.2013)	
Tensile test specimen 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) 30,1 % ; Z (>= 40 %):70,1 %	
Standard (ASTM E2307-AE12007)	
Notch impact sample direction (Longitudinal):Longitudinal	
Notch Impact sample type (CHARPY-V):CHARPY-V ; Notch Impact test Temperature (14 °F):14 °F	
K(1):88 Ft.Lb ; K(2):89 Ft.Lb ; K(3):87 Ft.Lb ; K (average) (>= 30 Ft.Lb):88 Ft.Lb	
K (single) (>= 25 Ft.Lb):87 Ft.Lb ; Lateral expansion:1.6-1.61-1.59 mm ; Shear value:80-80-80 %	
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	

TECHNOLOGY & QUALITY CERTIFIES THAT THE PRODUCT FULL FILLS THE ORDER'S SPECIFICATION	
APPROVED BY:ALBERTO CUBERO ZABALA	SIGN:
DATE:19.02.2015	
REF.:1002186330000	Analyst of Quality certificates



Customer PO#	Sales Order#	Howco Disp Cert#	Date	Authorized by	Page No.	Total Pages
203256	2057757-1	2057757-1	Apr 19 2017	Megan McKeever	1	2

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ADDITIONAL TESTS

Structure:OK ; Standard (ASTM E112201301.10.2013) ; Grain size:7 ; radioactivity:FREE

NON DESTRUCTIVE TESTS

Surface defects standard (API SPEC 6A20*ED.+ER1&2+AD12.3. .03.2013)
 Internal defects standard(1) (ASTM A388-A388M-...2011) ; Internal defects type/method(1) (FBH) ; 1/8"
 Internal defects standard(2) (API SPEC 6A20*ED.+ER1&2+AD12.3. .03.2013)
 Internal defects type/method(2) (FBH)
 Internal defects standard(3) (API SPEC 6A20*ED.+ER1&2+AD12.3. .03.2013)
 Internal defects 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:94 ; 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 Gerdau'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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