

Procedure Qualification Record

Asset Reliability Inspections

ABN 72 129 831 376

PO Box 2052, Bunbury WA 6231

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WPQR No: 283

Revision: 0

Date: 1/07/2013

Essentials

Standard: AS3992:1998 / ASME IX:2010 /
D.1.1:2010 / AS1554.1:2011
Process: GTAW / MMAW
Position: 6G
Progression: Up
Joint Type: Butt, Welded Single Side

Material Details

Material Group 1: ASTM A106B
Material Group 2: ASTM A106B
Thickness: 8.56mm
Thickness: 8.56mm
Diameter: DN100

Consumable Details

Consumable Class: BOC PROFILL AWS A5.18:E70S-6
Consumable Class: KOBE LB52U AWS A5.1 E7016
Shielding Gas Type: Argon 99.9 %
Shielding Gas Type:

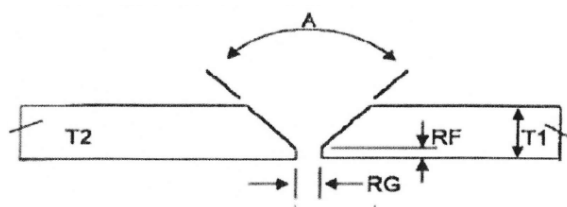
Joint Parameters

Root Gap(g): 4mm
Root Face (f): 0mm
Groove Angle (α): 60°

Welding Technique & Preparation

Preparation Method: Machined
Interpass Cleaning: Grind/Wire Brush
Bead Width: 10mm (measured)
Stringer/Weave: Stringer
Arc Transfer: Not applicable
Electrical Stickout: 14mm
Gas Lens/Nozzle Size: 8mm
Tungsten: 2.4mm Thoriated

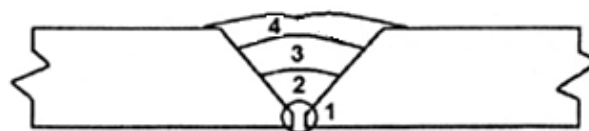
Joint Preparation



Thermal Treatment

Preheat Actual: 23°
Preheat Method: N/A Ambient
Temperature Check: Type K Temperature Probe
Interpass Maximum: 190°C (measured)
Post Weld Treatment: Not applicable

Welding Sequence



Pass No	Side	Position	Process	Polarity	Electrode/Wire		Gas/Flux		Amperage	Voltage	Travel Speed mm/min	Heat Input Kj/mm
					Class	Size mm	Type	L/min				
1	1	6G	GTAW	DC-	E70S-6	2.4	Argon	12	100	10.5	45	1.4
2	1	6G	MMAW	DC+	E7016	2.6	-	-	72	22.5	113	0.86
3	1	6G	MMAW	DC+	E7016	2.6	-	-	83	23	95	1.2
4	1	6G	MMAW	DC+	E7016	2.6	-	-	83	23	65	1.76

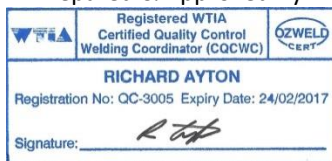
Notes:

- This procedure qualification was produced by Asset Reliability Inspections and R & P Ayton Services.
- ER70S-6 Batch # 53501; E7016 Certificate # 201781, Pipe Heat # 1121509.
- Welder: M Carnaby.

Witnessed By:



Prepared & Approved By:



AS 1796 Cert 10 # 7653

Client/Third Party:

Approved By:

Signature:

Date:

MATERIAL TEST REPORT



ABN 90 706 021 096

ACN 079 834 058

MARINE INSPECTION SERVICE Pty Ltd

Job No: **MT13-01164 / 1** **Reissue: A**

Issued: 11 July 2013 Order No: 00000023

Client: **ASSET RELIABILITY INSPECTIONS PTY LTD**
BUNBURY, Western Australia

Attention: Neil Young

Description: The machining and mechanical testing of one only butt welded
Welder / Procedure Qualification test pipe.

Identification: PQR 283 GTAW / MMAW 6G
Welder: M. Carnaby

Material Specification: ASTM A106 Grade B 100DIA x 8.56WT

Test Specification: AS/NZS3992-1998 (AS4041 Class 1.)
ASME IX - 2010, AWS D1.1 - 2010
AS/NZS1554.1-2011, Category SP.

Samples received: 04/07/2013

8 Egmont Road,
Henderson WA 6166

Phone: 08 9437 6155

Fax: 08 9437 6022

1. Transverse Weld Tensile

Specimen Type: Reduced Section , Weld Reinforcement Removed.

Specimen	Width (mm)	Thickness (mm)	Maximum Force (kN)	Tensile Stress (MPa)	Fracture Location	Compliance
TT 1	19.9	7.52	76.3	506	Parent	Complies
TT 2	20.0	7.58	79.2	518	Parent	Complies

2. Face Bend:

Equipment Type: Transverse Guided Bend, Roller Support, Angle 180°.

Specimen	Dimensions (mm)	Former Diameter (mm)	Result	Compliance
FB 1	20 x 8.5	24	No Defects Apparent	Complies
FB 2	20 x 8.5	24	No Defects Apparent	Complies

3. Root Bend:

Equipment Type: Transverse Guided Bend, Roller Support, Angle 180°.

Specimen	Dimensions (mm)	Former Diameter (mm)	Result	Compliance
RB 1	20 x 8.5	24	No Defects Apparent	Complies
RB 2	20 x 8.5	24	1.9mm Fissure	Complies

MATERIAL TEST REPORT

Job No: MT13-01164 / 1

Reissue: A



ABN 90 706 021 096

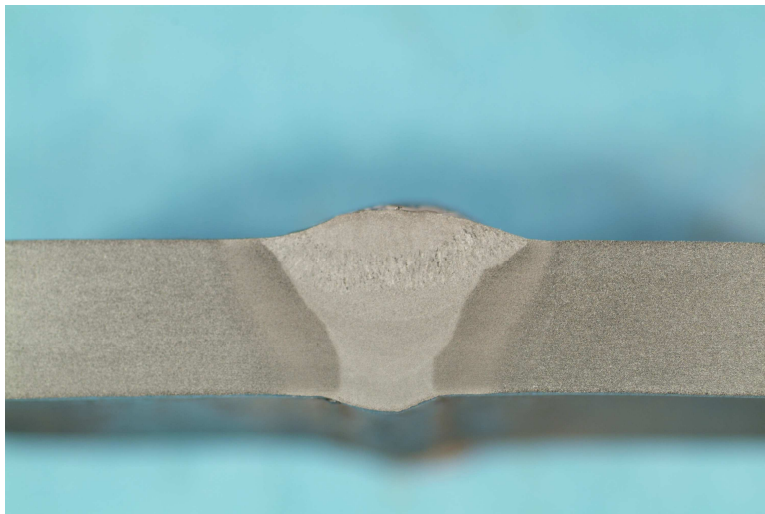
ACN 079 834 058

4. Macro Examination:

Specimen Examined at X20 Magnification.

Specimen	Etchant	Result	Compliance
MACRO 1	10% Nital	No Defects Apparent	Complies
MACRO 2	10% Nital	No Defects Apparent	Complies

5. Photo Macro:



MACRO 1


Jeff Cook
Materials Testing Manager



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025.

NATA Accredited Laboratory 12425.

REPORT NO: ARI0265-01

REPORT DATE: 02 July, 2013

CLIENT: Asset Reliability Inspections

ORDER NO: TBA

CONTACT: Neil Young

PLACE OF TEST: ARI Premises Bunbury

THE ULTRASONIC & MAGNETIC PARTICLE EXAMINATION OF: Welder and Procedure Qualification Pipe Coupon, 1 off

ACCEPTANCE CRITERIA: AS4037 1999 Table 8.4/8.2 Class 1

Generic Technical Data

Technician: A Peters	Material Specification: ASTM A106 Grade B
Design Specification: AS3992	Manufacturing Specification: AS3992
Weld Condition: As welded	Test Surface Preparation: Nil
Test Restrictions: Nil	Permanent Test Record: Photographs on the following page/s.

Magnetic Particle Technical Data

Test Standard: AS 1171 - 1998	Procedure: ARI Magnetic Particle Testing, Yoke
Method of Magnetisation: Magnetic flow	Magnetising Unit: Electrospect ES-X Yoke, S/N 10284
Contrast Aid: Ardrex 8901W	Test Media: Ardrex 800/3
Demagnetised: No	Current Source: AC

Ultrasonic Technical Data

Test Standard: AS 2207	Surface Condition: Complies with AS2207 clause 3.3
Scanning Positions: 1, 2 & 4	Test Method: UMB-2
Scanning Pattern: Overlapping scans	Terminology: AS 4749 and AS 2177
Heat Treatment: Nil	Flaw Sizing: Last significant echo
Couplant: Polycell solution	Equipment: Epoch 600 S/N 120393408

Probes & Calibration

Normal Probe: True Sonic DP- 4 12	Scanning Sensitivity: 2nd backwall 100% @ 9mm
Angle Probe: WCX 8*9 60-4	Scanning Sensitivity: 1.5 Ø SDH 80% + 6dB @ 15mm
Angle Probe: WCX 8*9 70-4	Scanning Sensitivity: 1.5 Ø SDH 80% + 6dB @ 15mm



Adam Peters
NDT Technician

Identification		Area tested	Description, location and size of indications	Result
Test Piece No	TP01	100% of weld & HAZ	No recordable discontinuities evident	Complies
Welder Name	Mark Carnaby			
Weld Type	Single Vee			
Weld Process	GTAW / MMAW			
Position	6G			
WPS / PQR	283			
Pipe Size	DN 100			
Thickness	8.56mm			

General View of Item Examined
(areas examined painted white)



Typical View of Pipe Penetration



BOC Limited
ABN 95 000 029 729
Riverside Corporate Park
10 Julius Avenue
North Ryde NSW 2113

BOC Customer Service Centre
Phone: 131 262
www.boc.com.au

Conformance Certificate

PRODUCT: BOC ProFill 70S-6 Mild Steel Rods	SIZE: 2.4 mm
TYPE: AWS / ASME-SFA A5.18 ER70S-6	
AS / NZS 1167.2 – R6	
PART NO: 12405S6	
BATCH NO: 1ZQ61 LOT NO: 53501	

	Chemical Composition									
	C	Mn	Si	P	S	Ni ²	Cr ²	Mo ²	V ²	Cu ¹
AWS A5.18 AS/NZS 1167.2 Requirements*	0.06 – 0.15	1.40 – 1.85	0.80 – 1.15	0.025	0.035	0.15	0.15	0.15	0.03	0.50
Actual Results	0.06	1.47	0.86	0.021	0.006	0.01	0.02	0.01	0.01	0.01

BOC Certifies that the product conforms to:

- The chemical requirements as stated and that the chemical analysis recorded above are actual results obtained from tests conducted on this batch.
 - *Single values shown are maximum percentages except where otherwise specified
 - ¹ The percentage of copper by mass due to any coating plus the residual copper content in the steel.
 - ² AS/NZS 1167.2 Table 3 Note 2 "These elements maybe present in carbon filler metals but not intentionally added"

p.p 

Nick Bothma
Technical Manager – South Pacific
Welding Products

Date: 26/12/2012

100053

INSPECTION CERTIFICATE									
COVERED ELECTRODE									
PURCHASER:					CERTIFICATE NO: 201781 DATE OF ISSUE: 05-Sep-12				
TRADE DESIGNATION	DIMENSION (mm)		MFG.NO.		APPLICABLE SPECIFICATION AND CLASSIFICATION				
LB-52U	2.6		117		AWS A5.1 E7016				
CHEMICAL COMPOSITION									
ACCORDING TO EN10204 TYPE 3.1									
ELEMENTS	C	Si	Mn	P	S	Ni	Cr	Mo	V
WELD METAL	0.06	0.59	0.97	0.012	0.004	0.01	0.02	0.01	0.01
TENSILE TEST OF WELD METAL					IMPACT TEST OF WELD METAL			HARDNESS TEST	
ACCORDING TO EN10204 TYPE 3.1					ACCORDING TO EN10204 TYPE 3.1				
YIELD STRENGTH AT 0.2% OFFSET	TENSILE STRENGTH		ELONGATION		TEST TEMP.	ABSORBED ENERGY AVG		VICKERS HARDNESS (AVG)	
483 N/mm2	564 N/mm2		33 %		-29 deg.(C)	70 J		-	
WELDING CONDITION					POST WELD HEAT TREATMENT		REMARKS		
TYPE OF CURRENT	DC+								
AMPERAGE	80 (A)								
ARC VOLTAGE	20 (V)								
KOBELCO WELDING ASIA PACIFIC PTE. LTD. WE HEREBY CERTIFY THAT THE TEST RESULTS OF THE ABOVE WELDING MATERIAL ARE AS DESCRIBED HEREIN AND SATISFY THE REQUIREMENTS OF THE APPLICABLE SPECIFICATION.									
					QC MANAGER <i>H. Oaka</i>				

Contract No.: 2110001865

PO. NO.: 7502786165

L/C NO.: SD3BM558093

Name of Customer: ONESTEEL TRADING PTY LTD (PIPING)

Description: SEAMLESS CARBON STEEL PIPE

TOTAL: 411PIECES, 59BUNDLES, 108.269MT, 4849.80METRES

HENGYANG VALIN STEEL TUBE CO., LTD

MILL INSPECTION CERTIFICATE

Date: MAR. 07, 2011

page: 4/4

Add: 10 Dalixincun, Hengyang City, Hunan, China

Tel and Fax: +86 734 8873739 8872942

P.C. 421001

SPEC. : ASTM A53B-2007/A106B-2008, API 5LB, PSL-1-2008 (44TH EDITION)													CERTIFICATE NO: 2011-02-0304-4				
NO.	BATCH NO.	HEAT NO.	STEEL GRADE	SIZE			BUNDLES		PIECES		METRES		QUANTITY (MT)				
3	912200513	1121509	B	4" * KH * 11.80M			7		49		578.2		12.908				
	912200514	1121508	B	4" * KH * 11.80M			20		138		1628.4		36.353				
	912200515	1110488	B	4" * KH * 11.80M			18		126		1486.8		33.192				
	912200516	1110489	B	4" * KH * 11.80M			14		98		1156.4		25.816				
NO.	DELIVERY CONDITION	NONDESTRUCTIVE TEST			CHEMICAL COMPOSITION %												
		ET	UT	TYPE	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	CE	
3				P	0.20	0.22	0.42	0.012	0.004	0.05	0.02	0.04	0.01	0.0020	0.001	0.29	
	HOT-ROLLED	OK	N/A	P	0.19	0.23	0.43	0.012	0.004	0.05	0.02	0.04	0.01	0.0020	0.001	0.28	
				L	0.21	0.21	0.40	0.005	0.003	0.05	0.02	0.03	0.01	0.0015	0.001	0.29	
				P	0.21	0.22	0.42	0.006	0.005	0.05	0.02	0.03	0.01	0.0016	0.001	0.29	
	HOT-ROLLED	OK	N/A	P	0.20	0.21	0.43	0.006	0.005	0.05	0.02	0.03	0.01	0.0016	0.001	0.28	
				L	0.20	0.21	0.43	0.006	0.006	0.05	0.02	0.03	0.01	0.0015	0.001	0.28	
				P	0.20	0.21	0.41	0.009	0.007	0.05	0.02	0.03	0.01	0.0017	0.001	0.28	
	HOT-ROLLED	OK	N/A	P	0.21	0.20	0.42	0.009	0.007	0.05	0.02	0.03	0.01	0.0017	0.001	0.29	
				L	0.20	0.20	0.42	0.009	0.008	0.05	0.02	0.03	0.01	0.0017	0.001	0.28	
				P	0.19	0.23	0.43	0.011	0.008	0.05	0.02	0.03	0.01	0.0020	0.001	0.27	
	HOT-ROLLED	OK	N/A	P	0.20	0.22	0.42	0.011	0.008	0.05	0.02	0.03	0.01	0.0020	0.001	0.28	
				L	0.20	0.23	0.43	0.011	0.008	0.05	0.02	0.03	0.01	0.0020	0.001	0.28	
NO	TENSILE STRENGTH σ _b (Psi)		YIELD STRENGTH σ _s (Psi)		ELONGATION δ (%)		IMPACT			HARDNESS HRC≤22	HYDROSTATIC TEST (Psi /6s)	FLATTEN TEST		BEND TEST			
	strip, L ₀ =25.4mm, L ₀ =50mm				SIZE	AK (J)	Ori/Tem										
3	66700		44225		45.0	N/A	N/A	N/A	OK	2800	OK	N/A					
	66700		42050		40.0	N/A	N/A	N/A	OK	2800	OK	N/A					
	66700		42775		39.5	N/A	N/A	N/A	OK	2800	OK	N/A					
	67425		44225		38.0	N/A	N/A	N/A	OK	2800	OK	N/A					

REMARKS: 1. We hereby certify that this certificate of quality is issued and signed by the manufacturer.

2. We hereby certify that the properties described herein meet the requirement of the above spec.

3. We hereby certify that this certificate is issued accordance with EN10204 3.1 and hardness certified to NACE MR-0175.

4. TYPE: P-Product analysis L-Ladle analysis;

5. ORIGIN: MADE IN CHINA;

6. ALL ELEMENTS TO BE LISTED.

QUALITY MANAGER:

[Signature]