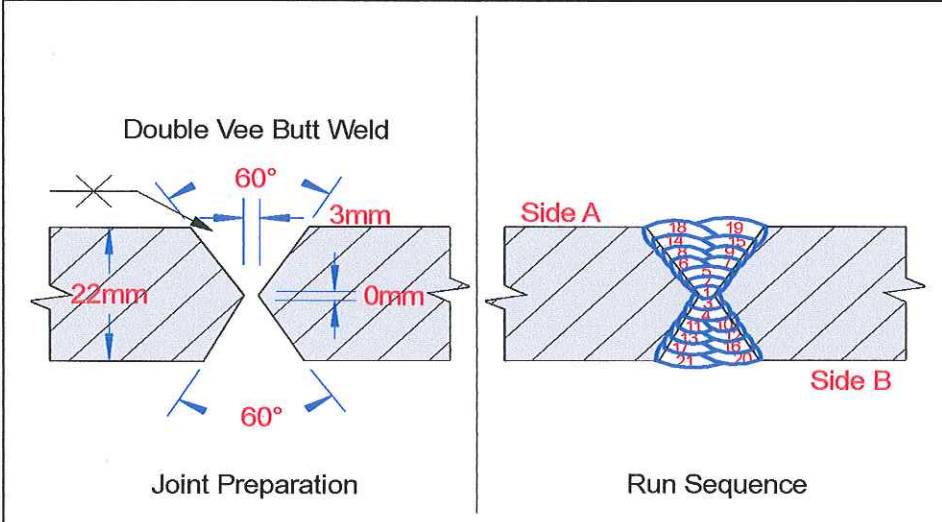


# WELDING PROCEDURE QUALIFICATION RECORD (WPQR)



PQR No:	TWE-PQR-010	DATE:	25th August 2007
WELDING CODE:	AS1210-1997 / AS/NZS 3992-1998 & ASME IX		
WELDING PROCESS:	Gas Tungsten Arc Welding (GTAW)		
JOINT TYPE:	Double Vee Butt Weld		
JOINT POSITION:	Flat (1G)		
PAGE:	1	REV.No:	1
MATERIAL GROUP:	Ti 51 (P51)		
EDGE PREPARATION:	Machined		
HEAT TREATMENT:	Yes (Furance)		
WPS No:	TWE-WPS-010		



JOINT TOLERANCES	
ROOT GAP:	3mm
ROOT FACE:	0mm
GROOVE ANGLE:	60
MATERIAL SPECIFICATION	
MTL:GR 1:	ASTM B265 Grade:7
MTL:GR 2:	ASTM B265 Grade:7
THICKNESS & DIA:	22mm
THICK RANGE QUAL:	See WPS
DIA RANGE QUAL:	See WPS
THERMAL TREATMENT	
PREHEAT METHOD:	Not Required
MAX INTERPASS:	150 degrees C
PWHT TEMP:	566-594
HEATING RATE:	50 per/hr to 580
HEATING DURATION:	1.5 hours
COOLING RATE:	50 per/hr to 300

JOINT DETAIL					WELD SEQUENCE					BACK	INTER	HEAT
WELD PASS DETAILS		ELECTRODE DESCRIPTION			WELDING PARAMETERS				GOUGE	PASS	INPUT	
No	SIDE	POS	DIA	TYPE	AMPS	VOLTS	POL	SPD-mm/min	TECH	TEMP Oc	KJ/mm	
1	A	1G	2.5mm	ER Ti-7	150	11	DC-	70 mm/min	n/a	0	1.4kj	
2	A	1G	2.5mm	ER Ti-7	170	12	DC-	129 mm/min	n/a	140	0.9kj	
3	B	1G	2.5mm	ER Ti-7	170	12	DC-	115 mm/min	n/a	110	1.1kj	
4	B	1G	2.5mm	ER Ti-7	170	12	DC-	86 mm/min	n/a	130	1.4kj	
5	A	1G	2.5mm	ER Ti-7	170	12	DC-	80 mm/min	n/a	140	1.5kj	
6,7	A	1G	2.5mm	ER Ti-7	170	12	DC-	145 mm/min	n/a	135	0.8kj	
8,9	A	1G	2.5mm	ER Ti-7	170	12	DC-	124 mm/min	n/a	150	1.0kj	
10,11	B	1G	2.5mm	ER Ti-7	170	12	DC-	193 mm/min	n/a	130	0.6kj	
12,13	B	1G	2.5mm	ER Ti-7	170	12	DC-	121 mm/min	n/a	130	1.0kj	
14,15	A	1G	2.5mm	ER Ti-7	170	12	DC-	115 mm/min	n/a	140	1.1kj	
16,17	B	1G	2.5mm	ER Ti-7	170	12	DC-	115 mm/min	n/a	140	1.1kj	
18,19	A	1G	2.5mm	ER Ti-7	170	12	DC-	110 mm/min	n/a	150	1.1kj	
20,21	B	1G	2.4mm	ER Ti-7	170	12	DC-	110 mm/min	n/a	150	1.1kj	

TEST PLATE IDENTIFICATION	CONSUMABLE DETAILS	TEST REQUIREMENTS AUSTRALIAN STANDARDS
WELDER: Jimmy Kim	WIRE DIAMETER: 2.5mm	VISUAL: 100%
WELDER ID: JK	CLASSIFICATION: AWS A5.16 ERTI-7	MAG PARTICLE: n/a
WELDERS: AS1796 No:7 or Radiography to qualify welders	TUNGSTEN TYPE: Thoriated	LIQUID PENETRANT: 100%
	SIZE: 2.4mm	ULTRA-SONIC: n/a
	SHIELDING GAS: Argon (99.99%)Pure	RADIOGRAPHY: 100%
	FLOW RATE: 25 litres/min	CHEMICAL ANALYSIS: 100%
CCI POPE: NEWC-86764	PURGE FLOW: 12 litres/min	CCI POPE CERT No: NEWC-86764
CCI POPE: MTU13292/RT/002	WIRE BATCH: 509-W10671	CCI POPE CERT No: MTU13292/RT/002
CCI POPE: MTU13292/PT/002	SHROUD SIZE: 18mm Diameter	CCI POPE CERT No: MTU13292/PT/002

**GENERAL NOTES:**

All runs to be stringer beads, with a maximum width of 8-10mm.

Stricking of the Arc shall only be performed within the confines of the joint design only

Interrun cleaning shall be done by Buff / Carbide Burrs

This procedure may vary due to the fabrication sequence provided its within the variables of clauses Section 5 Table 5.1. See WPS for specific details.

PREPARED BY: Alan Pohl	APPROVED BY: Alan Pohl	SIGNATURE:
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**RADIOGRAPHY TEST REPORT** WOL6624/RT001/00

**On behalf of:** TWE Pty Ltd  
**Job Details:** Procedure Qual TWE-PQR-010  
**Job Location:** CCI Pope Workshop ,Five Islands Rd

**Technician(s):** M.Hass/J.Horsley  
**Weld Process:** Tungsten Inert Gas Weld  
**Method Code:** AS2177 – 2006/ASME V article 2 - 2004  
**Test Procedure:** RT030 TST-1/RT080 TST-14

**Equipment:** XR1 Siefert 200KVp  
**Screens:** 0.125mm Pb  
**Film :** AGFA – D7

**Inspection Date:** 7 Aug 2007  
**Order No.:** TWE-211  
**Client Job No.:** -  
**Product Code:** AS4037-1999 Class 1  
 Piping and ASME IX-2007  
**Material:** Titanium Steel  
**Heat Treatment:** Not Nominated  
**Surface Cond.:** As Welded  
**Technique:** AS2177.1-1994  
 XR2/DWS  
**Source Type:** 160KVp  
**Source Strength:** 1.6x 1.6mm  
**IQI Type:** FE 6- 12FeDIN/  
 ASTM B

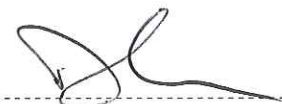
**Procedure No:** TWE-PQR-010  
**Welder:** Chun Bum Kim  
**Plate Butt Weld**

Film Ref.	Interpretation (AS 4749/2001)	Result*	SFD	Material Thick.	IQI	Density Range
0-1	A	Complies	750mm	22mm	Wire 6	2.6/3.0



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**Certified by:**



Dave Mann

**Reviewed by:**

M. Hass  
 (please print)

**Site No:** 10674  
**Accreditation No:** 785

**Report Issue Date:** 8 Aug 2007

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**DYE PENETRANT TEST REPORT WOL6624/PT001/00**

**Inspection Date:** 7 Aug 2007

**On behalf of:** TWE Pty Ltd

**Order No.:**

**Job Details:** Procedure Qual TWE-PQR-010

**Client Job No.:** TWE-211

**Job Location:** CCI Pope Workshop ,Five islands Rd

**Product Code:** AS4037-1999 Class 1 Piping and ASME IX-2007

**Technician(s):** J.Horsley

**Material:** Titanium Steel

**Weld Process:** Tungsten Inert Gas Weld

**Heat Treatment:** Not Nominated

**Method Code:** AS 2062 – 1997/ASME V article 6-2004

**Surface Cond.:** As Welded

**Test Procedure:** PT012 TST/13

**Technique:** Visible Solvent Removable

Test Media:	Process	Manufacturer	Dwell Times
	Pre-Cleaner	Ardrox 9PR50C	-
	Penetrant	Ardrox 907PB Red Dye	20mins
	Remover	Ardrox 9PR50C	-
	Developer	Ardrox 9D1B	10mins


**Results:**

A Dye penetrant examination was conducted on a (1) off Welder procedure Qual TWE-PQR-010

**No Surface discontinuities were detected.....Complies**



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**Certified by:**   
 -----  
 Dave Mann

**Reviewed by:** *M. HASS*  
 -----  
 (please print)

Site No:10674  
 Accreditation No: 785

**Report Issue Date:** 8 Aug 2007

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**RADIOGRAPHY TEST REPORT** MTU13292/RT001/00


On behalf of: TWE Pty Ltd  
 Job Details: Procedure Qualification TWE-PQR-010  
 Job Location: Warabrook  
 Technician(s): S Biddle  
 Weld Process: Tungsten Inert Gas Weld – 1G Position  
 Method Code: AS2177 - 2006  
 Test Procedure: RT096 TST  
 Equipment: XR2 Andrex 300KVp  
 Screens: 0.125mm Pb  
 Film : Type 2

Inspection Date: 15 Aug 2007  
 Order No.: TWE 211  
 Client Job No.: N/A  
 Product Code: AS4037-1999 Table  
 8.1 Class 1  
 Material: Titanium  
 Heat Treatment: Testing After PWHT  
 Surface Cond.: As Welded  
 Technique: XR1/S  
 Source Type: 180Kv  
 Source Strength: 2x2  
 IQI Type: Din Ti 10/16

Film Ref.	Interpretation (AS 4749/2001)	Result*	SFD or FFD	Material Thick.	% IQI	Density Range
	Procedure: TWE-PQR-010					
	Welder: Jimmy Kim					
	Double Vee Butt Weld					
0 – 1	A	Complies	750mm	22mm	1.5%	2-4

Certified by: 

Steve Biddle

Reviewed by:   
 (please print)

Report Issue Date: 15 Aug 2007

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Accreditation No: 785

Newcastle - Site. No.: 778



# CCI Pope Pty Ltd

A.B.N. 86 000 928 816

P.O. Box 96  
Hunter Region Mail Centre  
NSW 2310

Tel : (02) 4967 2788  
Fax : (02) 4968 4982



ASSET RELIABILITY CENTRE

## Welded Sample Test Certificate

Certificate Number : NEWC-85763

Report Date : 20-Aug-07

Client : Technology Welding & Engineering

PICK Job No : MTU13292

Order No : TBA

Job Number : J65

Specification : AS/NZS 3992-1998

Sample Description : 22mm Plate Double Vee Butt Weld Supplied.  
GTAW/1G Position.  
Procedure/Welder Qualification Test.

Material Code : ASTM B265 Gr.7

Welder : Jimmy Kim

Proc No : TWE-PQR-010

Heat Treatment : Heat @ 50°C/Hour To 580°C  
Hold @ 580° For 1.5 Hours  
Cool @ 50°C/Hour To 300°C

Compliance : Complies

Checked By :

A blue ink signature, likely belonging to J.B. Murray, written over a horizontal line.

J.B. Murray NATA Sig

A blue ink signature, likely belonging to J.B. Murray, written above the text 'J.B. Murray NATA Sig'.



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Site No : 1853

## VISUAL INSPECTION

**Compliance :** Complies  
**Tested By :** BM  
**Test Method :** AS/NZS3992:1998 Cl.6.2

**Report Date :** 15-Aug-07

**Weld Ident :** J65  
**Acceptance :** AS4037-1999  
**Discontinuities Evident :**  
Nil.

## TRANSVERSE BUTT TENSILE TEST

**Compliance :** Complies  
**Tested By :** BH  
**Prep Method :** AS/NZS3992:1998 Cl.7.4.1  
**Test Method :** AS/NZS3992:1998 Cl.7.4.1

**Report Date :** 16-Aug-07

**Specimen Ident :** J65-T1  
**Specimen Type :** Reduced section  
**Surface :** Ground flush  
**Minimum Parallel Length :** 60mm  
**Width (mm) :** 30.25 **Thickness (mm) :** 22.05  
**X - Section Area (sqr mm) :** 667.0  
**Maximum Force (kN) :** 280.3

**Tensile Strength (MPa) :** 420

**Location Of Failure :** Within parent metal  
**Remarks :**

Checked By :



J.B. Murray NATA Sig



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### GUIDED BEND TEST

Compliance : Complies

Tested By : BM

Prep Method : AS/NZS3992:1998 Cl.7.6.1

Test Method : AS/NZS3992:1998 Cl.7.6.1

Report Date : 20-Aug-07

Specimen Ident : J65-S1,S2

Specimen Type : Transverse

Equipment/Jig : Roller supports

Angle Of Bend : 180 Degrees

Surface In Tension : Side

Former Diameter : 80mm (8xt)

Condition After Test :

No discontinuities evident, both specimens satisfactory.

Remarks :

### MACRO TEST - CROSS-SECTION EXAMINATION

Compliance : Complies

Tested By : BM

Prep Method : AS/NZS3992:1998 Cl.7.8.1

Test Method : AS/NZS3992:1998 Cl.7.8.1

Report Date : 20-Aug-07

Specimen Ident : J65-M

Surface Prep . : Ground P1200

Etchant : HCL/Nitric/Water/HF


Location : Transverse through weld

Surface Appearance :

No discontinuities evident, satisfactory.

Remarks :

Checked By :



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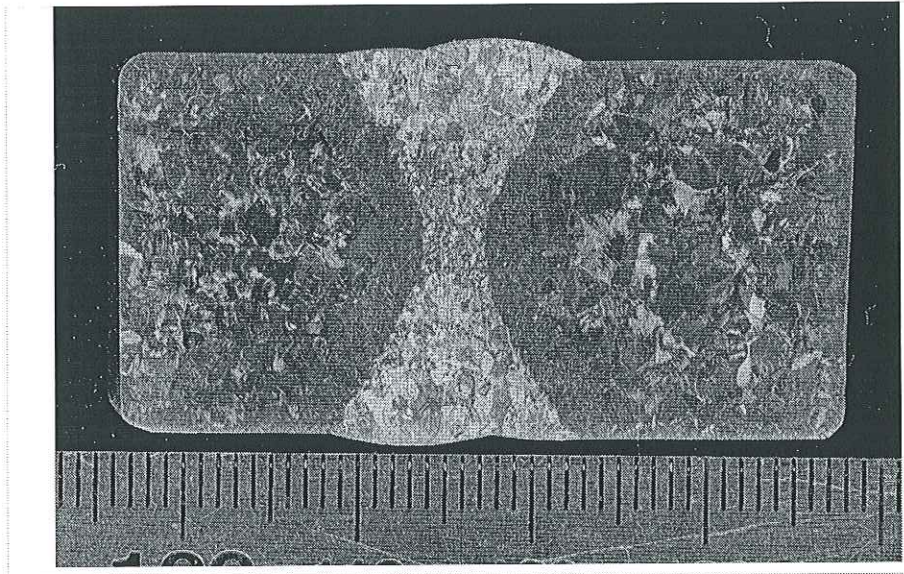
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## MACRO PHOTOGRAPH OF SPECIMEN EXAMINED

Tested By : BM

Report Date : 20-Aug-07



Spec. Ident : J65

Magnification : See Scale

Checked By : 

  
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### TRANSVERSE BUTT TENSILE TEST

**Compliance :** Complies

**Tested By :** B.Hunt

**Report Date :** 15-Aug-07

**Prep Method :** ASME Section IX Cl. QW151

**Test Method :** ASME Section IX Cl. QW152

**Specimen Ident :** J65-T1

**Specimen Type :** Reduced section

**Surface :** Ground flush

**Minimum Parallel Length :** 60mm

**Width (mm) :** 30.25 **Thickness (mm) :** 22.05

**X - Section Area (sqr mm) :** 667.0

**Maximum Force (kN) :** 280.3


**Tensile Strength (MPa) :** 420

**Location Of Failure :** Within parent metal

**Remarks :**

Checked By :



  
J.B. Murray NATA Sig



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## TRANSVERSE BUTT TENSILE TEST

**Compliance** : Complies

**Tested By** : B.Hunt

**Report Date** : 15-Aug-07

**Prep Method** : ASME Section IX Cl. QW151

**Test Method** : ASME Section IX Cl. QW152

**Specimen Ident** : J65-T2

**Specimen Type** : Reduced section

**Surface** : Ground flush

**Minimum Parallel Length** : 60mm

**Width (mm)** : 29.9 **Thickness (mm)** : 22.02

**X - Section Area (sq mm)** : 658.4

**Maximum Force (kN)** : 280.9

**Tensile Strength (MPa)** : 427

**Location Of Failure** : Within parent metal

**Remarks** :

Checked By : 

  
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