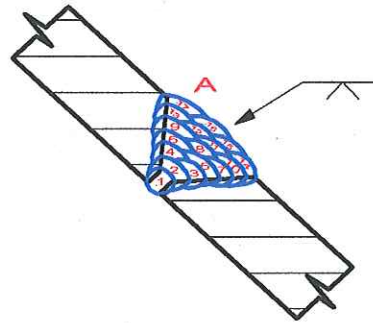
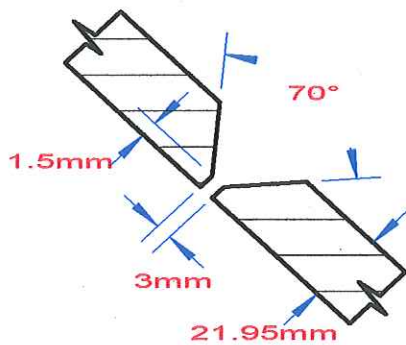


PROCEDURE QUALIFICATION RECORD



PQR No:	TWE-PQR-013	DATE:	1st Sept 2008
WELDING CODE:	AS/NZS3992 & ASME IX	MATERIAL GROUP:	D2, Group 1 & P91
WELDING PROCESS:	Arc Welding (GTAW root) & (MMAW fill)	EDGE PREPARATION:	Machined & Grind
JOINT TYPE:	Single Vee Butt Weld	HEAT TREATMENT:	Yes (see below)
JOINT POSITION:	6G position	WPS No:	TWE-WPS-013



JOINT TOLERANCES	
ROOT GAP:	3mm
ROOT FACE:	1.5mm
GROOVE ANGLE:	70 degrees
MATERIAL SPECIFICATION	
MTL:GR 1:	ASTM A335 -P91
MTL:GR 2:	ASTM A335 -P91
THICKNESS & DIA:	21.95(WT) & 150nb
THICK RANGE QUAL:	See WPS
DIA RANGE QUAL:	See WPS
THERMAL TREATMENT	
PREHEAT METHOD:	Heat Beads
PREHEAT TEMP:	200 degrees
MAX INTERPASS:	300 degrees
P.W.H.T:	Yes (see below)

JOINT DETAIL					WELD SEQUENCE					BACK GOUGE	INTER PASS	HEAT INPUT
WELD PASS DETAILS		ELECTRODE DESCRIPTION			WELDING PARAMETERS				TECH	TEMP Oc	KJ/mm	
No	SIDE	POS	DIA	TYPE	AMPS	VOLTS	POL	SPD-mm/min				
1	A	6G	2.4mm	ER90S-B9	105	11	DC-	60 mm/min	n/a	300 max	1.1kj	
2	A	6G	3.2mm	ER90S-B9	155	12	DC-	60 mm/min	n/a	300 max	1.9kj	
3,4	A	6G	2.5mm	E9015-B9	90	24	DC+	85 mm/min	n/a	300 max	1.5kj	
5,6	A	6G	3.2mm	E9015-B9	130	25	DC+	90 mm/min	n/a	300 max	2.1kj	
7,9	A	6G	4.0mm	E9015-B9	150	26	DC+	85 mm/min	n/a	300 max	2.8kj	
10,13	A	6G	4.0mm	E9015-B9	150	26	DC+	95 mm/min	n/a	300 max	2.5kj	
14,17	A	6G	3.2mm	E9015-B9	128	25	DC+	125 mm/min	n/a	300 max	1.5kj	

TEST PLATE IDENTIFICATION	CONSUMABLE DETAILS	TEST REQUIREMENTS
TEST DATE: 27/07/2007	ELEC TYPE: ER90S-B9	PEARLSTREET ETRS
WELDER: Kye Hong Lee	DIAMETER: 2.4mm	VISUAL: 100%
ID: KHL	CLASSIFICATION: AS1167.2-RB9	MAGNETIC PARTICLE: 27074204 M
WELDERS: AS1796 No:7&4	CLASSIFICATION: E9015-B9	ULTRASONIC: 27074204 UF
or RT to Qualify	SHIELDING GAS: Argon	MECHANICAL TESTS: 27074204.1 & 2
additional Welders	FLOW RATE: 12 litres/min	HARDNESS REPORT: 27074204 H
*HEAT TREATMENT	PURGING GAS: Argon	HEAT TREATMENT: 27074204
BAKE OUT: 300degC x 2 hrs	FLOW RATE: 5 litres/min	STORK COOPERHEAT
PWHT: 760 deg C	CUP SIZE: 12mm	MAGNETIC PARTICLE: S/07/03461
SOAK TIME: 150 minutes	TUNGSTEN: 2.4m, 2% Thoriated	HEAT TREATMENT: S/3461

GENERAL NOTES:

- Remove all oxides and mill scale prior to any welding
- Striking of the arc shall only be done within the confines of the joint design only.
- This procedure may vary due to the fabrication sequence provided its within the variables of clauses Section 5 Table 5.1
- *Heat treatment shall be conducted using Furnace Heat treatment method with use of thermocouples. and in conjunction with AS4458 & ASME 31.1
- This Procedure is a Dual Qualification along with TENIX Welding Procedure No: TAPQR-008

PREPARED BY: Alan Pohl	APPROVED BY: Alan Pohl	SIGNATURE:
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MECHANICAL TESTING REPORT

REPORT NUMBER: 27074204.2
DATE: 9 August 2007

Page 1 of 2

**Tenix Alliance Pty Ltd
& TWE Pipe & Steel Fabrication
PO Box 653
SEVEN HILLS NSW 1730**

CLIENT CONTACT: Mr Greg Piela

ORDER NUMBER: TW-055369

DESCRIPTION: The machining and mechanical testing of one steel butt welded procedure and welder qualification test pipe identified as follows:

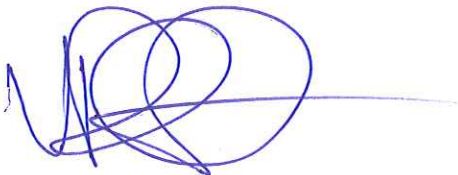
- Weld Procedure / Production and Welder Qualification TAPQR-008,
- Welder Kye Hong Lee
- Welder ID TA-06
- Position 45 Degree inclined butt weld (6G)
- Process: GTAW & MMAW
- Pipe Diameter 150NB, Shd XXS
- Test samples were stress relieved prior to testing.

TEST SPECIFICATION: AS3992-1998

MATERIAL: ASTM A335 P91, 21.95mm thick

TEST RESULTS:

TENSILE Transverse Weld		T1	T2
Dimensions	mm	30.05 x 20.76	30.02 x 20.69
Tensile Strength			
Load	kN	455.00	456.00
Stress	MPa	729	734
Fracture In		Weld Metal	Weld Metal



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Branch Operations Materials
Approved Signatory



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ENERGY SERVICES

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MECHANICAL TESTING REPORT

REPORT NUMBER: 27074204.2
DATE: 9 August 2007

Page 2 of 2

TEST RESULTS: continued

BEND TEST

Former 4T Dia

Side 1

No defects evident – Complies

Side 2

No defects evident – Complies

Root

No defects evident – Complies

MACRO EXAMINATION

Macro 1

No defects evident – Complies

Macro 2

No defects evident – Complies

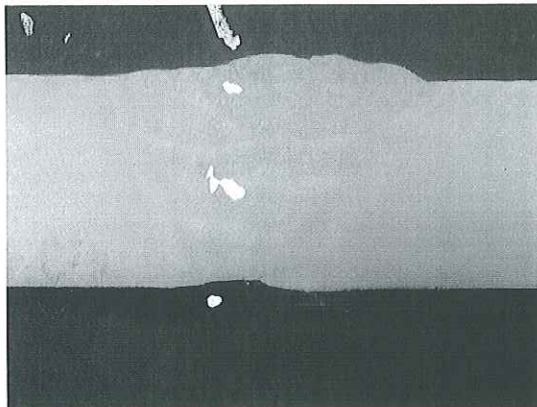


Figure 1. Showing typical weld profile examined, Viella's Reagent

-----End of Report-----

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MECHANICAL TESTING REPORT

REPORT NUMBER: 27074204.1

DATE: 9 August 2007

**Tenix Alliance Pty Ltd
& TWE Pipe & Steel Fabrication
PO Box 653
SEVEN HILLS NSW 1730**

CLIENT CONTACT: Mr Greg Piela

ORDER NUMBER: TW-055369

DESCRIPTION: The machining and mechanical testing of one steel butt welded procedure and welder qualification test pipe identified as follows:

- Weld Procedure / Production and Welder Qualification TAPQR-008,
- Welder Kye Hong Lee
- Welder ID TA-06
- Position 45 Degree inclined butt weld (6G)
- Process: GTAW & MMAW
- Pipe Diameter 150NB, Shd XXS
- Test samples were stress relieved prior to testing.

TEST SPECIFICATION: ASME IX

MATERIAL: ASTM A335 P91, 21.95mm thick

TEST RESULTS:

TENSILE Transverse Weld		T1	T2
Dimensions	mm	30.05 x 20.76	30.02 x 20.69
Tensile Strength			
Load	kN	455.00	456.00
Stress	MPa	729	734
Fracture In		Weld Metal	Weld Metal

BEND TEST Former 4T Dia

Side 1	No defects evident – Complies
Side 2	No defects evident – Complies
Side 3	No defects evident – Complies
Side 4	No defects evident – Complies

-----End of Report-----

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PO Box 6125, Wetherill Park NSW 2164
www.pearlstreetenergy.com.au

HARDNESS TESTING REPORT

REPORT NUMBER: 27074204 H

Page 1 of 2

DATE: 9 August 2007

**Tenix Alliance Pty Ltd
& TWE Pipe & Steel Fabrication
PO Box 653
SEVEN HILLS NSW 1730**

CLIENT CONTACT: Mr Greg Piela

ORDER NUMBER: TW-055369

DESCRIPTION: The hardness testing of one steel butt welded procedure and welder qualification test pipe identified as follows:

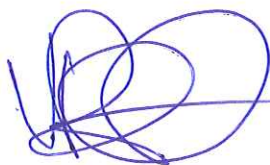
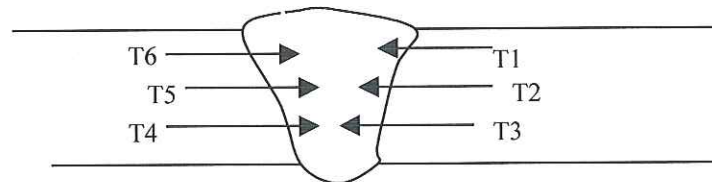
- Weld Procedure / Production and Welder Qualification TAPQR-008,
- Welder Kye Hong Lee
- Welder ID TA-06
- Position 45 Degree inclined butt weld (6G)
- Process: GTAW & MMAW
- Pipe Diameter 150NB, Shd XXS
- Test samples were stress relieved prior to testing.

MATERIAL: ASTM A335 P91, 21.95mm thick

TEST PROCEDURE: A Vickers Diamond Pyramid, hardness tester was used to conduct six (6) hardness traverses across the test specimen, in accordance with AS/NZS2205.6.1. - 2003 and Client Requirements.

TEST RESULTS: All Readings HV10

Refer Page 2 of this report.



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HARDNESS TESTING REPORT

REPORT NUMBER: 27074204 H
DATE: 9 August 2007
TEST RESULTS: All Readings HV10

Page 2 of 2

Traverse One	Parent Metal	220, 224, 228
	Heat Affected Zone	233, 245, 274, 276, 251, 264, 237
	Weld Metal	247, 237, 237
Traverse Two	Parent Metal	240, 228, 233
	Heat Affected Zone	240, 237, 240, 258, 274, 237
	Weld Metal	249, 237, 232
Traverse Three	Parent Metal	217, 219, 220
	Heat Affected Zone	230, 237, 245, 251, 260, 262, 260, 256
	Weld Metal	262, 266, 264
Traverse Four	Parent Metal	219, 222, 222
	Heat Affected Zone	233, 247, 256, 264, 264, 264, 264
	Weld Metal	270, 268, 266
Traverse Five	Parent Metal	233, 225, 224
	Heat Affected Zone	240, 247, 247, 256, 266, 247
	Weld Metal	251, 249, 258, 256
Traverse Six	Parent Metal	240, 240, 237
	Heat Affected Zone	230, 224, 220, 228, 237, 243, 264
	Weld Metal	245, 249, 242

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ENERGY SERVICES

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Magnetic Particle Report Number: 27074204 M

Page 1 of 2

Date: 9th August 2007

Client: Tenix Alliance Pty Ltd /
TWE Pipe & Steel Fabrication
PO Box 653
SEVEN HILLS NSW 1730

Contact: Mr Greg Piela.

Subject: The Dry Fluorescent Magnetic Particle Inspection of One
150NB Weld Procedure / Welder Qualification Test Pipe.

Location of Test: ETRS, Wetherill Park

Order Number: Request No. 17

Examination Date: 2nd August 2007

ETRS Worksheet Number: M 020807AB2

Technician/s: Tim Nguyen, Alex Beltran.

TECHNICAL DATA

Test Specification: AS 1171 – 1998 MT.001

Technique: Magnetic Flow

Media: MX 201- Green -Dry Fluorescent Magnetic Powder
Ultraviolet Light

Surface Condition: Clean – As Welded

Material Specification: ASTM A 335 P91

Fabrication Specification: AS 3992 -1998

Interpretation Specification: AS 4037 & ASME IX



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ASSET MANAGEMENT SERVICES

Magnetic Particle Report Number: 27074204 M

Page 2 of 2

RESULTS OF EXAMINATION

IDENTIFICATION

INTERPRETATION

QUALITY

WP No: TAPQR-008
Welder: Kye Hong Lee
Welder ID: TAW-06
Position: 45 Degree Inclined Butt Weld (6G)
Process: GTAW & MMAW
Pipe Size: 150NB
Material: ASTM A335 P91 to ASTM A335 P91
Thickness: Sch XXS, 21.95mm
Condition: As Welded

W 1

No Relevant Discontinuities Evident

Complies



Tim Nguyen
Technician
Non-Destructive Testing



Alex Beltran
Technician Trainee
Non-Destructive Testing



PearlStreet
ENERGY SERVICES

ETRS

Ultrasonic Report Number

27074204 UF

Page 1 of 2

Date:

August 9, 2007

Client:

Tenix Alliance Pty Ltd /
TWE Pipe & Steel Fabrication
PO Box 653
SEVEN HILLS NSW 1730

Contact:

Mr Greg Piela

Subject:

The Ultrasonic Examination of One (1) 150NB Weld
Procedure / Welder Qualification Test Pipe.

Location of Test:

PearlStreet ETRS Wetherill Park Laboratory

Identification:

Weld Procedure No. TAPQR-008

Order Number:

TW-055369

Examination Dates:

31st July & 01st August 2007

ETRS Worksheet Numbers:

U310807

Technician/s:

Tim Nguyen

TECHNICAL DATA

Test Specification:

AS 2207: 1994

Method:

UMB-2

Flaw Detector:

Krautkramer US52R

Serial Number:

N719

Probes:

Krautkramer, WK CDP 10/0/5.0
MWB 70° E4, MWB 60° E4.

Surface Finish:

Smooth / As Welded

Material Specification:

ASTM A335 P91, (schedule XXS)

Fabrication Specification:

ASS3992 & ASME IX

Acceptance Standard:

AS4037 & ASME IX



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ASSET MANAGEMENT SERVICES

Ultrasonic Report Number

27074204 UF

Page 2 of 2

RESULTS OF EXAMINATION

IDENTIFICATION	INTERPRETATION	QUALITY
Weld Procedure No.	TAPQR-008	
Welder Name:	Kye Hong Lee	
Welder No.:	TAW-06	
Position:	45Degree Inclined Butt Weld (6G)	
Process:	GTAW and MMAW	
Pipe Size:	150NB	
Material:	ASTM A335 P91	
Thickness:	Schedule XXS (21.95mm)	
Weld 1: Before Stress Relieve (Half Pipe)	No Recordable Discontinuity Detected	Complies
Weld 1: After Stress Relieve (Half Pipe)	No Recordable Discontinuity Detected	Complies



Tim Nguyen
Technician
Non-Destructive Testing



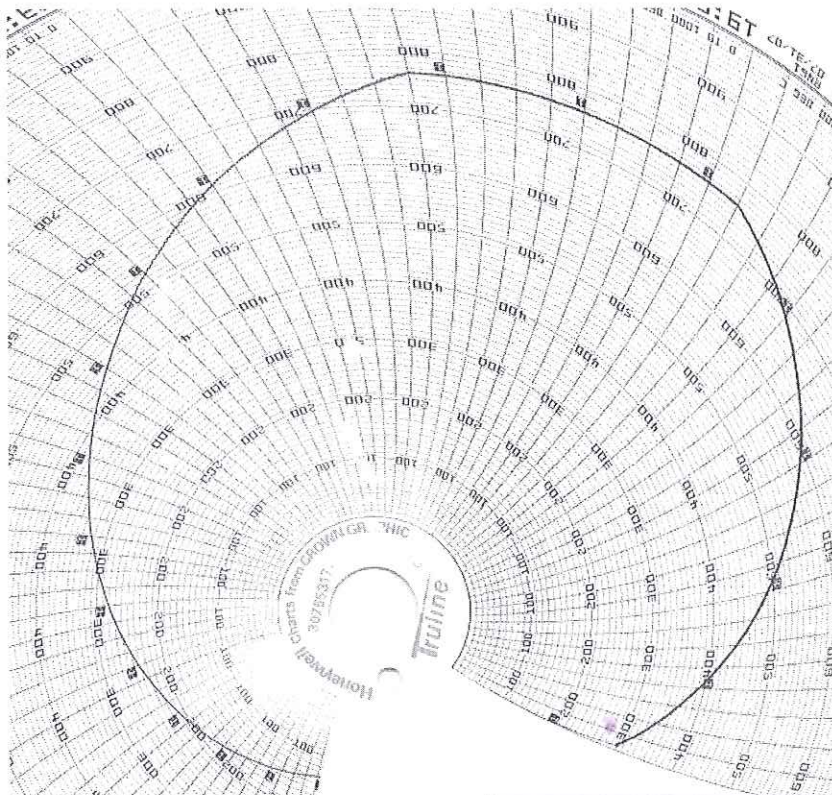
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HEAT TREATMENT CHART

REPORT NUMBER: 27074204

DATE: 9 August 2007



Heat Treatment	
Client:	Tenix Alliance Pty Ltd & TWE Pipe & Steel Fabrication
Order Number :	TW-055369
Coupon ID:	TAPQR-007 and 008
Material:	ASTM A335 P91
Specification:	C.R and AS4458
Heating Rate:	102 ⁰ C/hr
From:	300 ⁰ C
Soaking Time:	2hr 30 min. @ 760 ⁰ C
Cooling Rate:	51 ⁰ C/hr
To:	30 ⁰ C

Victor Konstantinoff
Branch Operations Materials

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