

WELDING PROCEDURE SPECIFICATION (WPS)

PT. REXLINE ENGINEERING INDONESIA
 Company Name

0
 Revision No.

02/WPS/REI/SAW/2023
 WPS No.

March 15, 2023
 Date.

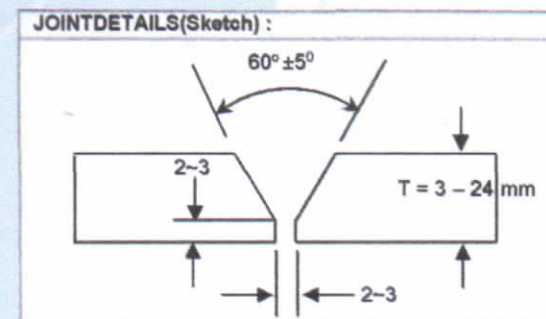
02/PQR/REI/SAW/2023
 Supporting PQR No.

CVN Report.

BASE METALS	Specification	Type or Grade	AWS Group No.
Base Material	A36	UNS K02600	I
Welded to	A36	UNS K02600	I
Backing Material	-	-	-
Other	-	-	-

BASEMETAL THICKNESS	As-Welded	With PWHT
CJP Groove Welds	3 mm - 24 mm	-
CJP Groove w/CVN	-	-
PJP Groove Welds	-	-
Fillet Welds	3 mm - 24 mm	-
DIAMETER	-	-

JOINT DETAILS	
Groove Type	Single V Groove or Fillet
Groove Angle	60°
Root Opening	2 - 3 mm
Root Face	2 - 3 mm
Back gauging	None
Method	-



POSTWELD HEAT TREATMENT	
Temperature	-
Time at Temperature	-
Other	-

PROCEDURE	
Weld Layer(s)	All
Weld Pass(es)	All
Process	SMAW
Type (manual / Mechanized, etc)	Manual
Position	2G
Vertical Progression	-
Filler Metal (AWS Spec.)	A5.1
AWS Classification	E7018
Diameter (mm)	2.5 - 3.2
Manufacturer / Trade Name	Essab or Equivalent
Shielding Gas (Composition)	None
Flow Rate (GTAW)	-
Nozzle Size (GTAW)	-
Preheat Temperature	None
Interpass Temperature	-
Electrical Characteristics	-----
Electrode Diameter (GTAW)	-
Current Type & Polarity	DCEP
Amps (A)	70 - 150
Volts (V)	20 - 30
Cold or Hot Wire Feed (GTAW)	-
Travel Speed (mm/ minute)	60 - 150
Maximum Heat Input	-
Technique	-----
Stringer or Weave	Both
Multi or Single Pass (per side)	Multipass
Oscillation (GTAW Mech./ Auto.)	-
Traverse Length	-
Traverse Speed	-
Dwell Time	-
Peening	None
Interpass Cleaning	Wire Brush or Grinding
Other	-



PROCEDURE QUALIFICATION RECORD (PQR)

PT. REXLINE ENGINEERING INDONESIA
Company Name

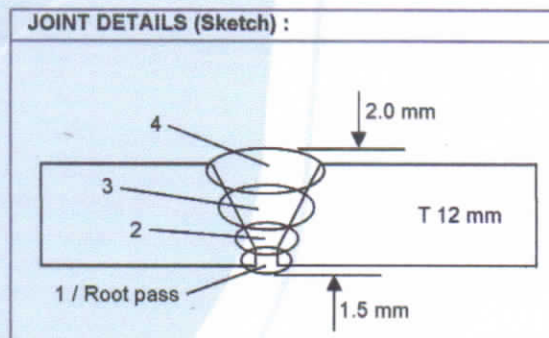
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Revision No.

02/PQR/REI/SMAW/2023
PQR No.

March 15, 2023
Date.

BASE METAL	Specification	Type or Grade	AWS Group No	Thickness	Size (NPS)	Schedule	Diameter
Base Material	ASTM A36	UNS K02600	I	12 mm	-	-	-
Welded To	ASTM A36	UNS K02600	I	12 mm	-	-	-
Backing Material	-	-	-	-	-	-	-
Other							

JOINT DETAILS	
Groove Type	Single V Groove Butt Joint
Groove Angle	60°
Root Opening	3 mm
Root Face	2 mm
Back gouging	None
Method	-



POST WELD HEAT TREATMENT	
Temperature	-
Time at Temperature	-
Other	-

PROCEDURE				
Weld Layer(s)	Root Pass	2	3	4
Weld Pass(es)	1			
Process	SMAW	SMAW	SMAW	SMAW
Type (manual / Mechanized, etc)	Manual	Manual	Manual	Manual
Position	3G	3G	3G	3G
Vertical Progression	Up hill	Up hill	Up hill	Up hill
Filler Metal (AWS Spec.)	A5.1	A5.1	A5.1	A5.1
AWS Classification	E7018	E7018	E7018	E7018
Diameter (mm)	2.6	2.6	3.2	3.2
Manufacturer/Trade Name	Essab	Essab	Essab	Essab
Shielding Gas Composition (GTAW)	None	None	None	None
Flow Rate (GTAW)	-	-	-	-
Nozzle Size (GTAW)	-	-	-	-
Preheat Temperature	None	None	None	None
Interpass Temperature	-	-	-	-
Electrical Characteristics				
Electrode Diameter (GTAW)	-	-	-	-
Current Type & Polarity	DCEP	DCEP	DCEP	DCEP
Amps (A)	72	80	112	118
Volts (V)	23	24	25	25
Cold or Hot Wire Feeder (GTAW)	-	-	-	-
Travel Speed (mm / minute)	74	86	98	103
Maximum Heat Input	-	-	-	-
Technique				
Stringer or Weave	Both	Both	Both	Both
Multi or Single Pass (perside)	Multipass	Multipass	Multipass	Multipass
Oscillation(GTAW Mechanized/Auto)	-	-	-	-
Traverse Length	-	-	-	-
Traverse Speed	-	-	-	-
Dwell Time	-	-	-	-
Peening	None	None	None	None
Interpass Cleaning	Wire Brush and Grinding	Wire Brush and Grinding	Wire Brush and Grinding	Wire Brush and Grinding
Other	-	-	-	-



PROCEDURE QUALIFICATION RECORD (PQR) TEST RESULTS

02/PQR/REI/SMAW/2023
PQR No.

0
Rev.No.

TESTS

	Type of Test	Clause / Figure (s) Reference	Acceptance Criteria	Result	Remark
√	Visual Inspection	6.10.1	6.10.1	Acceptable	-
√	Radiographic Examination	6.10.2.1	6.10.2.2	Acceptable	-
	Ultrasonic Testing	6.10.2.1	6.10.2.2	-	-
	2 Transverse Root Bends	6.10.3.1 / Fig. 6.8	6.10.3.3	-	-
	2 Transverse Face Bends	6.10.3.1 / Fig. 6.8	6.10.3.3	-	-
	2 Longitudinal Root Bends	6.10.3.1 / Fig. 6.8	6.10.3.3	-	-
	2 Longitudinal Face Bends	6.10.3.1 / Fig. 6.8	6.10.3.3	-	-
	2 Side Bends	6.10.3.1 / Fig. 6.9	6.10.3.3	-	-
√	4 Side Bends	6.10.3.1 / Fig. 6.9	6.10.3.3	Acceptable	-
√	2 Tensile Test	6.10.3.1 / Fig. 6.10	6.10.3.5	Acceptable	-
	All-Weld-Metal Tensions	6.10.3.1 / Figs. 6.14 and 6.18	6.15.1.3(2)	-	-
	3 Macroetch	6.10.4	6.10.4.1	-	-
	4 Macroetch	6.10.4	6.10.4.1	-	-
	CVN Test	6 Part D/Fig. 6.28	6.30 and Table 6.14	-	-

TENSILE TEST DETAILS

Specimen Number	Width	Thickness	Area	Ultimate Tensile Load	Ultimate Unit Stress	Type of Failure and Location
2T1	20.29 mm	11.21 mm	227.45 mm ²	85.50 kN	375.91 MPa	Base Metal
2T2	20.24 mm	10.95 mm	221.63 mm ²	83.00 kN	374.50 MPa	Base Metal

TOUGHNESS TEST DETAILS

Specimen Number	Notch Location	Specimen Size	Test Temperature	Absorbed Energy	Percent Shear	Lateral Expansion	Average

GUIDED BEND TEST DETAILS

Specimen No.	Type of Bend	Result	Width (mm)	Thick (mm)	Remark
2SB1	Side Bend	Acceptable	10.39	12.00	Open Defect 0.25 mm
2SB2	Side Bend	Acceptable	10.08	12.00	Open Defect 0.62 mm
2SB3	Side Bend	Acceptable	9.89	12.00	Open Defect 1.22 mm
2SB4	Side Bend	Acceptable	9.85	12.00	None Open Defect

CERTIFICATION

Welder's Name	ID Number	Stamp Number
Dany Ardiyansah	-	WD - 02

Tests Conducted by	
Laboratory	Fakultas Teknologi Kelautan - ITS
Test Number	0304/IT2.4.1.1/PM.05.02/2023
File Number	-

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Clause 6 of AWS D1.1 / D1.1M, 2020 Structural Welding Code – Steel.

Prepared by,
PT.Rexline Engineering Indonesia

Approved by,
Disnaker Prov. Jatim

Chandra Bintang
Welding Inspector



REPORT ON TEST RESULT NO. : 0304/IT2.4.I.1/PM.05.02/2023

Page 1 of 2

DATE : March 13, 2023
ORDER FROM : PT.REXLINE ENGINEERING INDONESIA
TEST STANDARD : AWS.D1.1
WPS NUMBER : 02/WPS/REI/SMAW/2023
PQR NUMBER : 02PQR/REI/SMAW/2023
MATERIAL SPEC. : Plate A36 to Plate A36
THICKNESS : 12 mm to 12 mm
JOINT DESIGN : Butt Joint (Single Groove)
WELDING PROCESS : SMAW
TEST POSITION : 3G
WELDER NAME : Dany Ardiyansah
CERTIFICATE PLATE NO. : 200109-FPQ81N-0016A1-0004

1. TENSILE TEST

TEST PIECE CODE	VISUAL	SAMPLE SPECIFICATION					TENSILE TEST RESULTS		
		WIDTH (mm)	THICK. (mm)	C.S.A (mm ²)	Fy (kN)	Fu (kN)	YIELD STRENGTH (MPa)	TENSILE STRENGTH (MPa)	BREAKING
2T1	Good	20.29	11.21	227.45	64.00	85.50	281.38	375.91	Base Metal
2T2	Good	20.24	10.95	221.63	61.50	83.00	277.49	374.50	Base Metal

Equipment: Universal Testing Machine "MFL Systeme, UPD-20", 200 kN capacity.

2. BEND TEST

ANGLE OF BEND : 180°

DIA. OF FORMER : 50 mm

TEST PIECE CODE	WIDTH (mm)	THICK. (mm)	TEST RESULTS	
			OPEN DEFECT (mm)	
2SB1	Side Bend	10.39	12.00	0.25
2SB2	Side Bend	10.08	12.00	1.64
2SB3	Side Bend	9.89	12.00	1.22
2SB4	Side Bend	9.85	12.00	None

Equipment: Universal Testing Machine "MFL Systeme, UPD-20", 200 kN capacity.

NOTES : This report is valid only for the specimen tested on the Laboratory of Ships Strength and Construction

Witnessed by :
DISNAKERTRANS
Prov. Jatim



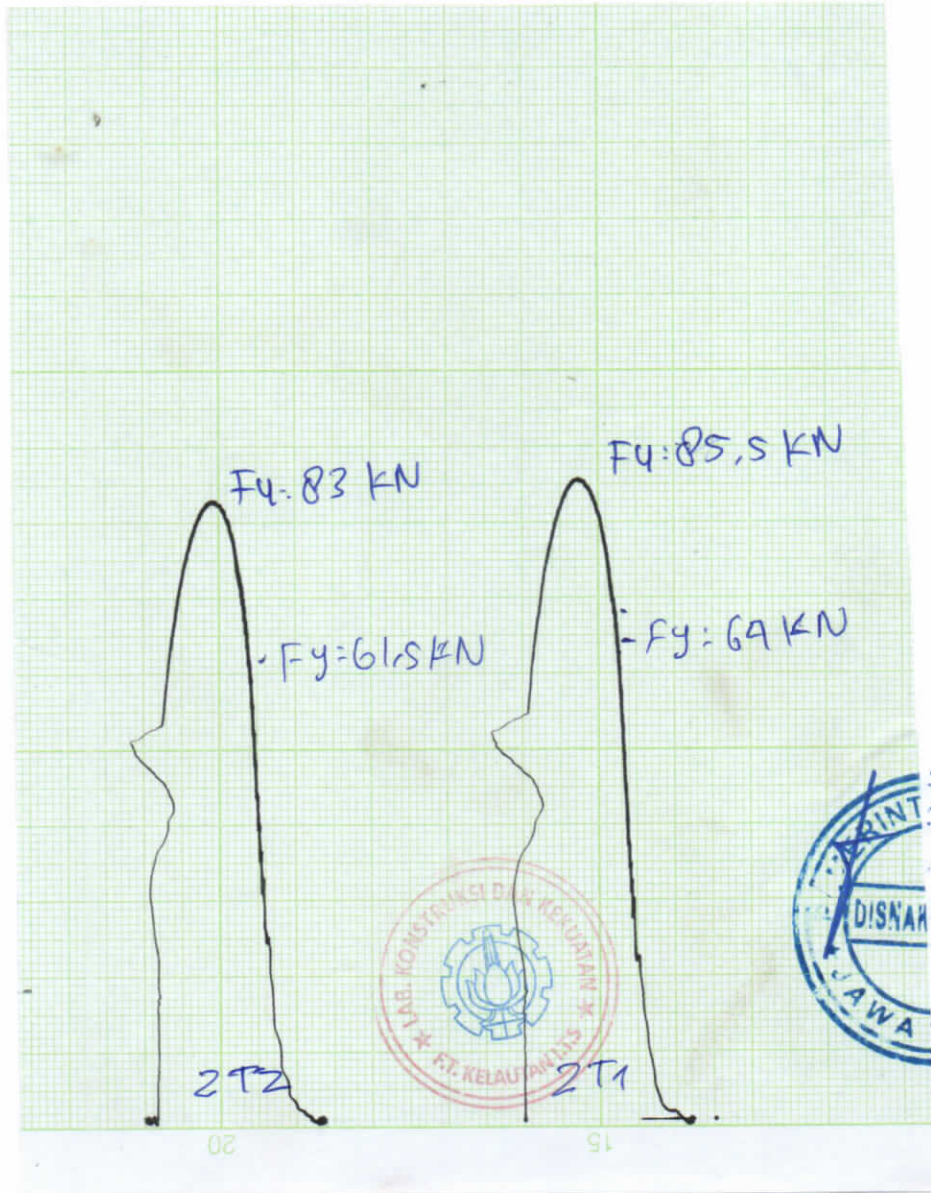
Head of the Laboratory
Ships Strength and Construction



M.Nurul Misbah, ST., MT.
NIP. 197304041997021001

REPORT ON TEST RESULT NO. : 0304/IT2.4.I.1/PM.05.02/2023

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Order No. : Q8S1016932

PO No. : GWK/LOMBOK/MTXII/19/02

Supplier : PT. GHEWANTIKA KONSTRUKSI

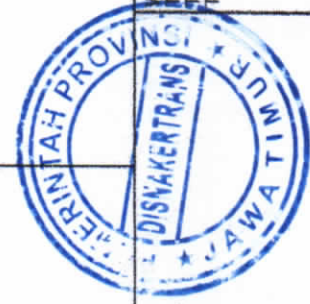
Commodity : PLATE

Customer : PT. GHEWANTIKA KONSTRUKSI

Spec & Type : ASTM A36

Size	Product No.	Quantity	Weight (kg)	Heat No.	Position	Tensile Test			Chemical Composition											
						YP (MPa)	TS (MPa)	EL (%)	C (%)	Si (%)	Mn (%)	P (%)	S (%)	Cr (%)	Ni (%)	Cu (%)	Mo (%)	Nb (%)	V (%)	
12x1800x12000	PK62519701	1	2,035	SK55821	T	370	427	26	0.1550	0.196	1.392	0.0126	0.0032	0.022	0.010	0.013	0.001	0.015	0.003	
*** Sub Total (0950) ***		1	2,035 (kg)						0.1606	0.214	1.373	0.0130	0.0038	0.020	0.009	0.012	0.002	0.015	0.004	
14x1800x12000	PK62519801-9802	2	4,748	SK55821	T	370	427	26	0.1550	0.196	1.392	0.0126	0.0032	0.022	0.010	0.013	0.001	0.015	0.003	
14x1800x12000	PK62519601-9602	2	4,748	SK55821	T	361	415	26	0.1550	0.196	1.392	0.0126	0.0032	0.022	0.010	0.013	0.001	0.015	0.003	
*** Sub Total (1050) ***		4	9,496 (kg)						0.1606	0.214	1.373	0.0130	0.0036	0.020	0.009	0.012	0.002	0.015	0.004	
*** Grade Total ***		25	38,992 (kg)																	
*** Grand Total ***		25	38,992 (kg)																	

=== Last Item ===



* Position - T : Top, M : Middle, B : Bottom
* Tensile Test Direction : Transversal, Gauge Length : 200mm (Rectangular).
* YP Method : 0.2% off-set
* Division - L : Ladle Analysis, P : Products Analysis
* Supply Condition : As-Rolled unless otherwise Heat Treated.


We hereby certify that the material herein has been made in accordance with the order and above specification.
This material has been fully killed and made by basic oxygen process.
This material has been made by vacuum degassing process.
Test Certificate is issued according to EN10204 3.1.

Legal sanction can be imposed on forging. Improper use of product can cause safety issues.

Surveyor To :

Choi Jong Seog

WELDER PERFORMANCE QUALIFICATION TEST RECORD

Name	Dany Ardiyansah		Test Date	13/03/2023	Rev.
ID Number	-		Record No.	WPQ-02	0
Stamp No.	WD - 02		Std. Test No.	-	0
Company	PT. Rexline Engineering Indonesia		WPS No.	02/WPS/REI/SMAW/2023	0
Division	-		Qualified To	AWS D1.1	

BASE METALS	Specification	Type or Grade	AWS Group No.	Size (NPS)	Schedule	Thickness	Diameter
Base Material	ASTM A36	UNS K02600	I	-	-	12 mm	-
Welded to	ASTM A36	UNS K02600	I	-	-	12 mm	-

VARIABLES	Actual Values	RANGE QUALIFIED
Type of Weld Joint	Plate - Single V Groove	Groove, Fillet, Plug, and Slot Welds (T-, Y-, K-Groove PJP only)
Base Metal	Group I to Group I	Any AWS D1.1 Qualified Base Metal

	Groove	Fillet	Groove	Fillet
Plate Thickness	12 mm	-	3 - 24 mm	3 - 24 mm
Pipe/Tube Thickness	-	-	3 - 24 mm	3 - 24 mm
Pipe Diameter	-	-	Min. 24 in	Min. 24 in

Welding Process	SMAW	SMAW
Type (Manual, Semiautomatic, Mechanized, Automatic)	Manual	Manual
Backing	Without	With and Without
Filler Metal (AWS Spec.)	A5.1	A5.1
AWS Classification	E7018	All
F-Number	4	4
Position	3G	----
Groove - Plate & Pipe \geq 24 in	-	F, H, V
Groove - Pipe < 24 in	-	-
Fillet - Plate & Pipe \geq 24 in	-	F, H, V
Fillet - Pipe < 24 in	-	F, H, V
Progression	Vertical Up Hill	Vertical
GMAW Transfer Mode	-	-
Single or Multiple Electrodes	Single	Single
Gas/Flux Type	-	-

TEST RESULTS

Type of Test	Acceptance Criteria	Results	Remarks
Visual Examination per 6.10.1	6.10.1	Acceptable	-
Radiographic Examination	6.10.2.2	Acceptable	-
Each Position: 1 Root Bend per 6.10.3.1 and Fig. 6.8	6.10.3.3	-	-
Each Position: 1 Face Bend per 6.10.3.1 and Fig. 6.8	6.10.3.3	-	-

CERTIFICATION

Test Conducted by	
Laboratory	PT. Quarta Sejahtera Perkasa
Test Number	02/RT/QSP-REI/2023
File Number	-

We, the undersigned, certify that the statements in this record are correct and that the test welds were prepared, welded, and tested in accordance with the requirements of Clause .6. of AWS D1.1/D1.1M (2020) Structural Welding Code-Steel.

Prepared by,
PT.Rexline Engineering Indonesia

Approved by,
Disnaker Prov. Jatim

Chandra Bintang
Welding Inspector



RECORD OF WELDER QUALIFICATION TEST

Welder Name : DANY ARDIYANSAH Company Name : PT. REI Location : Workshop Lamongan Standard : AWS D1.1 Welding Machine : Caldwell Arc 500ME Welding Process : SMAW Shielding Gas : - Backing Material : - Position of Welding : 3G Material Spec. : ASTM A36 Plate / Pipe : Plate Manufacture Plate : Krakatau Posko Heat No. : SK55821 Filler Metal Spec. : A5.1 Manufacture Filler : Essab or Equivalent Joint Design : Single V Groove Root Opening : 3 mm Face Reinforcement: 2 mm Preheat Temp. : - Inter pass Temp. : -	Test No. : WQT-02 WPS No. : 02/WPS/REI/SMAW/2023 PQR No. : 02/PQR/REI/SMAW/2023 Date : 13 - 3 - 2023 Current (A) : See Table Voltage (V) : See Table Gas Flow Rate : See Table Polarity : DCEP Progression : Up hill Thickness : 12 mm Schedule : - Diameter : - Interpass Cleaning : Wire Brush and Grinding AWS Classification : E7018 Length of Weld : 300 mm Groove Angle : 60° ± 5° Root Face : 2 mm Root Reinforcement: 1.5 mm Post Weld Heat : -
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Sketch :

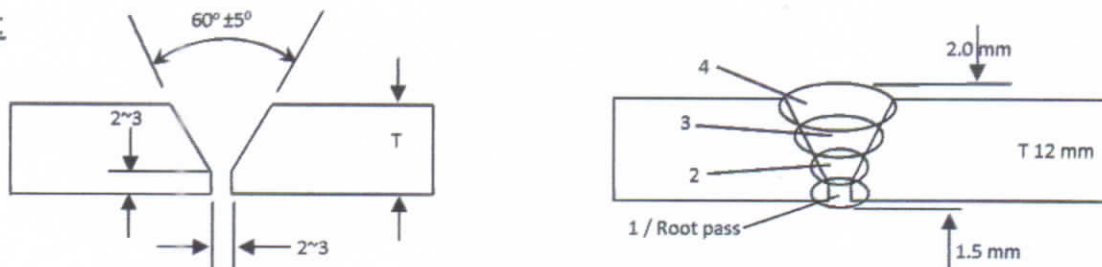


TABLE :

Pass No.	Welding Parameter			
	1 (Roo pass)	2	3	4
Electrode	E7018	E7018	E7018	E7018
Size (mm)	Ø 2.6	Ø 2.6	Ø 3.2	Ø 3.2
Welding Time (mm/sec.)	1.2	1.4	1.6	1.7
Ampere (A)	72	80	112	118
Volt (V)	23	24	25	25
Travel Speed (mm/min.)	74	86	98	103
Gas Flow Rate (L/min)	-	-	-	-
Inter pass Temp. (°C)	-	-	-	-
Heat Input (kj/mm)	-	-	-	-

Prepared by,
PT.Rexline Engineering Indonesia

Approved by,
Disnaker Prov. Jatim

Chandra Bintang
Welding Inspector





RADIOGRAPHIC INSPECTION REPORT

Job No. : _____
Report No. : 02/RT/QSP-REI/2023
Test Date : 13-03-2023

CLIENT : PT REI
Job Description : WPS / PQR / WPQT
Job Location : SIDOREJO
Material : A-36
NDT Procedure : QSP - RT - AWS D1.1
Test Method : SWSU
Acceptance Code : AWS D1.1
Weld Process : SMAW
Film Type : FUJIFILM X1
Density : 2-4
Screen (pb) : 0.125 mm
IQI Type : ASTM 1B
SFD : 15 mm
Source : Ir. 192 Act : 68 Ci

IPD : Incomplete Penetration Due to Hi-Low	ESI : Elongated Slag Inclusion	IU : Internal Undercut	TI : Tungsten Inclusion
CR : Crack	P : Internal Porosity	IC : Internal Concavity	EP : Excess Penetration
IF : Incomplete Fusion	CP : Cluster Porosity	WH : Worm Hole	BT : Burn Through
IP : Incomplete Penetration	SCP : Scattered Porosity	EC (HB) : Elongated Cavity (Hollow Bead)	
ISI : Isolated Slag inclusion	EU : External Undercut		
ACC : Accepted	REP : Repair	R1 / R2 : Repair 1 or Repair 2	RW : Re Weld

TEST RESULTS

Line No. : _____
Drawing No. : 36
KP : _____

JOINT No.	Welder	Dia / Lgt (Inches)	Thickness (mm)	Interest Area	Interpretation	Evaluation		REMARK
						ACC	REP	
<u>PANY</u>	<u>WD-02</u>	<u>-</u>	<u>12</u>	<u>A-B</u>		<u>✓</u>	<u>-</u>	
<u>ALDIYANSAH</u>								



Total Welds : <u>1</u> Joints	Radiographer : <u>[Signature]</u>	QA/QC Approved : _____	Client Representative : _____	3 rd Party Representative : _____
Film Used : _____	NDE Level : <u>IT</u>	Date : <u>13-03-2023</u>	Date : _____	Date : _____
Size : _____				
4" x 10" : <u>-</u> Sheets				
4" x 15" : <u>1</u> Sheets				