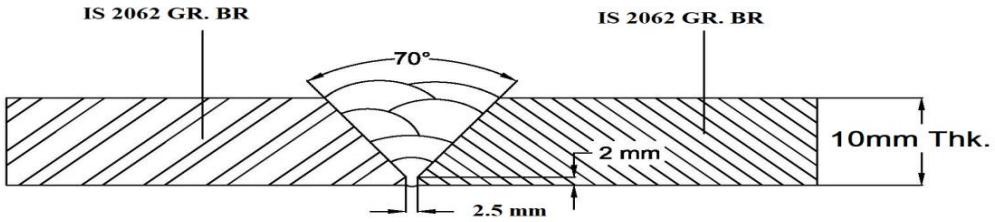
PROCEDURE QUALIFICATION RECORD (PQR)

Section IX, ASME Boiler & Pressure Vessel Code)EDITION 2019

Company Name	**PVJ Power Solutions** **Dabhota Industrial Area,Nalagarah, HP-174101**				
Procedure Qualification Record No.	PVJPQR-001			Date	20-03-2022
PWPS No.	PVJWPS-001	Revision No.	00	Date	20-03-2022
Welding Process(es)	SMAW	Type(s)	MANUAL		

JOINTS (QW-402)



Root Gap : 2mm, Root Face : 2mm, V angle.

Design of Test Coupon

(For combination qualifications, the deposited weld metal thickness shall be recorded for each filler metal or process used.)

BASE METALS (QW-403)								
Material Specification	IS 2062 TO IS 2062							
Type or Grade	GR. E250BR to GR. E250BR.							
P-No.	1	Group	1	To	P-No.	1	Group	1

POSTWELD HEAT TREATMENT (QW-407)	
Temperature Range	NA
Soaking Time	NA
Cooling	NA
Heating & Cooling Rate	NA

Thickness of Test Coupon	10.0MM
Diameter of Test Coupon	N.A.
Others	QW-403.6 – No pass greater than 13mm

GAS (QW-408)

Percent Composition			
	Gas(es)	Purity %	Flow Rate
Shielding	CO2	99.99%	5-10L/Min
Trailing	N.A.	N.A.	N.A.
Backing	N.A.	N.A.	N.A.

FILLER METALS (QW-404)		
Process	FCAW	
SFA Specification	SFA 5. 20	
AWS Classification	E71T-5X	
Filler Metal F-No.	6	
Weld Metal Analysis A-No.	-	
Size of Filler Metal Ø mm	--	
Weld Metal Thickness	10.00 MM	
Filler Metal Product Form	N.A.	
With or Without Filler	--	
Others	NONE	

ELECTRICAL CHARACTERISTICS (QW-409)

Current	☑ DC ☐ AC
Polarity	DCEP
Amps (Range)	See Table
Volts (Range)	See Table
Tungsten Electrode Size & Type	N.A.
Heat Input J/mm	N.A.

TECHNIQUE (QW-410)

Travel Speed	See Table
String / Weave Bead	STRINGE & WEAVE (Weaving Max. : 3 x Dia of Welding Electrode)
Oscillation	NONE
Multi or Single Pass	MULTIPLE

POSITION (QW-405)

Position	3G
Weld Progression (Uphill or Downhill)	Uphill
Other	NONE

PROCEDURE QUALIFICATION RECORD (PQR)

Section IX, ASME Boiler & Pressure Vessel Code)EDITION 2019

PREHEAT (QW-406)		Single or Multiple Electrodes	SINGLE
Preheat Temperature	10^0 C	Orifice / Gas cup size Contact Tube to work distance	N.A. N.A.
Interpass Temperature	**200^{0}C (Max)**		
Other	**N.A**		

Weld Layer(s)	Process	Filler Metal		Current		Volt Range	Travel Speed Range (mm/minute)	Heat Input J/mm
		Class	Diameter	Type/ Polarity	Amp Range			
Root Pass	FCAW	E71T-5X	0.8 mm	DCEP	82-85	16-17		
1st Pass	FCAW	E71T-5X	0.8 mm	DCEP	110-115	20-21		
2nd Pass	FCAW	E71T-5X	0.8 mm	DCEP	150-155	23-24		

TENSILE TEST (QW-150)

Tensile & Bend Test Conducted by :Test Well Laboratories, Report No. : TWLS/Mech-2203313/21-22 Date: 21.03.2022

Specimen No.	Width in mm	Thickness in mm	Area, mm^2	Ultimate Total Load, KN	Ultimate Unit Stress, N/ mm^2	Type of Failure and Location
T-1	19.02	10.02	190.58	88.62	465	Out of Weld
T-2	19.05	10.02	190.88	88.72	464.79	Out of Weld

GUIDED-BEND TESTS (QW-160)

Type and Figure No.	Result
Face Bend – 1 (QW 462.2) Former Dia. 4T	Satisfacotry
Face Bend – 2 (QW 462.2) Former Dia. 4T	Satisfacotry
Root Bend – 3 (QW 462.2) Former Dia. 4T	Satisfacotry
Root Bend – 4 (QW 462.2) Former Dia. 4T	Satisfacotry

TOUGHNESS TESTS (QW-170) (V-Notch)

Toughness Test Conducted by : N.A.

Specimen No.	Notch Location	Specimen Size (in mm)	Test Temperature	Impact Values (IN JOULE)			AVERAGE
				I	II	III	

REMARKS :

: VISUAL EXAMINATION OF WELD JOINT FOUND SATISFACTORY.

FILLET-WELD TEST (QW-180)

Result-Satisfactory	☐ Yes	☑ No NOT APPLICABLE
Penetration into Parent Metal	☐ Yes	☑ No NOT APPICABLE
Macro-Results	---	

PROCEDURE QUALIFICATION RECORD (PQR)

Section IX, ASME Boiler & Pressure Vessel Code)EDITION 2019

OTHER TESTS					
Type of Test	-				
ALTERNATE RADIOGRAPHY TEST CONDUCTED BY: No.: N.A.					
Welder's Name	**Mr. Gurdeep Singh**	Clock No.	--	Stamp No.	**W-01**
We 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 SECTION IX of the ASME BOILER AND PRESSURE VESSEL CODE EDITION 2019					
(Q.A. & Insp.) PVJ Power Solutions				Junedbhai Vhora CWI 14120721 QC1 EXP. 12/1/2023	

QW-484A – SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPQ)
(SEE QW-301, SECTION IX, ASME BOILER AND PRESSURE VESSEL CODE)

Welders Name	**Mr. Vimlesh Kumar**	Identification No.	**W-01**

Test Description

Identification of WPS followed	PVJWPS-001	☑ Test Coupon ☐ Production weld	
Specification of base metal(s)	IS 2062 GR. E250BR to IS 2062 GR. E250BR.	Thickness:	10 mm

Testing Conditions and Qualification Limits

Welding Variables (QW-350)	**Actual values**	**Range qualified**
Welding process (es)	FMAW	FMAW
Type (i.e., manual, semi-auto) used	Semi automatic	Semi automatic
Backing (metal, weld metal, double-welded, etc.)	Without	With and Without Backing
	N.A.	N.A.
☑ Plate ☐ Pipe (enter diameter, if pipe or tube)	Plate	Plate and 73 mm dia & Over
Base metal P- or S-Number to P-or S-Number	P 1	P-No. 1 through P-No. 15F, P-No. 34, and P-No. 41 through P-No. 49
Filler metal or electrode specification(s) (SFA) (info only)	5.20	5.20
Filler metal or electrode classification(s) (info only)	E71T-5X	E71T-5X
Filler metal F-Number(s)	6	F-No. 6.
Consumable insert (GTAW or PAW)	--	--
Filler type (solid/metal or flux cored/powder (GTAW or PAW)	flux cored	flux cored
Deposit thickness for each process		
Process 1: **FCAW** 3 layers minimum ☑ Yes ☐ No	10 mm	1.5 mm to 20 mm
Process 2: 3 layers minimum ☐ Yes ☐ No	---	---
Position qualified (2G, 6G, 3F, etc.)	3G	Groove- F for Plate & Pipe. Pipes : F for ≥73 mm OD & ≤ 610 mm OD Fillet & Tack : F for Plate, Pipe of All thickness & All Diameters
Vertical progression (uphill or downhill)	uphill	uphill
Type of fuel gas (OFW)	--	--
Inert gas backing (GTAW, PAW, GMAW)	--	--
Transfer mode (spray/globular or pulse to short circuit –GMAW)	N.A.	N.A.
GTAW current type/polarity (AC, DCEP, DCEN)	DC – EP	DC- EP

RESULTS

Visual Examination of Completed Weld (QW-302.4)	Satisfactory	
☐ Bend test; ☑ Transverse root and face [QW-462.3 (a)]	☐ Longitudinal root and face [QW-462.3 (b)]	☐ Side (QW-462.2);
☐ Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]	☐ Plate bend specimen, corrosion-resistant overlay [QW-462.5 (d)]	
☐ Macro test for fusion [QW-462.5 (b)]	☐ Macro test for fusion [QW-462.5 (e)]	

Type	Result	Type	Result	Type	Result
Tensile Test	Satisfactory	Bend Test (Side Bend)	Satisfactory	--	--

Alternative radiographic examination results (QW-191)	**N.A.**				
Fillet weld -- Fracture test (QW-180)	**Not Applicable**		Length and percent of defects	**Not Applicable**	
Macro examination (QW-184)	**Not Applicable**	Fillet size (in.):	**Not Applicable**	Concavity/convexity (in.):	**Not Applicable**
Other tests					
Film or specimens evaluated by	-	Company	PVJ Power Solutions		
Mechanical testing by:	Test Well Laboratories	Laboratory Test no.	**TWLS/Mech-2203313/21-22 Date: 21.03.2022**		
Welding supervised by					

We certify that the statements in this record are correct and that the test coupons were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Date : 21.03.2022

Certified By :

Junedbhai Vhora
CWI 14120721
QC1 EXP. 12/1/2023

Eucert Inspection and Certification Services Pvt. Ltd.

Organization: PVJ Power Solutions

QW-484A – SUGGESTED FORMAT A FOR WELDER PERFORMANCE QUALIFICATIONS (WPQ)
(SEE QW-301, SECTION IX, ASME BOILER AND PRESSURE VESSEL CODE)

Welders Name	**Mr. Rajan Yadav**	Identification No.	**W-02**

Test Description

Identification of WPS followed	PVJWPS-001	☑ Test Coupon ☐ Production weld	
Specification of base metal(s)	IS 2062 GR. E250BR to IS 2062 GR. E250BR.	Thickness:	10 mm

Testing Conditions and Qualification Limits

Welding Variables (QW-350)	Actual values	Range qualified
Welding process (es)	FCAW	FCAW
Type (i.e., manual, semi-auto) used	Semi automatic	Semi automatic
Backing (metal, weld metal, double-welded, etc.)	Without	With and Without Backing
	N.A.	N.A.
☑ Plate ☐ Pipe (enter diameter, if pipe or tube)	Plate	Plate and 73 mm dia & Over
Base metal P- or S-Number to P-or S-Number	P 1	P-No. 1 through P-No. 15F, P-No. 34, and P-No. 41 through P-No. 49
Filler metal or electrode specification(s) (SFA) (info only)	5.20	5.20
Filler metal or electrode classification(s) (info only)	E71T-5X	E71T-5X
Filler metal F-Number(s)	6	F-No. 6.
Consumable insert (GTAW or PAW)	--	--
Filler type (solid/metal or flux cored/powder (GTAW or PAW)	flux cored	flux cored
Deposit thickness for each process		
Process 1: **FCAW** 3 layers minimum ☑ Yes ☐ No	10 mm	1.5 mm to 20 mm
Process 2: 3 layers minimum ☐ Yes ☐ No	---	---
Position qualified (2G, 6G, 3F, etc.)	3G	Groove- F for Plate & Pipe. Pipes : F for ≥73 mm OD & ≤ 610 mm OD Fillet & Tack : F for Plate, Pipe of All thickness & All Diameters
Vertical progression (uphill or downhill)	uphill	uphill
Type of fuel gas (OFW)	--	--
Inert gas backing (GTAW, PAW, GMAW)	--	--
Transfer mode (spray/globular or pulse to short circuit –GMAW)	N.A.	N.A.
GTAW current type/polarity (AC, DCEP, DCEN)	DC – EP	DC- EP

RESULTS

Visual Examination of Completed Weld (QW-302.4)	Satisfactory	
☐ Bend test; ☑ Transverse root and face [QW-462.3 (a)]	☐ Longitudinal root and face [QW-462.3 (b)]	☐ Side (QW-462.2);
☐ Pipe bend specimen, corrosion-resistant overlay [QW-462.5(c)]	☐ Plate bend specimen, corrosion-resistant overlay [QW-462.5 (d)]	
☐ Macro test for fusion [QW-462.5 (b)]	☐ Macro test for fusion [QW-462.5 (e)]	

Type	Result	Type	Result	Type	Result
Tensile Test	Satisfactory	Bend Test (Side Bend)	Satisfactory	--	--

Alternative radiographic examination results (QW-191)	**N.A.**				
Fillet weld -- Fracture test (QW-180)	**Not Applicable**		Length and percent of defects	**Not Applicable**	
Macro examination (QW-184)	**Not Applicable**	Fillet size (in.):	**Not Applicable**	Concavity/convexity (in.):	**Not Applicable**
Other tests					

Film or specimens evaluated by	-	Company	PVJ Power Solutions
Mechanical testing by:	Test Well Laboratories	Laboratory Test no.	**TWLS/Mech-2203314/21-22 Date: 21.03.2022**
Welding supervised by			

We certify that the statements in this record are correct and that the test coupons were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Date : 21.03.2022

Certified By :

Junedbhai Vhora
CWI 14120721
QC1 EXP. 12/1/2023

Organization: PVJ Power Solutions

WELDING PROCEDURE SPECIFICATIONS (WPS)

Section IX ASME Boiler And Pressure Vessel Code (EDITION 2019)

Company Name	**PVJ Power Solutions** **Dabhota Industrial Area,Nalagarah, HP-174101**			By	**PVJ Power Solutions**
WPS No.	PVJWPS-001	Revision No.	00	Date	21.03.2022
Supporting PQR No.(s)	PVJPQR-001	Date	21.03.2022		
Welding Process(es)	FCAW	Type(s)	Semiautomatic		

JOINTS (QW-402)		JOINT DESIGN
Joint Design	V-JOINT	As per Annexture-01 (Drawing)
Backing	Root- NO & Subsequent Yes	
Backing Material (Type)	Subsequent – as weld	
Retainers	NONE	

BASE METALS (QW-403)

P-No.	1	Group No.	All	TO	P-No.	1	Group No.	All
OR								
Specification Type & Grade	Fall in above P no			TO	Specification Type & Grade	Fall in above P no		
OR								
Chem. Analysis & Mech. Prop.	-			TO	Chem. Analysis & Mech. Prop.	-		
Base Metal Thickness Range	Groove	1.5 to 20 mm (Without Impact)		Fillet	ALL			
Pipe Diameter Range	Groove	2 ½" & above		Fillet	ALL			
Other	QW-403.6 – No pass greater than 13mm							

FILLER METALS (QW-404)

Process	FCAW	
Size of Filler Metals	Ø 2.5 MM, Ø 3.15 MM, Ø 0.8 MM	
Specification No. (SFA)	SFA 5. 20	
AWS No. (Classification)	All	
Filler Metal F-No.	6	
Weld Metal Analysis A-No.	-	
Weld Metal Thickness Range : Groove	20 mm Max.	
Fillet	ALL	
Filler Metal Product Form	N.A.	
With or Without Filler	N.A.	
Consumable Insert	N.A	
Electrode-Flux (Classification)	N.A.	
Flux Trade Name	N.A.	
Other	QW-404.50 – Penetration enhancing flux not to be used	

For PVJ Power Solutions

Authorized Signatory

POSITIONS (QW-405)		POST WELD HEAT TREATMENT (QW-407)	
Position(s) of Groove/Fillet	All	Temperature Range	N.A.
Welding Progression Uphill/Down Hill	Both	Soaking Time	N.A.

WELDING PROCEDURE SPECIFICATIONS (WPS)
Section IX ASME Boiler And Pressure Vessel Code (EDITION 2019)

Fillet	All	Heating and Cooling rate		N.A.	
		Other		QW-407.4 – N.A.	
PREHEAT (QW-406)		GAS (QW-408)			
Preheat Temperature (Min.)	20 °C				
Inter pass Temperature (Max.)	250 °C		Gas(es)	Purity in %	Flow Rate
Preheat Maintenance	N.A.	Shielding	CO2	99.99	5-15L/min
		Trailing	NA	NA	NA
		Backing	NA	NA	NA

ELECTRICAL CHARACTERISTICS (QW-409)			
Current	☑ DC ☐ AC	Polarity	DCEP
Amps (Range)	See Table	Volts (Range)	See Table
(Amps and volts range should be recorded for each electrode size, position, and thickness, may be listed in a tabular form.)			
Tungsten Electrode Size & Type (Pure Tungsten, 2% Throated etc. as per SFA 5.12)			N.A.
Mode of Metal Transfer for GMAW			N.A.
Electrode Wire Feed Speed Range			N.A.
Heat Input J/MM			N.A.

TECHNIQUE (QW-410)	
String or Weave Bead	STRINGE & WEAVE (Weaving Max. : 3 x Dia of Welding Electrode)
Orifice or Gas Cup Size	N.A.
Initial and Inter pass Cleaning	BY S.S. WIRE BRUSH
Method of Back Gouging	N.A.
Oscillation	N.A.
Contact Tube to Work Distance	N.A.
Multiple or Single Pass (Per Side)	MULTIPLE
Multiple or Single Electrodes	SINGLE
Peening	Not Allowed
Other	QW-410.11, QW-410.15, QW-410.25 –N.A, QW-410.64 – N.A.

Weld Layer(s)	Process	Filler Metal		Current		Volt Range	Travel Speed Range (mm/minute) Not Actual	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Torch Angle, etc.)
		Class	Diameter	Type/ Polarity	Amp Range			
Root Pass	FCAW	E71T-5X	0.8 mm	DCEP	82-85	16-17		N.A
1st Pass	FCAW	E71T-5X	0.8 mm	DCEP	110-115	20-21		N.A
2nd Pass	FCAW	E71T-5X	0.8 mm	DCEP	150-155	23-24		N.A

Prepared By: Reviewed by

For PVJ Power Solutions

Authorized Signatory

(Q.A. & Insp.)

PVJ Power Solutions