

	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 1 of 68

## WPS AND PQR with Welding Map

**CLIENT** : PT. CITRA PALU MINERALS (CPM)  
**PROJECT NAME** : POBOYA 2000 TPD EXPANSION PROJECT  
**LOCATION** : PALU, SULAWESI  
**CONSULTANT** : PT. COMO ENGINEERS (PT. CE)  
**VENDOR** : PT. HANAZONO ENGINEERING INDONESIA  
**DOCUMENT NO.** : E2502-000-PRC-004

FOR APPROVAL

<input type="checkbox"/> AP	APPROVED
<input type="checkbox"/> AN	APPROVED AS NOTED
<input type="checkbox"/> RE	NOT APPROVED (Re-Submit)
<input type="checkbox"/> RV	REVIEWED
<input type="checkbox"/> RN	REVIEWED WITH NOTES
<input type="checkbox"/> NR	NOT BE RETURNED
RETURN DATE	
	

						
B	March 02, 2026	Issue For Approval	Benridho	Rusnandi	Murasato	
A	September 22, 2025	Issue For Approval	Benridho	Rusnandi	Murasato	
<b>REV</b>	<b>DATE ISSUED</b>	<b>ISSUE PURPOSE</b>	<b>PREPARE</b>	<b>CHECKED</b>	<b>APPROVED</b>	<b>AUTHORIZED</b>



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## 1. WPS AND PQR LIST

No	WPS No.	PQR No.	P No. To P No.	Weld Process	Qualification Record						Range Qualification Procedure								
					T (mm)	t (mm)	F No.	A No.	SFA No.	AWS Class.	T (mm)	t (mm)	F No.	A No.	SFA No.	AWS Class.			
					9.645		3	6	1	5.18	ER70S-6	1.5 ~ 19.29		6	6	1	5.18	All Classifications	
1.	006/HEI/WPS/MIG AS/20	006/HEI/PQR/MIG AS/20	1	1	GTAW	9.645		3	6	1	5.18	ER70S-6	1.5 ~ 19.29		6	6	1	5.18	All Classifications
				SMAW			6.645	4	1	5.1	E7018			13.29	4	1	5.1	E7018	EXX15/16/18/18M/48
2.	005/HEI/WPS/MIG AS/20	005/HEI/PQR/MIG AS/20	1	1	GTAW	9.73		3	6	1	5.18	ER70S-6	1.5 ~ 19.46		6	6	1	5.18	All Classifications
				SMAW			6.73	4	1	5.1	E7018-1H4R			13.46	4	1	5.1	E7018-1H4R	EXX15/16/18/18M/48
3.	008/HEI/WPS/MIG AS/20	008/HEI/PQR/MIG AS/20	1	1	SMAW	25	25	4	1	5.1	E7018-1H4R	5 ~ 50		50	4	1	5.1	E7018-1H4R	EXX15/16/18/18M/48
4.	04-WPS-HEI-MIGAS-26	04-PQR-HEI-MIGAS-26	1	1	SMAW	20	20	4	1	5.1	E7018	5 ~ 40		40	4	1	5.1	E7018	EXX15/16/18/18M/48



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## 2. WPS & PQR No. : 006/HEI/WPS/MIGAS/20 & 006/HEI/PQR/MIGAS/20



Office & Work Shop Address: Jl. Raya Bojonegara - Serdang RT/RW. 001/001 No.44  
Desa Kertasana, Kec. Bojonegara, Kab. Serang, Banten - Indonesia 42454  
Phone : +62-254-7850344/5/6, Fax : +62-254-785037

### WELDING PROCEDURE SPECIFICATION (WPS)

In accordance with  
Section IX, ASME Boiler and Pressure Vessel Code

Organization Name PT. HANAZONO ENGINEERING INDONESIA By Quality Department  
Welding Procedure Specification No. 006/HEI/MIGAS/20 Date 01/10/2020 Supporting PQR No.(s) 006/HEI/MIGAS/20  
Revision No. 0 Date 01/10/2020

Welding Process (es) GTAW & SMAW Type (s) Manual  
(Automatic, Manual, Machine or Semi-Auto)

#### JOINT (QW - 402)

#### Details

Joint Design Single Vee or Any  
Root Spacing 0 ~ 3 mm  
Backing With / Without  
Backing Material (Type) Air (GTAW) / Base Nor Weld Metal (GTAW / SMAW)

See Joint Details

Sketches, production Drawings, Weld Symbols or Written Description  
Should show the general arrangement of the parts to be welded. Where  
applicable, the root spacing and the details of weld groove maybe  
specified.

Sketches may be attached to illustrate joint design, weld layers, and  
bead sequence (e.g., for toughness procedures, for multiple process  
procedures, etc.)

#### \*BASE METALS (QW - 403)

P. No. 1 Group No. \_\_\_\_\_ to P. No. 1 Group No. \_\_\_\_\_  
OR  
Specification type, grade, or UNS \_\_\_\_\_  
to Specification type, grade, or UNS \_\_\_\_\_  
OR  
Chem. Analysis and Mech. Prop \_\_\_\_\_  
to Chem. Analysis and Mech. Prop \_\_\_\_\_  
Thickness Range :  
Base Metal : Groove 1.5 ~ 19.29 mm Fillet All  
Maximum Pass Thickness  $\leq \frac{1}{2}$  in. (13mm) (Yes) All (No) \_\_\_\_\_  
Other \_\_\_\_\_

#### \*FILLER METALS (QW - 404)

	1 GTAW	2 SMAW
Spec. No. (SFA)	5.18	5.1
AWS No. (Class)	ER70S-6	E7018
F - No.	6	4
A - No.	1	1
Size of Filler Metals	$\phi$ 1.6 mm ~ 2.4 mm	$\phi$ 3.2 ~ 4.0 mm
Weld Metal		
Deposit Thickness:		
Groove	Max. 6 mm	Max. 13.29 mm
Fillet	All	All
Electrode Flux (Class)	N/A	N/A
Flux Type	N/A	Low Hydrogen
Flux Trade Name	N/A	N/A
Consumable Insert	N/A	N/A
Other	Manufacturer : ESAB Electrode Name : OK Tigrod 12.64 & OK 48.04	

\*Each base metal-filler metal combination should be specified individually.

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AYG - 07081/0844/ww



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Desa Kertasana, Kec. Bojonegara, Kab. Serang, Banten - Indonesia 42454  
Phone : +62-254-7850344/5/6, Fax : +62-254-785037

## WELDING PROCEDURE SPECIFICATION (WPS) In accordance with Section IX, ASME Boiler and Pressure Vessel Code

Welding Procedure Specification No. : 006/HEI/MIGAS/20

Rev. 0

<b>POISITIONS (QW - 405)</b>				<b>POSTWELD HEAT TREATMENT (QW - 407)</b>						
Position(s) of Groove		All		Temperature Range		N / A				
Welding Progression		All		Time Range		N / A				
Position(s) of Fillet		All								
<b>PREHEAT (QW - 406)</b>				<b>GAS (QW - 408)</b>						
Preheat Temp. Min.		34 °C		Shielding			Percent Composition			Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Process/Torch Angle, etc.)
Interpass Temp. Max.		260 °C					Gas (es)	Mixture	Flow Rate	
Preheat Maintenance		N/A *)					Argon	99,99%	7 - 15 LPM	
Other							Trailing	-	-	
(Continuous or special heating, where applicable, should be specified)							Backing	-	-	
				Other	-	-				
<b>ELECTRICAL CHARACTERISTIC (QW - 409)</b>										
Weld Pass(es)	Process	Filler Metal		Current Type & Polarity	Amps. (Range)	Wire Feed Speed (Range)	Energy or Power (Range)	Volts (Range)	Travel Speed (Range)	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Process/Torch Angle, etc.)
		Class	Dia.							
Root & Hot	GTAW	ER70S-6	1.6 ~2.4	DCEN	80 - 160	-	-	9 - 18	18 - 72	-
Fill & Capping	SMAW	E7018	3.2 / 4.0	DCEP	80 - 190	-	-	19 - 24	38 - 112	-
Amps and volts, or power or energy range, should be specified for each electrode size, position, and thickness, etc.										
Pulsing Current		N/A		Heat Input (max.)		2.5J				
Tungsten Electrode Size and Type				1.6 ~ 2.4mm & 2% Thoriated (EWTh-2)						
Mode of Metal Transfer for GMAW (FCAW)				N/A						
Other				N/A						
<b>TECHNIQUE (QW - 410)</b>										
String or Weave Bead		Max. stringer or weaver within 2.5 time diameter of electrodes								
Orifice, Nozzle, or Gas Cup Size		5, 6, or 7								
Initial and Interpass Cleaning (Brushing, Grinding, etc.)		Brushing & Grinding								
Method of Back Gouging		Back Grinding / Back Gouging								
Oscillation		N/A								
Contact Tube to Work Distance		12 ~ 19 mm (GTAW)								
Multiple or Single Pass (Per Side)		Multiple								
Multiple or Single electrode		Single								
Electrode Spacing		N/A								
Peening		N/A								
Other		Welds shall be cleaned between each pass. When completed, remove all slag & projection with grinding & Brushing								

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**WELDING PROCEDURE SPECIFICATION (WPS)**

In accordance with  
Section IX, ASME Boiler and Pressure Vessel Code

Welding Procedure Specification No. : 006/HEI/MIGAS/20

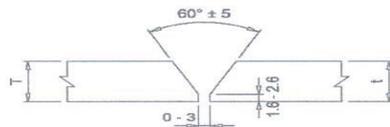
Rev. 0

**JOINT DETAILS**

**SINGLE VEE GROOVE**

**T = t**

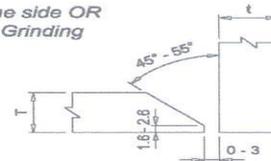
Welded from one side



**SINGLE BEVEL - CORNER JOINT**

**T = t**

Welded from one side OR  
both side Back Grinding



**SQUARE BUTT**

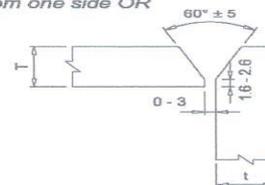
Welded from BOTH SIDES, T = 6 mm Max  
Root gap, 0 - t/2



**SINGLE VEE GROOVE**

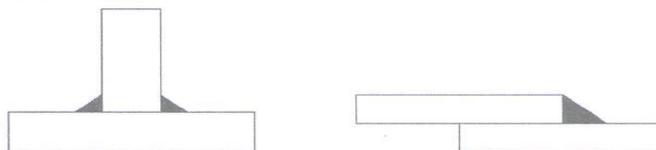
**T = t**

Welded from one side OR  
both side



**SINGLE OR DOUBLE FILLET**

UNLIMITED



For Non-Impact tested applications only, the following AWS/SFA classification can be used with this procedure :  
GTAW : ER70S-6 / 5.18 & SMAW : E7018 / 5.1

Weld Joint description shown are not inclusive of all of those found on job site. Weld joint design reference in an engineering specification or design shall take precedence over weld joint shown in this WPS.

Organization Prepared by,  
**PT. HANAZONO ENG. INDONESIA**

Verified by  
MINISTRY OF ENERGY AND MINERAL RESOURCES  
DIRJEN MIGAS

  
Date: October 1, 2020

Nomor Registrasi Migas

AYG - 07981 (0844/2020)

Date : October 1, 2020

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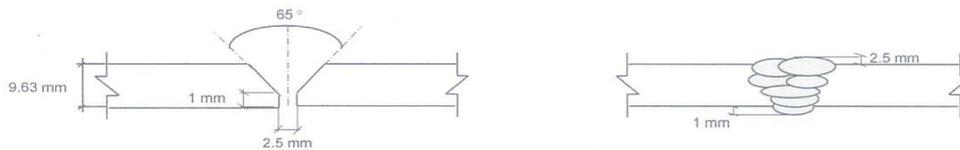
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Desa Kertasana, Kec. Bojonegara, Kab. Serang, Banten - Indonesia 42454  
Phone : +62-254-7850344/5/6, Fax : +62-254-785037

## PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

Organization Name **PT. HANAZONO ENGINEERING INDONESIA**  
 Procedure Qualification Record No. 006/HEI/MIGAS/20 Date 29/09/2020  
 WPS No. 006/HEI/MIGAS/20  
 Welding Process (es) GTAW & SMAW  
 Types (Manual, Automatic, Semi-Automatic) Manual

### JOINTS (QW - 402)



Groove Design of Test Coupon

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

### BASE METAL (QW - 403)

Material Spec. A36 to A36  
 Type or Grade, or UNS Number A36 to A36  
 P-No. 1 Group No. 1 to P-No. 1 Group No. 1  
 Thickness of Test Coupon 9.645 mm  
 Diameter of Test Coupon N/A  
 Maximum Pass Thickness ≤ 1/2 in. (13mm)  
 Other \_\_\_\_\_

### POSTWELD HEAT TREATMENT (QW - 407)

Temperature Range N/A  
 Time N/A  
 Others N/A

### GAS (QW - 408)

	Percent Composition		
	Gas (es)	Mixture	Flow Rate
Shielding	Argon	99,99%	12 LPM
Trailing	-	-	-
Backing	-	-	-

### FILLER METAL (QW - 404)

SFA Specification	5.18	5.1
AWS Specification	ER70S-6	E7018
Filler Metal F-No.	6	4
Weld Metal Analysis A-No.	1	1
Size of Filler Metal	Ø2.4 mm	Ø3.2 mm
Filler Metal Product Form	Solid Bare	Flux Coated
Supplemental Filler Metal	N/A	N/A
Electrode Flux Classification	N/A	N/A
Flux Type	N/A	Low Hydrogen
Flux Trade Name	N/A	N/A
Weld Metal Thickness	3 mm	6.645 mm
Other	OK Tigrod 12.64	OK 48.04

### ELECTRICAL CHARACTERISTIC (QW - 409)

Current DCEN (GTAW) & DCEP (SMAW)  
 Polarity See Table Welding Parameter  
 Amps See Table Welding Parameter  
 Waveform Control N/A  
 Power or Energy See Table Welding Parameter  
 Arc Time 5 - 10 Minutes / Pass  
 Weld Bead Length 4 mm (GTAW) & 5 mm (SMAW)  
 Tungsten Electrode Size 2.4mm & 2% Thoriated (EWTh-2)  
 Mode of Metal Transfer for GMAW (FCAW) N/A  
 Heat Input See Table Welding Parameter  
 Other N/A

### POSITION (QW - 405)

Position(s) of Groove 1G  
 Weld Progression (Uphill, Downhill) N/A  
 Other N/A

### TECHNIQUE (QW - 410)

Travel Speed See Table Welding Parameter  
 String or Weave Bead String & Weave Bead  
 Oscillation N/A  
 Multipass or Single Pass (Per Side) Single & Multipass  
 Single or Multiple Electrodes Single  
 Other N/A

### PREHEAT (QW - 406)

Preheat Temperature 34°C  
 Interpass Temperature 260°C  
 Other N/A

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## PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

Procedure Qualification Record No. : 006/HEI/MIGAS/20

Rev. 0

### WELDING PARAMETER

Weld No.	Welding Process	Filer Metal		Type Polarity	Ampere	Volt	Travel Speed Range (mm/min)	Heat Input (J/mm)
		Class	Dia.					
1	GTAW	ER70S-6	2.4 mm	DCEN	110	9	35	1,7
2					110	10	30	2,2
3	SMAW	E7018	3.2 mm	DCEP	92	20	47	2,3
4					87	20	53	2,0
5					95	20	52	2,2
6					85	19	50	1,9
7					85	19	55	1,8

### TENSILE TEST (QW - 160)

Specimen No.	Width (mm)	Thickness (mm)	Area (mm <sup>2</sup> )	Ultimate Total Load (kN)	Ultimate Unit Stress (N/mm <sup>2</sup> )	Type Failure & Location
T1	19,51	9,63	187,88	108,22	576	Fracture on base metal
T2	19,57	9,66	189,05	109,84	581	Fracture on base metal

### GUIDE BEND TESTS (QW - 160)

Type and Figure No.	Result
SB1 - QW 462.2	No Open Discontinuity
SB2 - QW 462.2	No Open Discontinuity
SB3 - QW 462.2	No Open Discontinuity
SB4 - QW 462.2	No Open Discontinuity

### TOUGHNESS TESTS (QW - 170)

Specimen No.	Notch Location	Specimen Size	Test Temp. (°C)	Toughness Values		Drop Weight Break (Y/N)
				% Shear	Mils (in.) or mm	
--Blank--						

Comments \_\_\_\_\_

Nomor Registrasi Migas

AYG - 07001 (0844/2020)









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## INSPECTION CERTIFICATE (3.1) - Chemical analysis TEST REPORT (2.2) - Mechanical properties

Date: 2020-02-12

Certificate number: EC25919813 rev. 0

Our order:

Your order:

Our reference:

Your reference:

Customer number: NA

Your fax number:

Customer order date:

Your e-mail:

Invoice address

Receiver of certificate

Delivery address

NA

DELIVERY

Lot number:

PLU02009

Quantity:

PRODUCT

CHEMICAL COMPOSITION

Brand: ESAB  
Description: OK 48.04 3.2x400mm  
Item number: 480432HNR0

Actual results: acc to EN 10204 - 3.1

CLASSIFICATIONS

SFA/AWS A5.1: E7018  
EN ISO 2560-A: E 42 4 B 32 H5

All weld metal

Auxiliary:

C 0.09%  
Si 0.35%  
Mn 1.07%  
P 0.015%  
S 0.008%  
Cr < 0.1%  
Ni < 0.1%  
Mo < 0.1%  
Nb < 0.01%  
Cu 0.02  
V 0.01%

MECHANICAL PROPERTIES

Typical data: acc to EN 10204 - 2.2

Standard:

Auxiliary:

Condition:

TENSILE

ReL Rm A5  
480 MPa 560 MPa 28 %

IMPACT

Temp -30 °C -40 °C  
KV 110 J 100 J

COMMENTS

Product supplied under a QA Programme fulfilling the EN ISO 9001 standard.  
This certificate is produced electronically and is valid without signature.  
Please refer any queries to:

PT. VICTOR TEKNOLOGI INDONESIA; Kawasan Industri Kota Bukit Indah Blok All No. 4; Purwakarta 41181; Jawa Barat - Indonesia.

Validation - Chemical Analysis

Miftakhudin Zaeni

Quality Assurance Manager

Validation - Others

J-P Emoult

Product Manager



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## INSPECTION CERTIFICATE (3.1) - Chemical analysis TEST REPORT (2.2) - Mechanical properties

Date: 2019-11-22

Certificate number: EC25830081 rev. 0

Our order:

Your order:

Our reference:

Your reference:

Customer number:

NA

Your fax number:

Customer order date:

Your e-mail:

Invoice address

Receiver of certificate

Delivery address

NA

DELIVERY

Lot number:

PVT21611205

Quantity:

### PRODUCT

Brand: ESAB  
Description: OK Tigrod 12.64 2.4x1000mm 5kg  
Item number: 126424R150

### CHEMICAL COMPOSITION

Actual results: acc to EN 10204 - 3.1

### CLASSIFICATIONS

EN ISO 636-A: W 46 4 4Si1  
EN ISO 636-A: W4Si1  
SFA/AWS A5.18: ER70S-6

### Wire/strip

Auxiliary:

C 0.08%  
Si 0.88%  
Mn 1.62%  
P 0.002%  
S 0.010%  
Cr 0.03%  
Ni 0.01%  
Mo < 0.01%  
Cu 0.06%  
V 0.01%  
Al 0.01%  
Ti+Zr 0.03%

### MECHANICAL PROPERTIES

Typical data: acc to EN 10204 - 2.2

Standard: EN

Auxiliary: I1

Condition:

### TENSILE

ReL Rm A4-A5  
525 MPa 595 MPa 26 %

### IMPACT

Temp -40 °C  
KV 150 J

### COMMENTS

Product supplied under a QA Programme fulfilling the EN ISO 9001 standard.

This certificate is produced electronically and is valid without signature.

Please refer any queries to:

PT Esabindo Pratama; Pulogadung; Indonesia; Tel : 62-21-460 0188; Fax : 62-21-461 2929

Validation - Chemical Analysis

Josef Moravek

Quality Manager

Validation - Others

Jose Abal Lopez,H. Rasmuson

Product Manager,

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**PT. GUNUNG RAJA PAKSI**  
Plate Mill  
**MILL TEST CERTIFICATE**



Acc to EN 10204 - 3.1

Head Office & Factory  
Jl. Raya Bojoli 4, Waring Bongsak, Desa Sakalau  
Cikarang Barat, Bekasi, West Java, Indonesia

Material : Hot Rolled Steel Plates  
Specification : ASME SA 36  
General Requirement : ASTM A 6  
Supply Condition : AS Rolled Killed

CERTIFICATE NUMBER : GRP-QA-MTC/0833/N/2018  
CERTIFICATE DATE : October 26, 2018  
S/O No. : L1033/MKT-PROD/N/2018

HEAT NUMBER	DIMENSIONS			WEIGHT MT	QTY (PCS)	CHEMICAL LADLE ANALYSIS (%)											TENSILE TEST (TR. Dir.)			BEND TEST			IMPACT VALUE (JOULE)							
	Plate Number	T mm	W mm			L mm	C	Si	Mn	P	S	Nb	Cu	Cr	Ni	Mo	V	Al	Ti	N	CF	Y.S. N/mm <sup>2</sup>	T.S. N/mm <sup>2</sup>	El. N/mm <sup>2</sup>	180° T	5° I	10° II	10° III	AV	
I1Q2 U 2105189	D01+6	10	1219	2438	2,748	12	0.17	0.27	0.86	0.012	0.007	<0.010	0.04	0.02	0.02	<0.01	<0.005	0.026	<0.005	0.009	0.32	326	492	26						
I1Q2 U 2105189	D01+6	10	1219	2438	20,152	88	0.17	0.27	0.86	0.012	0.007	<0.010	0.04	0.02	0.02	<0.01	<0.005	0.026	<0.005	0.009	0.32	346	499	24						
I1Q2 U 2105189	E01+6	10	1219	2438	19,465	85	0.17	0.27	0.86	0.012	0.007	<0.010	0.04	0.02	0.02	<0.01	<0.005	0.026	<0.005	0.009	0.32	326	492	26						
I1Q2 U 2105189	H01+7	10	1219	2438	19,923	87	0.17	0.27	0.86	0.012	0.007	<0.010	0.04	0.02	0.02	<0.01	<0.005	0.026	<0.005	0.009	0.32	326	489	24						
I1Q2 U 2105189	M01+8	10	1219	2438	19,694	86	0.17	0.27	0.86	0.012	0.007	<0.010	0.04	0.02	0.02	<0.01	<0.005	0.026	<0.005	0.009	0.32	346	499	24						
I1Q2 U 2105189	N01+5	10	1219	2438	19,465	85	0.17	0.27	0.86	0.012	0.007	<0.010	0.04	0.02	0.02	<0.01	<0.005	0.026	<0.005	0.009	0.32	346	489	24						
Total Weight						101,447																								
Total Qty						443																								
Total Weight						18,425																								
Total Qty						67																								
Total Weight						18,700																								
Total Qty						49																								
Total Weight						50,600																								
Total Qty						184																								

REMARKS:

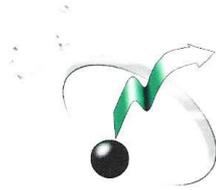
We hereby certify that the material described herein has been made and satisfactorily tested in accordance with the above specification

ACKNOWLEDGED BY:

Signature  
SULMAN

Signature  
USWALIN KHASANAH  
QUALITY ASSURANCE

	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 15 of 68



**PT. Hi-Test**  
Laboratory of Mechanical Testing

BSD City :  
Taman Tekno Blok A2 No. 49  
Bumi Serpong Damai (BSD) – Tangerang - Indonesia  
Telp : +62 21 75882884; Fax : +62 21 75882885  
E-mail : [hi-test@hitestlab.com](mailto:hi-test@hitestlab.com)  
Website : [www.hitestlab.com](http://www.hitestlab.com)



## Testing Report

(This Report is issued subjected to the term & conditions set out below)

<b>Customer</b>	: PT. Hanazono Engineering Indonesia	<b>Job No</b>	: B20625
<b>Address</b>	: Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	<b>No.</b>	: HT/JKT/0920/0332
<b>Reference Code</b>	: ASME Sect. IX : 2019	<b>Total of Page</b>	: 1 of 2
<b>Test Method</b>	: ASTM A370-19	<b>Date of Received</b>	: 22 September 2020
<b>Object to be tested</b>	: (as received)	<b>Date of Tested</b>	: 29 September 2020
		<b>PO No</b>	: PO-E001-HTT-TOL-004
		<b>Project Name</b>	: --
		<b>Sample Marking</b>	: 9. HEI 6

One welded carbon steel plate joint test sample, size: 10 mm thickness, material spec: A 36, PQR No. PQR006/HEI/MIGAS/20, welding process: GTAW+SMAW, welding position: 1G, for Procedure Qualification Record Test.

**Type of Test** : Reduced Section Tension Test (Transverse Specimen)  
**Environment Temp** : 25.1°C

Test Specimen No	T1	T2
<b>Measured Thickness (mm)</b>	9.63	9.66
<b>Measured Width (mm)</b>	19.51	19.57
<b>Effective Area (mm<sup>2</sup>)</b>	187.88	189.05
<b>Ultimate Tensile Load (kN)</b>	108.25	109.89
<b>Ultimate Tensile Strength (N/mm<sup>2</sup>)</b>	576	581
<b>Location of Failure</b>	Base Metal	Base Metal
<b>Type of Failure</b>	Ductile	Ductile

**Testing Machine Used** : INSTRON 600 DX,  
Model: 600 DX, S/N: S2513, Capacity : 600 kN  
**Remark** : --  
**Test Conducted By** : Canra Latipolia, ST  
**Witnessed By** :

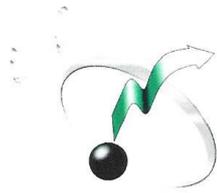
Approved Signatory

  
Suhadi ST  
Laboratory Manager

**Term & Conditions**

- The report is prepared for the sole use of the Client and is prepared based upon the item submitted, the Services required by the Client and the conditions under which the Services are performed by PT. Hi-Test.
  - The Report is not intended to be representative of similar or equivalent Services on similar or equivalent items. The Report does not constitute an endorsement by PT. Hi-Test of the Item.
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- Form No: HT/QM-F/TENSILE/RED-SEC/3 Rev.0  
The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2005) Date of Issued 06/01/2014

	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 16 of 68



## PT. Hi-Test Laboratory of Mechanical Testing

BSD City :  
Taman Tekno Blok A2 No. 49  
Bumi Serpong Damai (BSD) – Tangerang - Indonesia  
Telp : +62 21 75882884; Fax : +62 21 75882885  
E-mail : [hi-test@hittestlab.com](mailto:hi-test@hittestlab.com)  
Website : [www.hittestlab.com](http://www.hittestlab.com)



## Testing Report

(This Report is issued subjected to the term & conditions set out below)

<b>Customer</b> : PT. Hanazono Engineering Indonesia	<b>Job No</b> : B20625
<b>Address</b> : Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	<b>No.</b> : HT/JKT/0920/0332
<b>Reference Code</b> : ASME Sect. IX : 2019	<b>Total of Page</b> : 2 of 2
<b>Test Method</b> : ASTM E190-14	<b>Date of Received</b> : 22 September 2020
<b>Object to be tested</b> : (as received)	<b>Date of Tested</b> : 29 September 2020
	<b>PO No</b> : PO-E001-HTT-TOL-004
	<b>Project Name</b> : --
	<b>Sample Marking</b> : 9. HEI 6

One welded carbon steel plate joint test sample, size: 10 mm thickness, material spec: A 36, PQR No. PQR006/HEI/MIGAS/20, welding process: GTAW+SMAW, welding position: 1G, for Procedure Qualification Record Test.

**Type of Test** : Bending Test (Transverse Specimen)

<b>Test Temperature</b> : 25.1°C	<b>Test Specimen Width</b> : 38 mm
<b>Test Weld Ment Thickness</b> : 10 mm	<b>Bend Angle</b> : 180 Degree
<b>Former Diameter</b> : 40 mm	
<b>Shoulder Distance</b> : 63.2 mm	

Specimen No	Type of Bend	Observation	Result
FB1	Face Bend	No Open Discontinuity was Observed	Accepted
FB2	Face Bend	No Open Discontinuity was Observed	Accepted
RB1	Root Bend	No Open Discontinuity was Observed	Accepted
RB2	Root Bend	Discontinuity 1.73 mm of Opening was Observed	Accepted

**Testing Machine Used** : MOTOR PUMP BENDING TEST MACHINE,  
Model : Daventry England, S/N : DG 8881, Capacity : 700 Bar

**Remark** : --

**Test Conducted By** : Canra Latipolia, ST

**Witnessed By** :

Approved Signatory

  
Sufiadi, ST  
Laboratory Manager

### Term & Conditions

- The report is prepared for the sole use of the Client and is prepared based upon the Item submitted, the Services required by the Client and the conditions under which the Services are performed by PT. Hi-Test
- The Report is not intended to be representative of similar or equivalent Services on similar or equivalent items. The Report does not constitute an endorsement by PT. Hi-Test of the Item.
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Form No: HT/QM-F/BEND/3 Rev.0

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2005)

Date of issued 08/01/2014

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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### 3. WPS & PQR No. : 005/HEI/WPS/MIGAS/20 & 005/HEI/WPS/MIGAS/20



Office & Work Shop Address: Jl. Raya Bojonegara - Serdang RT/RW. 001/001 No.44  
Desa Kertasana, Kec. Bojonegara, Kab. Serang, Banten - Indonesia 42454  
Phone : +62-254-7850344/5/6, Fax : +62-254-785037

WELDING PROCEDURE SPECIFICATION (WPS)		
In accordance with Section IX, ASME Boiler and Pressure Vessel Code		
Organization Name <u>PT. HANAZONO ENGINEERING INDONESIA</u> By <u>Quality Department</u>		
Welding Procedure Specification No. <u>005/HEI/MIGAS/20</u> Date <u>01/10/2020</u> Supporting PQR No.(s) <u>005HEI/MIGAS/20</u>		
Revision No. <u>0</u> Date <u>01/10/2020</u>		
Welding Process (es) <u>GTAW &amp; SMAW</u> Type (s) <u>Manual</u> <small>(Automatic, Manual, Machine or Semi-Auto)</small>		
<b>JOINT (QW - 402) Details</b>		
Joint Design <u>Single Vee or Any</u>		
Root Spacing <u>0 ~ 3 mm</u>		
Backing <u>With / Without</u>		
Backing Material (Type) <u>Air (GTAW) / Base Nor Weld Metal (GTAW / SMAW)</u> <span style="float: right;"><b>See Joint Details</b></span>		
<small>Sketches, production Drawings, Weld Symbols or Written Description Should show the general arrangement of the parts to be welded. Where applicable, the root spacing and the details of weld groove maybe specified.</small>		
<small>Sketches may be attached to illustrate joint design, weld layers, and bead sequence (e.g., for toughness procedures, for multiple process procedures, etc.)</small>		
<b>*BASE METALS (QW - 403)</b>		
P. No. <u>1</u> Group No. <u>2</u> to P. No. <u>1</u> Group No. <u>2</u>		
OR		
Specification type, grade, or UNS <u>-</u>		
to Specification type, grade, or UNS <u>-</u>		
OR		
Chem. Analysis and Mech. Prop <u>-</u>		
to Chem. Analysis and Mech. Prop <u>-</u>		
Thickness Range : <u>9.73 ~ 15.73 mm (Impact Limit), 1.5 ~ 19.46</u>		
Base Metal : Groove <u>mm (W/O Impact)</u> Fillet <u>All</u>		
Maximum Pass Thickness $\leq \frac{1}{2}$ in. (13mm) (Yes) <u>All</u> (No) <u>-</u>		
Other <u>-</u>		
<b>*FILLER METALS (QW - 404)</b>		
	<b>1</b>	<b>2</b>
	<b>GTAW</b>	<b>SMAW</b>
Spec. No. (SFA)	5.18	5.1
AWS No. (Class)	ER70S-6	E7018-1H4R
F - No.	6	4
A - No.	1	1
Size of Filler Metals	$\phi$ 1.6 mm ~ 2.4 mm	$\phi$ 3.2 ~ 4.0 mm
Weld Metal		
Deposit Thickness:		
Groove	Max. 6 mm	Max. 13.46 mm
Fillet	All	All
Electrode Flux (Class)	N/A	N/A
Flux Type	N/A	Low Hydrogen
Flux Trade Name	N/A	N/A
Consumable Insert	N/A	N/A
Other	Manufacturer : BOHLER	
	Electrode Name : Bohler S EMK 6 & Fox S EV 50-1	
<small>*Each base metal-filler metal combination should be specified individually.</small>		

Nomor Registrasi Migas: 1 OF 6

Area - 07001/0045/2520



# POBOYA 2000 TPD EXPANSION PROJECT



(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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Office & Work Shop Address: Jl. Raya Bojonegara - Serdang RT/RW. 001/001 No.44  
Desa Kertasana, Kec. Bojonegara, Kab. Serang, Banten - Indonesia 42454  
Phone : +62-254-7850344/5/6, Fax : +62-254-785037

## WELDING PROCEDURE SPECIFICATION (WPS)

In accordance with  
Section IX, ASME Boiler and Pressure Vessel Code

Welding Procedure Specification No. : 005/HEI/MIGAS/20

Rev. 0

### POSITIONS (QW - 405)

Position(s) of Groove All  
Welding Progression All  
Position(s) of Fillet All

### POSTWELD HEAT TREATMENT (QW - 407)

Temperature Range 625°C ± 25°C  
Time Range Holding Time 1 h/25 mm (1 hr/in.)  
(15 min min.) Heating / Cooling rate max 315°C

### PREHEAT (QW - 406)

Preheat Temp. Min. 32 °C  
Interpass Temp. Max. 240 °C  
Preheat Maintenance N/A \*)  
Other \_\_\_\_\_  
*(Continuous or special heating, where applicable, should be specified)*

### GAS (QW - 408)

	Percent Composition		
	Gas (es)	Mixture	Flow Rate
Shielding	Argon	99,99%	7 - 15 LPM
Trailing	-	-	-
Backing	-	-	-
Other	-	-	-

### ELECTRICAL CHARACTERISTIC (QW - 409)

Weld Pass(es)	Process	Filler Metal		Current Type & Polarity	Amps. (Range)	Wire Feed Speed (Range)	Energy or Power (Range)	Volts (Range)	Travel Speed (Range)	Other (e.g. Remarks, Comments, Heat Wire Addition, Technique, Process Torch Angle, etc.)
		Class	Dia.							
Root & Hot	GTAW	ER70S-6	1.6 ~ 2.4	DCEN	50 - 150	-	-	9 - 18	11 - 65	-
Fill & Capping	SMAW	E7018-1H4R	3.2 / 4.0	DCEP	80 - 190	-	-	19 - 28	38 - 140	-

Amps and volts, or power or energy range, should be specified for each electrode size, position, and thickness, etc.

Pulsing Current N/A Heat Input (max.) 2.5 J  
Tungsten Electrode Size and Type 1.6 ~ 2.4mm & 2% Thoriated (EWTh-2)  
*(Pure Tungsten, 2% Thoriated, etc.)*

Mode of Metal Transfer for GMAW (FCAW) N/A  
*(Spray Arc, Short-Circuiting Arc, etc.)*

Other N/A

### TECHNIQUE (QW - 410)

String or Weave Bead Max. stringer or weaver within 2.5 time diameter of electrodes  
Orifice, Nozzle, or Gas Cup Size 5, 6, or 7  
Initial and Interpass Cleaning (Brushing, Grinding, etc.) Brushing & Grinding  
Method of Back Gouging Back Grinding / Back Gouging  
Oscillation N/A  
Contact Tube to Work Distance 12 ~ 19mm (GTAW)  
Multiple or Single Pass (Per Side) Multiple  
Multiple or Single electrode Single  
Electrode Spacing N/A  
Peening N/A  
Other Welds shall be cleaned between each pass. When completed, remove all slag & projection with grinding & Brushing

Nomor Registrasi Migas

AYG - 07001 / 0847 / 2020

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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## WELDING PROCEDURE SPECIFICATION (WPS)

In accordance with  
Section IX, ASME Boiler and Pressure Vessel Code

Welding Procedure Specification No. : 005/HEI/MIGAS/20

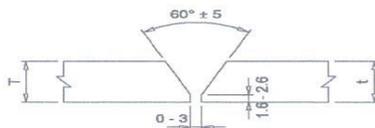
Rev. 0

### JOINT DETAILS

#### SINGLE VEE GROOVE

**T = t**

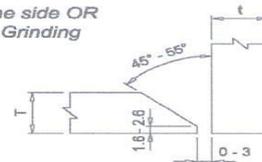
*Welded from one side*



#### SINGLE BEVEL - CORNER JOINT

**T = t**

*Welded from one side OR both side Back Grinding*



#### SQUARE BUTT

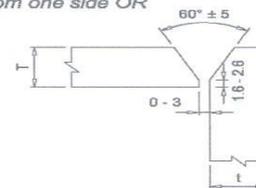
*Welded from BOTH SIDES, T = 6 mm Max  
Root gap, 0 - t/2*



#### SINGLE VEE GROOVE

**T = t**

*Welded from one side OR both side*



#### SINGLE OR DOUBLE FILLET

**UNLIMITED**



*For Non-Impact tested applications only, the following AWS/SFA classification can be used with this procedure :*

**GTAW : ER70S-6 / 5.18 & SMAW : E7018-1H4R / 5.1**

Weld Joint description shown are not inclusive of all of those found on job site. Weld joint design reference in an engineering specification or design shall take precedence over weld joint shown in this WPS.

Organization Prepared by,  
**PT. HANAZONO ENG. INDONESIA**

Verified by  
MINISTRY OF ENERGY AND MINERAL RESOURCES  
DIRJEN MIGAS

Date : October 1, 2020

Nomor Registrasi Migas  
**AYG - 07901 10845 / wib**

Date : October 1, 2020

(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 20 of 68



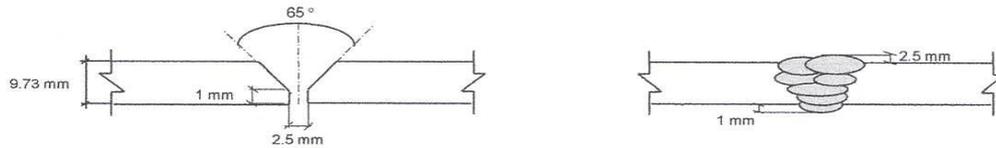
Office & Work Shop Address: Jl. Raya Bojonegara - Serdang RT/RW. 001/001 No.44  
Desa Kertasana, Kec. Bojonegara, Kab. Serang, Banten - Indonesia 42454  
Phone : +62-254-7850344/5/6, Fax : +62-254-785037

## PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

Organization Name PT. HANAZONO ENGINEERING INDONESIA  
 Procedure Qualification Record No. 005/HEI/MIGAS/20 Date 29/09/2020  
 WPS No. 005/HEI/MIGAS/20  
 Welding Process (es) GTAW & SMAW  
 Types (Manual, Automatic, Semi-Automatic) Manual

### JOINTS (QW - 402)



Groove Design of Test Coupon

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

### BASE METAL (QW - 403)

Material Spec. A516  
 Type or Grade, or UNS Number Gr. 70N  
 P-No. 1 Group No. 2 to P-No. 1 Group No. 2  
 Thickness of Test Coupon 9.73 mm  
 Diameter of Test Coupon N/A  
 Maximum Pass Thickness ≤ 1/2 in. (13mm)  
 Other \_\_\_\_\_

### POSTWELD HEAT TREATMENT (QW - 407)

Temperature Range 625°C  
 Time Holding at 1 Hr for 25.4mm Thk.  
 Others Heating & Cooling rate (280°C) per hours

### FILLER METAL (QW - 404)

SFA Specification	<u>5.18</u>	<u>5.1</u>
AWS Specification	<u>ER70S-6</u>	<u>E7018-1H4R</u>
Filler Metal F-No.	<u>6</u>	<u>4</u>
Weld Metal Analysis A-No.	<u>1</u>	<u>1</u>
Size of Filler Metal	<u>Ø2.4 mm</u>	<u>Ø3.2 mm</u>
Filler Metal Product Form	<u>Solid Bare</u>	<u>Flux Coated</u>
Supplemental Filler Metal	<u>N/A</u>	<u>N/A</u>
Electrode Flux Classification	<u>N/A</u>	<u>N/A</u>
Flux Type	<u>N/A</u>	<u>Low Hydrogen</u>
Flux Trade Name	<u>N/A</u>	<u>N/A</u>
Weld Metal Thickness	<u>3 mm</u>	<u>6.73 mm</u>
Other	<u>BOHLER S EMK 6</u>	<u>FOX S EV 50-1</u>

### GAS (QW - 408)

	Percent Composition		
	Gas (es)	Mixture	Flow Rate
Shielding	Argon	99,99%	12 LPM
Trailing	-	-	-
Backing	-	-	-

### POSITION (QW - 405)

Position(s) of Groove 1G  
 Weld Progression (Uphill, Downhill) N/A  
 Other N/A

### ELECTRICAL CHARACTERISTIC (QW - 409)

Current DCEN (GTAW) & DCEP (SMAW)  
 Polarity See Table Welding Parameter  
 Amps See Table Welding Parameter  
 Waveform Control N/A  
 Power or Energy See Table Welding Parameter  
 Arc Time 5-10 Minutes / Pass  
 Weld Bead Length 4 mm (GTAW) & 5 mm (SMAW)  
 Tungsten Electrode Size 2.4mm & 2% Thoriated (EWTh-2)  
 Mode of Metal Transfer for GMAW (FCAW) N/A  
 Heat Input See Table Welding Parameter  
 Other N/A

### PREHEAT (QW - 406)

Preheat Temperature 32°C  
 Interpass Temperature 240°C  
 Other N/A

### TECHNIQUE (QW - 410)

Travel Speed See Table Welding Parameter  
 String or Weave Bead String & Weave Bead  
 Oscillation N/A  
 Multipass or Single Pass (Per Side) Single & Multipass  
 Single or Multiple Electrodes Single  
 Other N/A

4 OF 6  
 Nomor Registrasi MIPA  
 AYG - 079801 / 0845 / 2020

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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Office & Work Shop Address: Jl. Raya Bojonegara - Serdang RT/RW. 001/001 No.44

Desa Kertasana, Kec. Bojonegara, Kab. Serang, Banten - Indonesia 42454

Phone : +62-254-7850344/5/6, Fax : +62-254-785037

## PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

Procedure Qualification Record No. : 005/HEI/MIGAS/20

Rev. 0

### WELDING PARAMETER

Weld No.	Welding Process	Filer Metal		Type Polarity	Ampere	Volt	Travel Speed Range (mm/min)	Heat Input (J/mm)
		Class	Dia.					
1	GTAW	ER70S-6	2.4 mm	DCEN	150	18	65	2,5
2					160	18	87	2,0
3					110	22	72	2,0
4	SMAW	E7018-1H4R	3.2 mm	DCEP	123	22	75	2,2
5					123	22	82	2,0
6					120	22	86	1,8
7					123	22	90	1,8

### TENSILE TEST (QW - 160)

Specimen No.	Width (mm)	Thickness (mm)	Area (mm <sup>2</sup> )	Ultimate Total Load (kN)	Ultimate Unit Stress (N/mm <sup>2</sup> )	Type Failure & Location
T1	19,54	9,71	189,73	108,34	571	Fracture on base metal
T2	19,51	9,75	190,22	108,05	568	Fracture on base metal

### GUIDE BEND TESTS (QW - 160)

Type and Figure No.	Result
SB1 - QW 462.2	<b>No Open Discontinuity</b>
SB2 - QW 462.2	
SB3 - QW 462.2	
SB4 - QW 462.2	

### TOUGHNESS TESTS (QW - 170)

Specimen No.	Notch Location	Specimen Size	Test Temp. (°C)	Toughness Values		Drop Weight Break (Y/N)
				% Shear	Mils (in.) or mm	
1	WCL	10 x 10 x 55	- 46	218		213
2				197		
3				225		
1	FL 1	10 x 10 x 55	- 46	96		94
2				84		
3				103		
1	FL 2	10 x 10 x 55	- 46	78		71
2				63		
3				72		

Comments \_\_\_\_\_

Nomor Registrasi Migas

Aya - 07981/08ur/2020





# POBOYA 2000 TPD EXPANSION PROJECT



(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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Office & Work Shop Address: Jl. Raya Bojonegara - Serdang RT/RW. 001/001 No.44  
Desa Kertasana, Kec. Bojonegara, Kab. Serang, Banten - Indonesia 42454  
Phone : +62-254-7850344/5/6, Fax : +62-254-785037

## PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

Procedure Qualification Record No. : 005/HEI/MIGAS/20

Rev. 0

### FILLET-WELD TEST (QW - 180)

Result - Satisfactory : Yes  No  Penetration into Parent Metal : Yes  No

Macro - Result None

### HARDNESS TESTS

Test No	Test Location	Vickers Hardness Value HV 10, Kgf/mm <sup>2</sup>			Remarks
		12 <sup>00</sup>			
		Line 1	Line 2	Line 3	
1	HAZ 1	170	169	167	
2		175	173	171	
3		187	176	174	
4	Weld Metal	179	168	177	
5		183	171	172	
6		187	180	175	
7	HAZ 2	218	175	181	
8		212	172	178	
9		205	168	175	

### Other Tests

Type of Test N/A

Deposit Analysis N/A

Other Radiography examination, Result : ACC, Report No. : 001/RT/HEI/IX/20 by PT. Rire Sanjaya Sakti

Welder's Name ASMURI Clock No. - Stamp No. W - 01

Tests conducted by : PT. HI-TEST Laboratory Test No. : HT/JKT/0920/0331

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.

Organization Prepared by,  
**PT. HANAZONO ENG. INDONESIA**

Verified by  
MINISTRY OF ENERGY AND MINERAL RESOURCES  
DIRJEN MIGAS

  
  
Date : September 29, 2020

Nomor Registrasi Migas

AYG - 07081604r/2020

Date : September 29, 2020

(CPM Work No.)  
11580

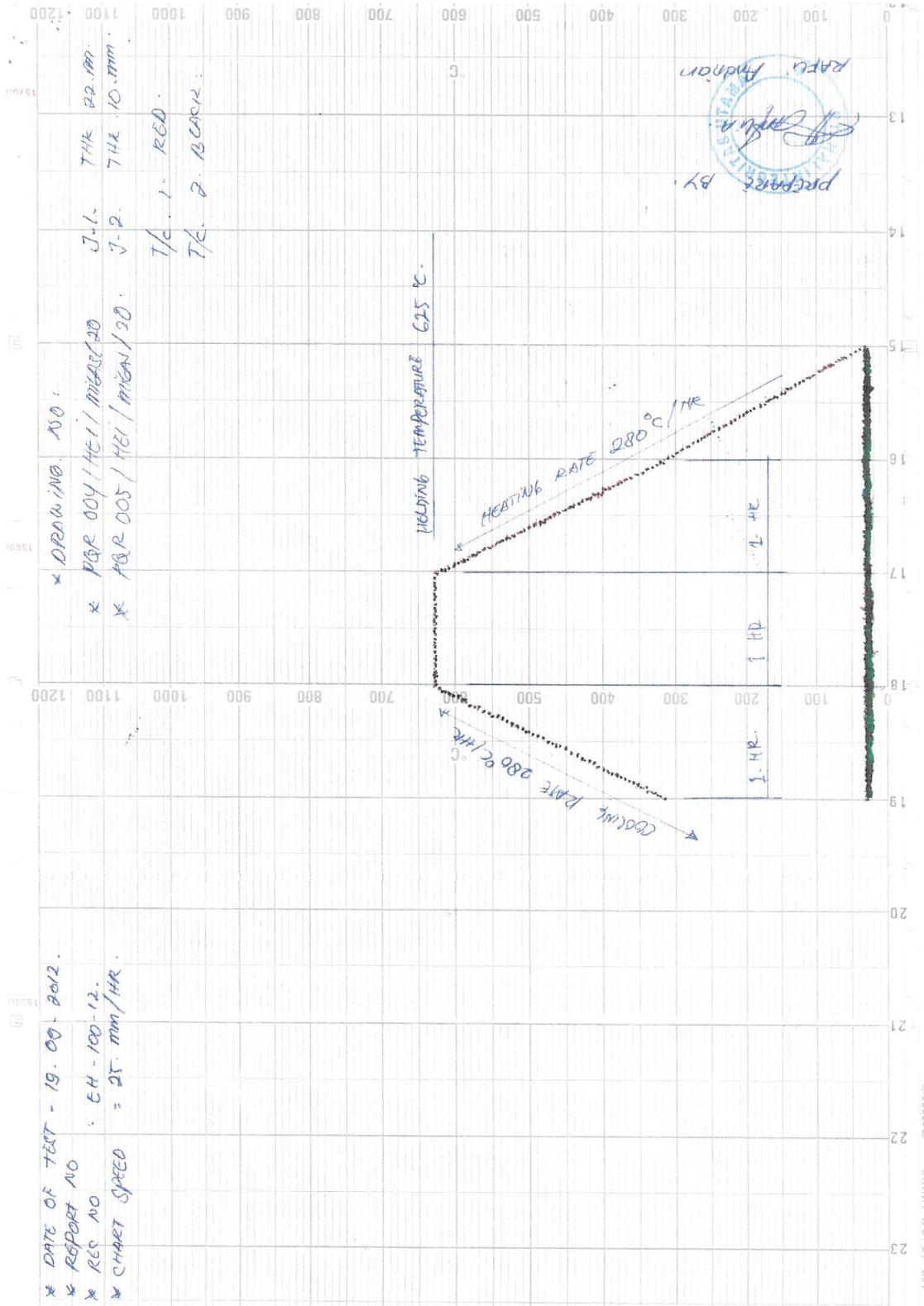
Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

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	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 24 of 68



**PT. Hi-Test**  
Laboratory of Mechanical Testing

BSD City :  
Taman Tekno Blok A2 No. 49  
Bumi Serpong Damai (BSD) – Tangerang - Indonesia  
Telp : +62 21 75882884; Fax : +62 21 75882885  
E-mail : [hi-test@hittestlab.com](mailto:hi-test@hittestlab.com)  
Website : [www.hittestlab.com](http://www.hittestlab.com)



## Testing Report

(This Report is issued subjected to the term & conditions set out below)

<b>Customer</b>	: PT. Hanazono Engineering Indonesia	<b>Job No</b>	: B20625
<b>Address</b>	: Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	<b>No.</b>	: HT/JKT/0920/0331
<b>Reference Code</b>	: ASME Sect. IX : 2019	<b>Total of Page</b>	: 1 of 4
<b>Test Method</b>	: ASTM A370-19	<b>Date of Received</b>	: 22 September 2020
<b>Object to be tested</b>	: (as received)	<b>Date of Tested</b>	: 29 September 2020
		<b>PO No</b>	: PO-E001-HTT-TOL-004
		<b>Project Name</b>	: --
		<b>Sample Marking</b>	: 9. HEI 5

One welded carbon steel plate joint test sample, size: 10 mm thickness, material spec: A 516 Gr. 70N, PQR No. PQR005/HEI/MIGAS/20, welding process: GTAW+SMAW, welding position: 1G, for Procedure Qualification Record Test.

**Type of Test** : Reduced Section Tension Test (Transverse Specimen)  
**Environment Temp** : 25.1°C

Test Specimen No	T1	T2
<b>Measured Thickness (mm)</b>	9.71	9.75
<b>Measured Width (mm)</b>	19.54	19.51
<b>Effective Area (mm<sup>2</sup>)</b>	189.73	190.22
<b>Ultimate Tensile Load (kN)</b>	108.39	107.96
<b>Ultimate Tensile Strength (N/mm<sup>2</sup>)</b>	571	568
<b>Location of Failure</b>	Base Metal	Base Metal
<b>Type of Failure</b>	Ductile	Ductile

**Testing Machine Used** : INSTRON 600 DX,  
Model: 600 DX, S/N: S2513, Capacity : 600 kN  
**Remark** : --  
**Test Conducted By** : Canra Latipolia, ST  
**Witnessed By** :

Approved Signatory,

  
Suhadi, ST  
Laboratory Manager

**Term & Conditions**

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Form No: HT/QM-F/TENSILE/RED-SEC/3 Rev.0

Date of Issued 06/01/2014

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2005)

	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 25 of 68



**PT. Hi-Test**  
Laboratory of Mechanical Testing

BSD City :  
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Telp : +62 21 75882884; Fax : +62 21 75882885  
E-mail : [hi-test@hittestlab.com](mailto:hi-test@hittestlab.com)  
Website : [www.hittestlab.com](http://www.hittestlab.com)



## Testing Report

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<b>Customer</b> : PT. Hanazono Engineering Indonesia	<b>Job No</b> : B20625
<b>Address</b> : Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	<b>No.</b> : HT/JKT/0920/0331
<b>Reference Code</b> : ASME Sect. IX : 2019	<b>Total of Page</b> : 2 of 4
<b>Test Method</b> : ASTM E190-14	<b>Date of Received</b> : 22 September 2020
<b>Object to be tested</b> : (as received)	<b>Date of Tested</b> : 29 September 2020
	<b>PO No</b> : PO-E001-HTT-TOL-004
	<b>Project Name</b> : --
	<b>Sample Marking</b> : 9. HEI 5

One welded carbon steel plate joint test sample, size: 10 mm thickness, material spec: A 516 Gr. 70N, PQR No. PQR005/HEI/MIGAS/20, welding process: GTAW+SMAW, welding position: 1G, for Procedure Qualification Record Test.

**Type of Test** : Bending Test (Transverse Specimen)

<b>Test Temperature</b> : 25.1°C	
<b>Test Weld Ment Thickness</b> : 10 mm	<b>Test Specimen Width</b> : 38 mm
<b>Former Diameter</b> : 40 mm	<b>Bend Angle</b> : 180 Degree
<b>Shoulder Distance</b> : 63.2 mm	

Specimen No	Type of Bend	Observation	Result
FB1	Face Bend	No Open Discontinuity was Observed	Accepted
FB2	Face Bend	No Open Discontinuity was Observed	Accepted
RB1	Root Bend	No Open Discontinuity was Observed	Accepted
RB2	Root Bend	No Open Discontinuity was Observed	Accepted

**Testing Machine Used** : MOTOR PUMP BENDING TEST MACHINE,  
Model : Daventry England, S/N : DG 8881, Capacity : 700 Bar

**Remark** : --

**Test Conducted By** : Canra Latipolia, ST

**Witnessed By** :

Approved Signatory



Suhadi, ST  
Laboratory Manager

**Term & Conditions**

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- Form No.: HT/QM-F/BEND/3 Rev.0  
The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2005)

Date of Issued 06/01/2014

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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## PT. Hi-Test Laboratory of Mechanical Testing

**BSD City :**  
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Telp : +62 21 75882884; Fax : +62 21 75882885  
E-mail : [hi-test@hittestlab.com](mailto:hi-test@hittestlab.com)  
Website : [www.hittestlab.com](http://www.hittestlab.com)



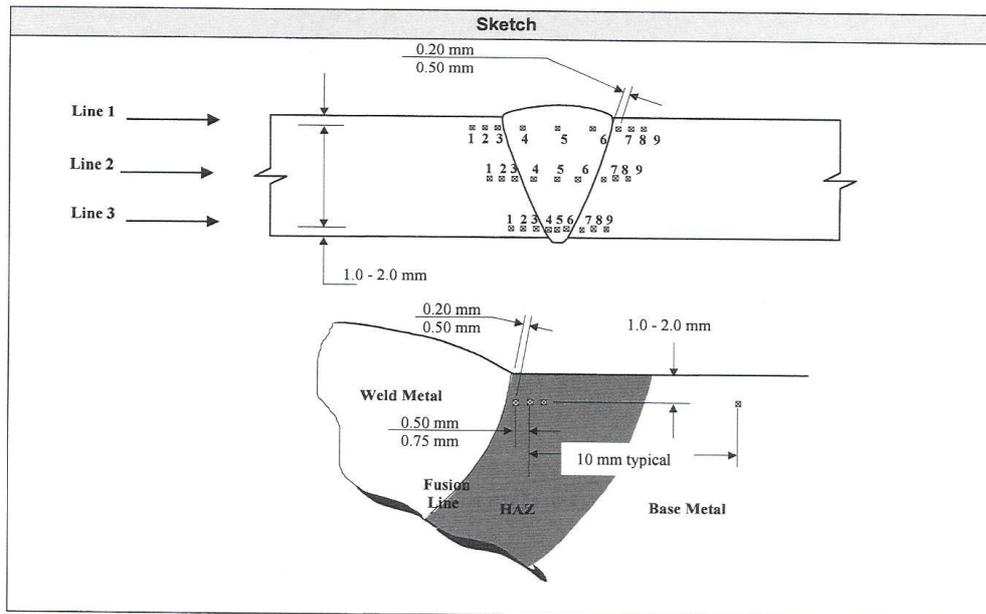
## Testing Report

(This Report is issued subjected to the term & conditions set out below)

<b>Customer</b> : PT. Hanazono Engineering Indonesia	<b>Job No</b> : B20625
<b>Address</b> : Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	<b>No.</b> : HT/JKT/0920/0331
<b>Reference Code</b> : ASME Sect. IX : 2019	<b>Total of Page</b> : 3 of 4
<b>Test Method</b> : ASTM E92-17	<b>Date of Received</b> : 22 September 2020
<b>Object to be tested</b> : (as received)	<b>Date of Tested</b> : 29 September 2020
	<b>PO No</b> : PO-E001-HTT-TOL-004
	<b>Project Name</b> : --
	<b>Sample Marking</b> : 9. HEI 5

One welded carbon steel plate joint test sample, size: 10 mm thickness, material spec: A 516 Gr. 70N, PQR No. PQR005/HEI/MIGAS/20, welding process: GTAW+SMAW, welding position: 1G, for Procedure Qualification Record Test.

**Type of Test** : Vickers Hardness Number (HV), Load Test 10 Kgf



Approved Signatory

**Suhadi ST**  
Laboratory Manager

**Term & Conditions**

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- Form No: HT/QM-FHARDNESS-SKETCH/3 Rev.0  
The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2005) Date of Issued 06/01/2014

	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 27 of 68



**PT. Hi-Test**  
**Laboratory of Mechanical Testing**  
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 Bumi Serpong Damai (BSD) – Tangerang - Indonesia  
 Telp : +62 21 75882884; Fax : +62 21 75882885  
 E-mail : [hi-test@hittestlab.com](mailto:hi-test@hittestlab.com)  
 Website : [www.hittestlab.com](http://www.hittestlab.com)



## Testing Report

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<b>Customer</b>	: PT. Hanazono Engineering Indonesia	<b>Job No</b>	: B20625
<b>Address</b>	: Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	<b>No.</b>	: HT/JKT/0920/0331
<b>Reference Code</b>	: ASME Sect. IX : 2017	<b>Total of Page</b>	: 3 of 4
<b>Test Method</b>	: ASTM E23-18	<b>Date of Received</b>	: 22 September 2020
<b>Object to be tested</b>	: (as received)	<b>Date of Tested</b>	: 29 September 2020
		<b>PO No.</b>	: PO-E001-HTT-TOL-004
		<b>Project Name</b>	: --
		<b>Sample Marking</b>	: 9. HE1 5

One welded carbon steel plate joint test sample, size: 10 mm thickness, material spec: A 516 Gr. 70N, PQR No. PQR005/HEI/MIGAS/20, welding process: SMAW+SAW, welding position: 1G, for Procedure Qualification Record Test.

**Type of Test** : Charpy Impact Test (Welding Joint Section)  
**Environment Temp** : 25.1°C

V-Notch Position	Specimen Size (mm)	Test Temp. (°C)	Impact Value Specimen (J)			Average (J)
			1	2	3	
WCL	10x10x55	-46	218	197	225	213
FL1	10x10x55	-46	96	84	103	94
FL2	10x10x55	-46	78	63	72	71

**Testing Machine Used** : Zwick Roell RKP 450 – SN : 215240  
**Remark** : --  
**Test Conducted By** : Sukmahadi, ST  
**Witnessed By** :

Approved Signatory   
  
**Sukmahadi, ST**  
 Laboratory Manager

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- Form No: HT/QM-F/CHARPY – MAT3 Rev.0  
 The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2005) Date of Issued 06/01/2014

	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 28 of 68



**PT. Hi-Test**  
Laboratory of Mechanical Testing

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Website : [www.hittestlab.com](http://www.hittestlab.com)



## Testing Report

(This Report is issued subjected to the term & conditions set out below)

<b>Customer</b> : PT. Hanazono Engineering Indonesia	<b>Job No</b> : B20625
<b>Address</b> : Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	<b>No.</b> : HT/JKT/0920/0331
<b>Reference Code</b> : ASME Sect. IX : 2019	<b>Total of Page</b> : 4 of 4
<b>Test Method</b> : ASTM E92-17	<b>Date of Received</b> : 22 September 2020
<b>Object to be tested</b> : (as received)	<b>Date of Tested</b> : 29 September 2020
	<b>PO No</b> : PO-E001-HTT-TOL-004
	<b>Project Name</b> : --
	<b>Sample Marking</b> : 9. HEI 5

One welded carbon steel plate joint test sample, size: 10 mm thickness, material spec: A 516 Gr. 70N, PQR No. PQR005/HEI/MIGAS/20, welding process: GTAW+SMAW, welding position: 1G, for Procedure Qualification Record Test.

**Type of Test** : Vickers Hardness Number (HV), Load Test 10 Kgf  
**Specimen No** : 1

Sample Identification	Material Specification	Test Location	Vickers Hardness Number (HV), Test Load Applied 10 Kgf					
			Line 1		Line 2		Line 3	
			No	Result	No	Result	No	Result
PQR No. PQR005/HEI/MIGAS/20	A 516 Gr. 70N	HAZ	1	170	1	169	1	167
			2	175	2	173	2	171
			3	187	3	176	3	174
	Weld Metal		4	179	4	168	4	177
			5	183	5	171	5	172
			6	187	6	180	6	175
	A 516 Gr. 70N	HAZ	7	218	7	175	7	181
			8	212	8	172	8	178
			9	205	9	168	9	175

**Testing Machine Used** : The Mitutoyo Vickers Hardness Testing Machine, Model HV-113, S/N: 500261112  
**Remark** : Has been verified using Deutsche Akkreditierungsstelle Standardised Blocks  
(Identity No: 15634, 15635, 15636)  
**Test Conducted By** : M. Anjar Rizki, ST  
**Witnessed By** :

Approved Signatory/



**Suhadi, ST**  
Laboratory Manager

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Form No: HT/QM-F/HARDNESS-RESULT/3 Rev 0

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(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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Page 1 of 1

**Client :** PT. HAMAZORO ENGINEERING INDONESIA.

**Contractor :** PQR

**Project :** PQR

**Report No. :** 001/RT/HEI/GR/20

**Shooting Date :** 18-09-2020

**Date of Report :** 19-09-2020

**Job No. :** PQR

**Work Order / Request No. :** -

**Location :** NYS - Cikam

**RT Tech :** DWSE  DWPC  SWSE

**Application Code :** ASME VII

**Material Specification :** 316 GR 70W 45316 GR

**Material Source :** 4340304/A 240.304.A

**Welder Stamp :** W

**Radigraphic Procedure :** RSS/RT-ASME/003

**Exposure Time :** 20 Min/Sec

**Development :** AGFA D7

**Unsharpness :** 0.5 mm

**ASTM 19 :** -

**RT Type :** S Side  F Side

**Sensitivity:** W No.9 P.D. 2-4

Identification	Joint No.	Material Size Thick	Location Marker		Welder Stamp	Type of Discontinuity										Remarks					
			4"x10"	4"x15"		Surface Indication	Crack	Incomplete Penetration	Incomplete Fusion	Slag	Inclusion	Slag Lines	Concavity	Burn Through	Under Cut		Gas and Worm Hole	Porosity	Others	Sensitivity	Range Density
PQR/001/HEI/MIGAS/20	-	Thk.45 mm	4"x10"	4"x15"	W														9	2B-3.2	ACC
PQR/002/HEI/MIGAS/20	-	Thk.10 mm	4"x10"	4"x15"	W														9	2B-3.2	ACC
PQR/003/HEI/MIGAS/20	-	Thk.10 mm	4"x10"	4"x15"	W														9	2B-3.5	ACC
PQR/004/HEI/MIGAS/20	-	Thk.22 mm	4"x10"	4"x15"	W														9	2B-3.5	ACC
PQR/005/HEI/MIGAS/20	-	Thk.10 mm	4"x10"	4"x15"	W														9	2B-3.0	ACC
PQR/006/HEI/MIGAS/20	-	Thk.10 mm	4"x10"	4"x15"	W														9	2A-3.1	ACC
PQR/007/HEI/MIGAS/20	-	Thk.22 mm	4"x10"	4"x15"	W														9	2B-3.5	ACC

**Technician :** \_\_\_\_\_

**Authorised Inspector :** \_\_\_\_\_

**Customer Rep. :** \_\_\_\_\_

**Comments :**

Total Welds / Film Used : 7 Joints

( 4" x 10" ) : 7 Sheets

( 4" x 15" ) : 7 Sheets

( 7" x 17" ) : 7 Sheets

**Date :** 31-08-2019

**Date :** 20/09/20

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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## 검사증명서 MILL TEST CERTIFICATE

**ORIGINAL**

주문번호/Order No. : P194500138  
 발주번호/PO No. :  
 품명/Commodity : STEEL PLATE  
 제품규격/Specification : ASTM A516-70N/ASME SA516-70N

고객사/Supplier : JUNGJIN  
 수요가/Customer : 탑스틸

검사증명서번호/Certificate No. : DP3-2-190606-022-001  
 발행일자/Date of issue : 2019-06-06

제품 수 인식 단위 inch : , mm : Space	제품 번호 Product No	수량 Quantity	중량 Weight kg	화학 성분 (%) Chemical Composition				비고 Remarks
				T, S, Al 3 3 3	Ceq 3	B 3	4	
*Specimen No.: DP08221216-a, DP08221215-d ** Normalized: 910 °C, 30min	A67079-01, 02		2,188	33	388	1		
	Sub Total (20)	3	4,376					
*Specimen No.: DP03048*6086 DP08266721-a, DP08266721-d ** Normalized: 910 °C, 35min	A673276-01		2,772	40	417	1		
	Sub Total (40)	1	2,772					
*Specimen No.: DP08266525-a, DP08266525-d ** Normalized: 910 °C, 35min	A673334-01		3,209	30	403	1		
	Sub Total (50)	1	3,209					
*Specimen No.: DP08227619-a, DP08227619-b ** Normalized: 910 °C, 45min	A673275-01		3,708	37	424	1		
	Sub Total (60)	1	3,708					



We hereby certify that the material has been made by basic oxygen process (Fully killed steel, Fine grain practice) and satisfactorily tested in accordance with above specification requirement called for by the above order. The amount of C, Ni, Cu, Mn, Ti or Si is blank; the heat analysis results are blank. The amount of S is 0.008%, \* Inspection documents - According to EN 10204 Type 3.1, NACE MR0175 Hardness only.

\* Tensile Test Direction-Transverse  
 \* Ceq = C+Mn/6+(Ni+Cu)/15+(Cr+Mo+V)/5  
 \* Supply Condition - Normalized  
 \* Chemical Composition Unit: %  
 \* T: Tension, d-Hardness  
 \* Position: 1-Top, M-Middle, B-Bottom  
 \* Division: L-Label Analysis, P-Product Analysis  
 \* Gauge Length: 1-75, 2-50, 3-10, 4-70, 5-50, 6-5.65, 7-5d, 8-4d, 9-8d  
 \* T(S), Al: Total(Soluble) Al \*T: Trace  
 \* NFL Result: G-No Break, B-Break  
 \* TTP(Through Thickness Position): 1-Surface, 2-1/4T, 3-1/2T

본 주문물은 상가의 규격요도 외 타용도로 사용시 제품특성 및 안전사고등의 문제가 발생할 수 있으며, 본 검사증명서를 위조 또는 변조시 형사법에 의해 처벌될 수 있습니다.

본 주문물은 상가의 규격요도 외 타용도로 사용시 제품특성 및 안전사고등의 문제가 발생할 수 있으며, 본 검사증명서를 위조 또는 변조시 형사법에 의해 처벌될 수 있습니다.

원본검증 방법 : 동국제강 홈페이지 접속 (www.dongkuk.co.kr) → e바즈니스 클릭(홈페이지 하단) → 검사증명서 원본검증 클릭 → 정보관리추진 검색

*(Handwritten signature)*

Surveyor to: \_\_\_\_\_ Surveyor to: \_\_\_\_\_  
 Chief of Quality Control Team



(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

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## 검사증명서 MILL TEST CERTIFICATE

주문번호/Order No. : P194500138  
 발주번호/PO No. :  
 품명/Commodity : STEEL PLATE  
 제품규격/Specification : ASTM A516-70N/ASME SA516-70N

고객사/Supplier : JUNGJIN  
 수요가/Customer : 탑스틸

검사증명서번호/Certificate No. : DP3-2-190606-022-001  
 발행일자/Date of issue : 2019-06-06

제품치수 Dimension 단위 Unit Inch: ", mm: Space	제품번호 Product No	수량 Quantity	중량 Weight kg	재간번호 Heat No	P S I T I O N	인장시험 Tensile Test			경도시험 Hardness		화학성분(%) Chemical Composition											Remarks		
						YP02	TS	EL	GL	%	HB	C	SI	Mn	P	S	Cr	Ni	Cu	Mo	Nb		TI	V
10.00*3048*6096 *Specimen No: DP08221216-a, DP08221215-d ** Normalized: 910 °C, 30min	A670179-01,02 Sub Total (20)	3	4,376	PK696499	T 1	346	527	25	139	L	16	37	138	18	4	20	10	10	3	2	18	2		
19.00*3048*6096 *Specimen No: DP08266721-e, DP08266721-d ** Normalized: 910 °C, 35min	A673276-01 Sub Total (40)	1	2,772	PK696499	T 1	348	531	27	142	L	17	38	144	18	4	20	10	10	5	1	2	2		
22.00*3048*6096 *Specimen No: DP08266525-a, DP08266525-d ** Normalized: 910 °C, 35min	A673334-01 Sub Total (50)	1	3,209	PK696496	T 1	365	541	25	147	L	16	37	142	20	3	20	10	10	5	1	2	2		
25.00*3100*6096 *Specimen No: DP08227619-a, DP08227619-d ** Normalized: 910 °C, 45min	A673275-01 Sub Total (60)	1	3,708	PK404319	T 1	352	529	27	149	L	15	33	144	14	3	20	140	190	12	1	16	26		

We hereby certify that the material has been made by basic oxygen process (Fully killed steel) and the test results are in accordance with above specification requirement called for by the above order. If the amount of Cr, Ni, Cu, Mo, Ti or Si is blank, the heat analysis for that element is less than 0.02% and/or of Nb, V is blank, it is less than 0.008%. \* Inspection documents : According to EN 10204 Type 3.1, NACE MR0175 Hardness only.

\* Specimen No. : a-Tension, d-Hardness  
 \* Position : T-Top, M-Middle, B-Bottom  
 \* Division : L-Ladle Analysis, P-Product Analysis  
 \* Sub(Sub Size, Real Value, mm) : Blank-Full Size, 1-7.5\*10, 2-5.0\*10, 3-3.0\*10, 4-2.0\*10, 5-1.5\*10, 6-1.0\*10, 7-0.5\*10, 8-0.2\*10, 9-0.1\*10  
 \* GL(Gauge Length, mm) : 1-200, 2-100, 3-60, 4-70, 5-50, 6-35.5VA, 7-25.4, 8-15.2, 9-7.62  
 \* TS : Total(Soluble) Al \*Tr : Trace  
 \* NPL Result : G-No Break, B-Break  
 \* TTR(Through Thickness Position) : 1-Surface, 2-1/4T, 3-1/2T

본 주문용량의 규격용도의 타용도로 사용시 제품순상 및 안전사고등의 문제가 발생할 수 있으며, 본 검사증명서를 참조 또는 번조시 항상 원상보존을 위하여 자발할 수 있습니다.

원본검증 방법 : 동국제강 홈페이지 접속 (www.dongkuk.co.kr) → e비즈니스 클릭(홈페이지 하단) → 검사증명서 원본검증 클릭 → 정보입력후 검색

Surveyor to: \_\_\_\_\_  
 Chief of Quality Control Team: *Yoon*

Surveyor to: \_\_\_\_\_  
 Surveyor to: \_\_\_\_\_

Dangjin Works, 25, Godeogongdan 1-gil, Songak-eup, Dangjin-si, Chungcheongnam-do, Republic of Korea/Quality Control Team, TEL. 041-351-4633

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# POBOYA 2000 TPD EXPANSION PROJECT



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11580

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E2502

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PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

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JL. Industri Selatan 2 Blok JJ NO. 7-10  
17530 Bekasi  
T. +6221893 7572, F. +6221893 7518  
www.voestalpine.com/welding

PT ALLALLOY CAHAYA DYNAWELD  
JL. PANTAI INDAH SELATAN KOMP.  
KAMAL MUARA, PENJARINGAN  
14470 Jakarta Utara  
Indonesia

## Inspection certificate 3.1

as per : EN 10204

No. : 2020-2047011900-30-20607-025

Rev. 0 Page 1 of 1

PO no.	ACD/BS-N/20/07/0624	of	13.07.2020
Order no.	1042004566		
Delivery note/pos./splitt	2047011900/000000/000030	of	20.07.2020
Product	covered electrode		
Trade name	<b>BOHLER FOX S EV 50-1 VP</b>		
Standard designation	ISO 2560-B : E 49 18-1 A U H 5 ISO 2560-A : E 42 5 B 42 H5 AWS A5.1/SFA 5.1 : E7018-1H4R		
Dimension	SMAW 3,25 x 350 mm		
Lot no.	20607		118855 46917
Quantity	3312,0 KG		JUPB010E 0425

### Chemical composition in % of the weld metal

C	Si	Mn	P	S	Cr	Mo	Ni	V	Cu					
0,07	0,59	1,39	0,013	0,008	0,03	< 0,01	0,01	< 0,01	0,01					

### Mechanical properties

ASME II/Sched.F

Tensile test		according to : ASTM E8					
Specimen preparation		according to : AWS B4.0					
T	ReL / Rp 0,2 MPa	Rp 1,0 MPa	Rm MPa	A (Lo = 4d) %	Z %	WBH PWHT	Remarks
25°C	≥ 420		≥ 520	≥ 27		AW	Typical values
Impact test		according to : ASTM E23					
Specimen preparation		according to : AWS B4.0					
T	Impact energy KV / J	Average KV / J	Lateral expansion mm	Shear fracture %	WBH PWHT	Remarks	
-50°C		≥ 70			AW	Typical values	

The product BOHLER FOX S EV 50-1 VP meets the requirements of the filler metal specification ASME sec II, part C, AWS A5.1/SFA 5.1 : E7018-1H4R when tested in accordance with that specification.

Complying the corrosion testing requirements as per NACE MR 0175 standard TM 01-77-96 (SSC) and 02-84-96 (HIC).

Town  
Bekasi

Date  
27.07.2020

This certificate was issued by DP-equipment and does not require signature.

Authorized representative  
Miftah Farid

voestalpine

ONE STEP AHEAD.



# POBOYA 2000 TPD EXPANSION PROJECT



(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

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PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

Kawasan Industri Jababeka Cikarang  
Jl. Industri Selatan 2 Blok JJ NO. 7-10  
17530 Bekasi  
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www.voestalpine.com/welding

PT ALLALLOY CAHAYA DYNAWELD  
JL. PANTAI INDAH SELATAN KOMP.  
KAMAL MUARA, PENJARINGAN  
14470 Jakarta Utara  
Indonesia

### Inspection certificate 3.1

as per : EN 10204

No. : 2020-2047011831-30-20098-025

Rev. 0 Page 1 of 1

PO no.	ACD/JK-N/20/04/0464	of	27.04.2020
Order no.	1042004411		
Delivery note/pos./splitt	2047011831/000000/000030	of	08.07.2020
Product	GTAW rod/wire		
Trade name	<b>BOHLER S EMK 6</b>		
Standard designation	EN ISO 636-A : W 42 5 3Si1 AWS A5.18/SFA 5.18 : ER70S-6		
Dimension	2,4 x 1000mm		
Lot no.	20098		
Quantity	2500,0 KG		

#### Chemical composition in % of the product

C	Si	Mn	P	S	Cr	Mo	Ni	V	Cu					
0,06	0,87	1,51	0,017	0,012	< 0,01	< 0,01	< 0,01		0,02					

#### Mechanical properties

ASME II/Sched.F

Tensile test							according to : ASTM E8	
Specimen preparation							according to : AWS B4.0	
T	ReL / Rp 0,2	Rp 1,0	Rm	A (Lo = 4d)	Z	WBH	Remarks	
	MPa	MPa	MPa	%	%	PWHT		
25°C	≥ 420		≥ 500	≥ 25		AW	Typical values	
Impact test							according to : ASTM E23	
Specimen preparation							according to : AWS B4.0	
T	Impact energy	Average	Lateral expansion	Shear fracture	WBH	Remarks		
	KV / J	KV / J	mm	%	PWHT			
-50°C		≥ 47			AW	Typical values		

The product BOHLER S EMK 6 meets the requirements of the filler metal specification ASME sec II, part C, AWS A5.18/SFA 5.18 : ER70S-6 when tested in accordance with that specification.

Complying the corrosion testing requirements as per NACE MR 0175 standard TM 01-77-96 (SSC) and 02-84-96 (HIC).

Town  
Bekasi

Date  
13.07.2020

This certificate was issued by DP-equipment and does not require signature.

Authorized representative  
Miftah Farid

voestalpine

ONE STEP AHEAD.





# POBOYA 2000 TPD EXPANSION PROJECT



(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

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(Vendor Work No.)  
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Office & Work Shop Address: Jl. Raya Bojonegara - Serdang RT/RW. 001/001 No.44

Desa Kertasana, Kec. Bojonegara, Kab Serang, Banten - Indonesia 42454

Phone : +62-254-7850344/5/6, Fax : +62-254-785037

## WELDING PROCEDURE SPECIFICATION (WPS)

In accordance with  
ASME Section IX:2021 Boiler and Pressure Vessel Code

Page No : 2 of 3

Welding Procedure Specification No. : 008/HEI/WPS/MIGAS/21

REV. 0

### POSITIONS (QW - 405)

Position(s) of Groove	All
Welding Progression	Uphill
Position(s) of Fillet	All

### POSTWELD HEAT TREATMENT (QW - 407)

Temperature Range	N/A
Time Range	N/A

t = up to 2" - 1 Hour / inch, 15 minute minimum  
t = over 2" to 5" - 2 Hour + 15 minute for each additional inch, over 2"

### PREHEAT (QW - 406)

Preheat Temp. Min	55 °C
Interpass Temp. Max.	230 °C
Preheat Maintenance	55 °C of minimum

Temperature shall be applied for thickness 1 1/4" and over  
*(Continuous or special heating, where applicable, should specified)*

### GAS (QW - 408)

	Percent Composition		
	Gas (es)	Mixture	Flow Rate
Shielding	None	None	None
Trailing	None	None	None
Backing	None	None	None
Other	None	None	None

### ELECTRICAL CHARACTERISTIC (QW - 409)

Weld Pass(es)	Process	Filler Metal		Current Type & Polarity	Amps (Range)	Wire Feed Speed (Range)	Energy or Power (Range)	Volts (Range)	Travel Speed (Range)	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Process Torch Angle, etc.)
		Class	Dia							
Root	SMAW	E 7018-1H4R	3.2, 4.0	DCEP	85 ~ 100	-	-	23 ~ 25	60 ~ 75	-
Fill	SMAW	E 7018-1H4R	3.2 / 4.0	DCEP	100 ~ 115	-	-	24 ~ 26	65 ~ 87	
Cap	SMAW	E 7018-1H4R	3.2 / 4.0	DCEP	110 ~ 125	-	-	24 ~ 27	70 ~ 90	

Amps and Volts, or power or energy range, should be specified for each electrode size, position, and thickness, etc.

Pulsing current N/A Heat Input (max.) 2.9 Kj  
 Tungsten Electrode Size and Type N/A  
(Pure Tungsten, 2% Thoriated, etc.)

Mode of Metal transfer for GMAW (FCAW) N/A  
(Spray Arc, Short-Circuiting Arc, etc.)

Other N/A

### TECHNIQUE (QW - 410)

String or Weave Bead	String and or weave
Orifice, Nozzle, or Gas Cup Size	N/A
Initial and Interpass Cleaning (Brushing, Grinding, etc.)	Brushing and Grinding
Method of Back Gouging	Back Grinding / Back Gouging
Oscillation	N/A
Contact Tube to Work Distance	N/A
Multiple or Single Pass (Per Side)	Single or Multi
Multiple or Single electrode	Single
Electrode Spacing	N/A
Peening	N/A
Other	Welds shall be cleaned between each pass. When completed, remove all slag & projection with grinding and brushing



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Office & Work Shop Address: Jl. Raya Bojonegara - Serdang RT/RW. 001/001 No.44

Desa Kertasana, Kec. Bojonegara, Kab Serang, Banten - Indonesia 42454

Phone : +62-254-7850344/5/6, Fax : +62-254-785037

WELDING PROCEDURE SPECIFICATION (WPS)			
In accordance with ASME Section IX:2021 Boiler and Pressure Vessel Code		Page No : 3 of 3	
Welding Procedure Specification No. : 008/HEI/WPS/MIGAS/21			REV. 0
<b>JOINT DETAILS</b>			
<p><b>DOUBLE VEE GROOVE</b> T = t Welded from two side</p>	<p><b>SINGLE BEVEL-CORNER JOINT</b> T = t Welded from one side OR both side Back Grinding</p>		
<p><b>SQUARE BUTT</b> Welded from BOTH SIDES, T = 6 mm Max Root gap. 0 - t/2</p>	<p><b>SINGLE VEE GROOVE</b> T = t Welded from one side OR both side</p>		
<p><b>FILLET</b> UNLIMITED</p>			
<p>For Non-Impact tested applications only, the following AWS/SFA classification can be used with this procedure : SMAW : E7018-1H4R / 5.1</p>			
<p>Weld Joint description shown are not inclusive of all of those found on job site. Weld joint design reference in an engineering specification or design shall take precedence over weld joint shown in this WPS.</p>			
Prepared By,	Reviewed By,	Reviewed By,	Verified by,
PT Hanazono Engineering Indonesia			MIGAS
QC	WE	QC Manager	
Bayu Satrio Utomo	Andi Iskandar	Rusnandi	
Date : Nov 03, 2021	Date : Nov 3, 2021	Date : Nov 03, 2021	Date :

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11580

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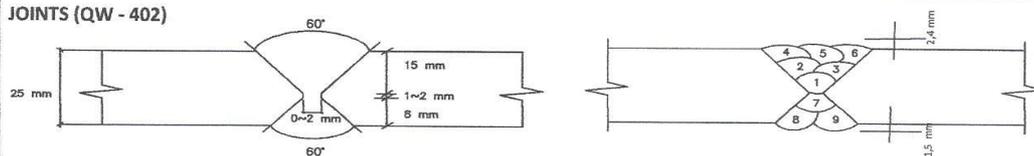
## PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld test Coupon

Page No : 1 of 3

Organization Name PT. HANAZONO ENGINEERING INDONESIA  
 Procedure Qualification Record No. 008/HEI/PQR/MIGAS/21 Date October 11, 2021  
 WPS No. 008/HEI/WPS/MIGAS/21  
 Welding Process (es) SMAW  
 Types (Manual, Automatic, Semi-Automatic) Manual

### JOINTS (QW - 402)



Groove Design of Test Coupon

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

### BASE METAL (QW - 403)

Material Spec. SA 516  
 Type or Grade, or UNS Number Grade 70N  
 P-No.1 - Group No. 1 to P-No.1 - Group No. 1  
 Thickness of Test Coupon 25mm  
 Diameter of test Coupon N/A  
 Maximum Pass Thickness ≤½ in. (13mm)  
 Other N/A

### POST WELD HEAT TREATMENT (QW - 407)

Temperature Range N/A  
 Time N/A  
 t = up to 2" - 1 Hour / inch, 15 minute minimum  
 t = over 2" to 5" - 2 Hour + 15 minute for each additional inch, over 2"

### GAS (QW - 408)

	Percent Composition		
	Gas (es)	Mixture	Flow Rate
Shielding	None	None	None
Trailing	None	None	None
Backing	None	None	None

### FILLER METAL (QW - 404)

SFA Specification A 5.1  
 SWA Specification E 7018-1H4R  
 Filler Metal F-No. 4  
 Weld Metal Analysis A-No. 1  
 Size of Filler Metal Φ 3.2mm & Φ 4.0mm  
 Filler Metal Product Form N/A  
 Supplemental Filler Metal N/A  
 Electrode Flux Classification N/A  
 Flux Type N/A  
 Flux Trade Name N/A  
 Weld Metal Thickness N/A  
 Other N/A

### ELECTRICAL CHARACTERISTIC (QW - 409)

Current DCEP  
 Polarity See Table Welding Parameter  
 Amps See Table Welding Parameter  
 Waveform Control N/A  
 Power or Energy N/A  
 Arc Time N/A  
 Weld Bead Length N/A  
 Tungsten Electrode Size N/A  
 Mode of Metal Transfer for GMAW (FCAW) N/A  
 Heat Input See Table Welding Parameter  
 Other N/A

### POSITION (QW - 405)

Position(s) of Groove 3G  
 Weld Progression (Uphill, Downhill) Uphill  
 Other N/A

### TECHNIQUE (QW - 410)

Travel Speed See Table Welding Parameter  
 String or Weave Bead Weave  
 Oscillation N/A  
 Multipass or Single Pass (Per Side) Multipass  
 Single or Multiple Electrodes Single  
 Other N/A

### PREHEAT (QW - 406)

Preheat Temperature 55 °C  
 Interpass Temperature 230 °C  
 Other N/A

AUG - 07901 / 0015 / 2021

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### PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld test Coupon

Page No : 2 of 3

Procedure Qualification Record No. : 008/HEI/PQR/MIGAS/21

Rev. 0

#### WELDING PARAMETER

Weld No.	Welding Process	Filer Metal		Type Polarity	Ampere	Volt	Travel Speed Range (mm/min)	Heat Input (Kj)
		Class	Dia.					
Front Side								
1	SMAW	E 7018-1H4R	3.2 mm	DCEP	96	24	67	2,06
2					102	26	68	2,34
3					110	25	74	2,23
4					114	24	71	2,31
5					118	25	74	2,39
6					122	27	82	2,41
Back Side								
7	SMAW	E 7018-1H4R	4.0 mm	DCEP	110	26	82	2,09
8					122	27	84	2,35
9					124	26	85	2,28

#### TENSILE TEST (QW - 160)

Specimen No.	Width (mm)	Thickness (mm)	Area (mm <sup>2</sup> )	Ultimate Total Load (kN)	Ultimate Unit Strength (N/mm <sup>2</sup> )	Type Failure & Location
T1	19,57	24,6	481,42	261,4	543	Ductile (base metal)
T2	19,53	24,55	479,46	262,47	547	Ductile (base metal)

#### GUIDE BENT TESTS (QW - 160)

Type and Figure No.	Result
Side Bend (SB1)	No open discontinuity was observed
Side Bend (SB2)	No open discontinuity was observed
Side Bend (SB3)	No open discontinuity was observed
Side Bend (SB4)	No open discontinuity was observed

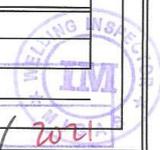
#### TOUGHNESS TESTS (QW -170)

Specimen No.	Notch Location	Specimen Size	Test temp. (°C)	Toughness Values		Drop Weight Break (Y/N)
				% Shear	Mils (in.) or mm	
N/A	N/A	N/A	N/A	N/A		N/A

Comments \_\_\_\_\_

Nomor Registrasi Migas

AYG - 07981 / 0015 / 2021





	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 40 of 68



## PT. Hi-Test Laboratory of Mechanical Testing

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Bumi Serpong Damai (BSD) – Tangerang - Indonesia  
Telp : +62 21 75882884; Fax : +62 21 75882885  
E-mail : [hi-test@hitestlab.com](mailto:hi-test@hitestlab.com)  
Website : [www.hitestlab.com](http://www.hitestlab.com)



## Testing Report

(This Report is issued subjected to the term & conditions set out below)

<b>Customer</b>	: PT. Hanazono Engineering Indonesia	<b>Job No</b>	: B21654
<b>Address</b>	: Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	<b>No.</b>	: HT/JKT/1021/0095
<b>Reference Code</b>	: ASME Sect. IX : Ed 2021	<b>Total of Page</b>	: 1 of 2
<b>Test Method</b>	: ASTM E8/E8M-21	<b>Date of Received</b>	: 14 October 2021
<b>Object to be tested</b>	: (as received)	<b>Date of Tested</b>	: 19 October 2021
		<b>PO No</b>	: --
		<b>Project Name</b>	: --
		<b>Sample Marking</b>	: 10. HEI 1

One welded carbon steel plate Joint test sample, size: 25 mm thickness, material spec: SA 516 Gr. 70, WPS No. 008/HEI/WPS/MIGAS/21, PQR No. 008/HEI/PQR/MIGAS/21, welding process: SMAW, welding position: 3G, filler metal: E7018, for Welding Procedure Specification Test.

**Type of Test** : Reduced Section Tension Test (Transverse Specimen)  
**Environment Temp** : 26.1°C

Test Specimen No	T1	T2
<b>Measured Thickness (mm)</b>	24.60	24.55
<b>Measured Width (mm)</b>	19.57	19.53
<b>Effective Area (mm<sup>2</sup>)</b>	481.42	479.46
<b>Ultimate Tensile Load (kN)</b>	261.40	262.47
<b>Ultimate Tensile Strength (N/mm<sup>2</sup>)</b>	543	547
<b>Location of Failure</b>	Base Metal	Base Metal
<b>Type of Failure</b>	Ductile	Ductile

**Testing Machine Used** : INSTRON 600 DX,  
Model: 600 DX, S/N: S2513, Capacity : 600 kN  
**Remark** : --  
**Test Conducted By** : Canra Latipolia, ST  
**Witnessed By** :

Approved Signatory {

**Suhadi, ST**  
Laboratory Manager

### Term & Conditions

- The report is prepared for the sole use of the Client and is prepared based upon the item submitted, the Services required by the Client and the conditions under which the Services are performed by PT. Hi-Test  
The Report is not intended to be representative of similar or equivalent Services on similar or equivalent items. The Report does not constitute an endorsement by PT. Hi-Test of the Item.
- PT. Hi-Test agrees to use reasonable diligence in the performance of the Services but no warranties are given and none may be implied directly or indirectly relating to the Services, the Report or the facilities of PT. Hi-Test.
- The Report may not be reproduced in part or in full unless approval in writing has been given by PT. Hi-Test.
- PT. Hi-Test shall under no circumstances be liable to the Client or its agents, servants or representatives, in contract, tort (including negligence or breach of statutory duty) or otherwise for any direct or indirect loss or damage suffered by the Client. Its agents, servants or representatives howsoever arising or whether connected with the Services provided by PT. Hi-Test herein.

Form No: HT/QM-F/TENSILE/RED-SEC/3 Rev.0

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2005)

Date of Issued 06/01/2014

	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 41 of 68



## PT. Hi-Test Laboratory of Mechanical Testing

BSD City :  
Taman Tekno Blok A2 No. 49  
Bumi Serpong Damai (BSD) – Tangerang - Indonesia  
Telp : +62 21 75882884; Fax : +62 21 75882885  
E-mail : [hi-test@hitestlab.com](mailto:hi-test@hitestlab.com)  
Website : [www.hitestlab.com](http://www.hitestlab.com)



## Testing Report

(This Report is issued subjected to the term & conditions set out below)

<b>Customer</b>	: PT. Hanazono Engineering Indonesia	<b>Job No</b>	: B21654
<b>Address</b>	: Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	<b>No.</b>	: HT/JKT/1021/0095
<b>Reference Code</b>	: ASME Sect. IX : Ed 2021	<b>Total of Page</b>	: 2 of 2
<b>Test Method</b>	: ASTM E190-14	<b>Date of Received</b>	: 14 October 2021
<b>Object to be tested</b>	: (as received)	<b>Date of Tested</b>	: 19 October 2021
		<b>PO No</b>	: --
		<b>Project Name</b>	: --
		<b>Sample Marking</b>	: 10. HEI 1

One welded carbon steel plate Joint test sample, size: 25 mm thickness, material spec: SA 516 Gr. 70, WPS No. 008/HEI/WPS/MIGAS/21, PQR No. 008/HEI/PQR/MIGAS/21, welding process: SMAW, welding position: 3G, filler metal: E7018, for Welding Procedure Specification Test.

**Type of Test** : Bending Test (Transverse Specimen)

<b>Test Temperature</b>	: 26.1°C	<b>Test Specimen Width</b>	: 10 mm
<b>Test Weld Ment Thickness</b>	: 25 mm	<b>Bend Angle</b>	: 180 Degree
<b>Former Diameter</b>	: 40 mm		
<b>Shoulder Distance</b>	: 63 mm		

Specimen No	Type of Bend	Observation	Result
SB1	Side Bend	No Open Discontinuity was Observed	Accepted
SB2	Side Bend	No Open Discontinuity was Observed	Accepted
SB3	Side Bend	No Open Discontinuity was Observed	Accepted
SB4	Side Bend	No Open Discontinuity was Observed	Accepted

**Testing Machine Used** : MOTOR PUMP BENDING TEST MACHINE,  
Model: Daventry England, S/N: DG 8881, Capacity: 700 Bar

**Remark** : --

**Test Conducted By** : Deri Rizki Ramadhan, ST

**Witnessed By** :

Approved Signatory



Suhadi, ST  
Laboratory Manager

### Term & Conditions

- The report is prepared for the sole use of the Client and is prepared based upon the Item submitted, the Services required by the Client and the conditions under which the Services are performed by PT. Hi-Test.
- The Report is not intended to be representative of similar or equivalent Services on similar or equivalent items. The Report does not constitute an endorsement by PT. Hi-Test of the Item.
- PT. Hi-Test agrees to use reasonable diligence in the performance of the Services but no warranties are given and none may be implied directly or indirectly relating to the Services, the Report or the facilities of PT. Hi-Test.
- The Report may not be reproduced in part or in full unless approval in writing has been given by PT. Hi-Test.
- PT. Hi-Test shall under no circumstances be liable to the Client or its agents, servants or representatives, in contract, tort (including negligence or breach of statutory duty) or otherwise for any direct or indirect loss or damage suffered by the Client. Its agents, servants or representatives howsoever arising or whether connected with the Services provided by PT. Hi-Test herein.

Form No: HT/QM-F/BEND/3 Rev.0

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2005)

Date of Issued 06/01/2014

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

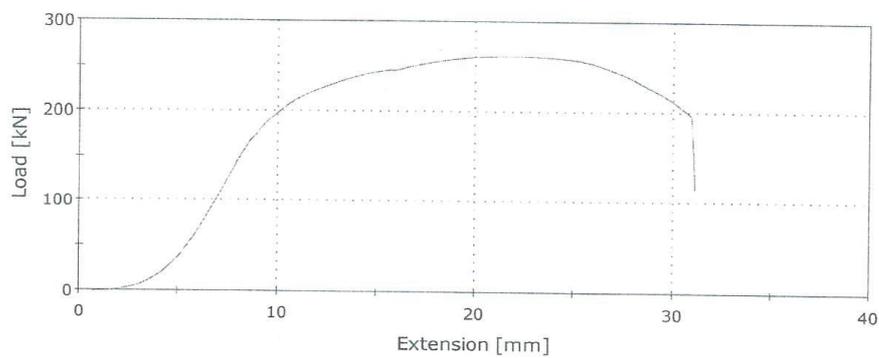
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Tuesday, October 19, 2021

### PT. HI-TEST

Company	PT. Hanazono Engineering Indonesia
Report No	HT/JKT/1021/0095
Sample/Stamp No	10. HEI 1 - T1

Stress vs Strain



	Specimen label	Thickness [mm]	Width [mm]	Initial Area [mm <sup>2</sup> ]	Load at Tensile Strength [kN]	Tensile Stress [MPa]
1	10. HEI 1 - T1	24.60	19.57	481.42	261.40	543

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

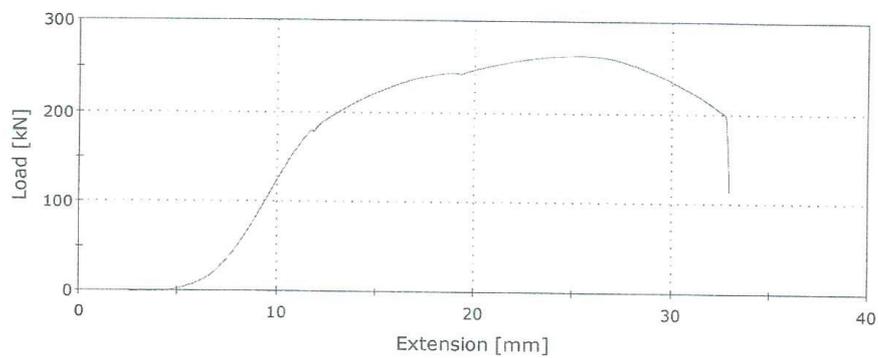
Page 43 of 68

Tuesday, October 19, 2021

**PT. HI-TEST**

Company	PT. Hanazono Engineering Indonesia
Report No	HT/JKT/1021/0095
Sample/Stamp No	10. HEI 1 - T2

Stress vs Strain



	Specimen label	Thickness [mm]	Width [mm]	Initial Area [mm <sup>2</sup> ]	Load at Tensile Strength [kN]	Tensile Stress [MPa]
1	10. HEI 1 - T2	24.55	19.53	479.46	262.47	547

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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**PT GUNUNG RAJA PAKSI Tbk**  
SHAPING TOMORROW  
Plate Mill

**MILL TEST CERTIFICATE**

MAX 10 EN 10201:2004

Purchaser: CV. MIFRAMUDA MANJARI

Material: Hot Rolled Steel Plates  
Specification: ASME SA 312 Grade 304 - SS - (2017)  
General Requirement: ASME SA 312 (2017)  
Supplementary Requirement: Impact Test  
Supply Condition: Normalized

Head Office & Factory: Jl. Ponggung No. 8 Rp, Tangguli RT. 003/004 Subdusun, Caringin Baran, Teluk TUBU, Arosi Jaya, TELUK NISKA

CERTIFICATE NUMBER: GRP QA MTC / REER / MI / 30RP  
CERTIFICATE DATE: 2020 12 11  
S/C: ANANTA Ys.

PLATE ID	DIMENSIONS		WEIGHT MT	WELDED QTY	CHEMICAL ANALYSIS (%)											TENSILE TEST (F150)			NORMALIZING TEMPERATURE and TIME			IMPACT VALUE (JULIE)													
	T mm	W mm			L mm	C	Mn	P	S	Nb	Cu	Cr	Ni	Mo	V	Al	Ti	N	E	Cl	U.S. N/mm <sup>2</sup>	U.S. N/mm <sup>2</sup>	U.S. N/mm <sup>2</sup>	Temp. °C	Time Min/Sec	Temp. °C	Time Min/Sec	Temp. °C	Time Min/Sec						
Item No. 23	25	1524	6200	1.929	1	0.27	0.26	1.10	0.012	0.008	0.003	0.21	0.11	0.10	0.022	0.004	0.026	0.003	0.010	0.002	0.26	385	551	32	890	31	97	82	76	85					
2004 100412007 E3-1																																			
2004 100412007 E3-2																																			
2004 100412007 E3-3																																			
2004 100412007 E3-4																																			
Total Weight																																			
Total Qty																																			
Item No. 24	25	2438	6200	3.135	1	0.22	0.28	1.07	0.015	0.009	0.003	0.18	0.23	0.09	0.018	0.005	0.031	0.002	0.009	0.002	0.17	368	578	30	890	31	91	77	64	67					
2004 100412003 D2-1																																			
2004 100412003 D2-2																																			
2004 100412003 D2-1																																			
2004 100412003 D2-2																																			
2004 100412003 E2-1																																			
2004 100412003 E2-2																																			

REMARKS: "The plate is subjected to cold forming operation, surface, forming such as blasting process has to be performed prior to cold forming operation."

We hereby certify that the material described herein has been made & satisfactorily tested in accordance with above specification.

Prepared by:

*Revised by*  
*Approved by*



Approved by: *[Signature]*  
SMA NIS

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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## RADIOGRAPHY EXAMINATION REPORT

Head Office : Jl. Willemala Muband II, Kav.1 - 2, Jati Asih  
Bekasi 17412 - Jawa Barat, Indonesia  
PT. HANA ZENGO ENGINEERING  
Phone : +62-21-8243-8561 / 8241-5794  
Fax : +62-21-8243-5168  
Email : admin@hzenzo.id Website : www.hzenzo.id

Page 1 of 1

Report No. : 002/RT/WPS/HBT/0021 Shooting Date : 28-08-2021 Date of Report : 29-09-2021		Job No. : Work Order / Request No. : Location :	
Radiation Source : IR-192 P/S Source Size : 2.7 x 2.1 mm Activity : EC Ci Exp. Time : 1 Min.		Screen Type : LEAD Back / Front Thickness : 0.125 mm Double : <input type="checkbox"/> Single Lead <input checked="" type="checkbox"/> Film Type : ASFA D7	
Client : PT. HANA ZENGO ENGINEERING INDONESIA Contractor : Project : WELDING PROCEDURE QUALIFICATION Radiographic Procedure : RSS/RT-ASME VIII Application Code : ASME VIII DIV. 1 Material Specification : SA 516 GR. 70		SFP : 391 mm / inch S90P : 27 mm / inch SCD : 384 mm / inch Penetration : ASTM IB	
RT Tech : DWST <input type="checkbox"/> DWDT <input type="checkbox"/> SWS <input type="checkbox"/> RT Type : S Side <input type="checkbox"/> F Side <input type="checkbox"/> Sensitivity: Ref No 10 F Density: 2.4 Unsharp. Coef. : 0.29 mm.		Type of Discontinuity: Cracks Incomplete Penetration Incomplete Fusion Slag Inclusion Slag Lines Concavity Under Cut Gas and Worm Hole Porosity Others	
Film SEQUENCE Location Marker 4"x10" 4"x15" 7"x17"		Welder Stamp IM 0305 AM-1703	
Material Spec Thick TC 01 Thick 25 mm		Comments: Total Welds/Film Used : 1 Joints : [ 4' x 10" ] : Shears : [ 4' x 15" ] : 1 Shears : [ 7' x 17" ] :	
Identification 008/HE/WPS/0305/21		Remarks Inspector Range Density Sensitivity Others	
Technician: Date: 29-09-2021		Authorized Inspector: Date:	

M. E. H. H. S.  
 M. E. H. H. S.  
 M. E. H. H. S.



# POBOYA 2000 TPD EXPANSION PROJECT



(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

Kawasan Industri Jababeka Cikarang  
Jl. Industri Selatan 2 Blok JJ NO. 7-10  
17630 Bekasi  
T. +6221893 7572, F. +6221893 7518  
www.voestalpine.com/welding

PT ALLALLOY CAHAYA DYNAWELD  
JL. PANTAI INDAH SELATAN KOMP.  
KAMAL MUARA, PENJARINGAN  
14470 Jakarta Utara  
Indonesia

### Inspection certificate 3.1

as per : EN 10204

No. : 2021-2047013281-10-20969-025

Rev. 0

Page 1 of 1

PO no.	ACD/GT-N/21/03/0190	of	09.03.2021
Order no.	1042005117		
Delivery note/pos./splitt	2047013281/000000/000010	of	16.03.2021
Product	covered electrode		
Trade name	BOHLER FOX S EV 50-1		
Standard designation	ISO 2560-B : E 49 18-1 A U H 5 ISO 2560-A : E 42 5 B 42 H5 AWS A5.1/SFA 5.1 : E7018-1H4R		
Dimension	SMAW 4,00 x 350 mm		
Lot no.	20969		118555 80834
Quantity	800,0 KG		JUPB010E 0425

Chemical composition in % of the weld metal

C	Si	Mn	P	S	Cr	Mo	Ni	V	Cu					
0,09	0,43	1,20	0,018	0,007	0,027	0,007	0,013	0,003	0,016					

Mechanical properties

EN 10204: 2.2

Tensile test		according to : ASTM E8						according to : AWS B4.0	
Specimen preparation									
T	ReL / Rp 0,2 MPa	Rp 1,0 MPa	Rm MPa	A (Lo = 4d) %	Z %	WBH	Remarks		
25°C	470		570	30		PWHT AW			
Impact test		according to : ASTM E23						according to : AWS B4.0	
Specimen preparation									
T	Impact energy KV / J	Average KV / J	Lateral expansion mm	Shear fracture %	WBH	Remarks			
-50°C		90			PWHT AW				

The product BOHLER FOX S EV 50-1 meets the requirements of the filler metal specification ASME sec II, part C, AWS A5.1/SFA 5.1 : E7018-1H4R when tested in accordance with that specification.

Town  
Bekasi

Date  
18.03.2021

This certificate was issued by DP-equipment and does not require signature.

Authorized representative  
Miftah Farid



Reviewed by,  
Date  
Signature  
09 Oct 01. 2021

voestalpine

ONE STEP AHEAD.

	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 47 of 68

PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

Kawasan Industri Jababeka Cikarang  
Jl. Industri Selatan 2 Blok JJ NO. 7-10  
17630 Bekasi  
T. +6221893 7572, F. +6221893 7518  
www.voestalpine.com/welding

PT ALLALLOY CAHAYA DYNAWELD  
JL. PANTAI INDAH SELATAN KOMP.  
KAMAL MUARA, PENJARINGAN  
14470 Jakarta Utara  
Indonesia

**Inspection certificate 3.1**

as per : EN 10204  
No. : 2021-2047013367-20-20981-025  
Rev. 0 Page 1 of 1

PO no.	ACD/YG-N/21/02/0114	of	15.02.2021
Order no.	1042005053		
Delivery note/pos./splitt	2047013367/000000/000020	of	25.03.2021
Product	covered electrode		
Trade name	BOHLER FOX S EV 50-1		
Standard designation	ISO 2560-B : E 49 18-1 A U H 5 ISO 2560-A : E 42 5 B 42 H5 AWS A5.1/SFA 5.1 : E7018-1H4R		
Dimension	SMAW 3,25 x 350 mm		
Lot no.	20981		118955 82915
Quantity	640,0 KG		JUP8610E 0425

Chemical composition in % of the weld metal

C	Si	Mn	P	S	Cr	Mo	Ni	V	Cu				
0,10	0,52	1,30	0,015	0,004	0,028	0,007	0,016	0,003	0,018				

Mechanical properties

EN 10204: 2.2

Tensile test								according to : ASTM E8	
Specimen preparation								according to : AWS B4.0	
T	ReL / Rp 0,2	Rp 1,0	Rm	A (Lo = 4d)	Z	WBH	Remarks		
	MPa	MPa	MPa	%	%	PWHT			
25°C	470		570	30		AW			

Impact test							according to : ASTM E23	
Specimen preparation							according to : AWS B4.0	
T	Impact energy	Average	Lateral expansion	Shear fracture	WBH	Remarks		
	KV / J	KV / J	mm	%	PWHT			
-50°C		90			AW			

The product BOHLER FOX S EV 50-1 meets the requirements of the filler metal specification ASME sec II, part C, AWS A5.1/SFA 5.1 : E7018-1H4R when tested in accordance with that specification.

Town  
Bekasi

Date  
05.04.2021

This certificate was issued by DP-equipment and does not require signature.

Authorized representative  
Miftah Farid



Reviewed by,  
OCT 04, 2021

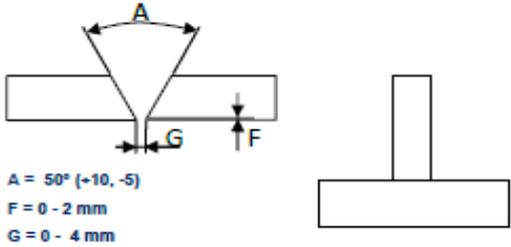
**voestalpine**  
ONE STEP AHEAD

<b>COMO</b> ENGINEERS	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 48 of 68

### 5. WPS & PQR NO. 04-WPS-HEI-MIGAS-26 & 04-PQR-HEI-MIGAS-26

 <b>PT. HANAZONO Engineering Indonesia</b> We are always partner with you	<b>Welding Procedure Specification</b> (Section IX, ASME Boiler and Pressure Vessel Code, Edition 2025)
---	--

WPS NO. :	04-WPS-HEI-MIGAS-26	Rev. :	0	Date :	February 27, 2026
Supporting PQR No.(s) :	04-PQR-HEI-MIGAS-26				
Welding Process(es) :	SMAW	Type(s) :	MANUAL		
Applicable Code :	ASME BPVC IX 2025				

<b>JOINTS (QW-402)</b>	<b>Joint Detail</b>
Joint Design :	See Joint Detail
Root Spacing :	See Joint Detail
Backing :	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Backing Material :	Weidmetal
Other :	N/A
	 <p>A = 50° (+10, -5) F = 0 - 2 mm G = 0 - 4 mm</p>

<b>BASE METAL (QW-403)</b>
P. No. : 1    Group No. : 1&2    to P. No. : 1    Group No. : 1&2
Specification Type & Grade : A 36 or Equivalent    to    A36 or Equivalent
Thickness Range    Groove : 5 mm - 40 mm    Fillet : Unlimited
Maximum Pass Thickness ≤ 1/2 In. (13mm) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Other : N/A

<b>FILLER METALS (QW-404)</b>	
Process :	SMAW
Spec No. (SFA) :	5.1
AWS. No. (Class) :	E7018
F. No. :	4
A. No. :	1
Size of Filler Metals :	See Below Table
<b>Weld Metal Thickness Range</b>	
Groove :	Max. 40 mm
Fillet :	Unlimited
Manufacturer :	Bohler or Equivalent
Brand :	-
Other :	N/A

Approvals	Prepared By	Checked By	Approved By MIGAS
Name	ANDI ISKANDAR	RUSNANDI	
Signature			
Date	February 27, 2026	February 27, 2026	



# POBOYA 2000 TPD EXPANSION PROJECT



(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

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## Welding Procedure Specification (Section IX, ASME Boiler and Pressure Vessel Code, Edition 2025)

### POSITION (QW-405)

Position of Groove : ALL

Welding Progression :  Up  Down

Position of Fillet : All

Other : N/A

### POST WELD HEAT TREATMENT (QW-407)

Temperature Range : N/A

Time Range : N/A

Other : N/A

### PREHEAT (QW-406)

Preheat

Preheat Temp. Min. : 10 °C

Interpass Temp. Max : 250 °C

Preheat Maintenance : N/A

Other : N/A

### GAS (QW-408)

	Percent composition		
	Gas(es)	(Mixture)	Flowrate
Shielding	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Trailing	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>
Backing	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

### ELECTRICAL CHARACTERISTICS (QW-409)

Process : SMAW

Current & Polarity : See Below Table

Amps (Range) : See Below Table

Volts (Range) : See Below Table

Tungsten Electrode Size and Type : N/A

Electrode Wire Feed Spec Range : N/A

Other : N/A

### TECHNIQUE (QW-410)

String or Weave Bead : Both

Orifice, Nozzle, or Gas Cup Size : N/A

Initial & Interpass Cleaning : Wire Brush & Grinding

Method of Back Gouging : Air Arc Gouging or Grinding if required

Oscillation : N/A

Contact Tube to Work Distance : N/A

Multiple or single Pass :  MULTI  SINGLE

Multiple or single Electrodes :  MULTI  SINGLE

Peening : N/A

Other : N/A

Weld Pass(es)	Process	Filler Metal		Current Type and Polarity	Amps (Range)	Wire Feed Speed (Range)	Volts (Range)	Travel Speed (Range) cm/min	Remarks
		Classification	Dia. (mm)						
As Req'd	SMAW	E7018	2.5, 3.2, 4.0	DCEP	80-160	N/A	20 - 30	3 - 8	

Remarks :

Approvals	Prepared By	Checked By	Approved By MIGAS
Name	Andi Iskandar	Rusnandi	
Signature			
Date	February 27, 2026	February 27, 2026	

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

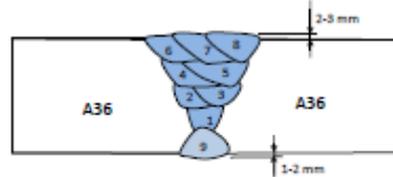
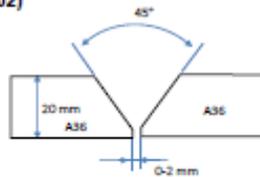
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## PROCEDURE QUALIFICATION RECORDS (PQR)

(See QW-200.1 Section IX, ASME Boiler and Pressure Vessel Code, Edition 2025)

Company Name PT. HANAZONO ENGINEERING INDONESIA Sub Contractor Name -  
 Procedure Qualification Record No. 04-PQR-HEI-MIGAS-26 Date February 27, 2026  
 WPS No. 04-WPS-HEI-MIGAS-26 Date February 27, 2026  
 Welding Process (es) SMAW  
 Types (Manual, Automatic, Semi-Auto) Manual

### JOINTS (QW-402)



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

### BASE METALS (QW-403)

Material Spec. A 36  
 Type/Grade, or UNS Number -  
 P. No. 1 Group No. 1 to P-No. 1 Group No. 1  
 Thickness of Test Coupon 20 mm  
 Diameter of Test Coupon None  
 Maximum Pass Thickness 2 mm  
 Other \_\_\_\_\_

### POSTWELD HEAT TREATMENT (QW-407)

Temperature NA  
 Time NA  
 Other NA

### FILLER METALS (QW-404)

SMAW  
 SFA Specification 5.1  
 AWS Classification E7018  
 Filler Metal F- No. 4  
 Weld Metal Analysis A-No. 1  
 Size of Filler Metal See Table  
 Filler Metal Product Form N/A  
 Supplemental Filler Metal NA  
 Electrode Flux Classification NA  
 Flux Type NA  
 Flux Trade Name NA  
 Weld Metal Thickness 20 mm  
 Other \_\_\_\_\_

### GAS (QW-408)

	Percent Composition		
	Gas (es)	(Mixture)	Flow Rate
Shielding	<u>NA</u>		
Trailing	<u>NA</u>		
Backing	<u>NA</u>		
Other	<u>NA</u>		

### ELECTRICAL CHARACTERISTICS (QW-409)

Current DC  
 Polarity EP  
 Amps. See table Volts See Table  
 Tungsten Electrode Size N/A  
 Mode of Metal Transfer for GMAW (FCAW) NA  
 Heat Input NA  
 Other NA

### POSITION (QW-405)

Position of Groove 3G  
 Weld Progression (Uphill, Downhill) Uphill  
 Other NA

### TECHNIQUE (QW-410)

Travel Speed See Table  
 String or Weave Bead Weave  
 Oscillation NA  
 Multipass or Single Pass (per side) Multiple  
 Single or Multiple Electrodes Single  
 Other NA

### PREHEAT (QW-406)

Preheat Temp. 33 °C  
 Interpass Temp. 202 °C  
 Other NA

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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Head Office : Jl. Raya Bojonegara-Serdang No. 44 RT. 001/RW.001  
Desa Kertasana, Kecamatan Bojonegara, Kabupaten Serang  
Banten, Indonesia (42414)  
Telp : +62-254-7850344/45/46/47  
e-mail : [info@hanazono.co.id](mailto:info@hanazono.co.id)

PAGE : 2 OF 2

PQR No. 04-PQR-HEI-MIGAS-28

### Welding Parameter

Weld Layers	Process	Filler Metal		Current		Voltage (V)	Travel Speed (mm/min)	Heat Input (KJ/mm)
		Class	Dia. (mm)	Polarity	Ampere (A)			
1	SMAW	E7018	3.2	DCEP	100	20	37,36	3,21
2	SMAW	E7018	3.2	DCEP	120	22	52,36	3,03
2	SMAW	E7018	3.2	DCEP	120	22	43,60	3,63
2	SMAW	E7018	3.2	DCEP	124	25	55,05	3,38
2	SMAW	E7018	3.2	DCEP	124	25	64,10	2,90
3	SMAW	E7018	3.2	DCEP	122	24	58,82	2,99
4	SMAW	E7018	3.2	DCEP	122	24	68,97	2,55
5	SMAW	E7018	3.2	DCEP	122	24	65,22	2,69
6	SMAW	E7018	3.2	DCEP	120	24	69,44	2,49

### Tensile Test (QW-150)

Specimen No.	Width (mm)	Thickness (mm)	Area (mm <sup>2</sup> )	Ultimate Total Load (kN)	Ultimate Unit Stress (N/mm <sup>2</sup> )	Type of Failure and Location
T1	19,49	19,54	380,83	193,77	509	Ductile (Base Metal)
T2	19,45	19,56	380,46	192,54	506	Ductile (Base Metal)

### Guided - Bend Test (QW-160)

Type and Figure No.	Result
Side Bend (SB1)	No Open Discontinuity was observed
Side Bend (SB2)	No Open Discontinuity was observed
Side Bend (SB3)	No Open Discontinuity was observed
Side Bend (SB4)	No Open Discontinuity was observed

### Toughness Tests (QW-170)

Specimen No.	Notch Location	Specimen Size	Test Temperature	Impact Values			Drop Weight Break (Y/N)
				ft-lb or J	% Shear	Mils (in.) or mm	

Comments : NA

#### Fillet - Weld Test (QW-180)

Result - Satisfactory : Yes NA No. NA Penetration into parent metal : Yes NA No. NA

Macro - Result NA

#### Other Tests

Type of test NA

Deposit Analysis NA

Radiographic Result Accepted Report No. 01/RT/RPD/II/26

Other NA

Welder's Name : SAHRUL Clock No. - Stamp No. SR-0904

Test conducted by : PT. HI-Test Laboratory Test No. HT/JKT/0226/0245

Date February 23, 2026

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.

Prepared By,

Andi Iskandar

Date : February 27, 2026

Reviewed By,

Rushandi

Date : February 27, 2026

Approved By,

MIGAS

Date :



	<b>POBOYA 2000 TPD EXPANSION PROJECT</b>	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 53 of 68



## PRELIMINARY TESTING REPORT



Report No : HT/JKT/0226/0245  
Date Issued : N/A  
Page : 1 of 3

CUSTOMER : PT. Hanazono Engineering Indonesia  
ADDRESS : Jl. Raya Bojonegara - Serdang No. 44 RT. 001/RW. 001, Desa Kertasan, Kecamatan Bojonegara, Kab. Serang  
REFERENCE CODE : ASME BPVC. IX - 2025

Sample description and object to be tested (As Received / the Customer states):

Plate, Size : Thickness Plate 20 mm, Material spec : ASTM A36, WPS No: 04-WPS-HEI-MIGAS-26, PQR No: 04-PQR-HEI-MIGAS-26, Welding Process: SMAW, Welding Position: 3G, for Welding Procedure Specification Test.

PT Hi-Test Sample Marking : 2. HEI 1  
Date of Received : 21/02/2026  
Date Tested : 23/02/2026  
Testing Result : Please refer to the following page (s)  
Test Conducted By : - M. Anjar Rizki, ST (Tensile Welding Transverse)  
- Fikri Taufik Iskandar., ST (Bending)  
Witnessed By :

Approved Signatory  
Laboratory Manager  
PT Hi Test

Suhadi, ST

### Term & Conditions

The Report is prepared for the sole use of the Client and is prepared based upon the item submitted, the Services required by the Client and the conditions under which the Services are performed by PT. Hi-Test. The Report is not intended to be representative of similar or equivalent Services on similar or equivalent Items. The Report does not constitute an endorsement by PT. Hi-Test of the Item. PT. Hi-Test agrees to use reasonable diligence in the performance of the Services but no warranties are given and none may be implied directly or indirectly relating to the Services, the Report or the facilities of PT. Hi-Test. This report shall not be reproduced except in full unless permission for the reproduction of an approved abstract has been obtained in writing from PT. Hi-Test. PT. Hi-Test shall under no circumstances be liable to the Client or its agents, servants or representatives, in contract, tort (including negligence or breach of statutory duty) or otherwise for any direct or indirect loss or damage suffered by the Client, its agents, servants or representatives shows ever arising or whether connected with the Services provided by PT. Hi-Test herein.

### PT Hi-Test

Taman Tekno Blok A2 No. 49  
Bumi Serpong Damai (BSD),  
Tangerang – Indonesia.  
Telp: +62 21 75881884  
E-mail: hi-test@hittestlab.com

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

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E2502

Purchase Order No. : 11580

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Taman Tekno Blok A2 No. 49  
Duri Serang Duri (8500),  
Tangerang - Indonesia  
Telp: +62 21 75001884  
E-mail: hi-test@hitestlab.com

## TESTING REPORT

(This Report is issued to the terms & conditions set out below)



Customer	: PT. Hanazono Engineering Indonesia	Job No.	: B26144
Address	: Jl. Raya Bojonegara - Serdang No. 44 RT. 001/RW. 001, Desa Kertasan, Kecamatan Bojonegara, Kab. Serang	Report No.	: HT/JKT/0226/0245
Reference Code	: ASME BPVC. IX - 2025	Date Tested	: 23 February 2026
Sample Marking	: 2. HEI 1	Test Method	: ASTM E8/E8M - 25
Type of Test	: Tensile Welding Transverse	Direction	: Butt Weld
Temperature	: 25.4 °C	Page	: 2 of 3

Specimen No	T1	T2
Thickness (mm)	19.54	19.56
Width (mm)	19.49	19.45
Area (mm <sup>2</sup> )	380.83	380.46
Force at Tensile Strength (kN)	193.77	192.54
Tensile Stress at Tensile Strength (MPa)	509	506
Location Failure	Base Metal	Base Metal
Type of Failure	Ductile	Ductile

Testing Machine

GOTECH COMPUTERISED UNIVERSAL TESTING MACHINE, Model : GT-7001-LS 50, S/N : TC0900251, Capacity : 500 kN

Test Conducted

M. Anjar Rizki, ST

Approved Signatory  
Laboratory Manager  
PT HI Test

Suhadi, ST

(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

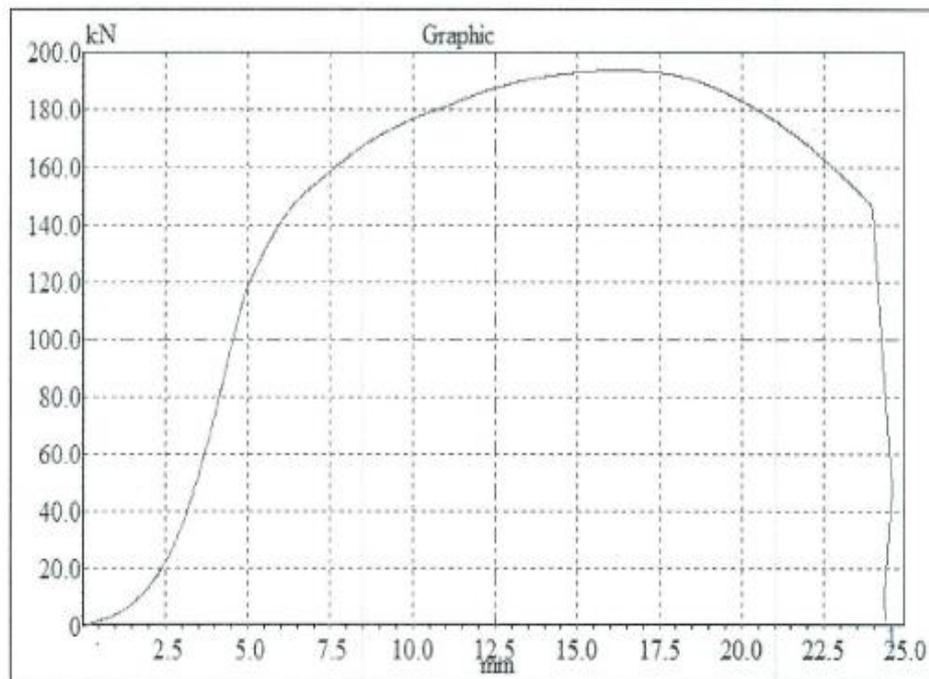
(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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Test date	ReportNo	Sample
23-02-2026	HT/JKT/0226/0245	2. HEI 1 - T1

No.	Thickness mm	Width mm	Area mm <sup>2</sup>	Max. Load kN	UTS N/mm <sup>2</sup>
1	19.54	19.49	380.83	193.77	509



(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

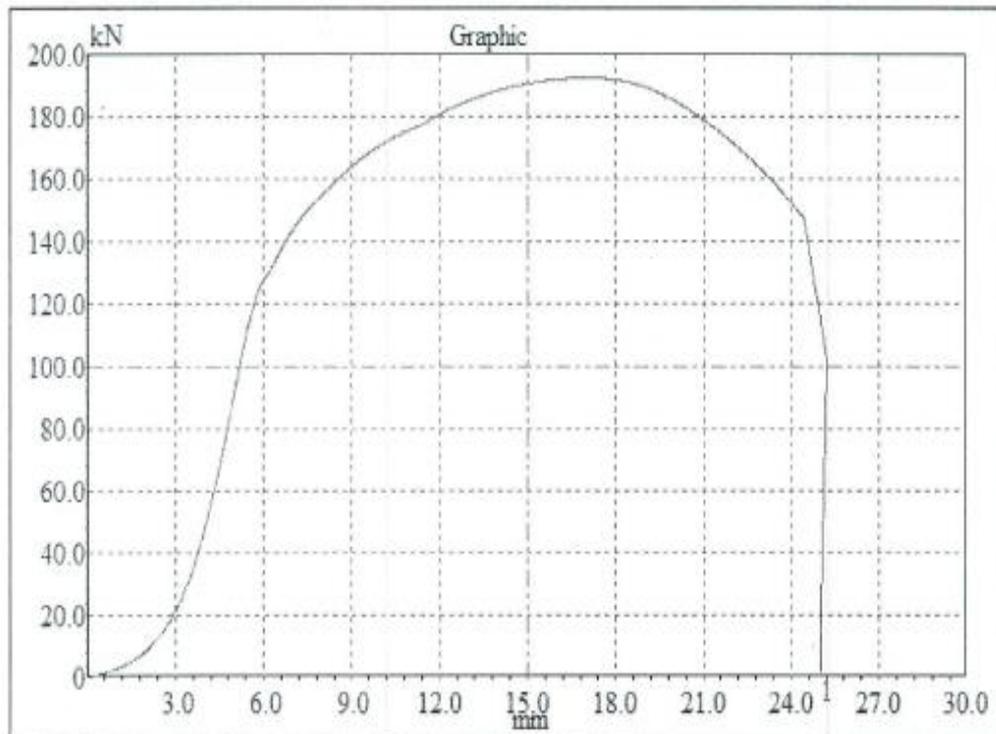
(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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Test date	ReportNo	Sample
23-02-2026	HT/JKT/0226/0245	2. HEI 1 - T2

No.	Thickness mm	Width mm	Area mm <sup>2</sup>	Max. Load kN	UTS N/mm <sup>2</sup>
1	19.56	19.45	380.46	192.54	506



(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

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E2502

Purchase Order No. : 11580

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## TESTING REPORT

(This Report is issued to the terms & conditions set out below)



Customer	: PT. Hanazono Engineering Indonesia	Job No.	: B26144
Address	: JL. Raya Bojonegara - Serdang No. 44 RT. 001/RW. 001, Desa Kertasan, Kecamatan Bojonegara, Kab. Serang	Report No.	: HT/JKT/0226/0245
Reference Code	: ASME BPVC. IX - 2025	Date Tested	: 23 February 2026
Sample Marking	: 2. HEI 1	Test Method	: ASTM E190-21
Type of Test	: Bending	Direction	: Transverse Weld
Temperature	: 25.1 °C	Page	: 3 of 3

Bending Test	Transversal Specimen
Test Specimen Width	10 mm
Test Specimen Thickness	20 mm
Former Diameter	40 mm
Shoulder Distance	63 mm
Bend Angle	180°

Sample Identification	Type of Bend	Observation	Result
SB1	Side Bend	No Discontinuities	Accepted
SB2	Side Bend	No Discontinuities	Accepted
SB3	Side Bend	No Discontinuities	Accepted
SB4	Side Bend	No Discontinuities	Accepted

Testing Machine	MOTOR PUMP BENDING TEST MACHINE, Model : Daventry England, S/N : DG 8881, Capacity : 700 Bar
-----------------	--

Test Conducted: Fikri Taufik Iskandar, ST

Approved Signatory  
Laboratory Manager  
PT Hi Test

Suhadi, ST

### Term and Condition

- The Report is prepared for the sole use of the Client and is prepared based upon the item submitted, the Services required by the Client and the conditions under which the Services are performed by PT. Hi-Test.
- PT. Hi-Test agrees to use reasonable diligence in the performance of the Services but no warranties are given and none may be implied directly or indirectly relating to the Services, the Report or the facilities of PT. Hi-Test.

(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : B
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 58 of 68

PT. voestalpine Böhler Welding Asia Pacific

PT. voestalpine Böhler Welding Asia Pacific

Jl. Industri Selatan 2 Blok JJ No. 7-10  
Kawasan Industri Ababekta, Cikarang, Bekasi  
17530 Indonesia

www.voestalpine.com/welding

*Jae*

PT Bhinneka Bajasas

Inspection certificate 3.1

JL. Karang Bolong Raya No. 5  
14430 Jakarta  
Indonesia

as per : EN 10204  
No. : 2025-2047022863-20-A102856-025  
Rev. 0 Page 1 of 1

PO no.	PO.BB-BOHLER.VIII.2025.055	of	11.09.2025
Order no.	1042009318		
Delivery note/pos./split	2047022863/000000/000020	of	30.09.2025
Product	covered electrode		
Trade name	<b>BÖHLER FOX 5 EV 50</b>		
Standard designation	EN ISO 2560-B - E 49 18 A U H5 EN ISO 2560-A - E 42 3 B 42 H5 AWS A5.1/ASME SFA-5.1: E7018-H4R		
Dimension	SMAW 3,25 x 350 mm		
Lot no.	A102856		
Quantity	1980,0 KG		

**Chemical composition in % of the weld metal**

C	Si	Mn	P	S	Cr	Mo	Ni	V	Cu	Nb				
0,08	0,55	1,24	0,028	0,013	0,039	0,001	0,013	0,002	0,020	0,003				

**Mechanical properties**

**ASME II C; Sch F**

Tensile test						according to : ASTM E8		
Specimen preparation						according to : AWS B4.0		
T	ReL / Rp 0,2	Rp 1,0	Rm	A (Lo = 4d)	Z	WBH	Remarks	
	MPa	MPa	MPa	%	%	PWHT		
25°C	490		560	30		AW		
Impact test						according to : ASTM E23		
Specimen preparation						according to : AWS B4.0		
T	Impact energy	Average	Lateral expansion	Shear fracture	WBH	Remarks		
	KV / J	KV / J	mm	%	PWHT			
-40°C		55			AW			

The product BÖHLER FOX 5 EV 50 meets the requirements of the filler metal specification ASME sec II, part C, AWS A5.1/ ASME SFA-5.1: E7018-H4R when tested in accordance with that specification.

TRUE COPY

HANYA BERLAKU  
UNTUK DO NO : BB/DO/25/11/00594  
CLG/12/11/2025  
PT. BHINNEKA BAJANAS

Town  
Bekasi

Date  
07.10.2025

This certificate was issued by DP-equipment and does not require signature.

Authorized representative  
Miftah Farid



(CPM Work No.)  
11580

Project Doc. No.: E2502-000-PRC-004

Revision No. : B

(Vendor Work No.)  
E2502

Purchase Order No. : 11580

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## PT. GUNAWAN DIANJAYA STEEL Tbk.

Surabaya - Indonesia

Head Office :  
J. Mergomulyo No. 25A  
Tombak Sarone - Asemrowo - Surabaya 60184  
Phone : +62.31.7480528 (Hotline)  
Fax : +62.31.7480581  
e-mail : quality@gunawansteel.com  
Website : www.gunawansteel.com

MILL TEST CERTIFICATE  
ACC. TO EN10204 : 2004 3.1

Purchaser : KORINDO HEAVY INDUSTRY PT

Jl. Wisma Korindo Jl.MT.Haryono Kav.02 Pancoran Jakarta Selatan DKI Jakarta Raya 12780

PO. NO : 4000230528

Order No. : D- 262 - 2022

Material : HOT ROLLED STEEL PLATE

Specification : ASTM A38 - 14

Tolerances : ASTM A6 - 17a

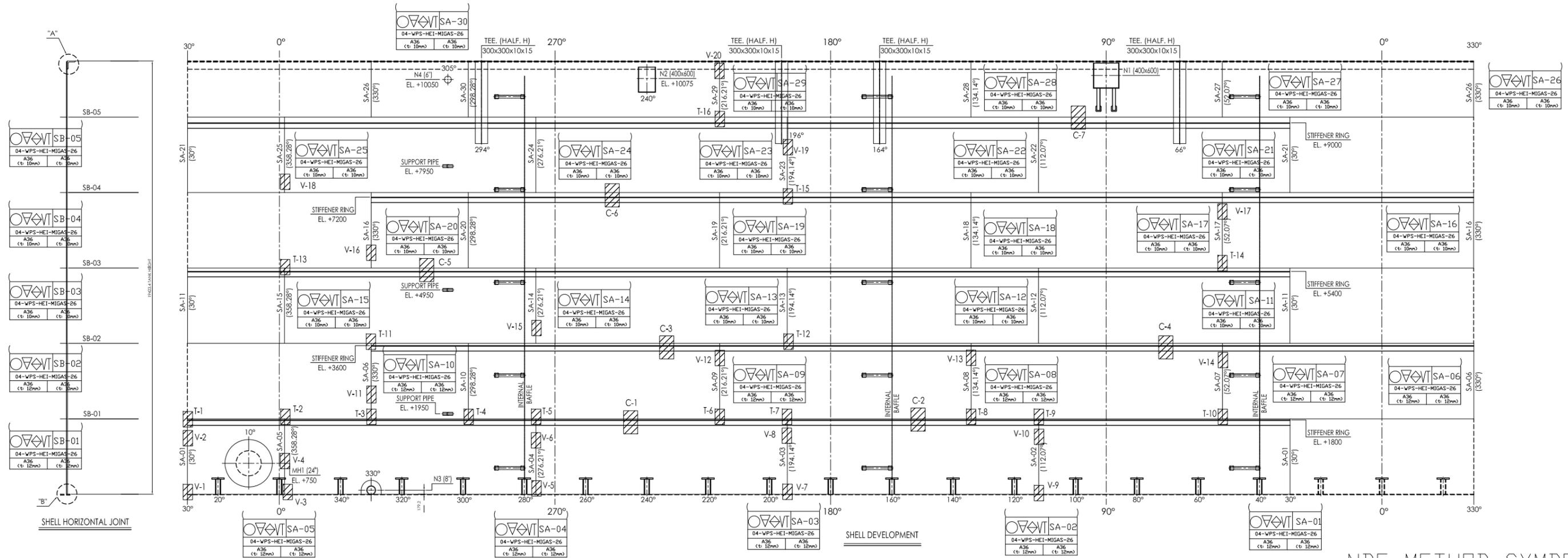
Certificate No. : GDS-QC-2022-1188  
Date : May 31, 2022  
Despatch Advice No. : LDO-2205-00243-00247

Heat Number	Plate Number	Qty	Dimensions (mm)			Weight (MT)	Ladle Analysis (%)										Tensile Test			Impact Value in Joule (°C)			Reference				
			T	W	L		C	Si	Mn	P	S	Nb	Mo	Cu	Cr	Ni	Mg	V	Al	Ti	N	Test No.		Y.S N/mm <sup>2</sup>	T.S N/mm <sup>2</sup>	EI % (20mm <sup>2</sup> min)	Charpy I
D 1200320	I 21	1	18	1524	6096	1.313	14	21	76	21	15	2	2	1	5	2	44	1	3	G6	304	440	23				
D 2202241	L 51-52	2	20	1524	6096	2.918	12	21	72	16	14	4	2	1	1	4	43	1	7	I2	307	440	29				
D 2202243	I 41-42	2	*	*	*	2.918	12	20	74	17	14	4	2	1	1	4	52	1	7	I2	305	426	30				
K 79142	I 51-52	2	*	*	*	2.918	17	24	108	11	4	3	1	0	1	3	32	2	3	L1	325	481	30				
K 79145	R 41-42	2	*	*	*	3.208	17	25	111	9	6	3	1	0	1	3	38	2	5	H2	326	487	29				
K 79159	T 41-42	2	*	*	*	3.208	16	25	107	11	6	2	1	0	1	3	37	2	3	O1	325	484	30				
K 79055	M 31-32	2	24	1524	6096	3.500	17	24	107	14	6	3	2	1	3	37	2	2	H2	334	484	29					
K 79057	F 31-32	2	*	*	*	3.500	16	24	107	12	7	3	2	1	2	3	36	3	4	M2	332	475	35				
K 79141	O 31-32	2	*	*	*	3.500	17	25	109	9	3	3	0	0	1	3	34	2	6	M4	333	484	29				
K 79146	M 31-32	2	*	*	*	3.500	16	24	107	13	6	2	1	0	1	3	36	2	3	P3	295	477	32				
K 79159	S 31-32	2	*	*	*	3.500	16	25	107	11	6	2	1	0	1	3	37	2	3	O6	328	479	32				
K 79160	S 41	1	*	*	*	1.750																					
K 79056	I 31-32	2	*	*	*	3.500	16	24	106	11	7	2	1	0	1	3	38	2	4	Q2	335	488	29				
R 220013	G 23-27	5	25	1219	2438	2.915	17	24	107	13	6	3	2	0	2	3	38	3	3	H4	327	480	29				
	H 24/27	2	*	*	*	1.166	19	23	110	7	2	<5	1	2	4	<2	50	<2	4	H2	354	498	27				
						81.256																					
						77																					

We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirement called for by the above order.

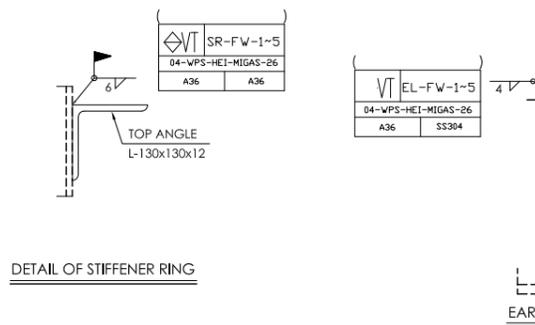
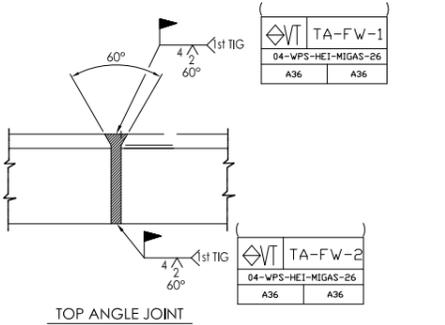
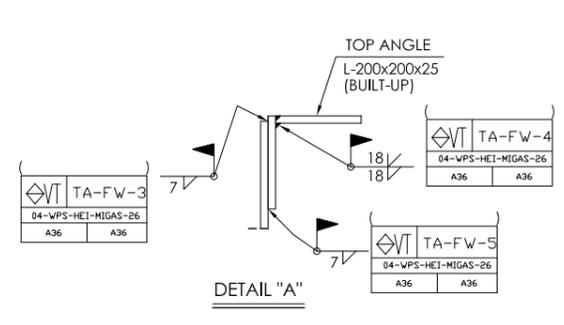
GENERAL NOTES :

- BOLT HOLE ORIENTATION  
BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
- WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
- LIQUID PENETRANT  
# LIFTING LUG AND REMOVING OF JIG  
# NOZZLE ATTACHMENT WELDING OF DUCTING



NDE METHOD SYMBOL

- VACUUM BOX
- RT 10%
- ▽ UT SPOT LAMINATION
- ◇ PT 10%
- ▽ VT VISUAL 100%

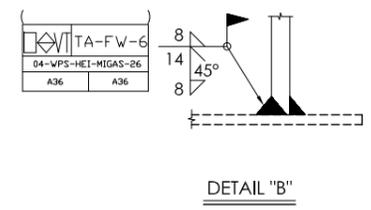


RT AREA :  
C1-C7 (CIRCUMFERENCE)  
V1-V20 (VERTICAL)  
T1-T16 (TEE)

Welding Mark & No.  
Date Welding  
CNI-1

WPS Applicable  
WPS-A001

Material Spec.



MATERIAL SPECIFICATION	
SHELL	A36
TOP ANGLE	A36
STIFFENER RING	A36

LEGEND :	
WPS NO : 04-WPS-HEI-MIGAS-26	SMW P1 to P1

REV	DATE	APPR
0	29/09/25	

CHANGE BY CAD SYSTEM ONLY

1	2

Deviation for dimensions without indication of tolerance in mm  
1) cutting + non cutting machining  
2) WELDMENT connecting + forging

Scale : NTS

Sheet No./Total sheets	1/9
Size of memory	
PT. HANAZONO Engineering Indonesia	
JOB NO.	E2502
DESIGN FOR PRODUCT	POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	LEACH TANK
REFER DWG NO.	E2502-000-DWG-102

Name: \_\_\_\_\_

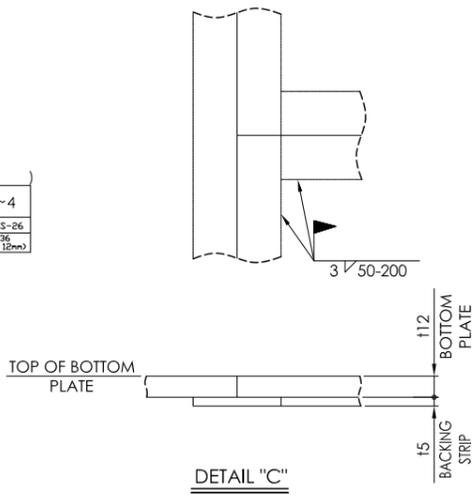
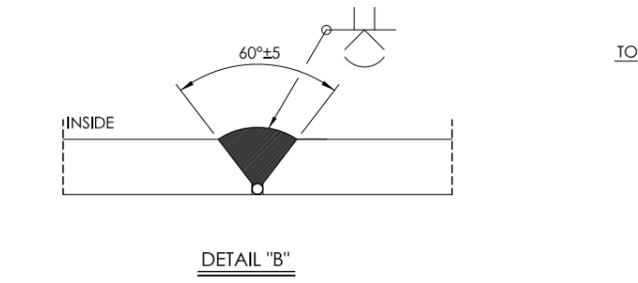
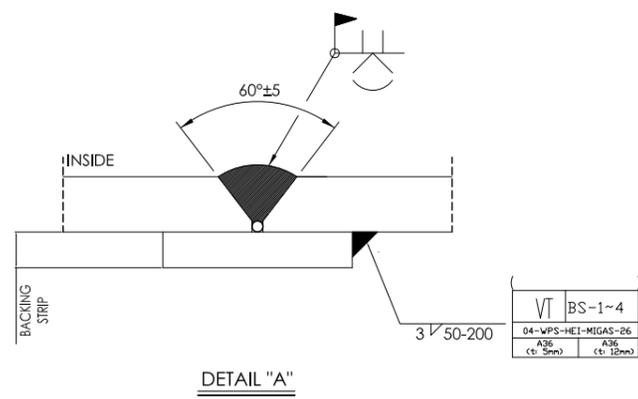
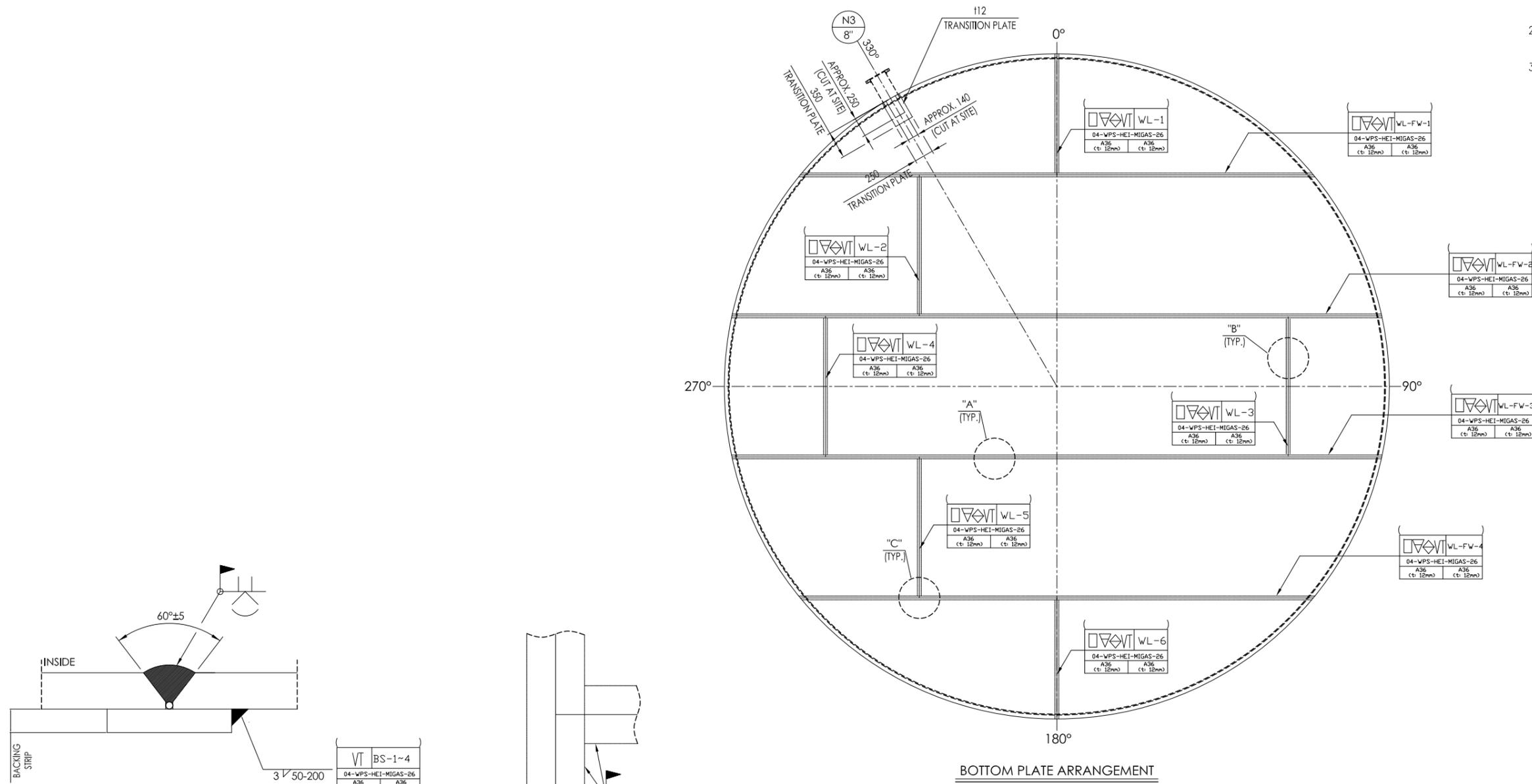
NDE MAP SHELL LEACH TANK

NDE Map No. E2502-NDE-PBY-001

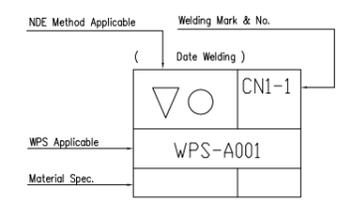
REV.

GENERAL NOTES :

- BOLT HOLE ORIENTATION  
BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
- WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
- LIQUID PENETRANT  
# LIFTING LUG AND REMOVING OF JIG  
# NOZZLE ATTACHMENT WELDING OF DUCTING



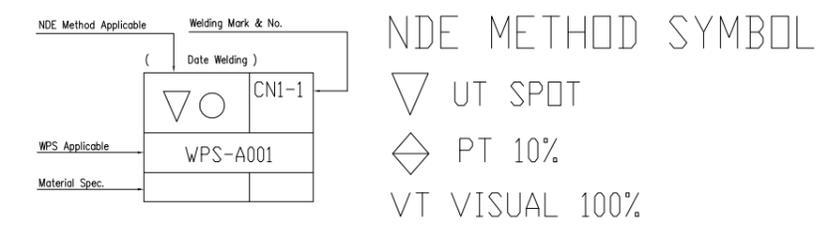
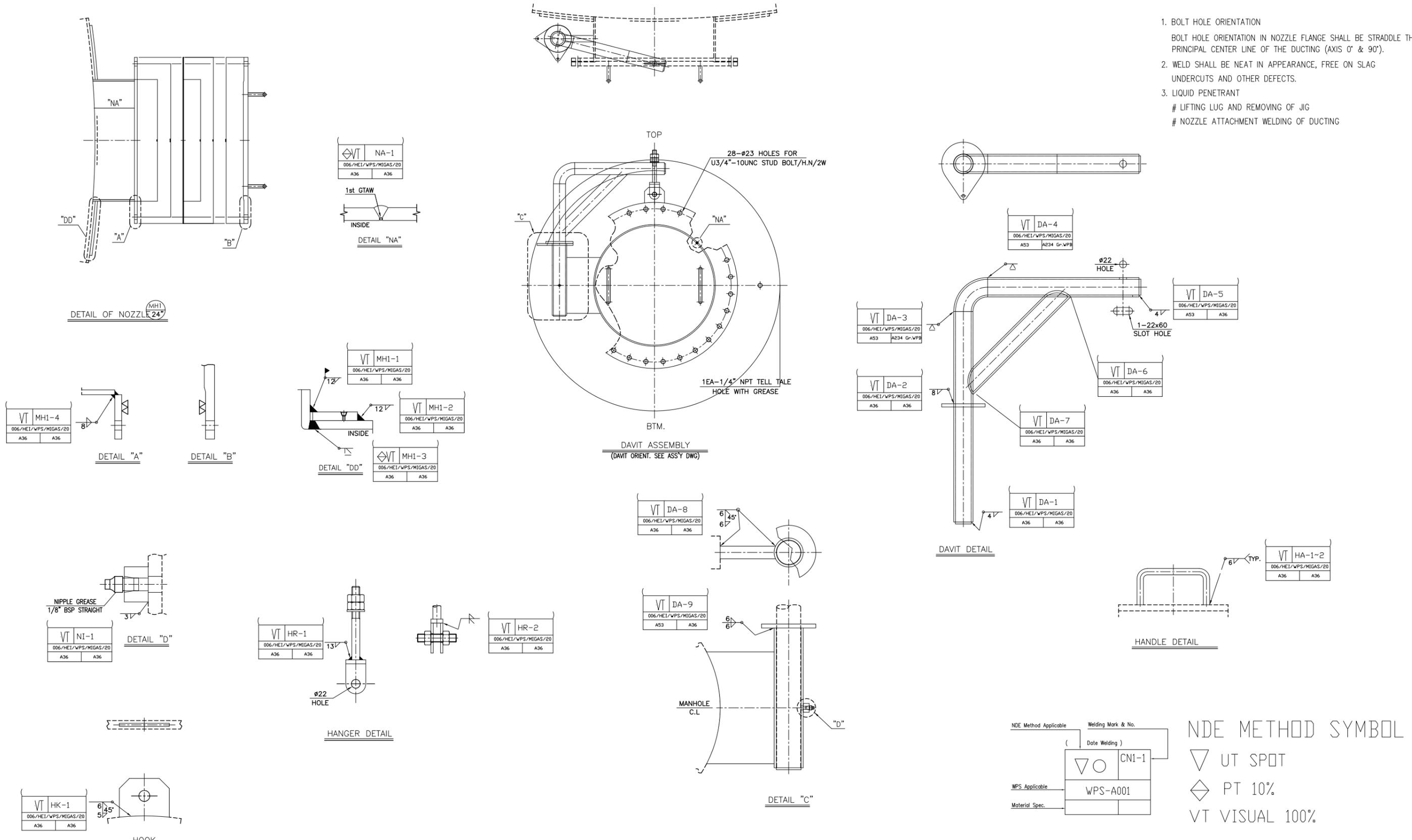
- NDE METHOD SYMBOL
- VACUUM BOX
  - ▽ UT SPOT LAMINATION CHECK FOR BOTTOM
  - ◇ PT 10%
  - VT VISUAL 100%



MATERIAL SPECIFICATION BOTTOM PLATE A36 BACKING STRIPE A36	LEGEND : WPS NO : 04-WPS-HEI-MIGAS-26 SMAW P1 to P1	File name :		CHANGE BY CAD SYSTEM ONLY				Sheet No./Total sheets 2/9	Size of memory
		REV 0	DATE 29/09/25	APPR	1	2	Deviation for dimensions without indication of tolerance in mm 1) cutting + non cutting machining 2) WELDMENT connecting + forging	DATE	SIGN
						Scale : NTS			
								JOB NO. : E2502 DESIGN FOR PRODUCT : POBOYA 2000 TPD EXPANSION TAG NO./LINE NO. : LEACH TANK REFER DWG NO. : E2502-000-DWG-103	
						Name : NDE MAP BOTTOM LEACH TANK		NDE Map No. : E2502-NDE-PBY-001 REV. :	

GENERAL NOTES :

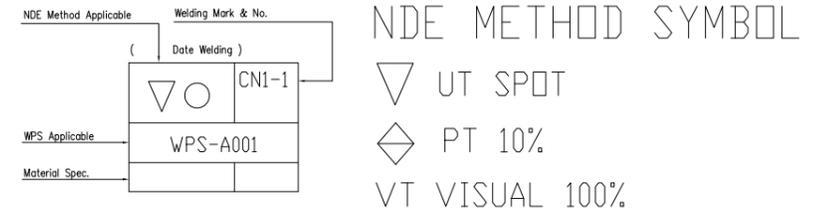
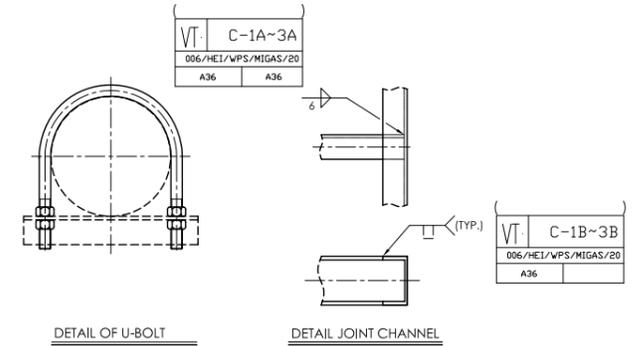
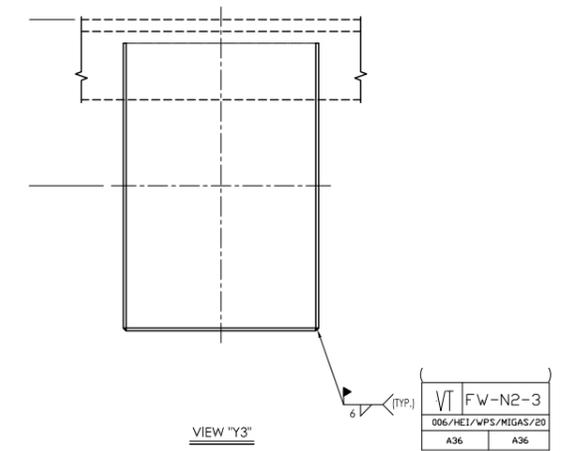
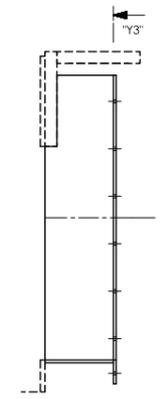
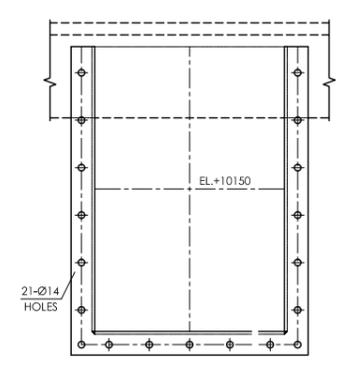
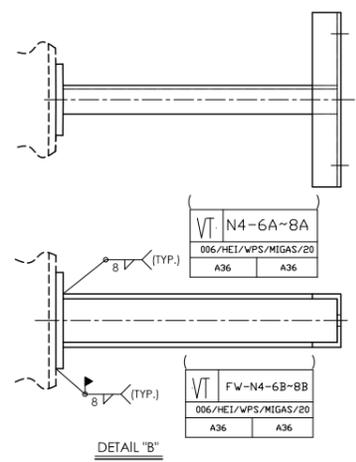
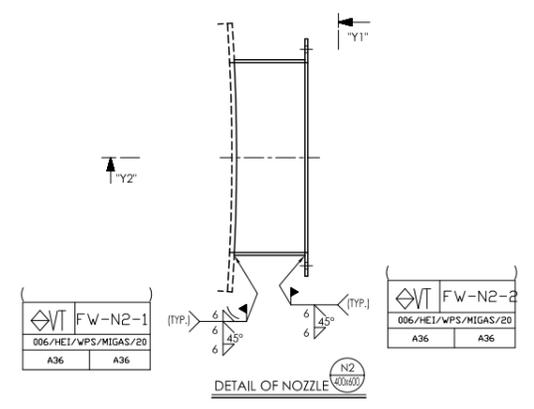
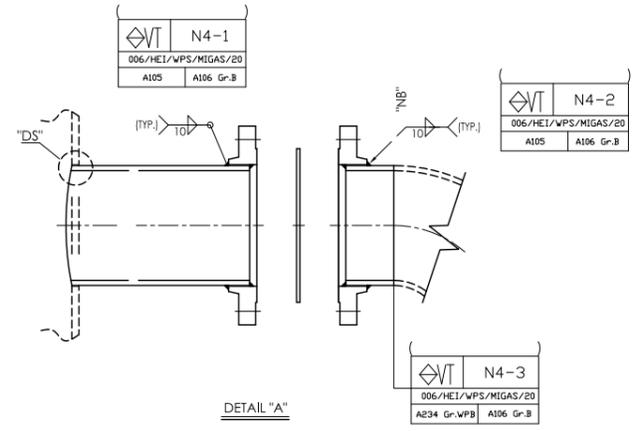
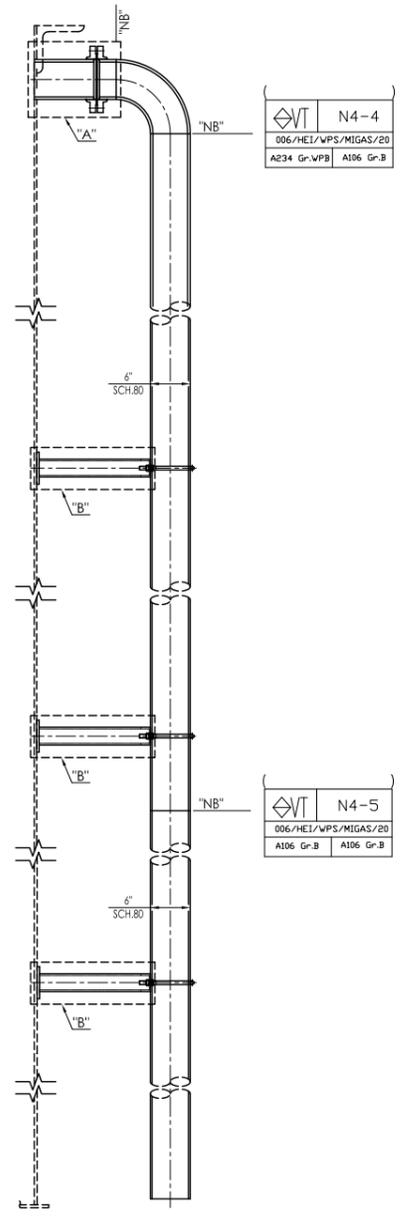
- BOLT HOLE ORIENTATION  
BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
- WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
- LIQUID PENETRANT  
# LIFTING LUG AND REMOVING OF JIG  
# NOZZLE ATTACHMENT WELDING OF DUCTING



<b>MATERIAL SPECIFICATION</b> HOOK A36 PIPE DAVIT A53 Gr.B HANDLE A36 NOZZLE NECK A36 PLATE FLANGE A36	<b>LEGEND :</b> WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1	File name :	CHANGE BY CAD SYSTEM ONLY		Sheet No./Total sheets 3/9								
		<table border="1"> <tr> <th>REV</th> <th>DATE</th> <th>APPR</th> <th>1</th> <th>2</th> </tr> <tr> <td>0</td> <td>29/09/25</td> <td></td> <td></td> <td></td> </tr> </table>	REV	DATE	APPR	1	2	0	29/09/25				Deviation for dimensions without indication of tolerance in mm 1) cutting + non cutting machining 2) WELDMENT connecting + forging
REV	DATE	APPR	1	2									
0	29/09/25												
		Name	NDE MAP MANHOLE LEACH TANK		JOB NO. : E2502 DESIGN FOR PRODUCT : POBOYA 2000 TPD EXPANSION TAG NO./LINE NO. : LEACH TANK REFER DWG NO. : E2502-000-DWG-104								
					NDE Map No. E2502-NDE-PBY-001 REV.								

GENERAL NOTES :

- BOLT HOLE ORIENTATION  
BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
- WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
- LIQUID PENETRANT  
# LIFTING LUG AND REMOVING OF JIG  
# NOZZLE ATTACHMENT WELDING OF DUCTING

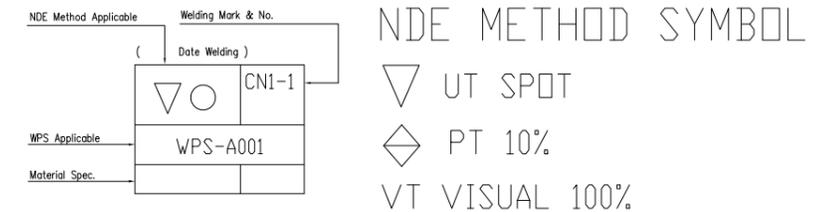
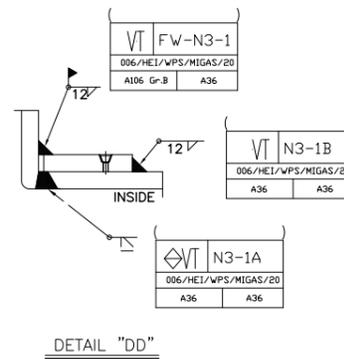
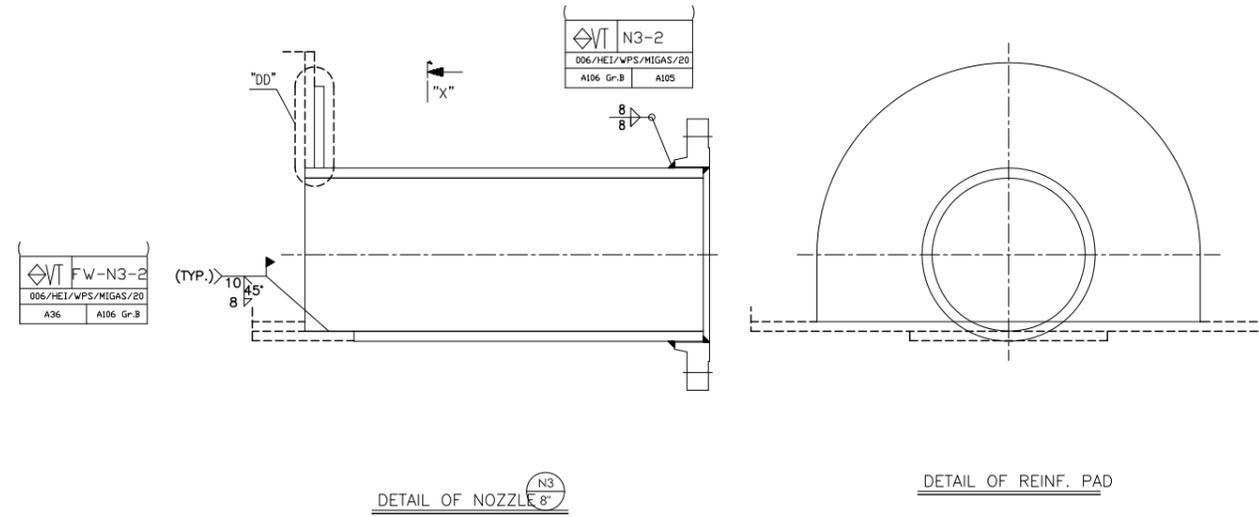


MATERIAL SPECIFICATION		LEGEND :		File name :		CHANGE BY CAD SYSTEM ONLY				Sheet No./Total sheets 4/9			
FLANGE	A105	WPS NO :	006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1	REV	DATE	APPR	1	2	DATE	SIGN	 We sincerely always partner with you		
NOZZLE NECK	A106 Gr.B			0	29/09/25				DRAFT	BENRIDHO			
REINF. PAD	A36								CHECK	RUSNANDI			
CHANNEL	A36								APPR				
				Deviation for dimensions without indication of tolerance in mm 1) cutting + non cutting machining 2) WELDMENT connecting + forging				Scale :		NTS			
				Name				NDE MAP NOZZLE 1-3 LEACH TANK				NDE Map No.	REV.
												E2502-NDE-PBY-001	



GENERAL NOTES :

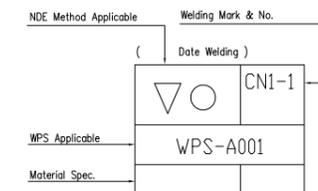
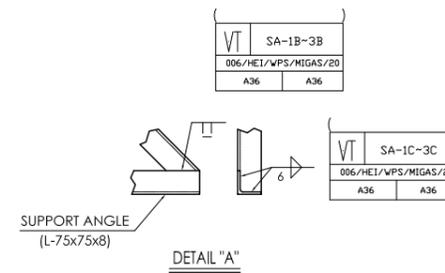
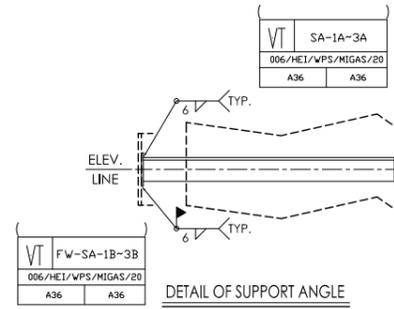
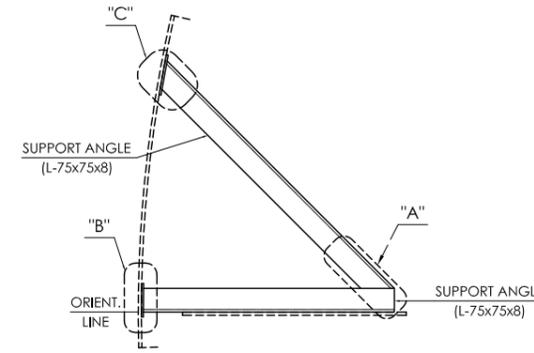
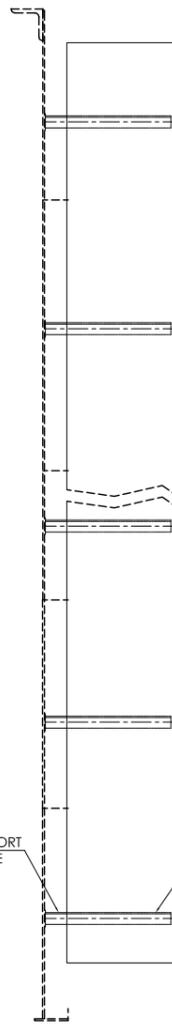
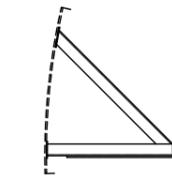
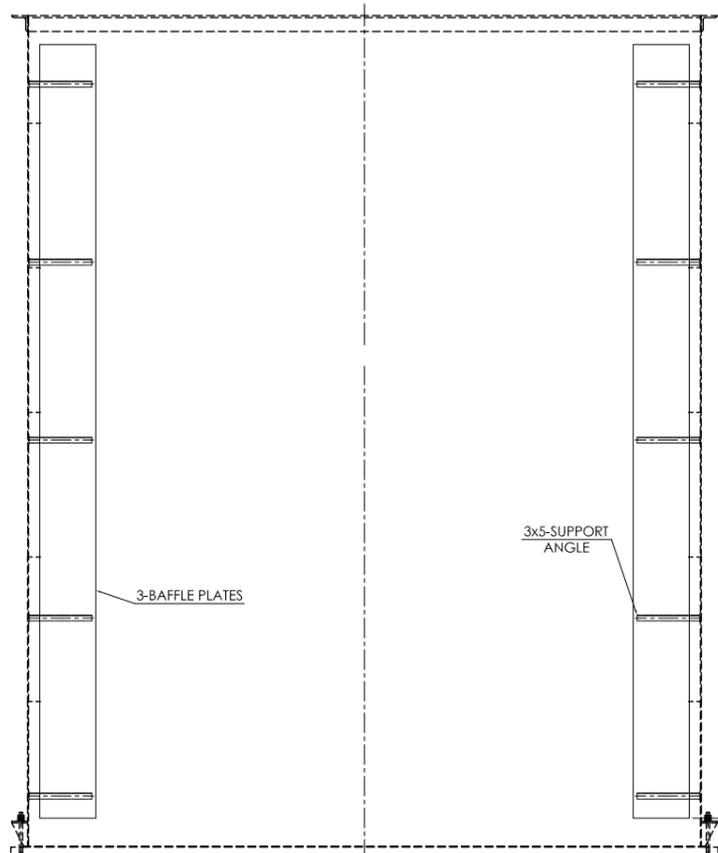
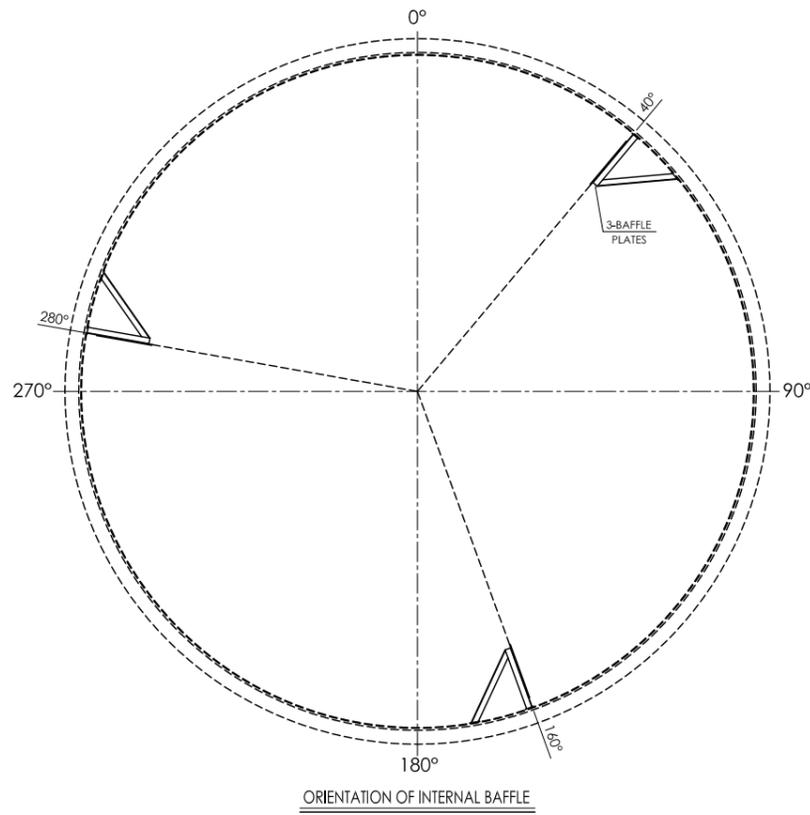
1. BOLT HOLE ORIENTATION  
BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT  
# LIFTING LUG AND REMOVING OF JIG  
# NOZZLE ATTACHMENT WELDING OF DUCTING



<b>MATERIAL SPECIFICATION</b> FLANGE A105 NOZZLE NECK A106 Gr.B REINF. PAD A36	<b>LEGEND :</b> WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1	File name :		<b>CHANGE BY CAD SYSTEM ONLY</b>				Sheet No./Total sheets 6/9	
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		0		29/09/25				CHECK	
								APPR	
						Scale : NTS		PT. HANAZONO Engineering Indonesia <i>We are always partner with you</i>	
						Name NDE MAP NOZZLE 3-3 LEACH TANK		JOB NO. : E2502 DESIGN FOR PRODUCT : POBOYA 2000 TPD EXPANSION TAG NO./LINE NO. : LEACH TANK REFER DWG NO. : E2502-000-DWG-107	
						NDE Map No. E2502-NDE-PBY-001		REV. 	

GENERAL NOTES :

- BOLT HOLE ORIENTATION  
BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
- WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
- LIQUID PENETRANT  
# LIFTING LUG AND REMOVING OF JIG  
# NOZZLE ATTACHMENT WELDING OF DUCTING



NDE METHOD SYMBOL

- ▽ UT SPOT
- ◇ PT 10%
- △ VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :		File name :		CHANGE BY CAD SYSTEM ONLY				Sheet No./Total sheets 7/9		
INTERNAL BAFFLE	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1		REV	DATE	APPR	1	2	DRAFT		DATE	SIGN
SUPPORT ANGLE	A36			0	29/09/25				CHECK			BENRIDHO
SUPPORT PAD	A36								APPR			RUSNANDI
								Scale :		NTS		
								Name		NDE MAP INTERNAL BAFFLE LEACH TANK		
								NDE Map No.		REV.		
								E2502-NDE-PBY-001				

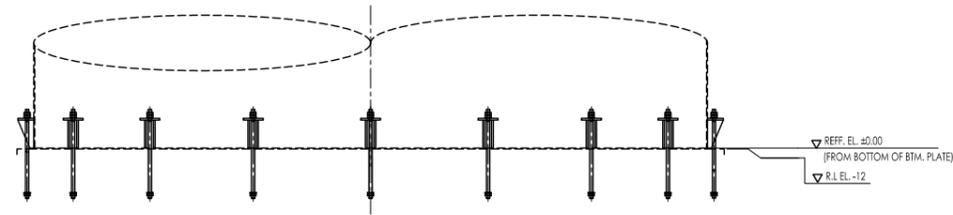
PT. HANAZONO Engineering Indonesia

JOB NO. : E2502  
 DESIGN FOR PRODUCT : POBOYA 2000 TPD EXPANSION  
 TAG NO./LINE NO. : LEACH TANK  
 REFER DWG NO. : E2502-000-DWG-108

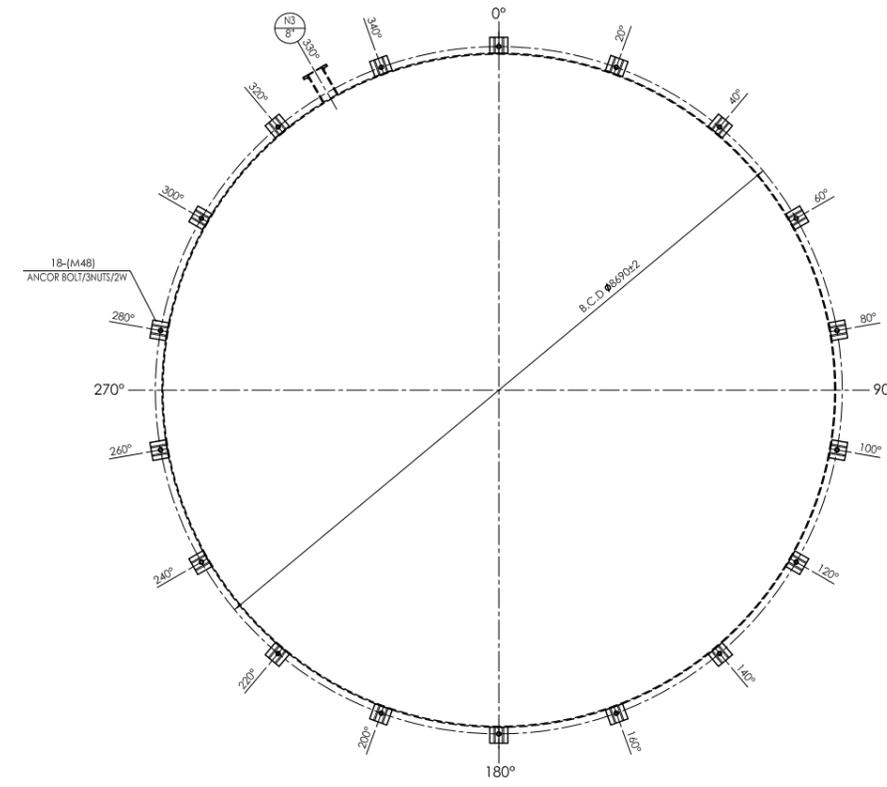


GENERAL NOTES :

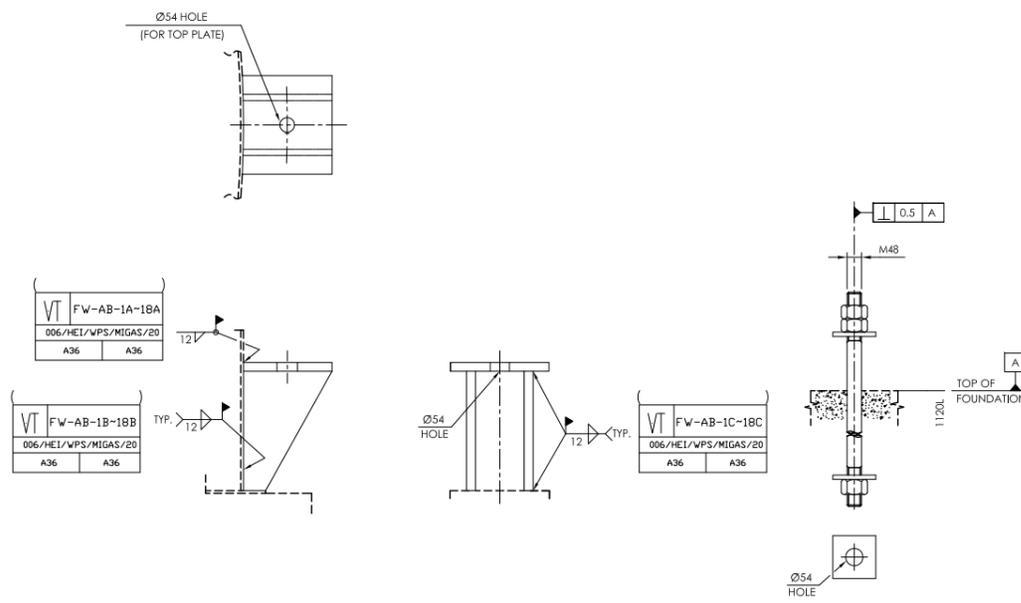
1. BOLT HOLE ORIENTATION  
BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT  
# LIFTING LUG AND REMOVING OF JIG  
# NOZZLE ATTACHMENT WELDING OF DUCTING



ANCHOR BOLT ELEVATION

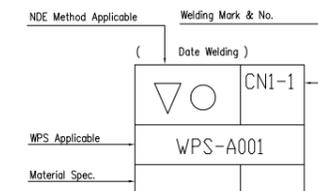


ANCHOR BOLT ORIENTATION (PLAN VIEW)



DETAIL OF ANCHOR BOLT CHAIR

ANCHOR BOLT/3N/2W (BY OTHERS)



NDE METHOD SYMBOL

- ▽ UT SPOT
- ◇ PT 10%
- VT VISUAL 100%

<b>MATERIAL SPECIFICATION</b> TOP PLATE A36 GUSSET PLATE A36	<b>LEGEND :</b> WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1	File name :		CHANGE BY CAD SYSTEM ONLY				Sheet No./Total sheets 9/9	
		REV		DATE	APPR	1	2	DATE	SIGN
		0		29/09/25					BENRIDHO
									RUSNANDI
				Deviation for dimensions without indication of tolerance in mm		Scale : NTS		PT. HANAZONO Engineering Indonesia <i>We are always partner with you</i>	
				1) cutting + non cutting machining		JOB NO. : E2502			
				2) WELDMENT connecting + forging		DESIGN FOR PRODUCT : POBOYA 2000 TPD EXPANSION			
						TAG NO./LINE NO. : LEACH TANK			
						REFER DWG NO. : E2502-000-DWG-111			
						NDE Map No. E2502-NDE-PBY-001			
						REV.			