

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 1 of 85

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

☐ AP	APPROVED
☐ AN	APPROVED AS NOTED
☐ RE	NOT APPROVED (Re-Submit)
☐ RV	REVIEWED
☐ RN	REVIEWED WITH NOTES
☐ NR	NOT BE RETURNED
RETURN DATE	
	

						
D	Sept 08, 2026	Issue For Approval	Afifah	Rusnandi	Murasato	
C	Jul 06, 2026	Issue For Approval	Benridho	Rusnandi	Murasato	
B	March 02, 2026	Issue For Approval	Benridho	Rusnandi	Murasato	
A	September 22, 2025	Issue For Approval	Benridho	Rusnandi	Murasato	
REV	DATE ISSUED	ISSUE PURPOSE	PREPARE	CHECKED	APPROVED	AUTHORIZED

	POBOYA 2000 TPD EXPANSION PROJECT	
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1. WPS AND PQR LIST

 PT. HANAZONO Engineering Indonesia We are always partner with you			WPS & PQR LIST										Document No		QC-WPS-L-2502-01		
			In According ASME Section IX, ASME Boiler and Pressure Vessel Code										Project No.		2502		
													Revision No.		2		
													Page No.		1 of 1		
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.
1.	006/HEI/WPS/MIGAS/20	006/HEI/PQR/MIGAS/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	EXX15/16/18/18 M/48
2.	005/HEI/WPS/MIGAS/20	005/HEI/PQR/MIGAS/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	EXX15/16/18/18 M/48
3.	008/HEI/WPS/MIGAS/21	008/HEI/PQR/MIGAS/21	1	1	SMAW	25	25	4	1	5.1	E7018-1H4R	5 ~ 50	50	4	1	5.1	EXX15/16/18/18 M/48
4.	04-WPS-HEI-MIGAS-26	04-PQR-HEI-MIGAS-26	1	1	SMAW	20	20	4	1	5.1	E7018-1H4R	5 ~ 40	40	4	1	5.1	EXX15/16/18/18 M/48
5.	002/HEI/MIGAS/20	002/HEI/MIGAS/20	8	8	GTAW	9.76	3	6	8	5.9	ER 309L	1.5 ~ 19.42	6	6	8	5.9	All classifications
					SMAW		6.76	5	8	5.4	E 309L		13.42	5	8	5.4	EXX15/16/17

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



Office & Work Shop Address: Jl. Raya Sajonegara - Sendang 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																																													
Revision No.	0	Supporting PQR No. (s)	006/HEI/MIGAS/20																																													
Welding Process (es)		Type (s)																																														
GTAW & SMAW		Manual																																														
(Automatic, Manual, Machine or Semi-Auto)																																																
JOINT (QW - 402) Joint Design: Single Vee or Any Root Spacing: 0 - 3 mm Backing: With / Without Backing Material (Type): As per (EN) (J) Base Your Vessel Material (077300) (SMAW)		Details 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 may be 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 ≤ 1/8 in. (13mm) (Yes) All (No) - Other																																																
*FILLER METALS (QW - 404) <table border="1" style="width: 100%; border-collapse: collapse; font-size: small;"> <thead> <tr> <th></th> <th style="text-align: center;">1 GTAW</th> <th style="text-align: center;">2 SMAW</th> </tr> </thead> <tbody> <tr> <td>Spec. No. (SFA)</td> <td style="text-align: center;">5.18</td> <td style="text-align: center;">5.1</td> </tr> <tr> <td>AWS No. (Class)</td> <td style="text-align: center;">ER70S-6</td> <td style="text-align: center;">E7018</td> </tr> <tr> <td>F - No.</td> <td style="text-align: center;">6</td> <td style="text-align: center;">4</td> </tr> <tr> <td>A - No.</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Size of Filler Metals</td> <td style="text-align: center;">ø 1.6 mm - 2.4 mm</td> <td style="text-align: center;">ø 3.2 - 4.0 mm</td> </tr> <tr> <td>Weld Metal</td> <td></td> <td></td> </tr> <tr> <td>Deposit Thickness:</td> <td></td> <td></td> </tr> <tr> <td> Groove</td> <td style="text-align: center;">Max. 6 mm</td> <td style="text-align: center;">Max. 13.29 mm</td> </tr> <tr> <td> Fillet</td> <td style="text-align: center;">All</td> <td style="text-align: center;">All</td> </tr> <tr> <td>Electrode Flux (Class)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">N/A</td> </tr> <tr> <td>Flux Type</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">Low Hydrogen</td> </tr> <tr> <td>Flux Trade Name</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">N/A</td> </tr> <tr> <td>Consumable Insert</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">N/A</td> </tr> <tr> <td>Other</td> <td colspan="2"> Manufacturer : ESAB Electrode Name : OK Tigrod 12.64 & OK 48.04 </td> </tr> </tbody> </table>					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	ø 1.6 mm - 2.4 mm	ø 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	
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Other	Manufacturer : ESAB Electrode Name : OK Tigrod 12.64 & OK 48.04																																															
*Each base metal-filler metal combination should be specified individually.																																																

Names Requested: 1 OF 6

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WELDING PROCEDURE SPECIFICATION (WPS)

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

Welding Procedure Specification No. : 008/HEI/MIGAS/20

Rev. 0

POSITIONS (QW - 405) Position(s) of Groove: <u>All</u> Welding Progression: <u>All</u> Position(s) of Fillet: <u>All</u>				POSTWELD HEAT TREATMENT (QW - 407) Temperature Range: <u>N / A</u> Time Range: <u>N / A</u>																								
PREHEAT (QW - 406) Preheat Temp. Min.: <u>34 °C</u> Interpass Temp. Max.: <u>260 °C</u> Preheat Maintenance: <u>N/A *</u> Other: _____ <i>(Continuous or special heating, where applicable, should be specified)</i>				GAS (QW - 408) <table border="1"> <thead> <tr> <th colspan="3">Percent Composition</th> </tr> <tr> <th>Gas (es)</th> <th>Mixture</th> <th>Flow Rate</th> </tr> </thead> <tbody> <tr> <td>Argon</td> <td>99.99%</td> <td>7 - 15 LPM</td> </tr> <tr> <td>Shielding</td> <td>-</td> <td>-</td> </tr> <tr> <td>Trailing</td> <td>-</td> <td>-</td> </tr> <tr> <td>Backing</td> <td>-</td> <td>-</td> </tr> <tr> <td>Other</td> <td>-</td> <td>-</td> </tr> </tbody> </table>				Percent Composition			Gas (es)	Mixture	Flow Rate	Argon	99.99%	7 - 15 LPM	Shielding	-	-	Trailing	-	-	Backing	-	-	Other	-	-
Percent Composition																												
Gas (es)	Mixture	Flow Rate																										
Argon	99.99%	7 - 15 LPM																										
Shielding	-	-																										
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., Reverse, Commutator, 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	-	-	18 - 24	38 - 112	-																		
Amps and volts, or power or energy range, should be specified for each electrode size, position, and thickness, etc. Pulsing Current: <u>N/A</u> Heat Input (max.): <u>2.5J</u> Tungsten Electrode Size and Type: <u>1.6 ~ 2.4mm & 2% Thoriated (EWTh-2)</u> <i>(File Tungsten, 2% Thoriated, etc.)</i> Mode of Metal Transfer for GMAW (FCAW): <u>N/A</u> <i>(Spray Arc, Short-Circuiting Arc, etc.)</i> Other: <u>N/A</u>																												
TECHNIQUE (QW - 410) String or Weave Bead: <u>Max. stringer or weaver within 2.5 time diameter of electrodes.</u> Orifice, Nozzle, or Gas Cup Size: <u>5, 6, or 7</u> Initial and Interpass Cleaning (Brushing, Grinding, etc.): <u>Brushing & Grinding</u> Method of Back Gouging: <u>Back Grinding / Back Gouging</u> Oscillation: <u>N/A</u> Contact Tube to Work Distance: <u>12 ~ 19 mm (GTAW)</u> Multiple or Single Pass (Per Side): <u>Multiple</u> Multiple or Single electrode: <u>Single</u> Electrode Spacing: <u>N/A</u> Peening: <u>N/A</u> Other: <u>Welds shall be cleaned between each pass. When completed, remove all slag & projection with grinding & Brushing</u>																												

Nomor Registrasi Migas

A4G - 07901 / 0844 / 2020

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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

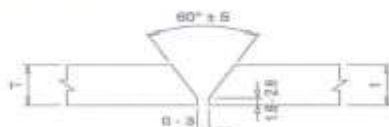
Rev. 0

JOINT DETAILS

SINGLE VEE GROOVE

$T = t$

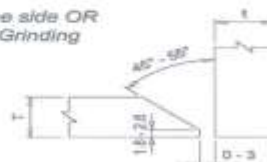
Welded from one side



SINGLE BEVEL - CORNER JOINT

$T = t$

Welded from one side OR
both side Back Grinding



SQUARE BUTT

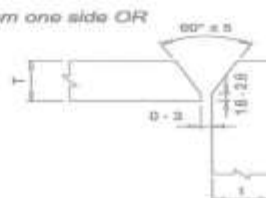
Welded from BOTH SIDES, $T = 6$ mm Max
Root gap, 0 - 1/2



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

Nomor Registrasi Migas

AYG - 07981 / 0844 / 2020

Date : October 1, 2020

Date : October 1, 2020

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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 29/08/2020
 WPS No. 006/HEI/MIGAS/20
 Welding Process (es) GTAW & SMAW
 Types (Manual, Automatic, Semi-Automatic) Manual

JOINTS (QW - 402)



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 ≤ 1/4 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	5.645 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

PREHEAT (QW - 406)

Preheat Temperature 34°C
 Interpass Temperature 260°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

Nomor Registrasi Migas 4 OF 5

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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 ²)	Ultimate Total Load (kN)	Ultimate Unit Stress (N/mm ²)	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

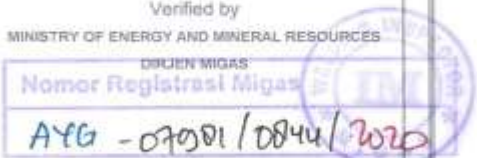
Nomor Registrasi Migas

AYG - 07081 / 0244 / 2020

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Paha Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
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Office & Work Shop Address: Jl. Raya Bojonegara - Gerdang 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. : 006/HEI/MIGAS/20					Rev. 0
FILLET-WELD TEST (QW - 180) Result - Satisfactory : Yes ☐ No ☐ Penetration into Parent Metal : Yes ☐ No ☐ Macro - Result <u>None</u>					
HARDNESS TESTS					
Test No	Test Location	Vickers Hardness Value HV 10, Kgf/mm ²			Remarks
		12 ^{HR}			
		Line 1	Line 2	Line 3	
—Blank—					
Other Tests					
Type of Test: <u>None</u>					
Deposit Analysis: <u>None</u>					
Other: <u>Radiography examination, Result : ACC, Report No. : 001/RT/HEI/XX/20 by PT. Rina Sanjaya Sakti</u>					
Welder's Name: <u>ASMURI</u> Clock No.: <u> </u> Stamp No.: <u>W - 01</u>					
Tests conducted by: <u>PT. HI-TEST</u> Laboratory Test No.: <u>HT/JKT/0920/0332</u>					
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 DIREN MIGAS Nomor Registrasi Migas <u>AYG - 07901/0844/2020</u>		
 Date : September 29, 2020			 Date : September 29, 2020		

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RADIOGRAPHY EXAMINATION REPORT

Head Office: Jl. Willem Hartelt II No. 1, 2nd Flr. Arah
Bekasi 17413 - Jawa Barat, Indonesia
Phone: (+62-21) 8243 5563 / 8241 5794
Fax: (+62-21) 8243 5169
Email: admin@ptcpm.com Website: www.ptcpm.com

Client : PT. HANAZUHO ENGINEERING INDONESIA

Contractor : PQR

Project : PQR

Location : PQR

Request No. : PQR

Report No. : 001/RT/HBI/04/20

Shooting Date : 18-09-2020

Date of Report : 18-09-2020

RT Tech : ENISI DWDC DWDC

RQ Type : S Side F Side

Sensitivity: 40 Iod 2-4

Utility Gas : 0.5 mm

ASTM 18

Seamless

ACPA 07

Back/ Front Thick : 0.125 mm

Double Slag Lead

Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

Seamless

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Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

Seamless

Flaw type : ACPA 07

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	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 12 of 85



**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:	PLU/G2009	Quantity:
----------	-------------	-----------	-----------

PRODUCT

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

CLASSIFICATIONS

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

CHEMICAL COMPOSITION

Actual results: acc to EN 10204 - 3.1

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 AII No. 4; Purwakarta 41181; Jawa Barat - Indonesia.

Validation - Chemical Analysis

MilBakhrudin Zaeni

Quality Assurance Manager

Validation - Others

J-P Enroult

Product Manager

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 13 of 85



**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: PVT21811208 Quantity:

PRODUCT

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

CLASSIFICATIONS

EN ISO 636-A: W 46 4 49i1
EN ISO 636-A: W4Si1
SFA/AWS A5.18: ER70S-6

MECHANICAL PROPERTIES

Typical data: acc to EN 10204 - 2.2

Standard: EN
Auxiliary: 11
Condition:

TENSILE

ReL Rm A4-A5
525 MPa 595 MPa 26 %

IMPACT

Temp -40 °C
KV 150 J

CHEMICAL COMPOSITION

Actual results: acc to EN 10204 - 3.1

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%

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 Abel Lopez H. Rasmussen

Product Manager

(CPM Work No.)
11580

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

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(Vendor Work No.)
E2502

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PT. GUNUNG RAJA PAKSI

Plate Mill

MILL TEST CERTIFICATE

As to EN 10204 - 3.1

Product

Head Office & Factory
Jl. Raya Bantul 6, Wung Bantul, Desa Salakara
Lirisany Ham, Ngliris, Wungliris, Indonesia

Material: Hot Rolled Steel Plate
Specification: ASME SA 36
Standard Requirement: ASTM A 36
Supply Condition: As Rolled
Kiln

CERTIFICATE NUMBER: GRP QA MTC/003/X/2018
CERTIFICATE DATE: October 26, 2018
S/C NO.: L1003/MK2 - PROD/X/2018

HEAT NUMBER	Plate Number	DIMENSIONS			QTY (PCS)	CHEMICAL ANALYSIS (%)											TENSILE TEST (T.M.D.R.)				IMPACT VALUE (J/CM ²)							
		T	W	L		C	Si	Mn	P	S	Nb	Cu	Cr	Ni	Mo	V	Al	Ti	N	CF	V.S. (kg/cm ²)	T.S. (kg/cm ²)	Elong. (%)	T	B	A ₅₀		
		mm	mm	mm																								
I102 U 2103189	D01-02	10	1219	2438	2.748	0.17	0.27	0.36	0.012	0.003	0.003	0.04	0.02	0.02	0.01	0.003	0.024	0.003	0.009	0.32	326	492	26					
I102 U 2103189	D01-03	10	1219	2438	2.748	0.17	0.27	0.36	0.012	0.003	0.003	0.04	0.02	0.02	0.01	0.003	0.024	0.003	0.009	0.32	326	492	26					
I102 U 2103189	D01-04	10	1219	2438	2.748	0.17	0.27	0.36	0.012	0.003	0.003	0.04	0.02	0.02	0.01	0.003	0.024	0.003	0.009	0.32	326	492	26					
I102 U 2103189	D01-05	10	1219	2438	2.748	0.17	0.27	0.36	0.012	0.003	0.003	0.04	0.02	0.02	0.01	0.003	0.024	0.003	0.009	0.32	326	492	26					
I102 U 2103189	D01-06	10	1219	2438	2.748	0.17	0.27	0.36	0.012	0.003	0.003	0.04	0.02	0.02	0.01	0.003	0.024	0.003	0.009	0.32	326	492	26					
I102 U 2103189	D01-07	10	1219	2438	2.748	0.17	0.27	0.36	0.012	0.003	0.003	0.04	0.02	0.02	0.01	0.003	0.024	0.003	0.009	0.32	326	492	26					
I102 U 2103189	D01-08	10	1219	2438	2.748	0.17	0.27	0.36	0.012	0.003	0.003	0.04	0.02	0.02	0.01	0.003	0.024	0.003	0.009	0.32	326	492	26					
I102 U 2103189	D01-09	10	1219	2438	2.748	0.17	0.27	0.36	0.012	0.003	0.003	0.04	0.02	0.02	0.01	0.003	0.024	0.003	0.009	0.32	326	492	26					
I102 U 2103189	D01-10	10	1219	2438	2.748	0.17	0.27	0.36	0.012	0.003	0.003	0.04	0.02	0.02	0.01	0.003	0.024	0.003	0.009	0.32	326	492	26					
Total Weight						101.447																						
Total Qty						443																						
I102 U 2103189	D01-11	12	1219	2438	18.423	0.18	0.28	1.18	0.012	0.002	0.001	0.07	0.02	0.01	0.003	0.002	0.041	0.003	0.003	0.38	332	510	21					
I102 U 2103189	D01-12	12	1219	2438	18.700	0.18	0.28	1.18	0.012	0.002	0.001	0.07	0.02	0.01	0.003	0.002	0.041	0.003	0.003	0.38	346	521	21					
I102 U 2103189	D01-13	12	1219	2438	17.475	0.18	0.28	1.18	0.012	0.002	0.001	0.07	0.02	0.01	0.003	0.002	0.041	0.003	0.003	0.38	346	521	21					
Total Weight						60.600																						
Total Qty						184																						

REMARKS:

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

ACKNOWLEDGMENT BY:

PT. GUNUNG RAJA PAKSI

USWALIN KURNIAWATI
QUALITY ASSURANCE

GRP QA MTC 12

DATE: 01/11/2018

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Cita Paha Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
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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
Website : www.hittestlab.com



Testing Report

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

Customer	: PT. Hanazono Engineering Indonesia	Job No	: B20625
Address	: Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	No.	: HT/JKT/0920/0332
Reference Code	: ASME Sect. IX : 2019	Total of Page	: 1 of 2
Test Method	: ASTM A370-19	Date of Received	: 22 September 2020
Object to be tested	: (as received)	Date of Tested	: 29 September 2020
		PO No	: PO-E001-HTT-TOL-004
		Project Name	: --
		Sample Marking	: 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
Measured Thickness (mm)	9.63	9.66
Measured Width (mm)	19.51	19.57
Effective Area (mm ²)	187.88	189.05
Ultimate Tensile Load (kN)	108.25	109.89
Ultimate Tensile Strength (N/mm ²)	576	581
Location of Failure	Base Metal	Base Metal
Type of Failure	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.
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Form No: HTQM-F/TENSILE/RED-SEC/3 Rev 0

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

Date of Issue 05/01/2014

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
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PT. Hi-Test Laboratory of Mechanical Testing

BSD City :
Taman Tekno Blok A2 No. 49
Bumi Serpong Damai (BSD) – Tangerang - Indonesia
Telp : +62 21 75882684; Fax : +62 21 75882685
E-mail : hi-test@hittestlab.com
Website : www.hittestlab.com



Testing Report

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

Customer	: PT. Hanazono Engineering Indonesia	Job No	: B20625
Address	: Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	No.	: HT/JKT/0920/0332
Reference Code	: ASME Sect. IX : 2019	Total of Page	: 2 of 2
Test Method	: ASTM E190-14	Date of Received	: 22 September 2020
Object to be tested	: (as received)	Date of Tested	: 29 September 2020
		PO No	: PO-E001-HTT-TOL-004
		Project Name	: --
		Sample Marking	: 9. HEI 8

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)

Test Temperature	: 25.1°C		
Test Weld Metal Thickness	: 10 mm	Test Specimen Width	: 38 mm
Former Diameter	: 40 mm	Bend Angle	: 180 Degree
Shoulder Distance	: 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 Latipolla, 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 damages 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-FREND/3 Rev.0
The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISIRI/SC 17025:2005)

Date of issued 06/01/2014

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 17 of 85

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



Office & Work Shop Address: Jl. Raya Bojonegara - Seriang RT/RW. 001/001 No-44
Desa Kertasana, Kec. Bojonegara, Kab. Serang, Banten - Indonesia 42454
Phone : +62-254-7850344/50, 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. 005/HEI/MIGAS/20		Date: 01/10/2020	Supporting PQR No.(s) 005/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) AP (STAINLESS) BASE METAL TYPE NAME (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 may be 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. 2	to P. No. 1	Group No. 2
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: 0.73 ~ 15.73 mm (Impact Limit), 1.5 ~ 19.46			
Base Metal: Groove -		mm (W/O Impact)	Fillet All
Maximum Pass Thickness < 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	E7018-1H4R	
F - No.	8	4	
A - No.	1	1	
Size of Filler Metals	Ø 1.5 mm ~ 2.4 mm	Ø 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		
*Each base metal-filler metal combination should be specified individually.			

Nomor Registrasi Migas: 1 OF 6

Area - 07001/0045/2020

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11580

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(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

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
Argon	99.99%	7 - 15 LPM
Shielding	-	-
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. Remelt, Comments, Hot Wire, Autoshield, Tension, 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, Shield-Casting 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 - 07081 / 0844 / 2020

(CPM Work No.)
11580

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

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E2502

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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

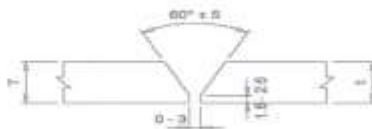
Rev. 0

JOINT DETAILS

SINGLE VEE GROOVE

$T = t$

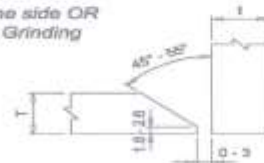
Welded from one side



SINGLE BEVEL - CORNER JOINT

$T = t$

Welded from one side OR
both side Back Grinding



SQUARE BUTT

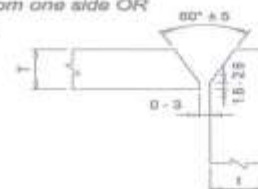
Welded from BOTH SIDES, $T = 6$ mm Max
Root gap, $0 - 1/2$



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


Date : October 1, 2020

Verified by
MINISTRY OF ENERGY AND MINERAL RESOURCES
DIRJEN MIGAS

Nomor Registrasi Migas

AYG - 07901 / 10045 / 420

Date : October 1, 2020

(CPM Work No.)
11580

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

Revision No. : D

(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

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

GAS (QW - 408)

Shielding	Percent Composition		
	Gas (es)	Mixture	Flow Rate
Trailing	Argon	99.99%	12 LPM
Backing	-	-	-

FILLER METAL (QW - 404)

SFA Specification	5.18	5.1
AWS Specification	ER70S-6	E7018-1H4R
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	6.73 mm
Other	BOHLER S EMK 6	FOX S EV 50-1

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

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

AYG - 079201 / 0845 / 2020

(CPM Work No.)
11580

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

Revision No. : D

(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 Kertasari, 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	85	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 ²)	Ultimate Total Load (kN)	Ultimate Unit Stress (N/mm ²)	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	No Open Discontinuity
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

(CPM Work No.)
11580

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

Revision No. : D

(Vendor Work No.)
E2502

Purchase Order No. : 11580

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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, Kg/mm ²			Remarks
		12 ⁰⁰			
		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 - 07981 6845/2020

Date : September 29, 2020

(CPM Work No.)
11580

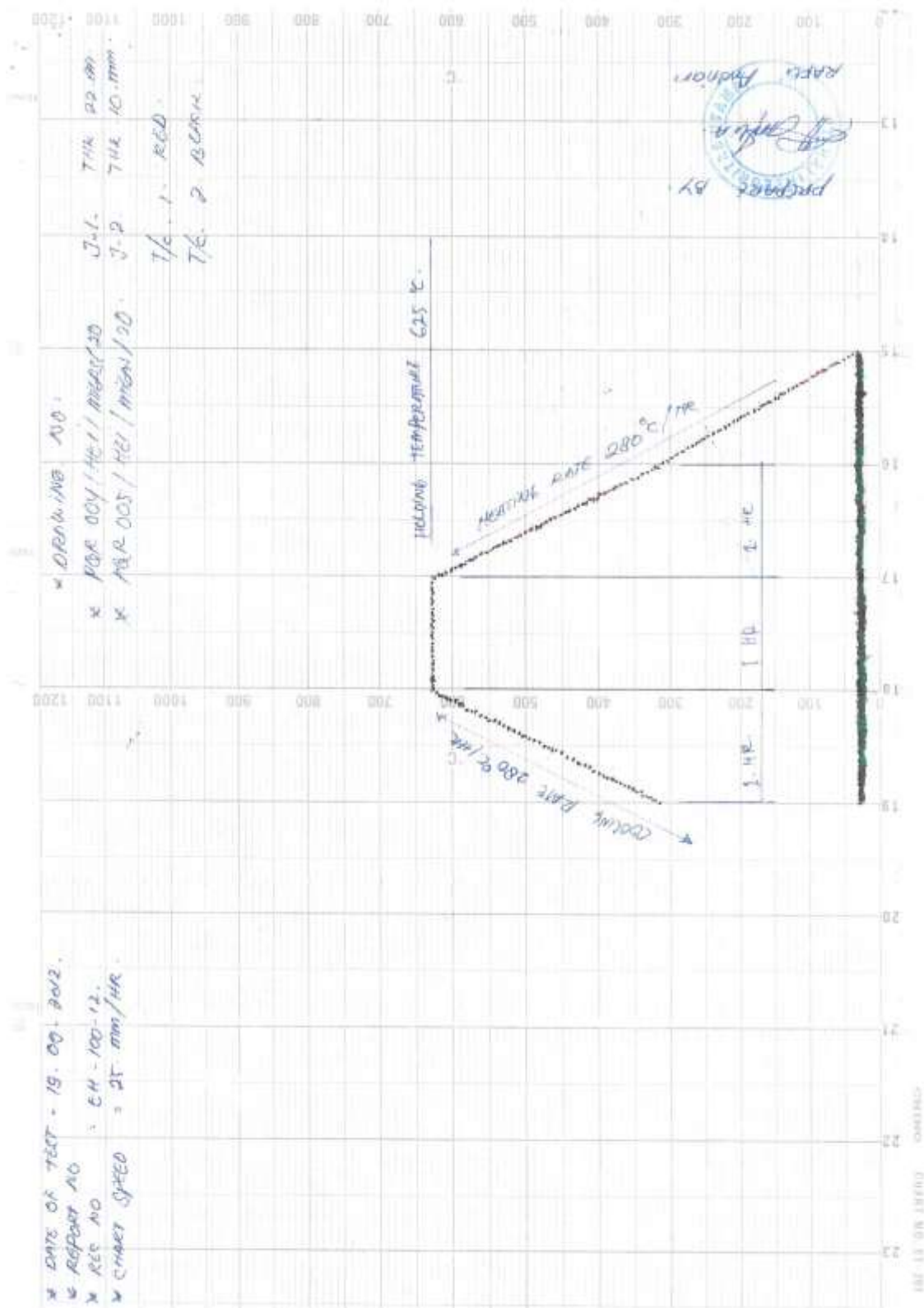
Project Doc. No.: E2502-000-PRC-004

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11580

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

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PT. Hi-Test
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E-mail : hi-test@hitestlab.com
Website : www.hitestlab.com



Testing Report

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

Customer	: PT. Hanazono Engineering Indonesia	Job No	: B20625
Address	: Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	No.	: HT/JKT/0920/0331
Reference Code	: ASME Sect. IX : 2019	Total of Page	: 1 of 4
Test Method	: ASTM A370-19	Date of Received	: 22 September 2020
Object to be tested	: (as received)	Date of Tested	: 29 September 2020
		PO No	: PO-E001-HTT-TOL-004
		Project Name	: --
		Sample Marking	: 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
Measured Thickness (mm)	9.71	9.75
Measured Width (mm)	19.54	19.51
Effective Area (mm ²)	189.73	190.22
Ultimate Tensile Load (kN)	108.39	107.96
Ultimate Tensile Strength (N/mm ²)	571	568
Location of Failure	Base Metal	Base Metal
Type of Failure	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

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Form No: HTQM-R/TENSILE/REC-SECQ 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)

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 25 of 85



PT. Hi-Test
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Website : www.hittestlab.com



Testing Report

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

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

Test Temperature :	25.1°C		
Test Weld Metal Thickness :	10 mm	Test Specimen Width :	38 mm
Former Diameter :	40 mm	Bend Angle :	180 Degree
Shoulder Distance :	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

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Form No. HT/QM-F-BEND-03 Rev.0

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

Date of issued 06/01/2014

(CPM Work No.)
11580

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

Revision No. : D

(Vendor Work No.)
E2502

Purchase Order No. : 11580

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PT. Hi-Test
Laboratory of Mechanical Testing

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E-mail : hi-test@hittestlab.com
Website : www.hittestlab.com



Testing Report

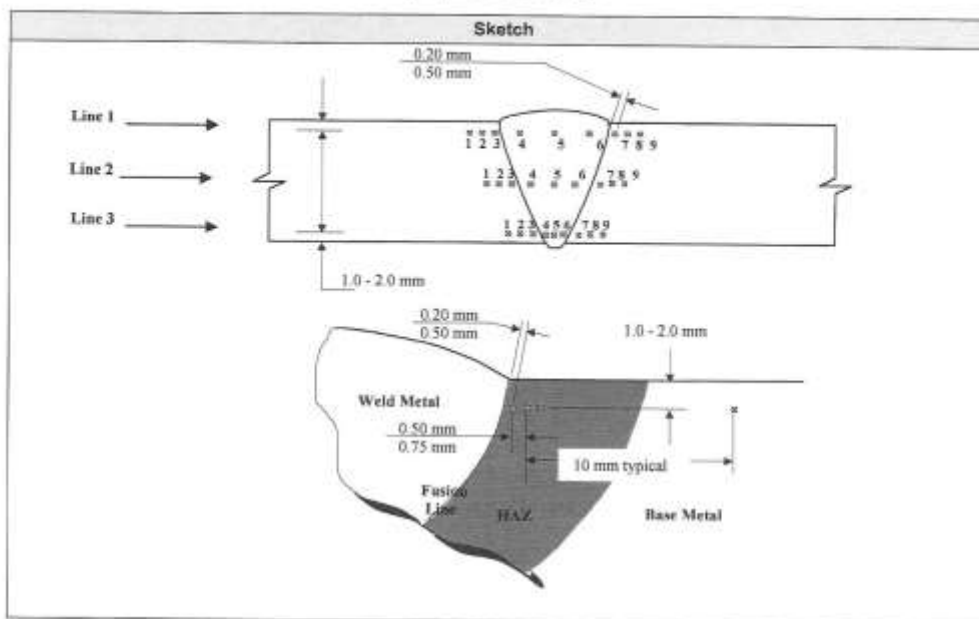
(This Report is issued subjected to the terms & conditions set-out below)

Customer : PT. Hanazono Engineering Indonesia
Address : Jl. Bojonegara No. 44
Kertasana, Serang, Banten 42454
Reference Code : ASME Sect. IX : 2019
Test Method : ASTM E92-17
Object to be tested : (as received)

Job No : B20625
No. : HT/JKT/0920/0331
Total of Page : 3 of 4
Date of Received : 22 September 2020
Date of Tested : 29 September 2020
PO No : PO-E001-HTT-TOL-004
Project Name : —
Sample Marking : 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

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Form No: HTQM-FINARDNESS-SKETCH 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 06/01/2021

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Paha Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 27 of 85



PT. Hi-Test
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E-mail : hi.test@hitestlab.com
Website : www.hitestlab.com



Testing Report

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

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

Suhadi, ST
Laboratory Manager

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Form No: HTQM-F/CHARPY – MATD Rev 0

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Date of Issue: 06/10/2020

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Paha Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 28 of 85



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Testing Report

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Customer : PT. Hanazono Engineering Indonesia	Job No : B20625
Address : Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	No. : HT/JKT/0920/0331
Reference Code : ASME Sect. IX : 2019	Total of Page : 4 of 4
Test Method : ASTM E92-17	Date of Received : 22 September 2020
Object to be tested : (as received)	Date of Tested : 29 September 2020
	PO No : PO-E001-HTT-TOL-004
	Project Name : —
	Sample Marking : 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: HTQM-PHARDNESS-RESULT/3 Rev.0

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Date of Issue: 06/01/2014

(CPM Work No.)
11580

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

Revision No. : D

(Vendor Work No.)
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Purchase Order No. : 11580

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RADIOGRAPHY EXAMINATION REPORT

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Fax: +62-21-8243 5168
Email: info@ptcitrapaha.com, sales@ptcitrapaha.com, www.cpm.co.id

Client : PT. INDAHATI ENGINEERING INDONESIA		Job No. : PQR		Report No. : 001/RT/HEI/IR/20	
Contractor : PQR		Work Order / Request No. : -		Shooting Date : 18-09-2020	
Project : PQR		Location : -		Date of Report : 19-09-2020	
Radiographic Procedure : RS/RT-ASME/2003		Radiation Source : IR-192		RT Tech : DMSI DW/DT: 0 SHELL	
Application Code : ASME VIII		P/S Source Size : 1.7 x 2.5 mm		RT Type : S. Side F Side	
Material Specification : A143304 / A242304 A		Activity : 30 Ci		Sensitivity: RT No. 8 R.D. 2-4	
Material Specification : 316 GR 304 / A316 GR		Exp. Time : 20 Min / Sec		Unitary Gap : 0.5 mm	
Material Specification : 70% A 34 / A 36		Exp. Time : 20 Min / Sec		Unitary Gap : 0.5 mm	
Identification	Joint No.	Material Size Thick	FILM SEQUENCE		Remarks
			Location Marker	Whole Sample	
			4"x10"	8"x10"	
PQR 001/HEI/MIGAS/20	-	Thk 45 mm	A-B		ACC
PQR 002/HEI/MIGAS/20	-	Thk 10 mm	A-B		ACC
PQR 003/HEI/MIGAS/20	-	Thk 10 mm	A-B		ACC
PQR 004/HEI/MIGAS/20	-	Thk 22 mm	A-B		ACC
PQR 005/HEI/MIGAS/20	-	Thk 10 mm	A-B		ACC
PQR 006/HEI/MIGAS/20	-	Thk 10 mm	A-B		ACC
PQR 007/HEI/MIGAS/20	-	Thk 22 mm	A-B		ACC
Technician: _____ Total Width/Film Used: _____ 7 Joints 4" x 10" : 1 4" x 15" : 7 7" x 17" : 1 Container: _____ 7 Joints 4" x 10" : 1 4" x 15" : 7 7" x 17" : 1 Signature: _____ Date: 20/09/20 Signature: _____ Date: 20/09/20					

(CPM Work No.)
11580

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

Revision No. : D

(Vendor Work No.)
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Purchase Order No. : 11580

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검 사 증 명 서
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
수요자/Customer : 탑스틸

검사증명서번호/Certificate No. : DP3-2-190806-022-001
발행일자/Date of Issue : 2019-06-06

제품지수 Order No. 단위 Unit Inch * mm * Space	제품명 Product No	수량 Quantity y	중량 Weight kg	재질번호 Heat No	인장시험 Tensile Test			경도시험 Hardness	화학성분(%) Chemical Composition													비고 Remarks	
					P g	Yield			B y	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Al	Ti	V		
						Y02	TS																EL
10.00*3046*6000 *Specimen No: DP08221215-a, DP08221215-d ** Normalized: 910 ° C, 30min	A670179-01_02		2,188	PK115635	1	346	527	25	138	L	16	37	136	18	4	20	10	10	3	2	18	2	
Sub Total (20)		3	4,376																				
19.00*3046*6000 *Specimen No: DP08221215-a, DP08221215-d ** Normalized: 910 ° C, 30min	A673275-01		2,772	PK066498	1	343	531	27	142	L	17	38	144	18	4	20	10	10	5	1	2	2	
Sub Total (40)		1	2,772																				
22.00*3046*6000 *Specimen No: DP08221215-a, DP08221215-d ** Normalized: 910 ° C, 30min	A673334-01		3,108	PK066496	1	365	541	25	147	L	16	37	142	20	3	20	10	10	5	1	2	2	
Sub Total (50)		1	3,108																				
25.00*3046*6000 *Specimen No: DP08221215-a, DP08221215-d ** Normalized: 910 ° C, 45min	A673275-01		3,708	PK04319	1	352	529	27	148	L	15	33	144	14	3	20	140	100	12	1	10	20	
Sub Total (60)		1	3,708																				

We hereby certify that the material has been made by ladle analysis process fully fitted steel.
The chemical composition is in accordance with the specification requirements.
If the amount of C, Si, Mn, P, S, Cu, Mo, Ti or Nb 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%. * Inspecimen
documents: According to EN 10204 Type 3.1. NACE MR0175 Hardness only.

본 주조물은 용기내 화학분석을 통해 완전제강의 품질이 보장될 수 있으며,
본 검사증명서를 참조 또는 본조사 원시결과에 의해 조사를 할 수 있습니다.

원본증명서 정보 : 동국제철 홈페이지 접속 (www.dongguk.co.kr) → e비즈니스 클릭 (클릭이치 하단) → 검사증명서 원본인증 클릭 → 정보입력후 검색

Surveyor to : _____
Dongguk Wore, 25, Gongsingangsan 1-gil, Songguk-eup, Dongguk-shi, Chungcheongnam-do, Republic of Korea/Quality Control Team, TEL. 041-351-4633

Surveyor to : _____
Chief of Quality Control Team

Page : 1/2

(CPM Work No.)
11580

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

Revision No. : D

(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 UJ NO. 7-10
17134 Bekasi
T. +6221885 7912 F. +6221885 1918
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	BOHLER FOX S EV 50-1 VP		
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		
Quantity	3312,0 KG		

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	Rp 1,0	Rm	A (Lo = 4d)	Z	WBH	Remarks								
	MPa	MPa	MPa	%	%	PWHT									
25°C	≥ 420		≥ 520	≥ 27		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		≥ 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).

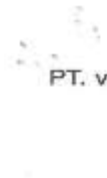
Town
Bekasi

Date
27.07.2020

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

Authorized representative
Miftah Farid

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
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PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

Kawasan Industri Jababeka Cikarang
Jl. Industri Selatan 3 Blok L1 NO. 1-18
17520 Bekasi
T: +621693 1512, F: +621693 1918
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

PQ no.	ACD/JK-N/20/04/0484	of	27.04.2020
Order no.	1042004411		
Delivery note/pos./splitt	2047011831/000000/000030	of	08.07.2020
Product	GTAW rod/wire		
Trade name	BOHLER S EMK 6		
Standard designation	EN ISO 636-A : W 42 5 3Si1 AWS A5.18/SFA 5.18 : ER70S-6		
Dimension	2,4 x 1000mm		118055
Lot no.	20098		80556
Quantity	2500,0 KG		J010800W 0425

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 III/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		≥ 500	≥ 25		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		≥ 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 01-77-86 (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	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 34 of 85

4. WPS & PQR NO. 008/HEI/WPS/MIGAS/21 & 008/HEI/PQR/MIGAS/21



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 : 1 of 3
Organization Name PT. HANAZONO ENGINEERING INDONESIA		By Quality Department		
Welding Procedure Specification No. 008/HEI/WPS/MIGAS/21		Date 23/08/2021		
Revision No. 0		Supporting PQR No.(s) 008/HEI/WPS/MIGAS/21		
		Date 19/08/2021		
Welding Process (es) SMAW		Type (s) Manual		
(Automatic, Manual, Machine or Semi-Auto)				
JOINT (QW - 402)				
Joint Design See joint Detail		Details		
Root Spacing See joint Detail				
Backing With / Without				
Backing Material (Type) as per joint details		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 covered.				
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. 1		
OR		to P. No. 1 Group No. 1		
Specification type, grade, or UNS		SA 516		
to Specification type, grade, or UNS		Gr.70		
OR				
Chem. Analysis and Mech. Prop		-		
to Chem. Analysis and Mech. Prop		-		
Thickness Range :				
Base Metal : Groove		5 mm ~ 50 mm		Fillet All
Maximum Pass Thickness $\leq 1/8$ in. (13mm)		(Yes) ☒		(No) ☐
Other				
*FILLER METALS (QW - 404)				
		1		
		SMAW		
Spec. No. (SFA)		A 5.1		
AWS No. (Class)		E 7018-1		
F - No.		4		
A - No.		1		
Size of Filler Metals		Φ 3.2 ~ 4.0 mm		
Weld Metal				
Deposit Thickness				
Groove		Max 50mm		
Fillet		All		
Electrode Flux (Class)		N/A		
Flux Type		Low Hydrogen		
Flux Trade Name		N/A		
Consumable Insert		N/A		
Other		Manufacturer : BOHLER		
		Electrode Name : Bohler S EMK 6 & Fox S EV 50-1		
*Each base metal-filler metal combination should be specified individually.				

AYG-07901/0855/2021

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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., Backs, 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

AYG 07/01/2015/ 1011

(CPM Work No.)
11580

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E2502

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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

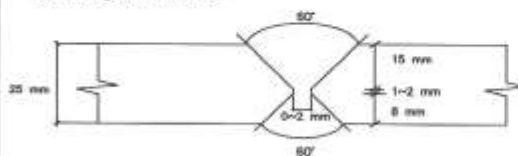
REV. 0

JOINT DETAILS

DOUBLE VEE GROOVE

T = t

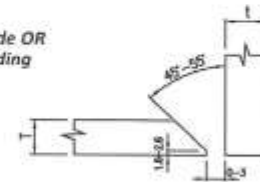
Welded from two side



SINGLE BEVEL-CORNER JOINT

T = t

Welded from one side OR
both side Back Grinding



SQUARE BUTT

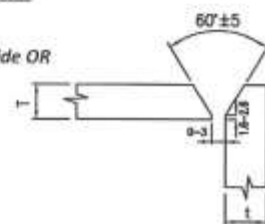
Welded from BOTH SIDES, T = 6 mm Max
Root gap. 0 - t/2



SINGLE VEE GROOVE

T = t

Welded from one side OR
both side



FILLET

UNLIMITED



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

Prepared By,

Reviewed By,

Reviewed By,

Verified by,

PT Hanazono Engineering Indonesia

MIGAS

QC

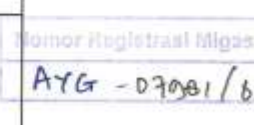
WE

QC Manager


Bayu Satrio Utomo


Andi Iskandar


Rusnandi


ATG - 07081/6000/2021

Date : NOV 03, 2021

Date : NOV 03, 2021

Date : NOV 03, 2021

Date :

(CPM Work No.)
11580

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

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(Vendor Work No.)
E2502

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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**

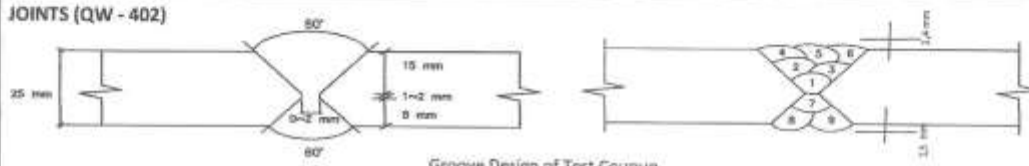
Procedure Qualification Record No. **008/HEI/PQR/MIGAS/21** Date **October 11, 2021**

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 **≤ 1/2 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**

A46-07901/001/2021

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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 ²)	Ultimate Total Load (kN)	Ultimate Unit Strength (N/mm ²)	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 :

Nonver Registrasi Migas

AYG - 07081 / 0015 / 2021

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 40 of 85



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
Website : www.hitestlab.com



Testing Report

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

Customer	: PT. Hanazono Engineering Indonesia	Job No	: B21654
Address	: Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	No.	: HT/JKT/1021/0095
Reference Code	: ASME Sect. IX : Ed 2021	Total of Page	: 1 of 2
Test Method	: ASTM E8/E8M-21	Date of Received	: 14 October 2021
Object to be tested	: (as received)	Date of Tested	: 19 October 2021
		PO No	: —
		Project Name	: —
		Sample Marking	: 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
Measured Thickness (mm)	24.60	24.55
Measured Width (mm)	19.57	19.53
Effective Area (mm²)	481.42	479.46
Ultimate Tensile Load (kN)	261.40	262.47
Ultimate Tensile Strength (N/mm²)	543	547
Location of Failure	Base Metal	Base Metal
Type of Failure	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


Suhiadi, 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-SRC/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

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 41 of 85



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
Website : www.hitestlab.com



Testing Report

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

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

Test Temperature :	26.1°C	Test Specimen Width :	10 mm
Test Weld Metal Thickness :	25 mm	Bend Angle :	180 Degree
Former Diameter :	40 mm		
Shoulder Distance :	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: Davenport England, S/N: DG 8881, Capacity: 700 Bar

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

Approved Signatory

Suhadi, ST
Laboratory Manager

Terms & 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 items.
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Form No: HTGMR-BEND/0 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 Issue: 06/01/2014

(CPM Work No.)
11580

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

Revision No. : D

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E2502

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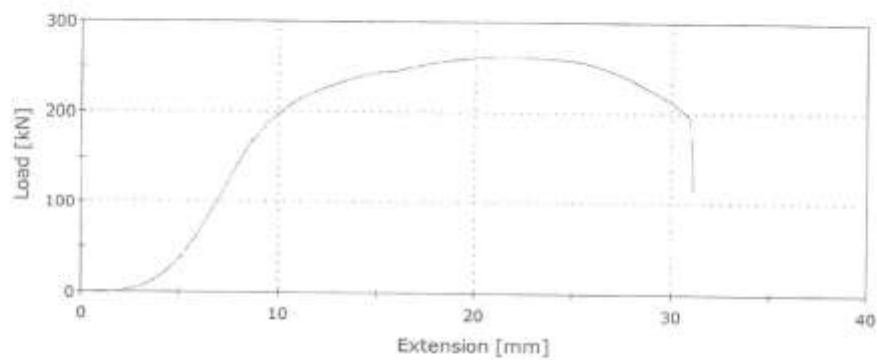
Tuesday, October 19, 2021

PT. HI-TEST

Company
Report No
Sample/Stamp No

PT. Hanazono Engineering Indonesia
HT/JKT/1021/0095
10. HEI 1 - T1

Stress vs Strain



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

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Paha Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 43 of 85

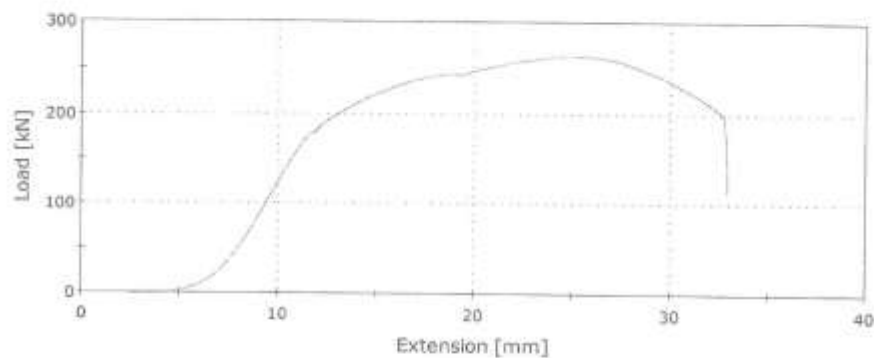
Tuesday, October 19, 2021

PT. HI-TEST

Company
Report No
Sample/Stamp No

PT. Hanazono Engineering Indonesia
HT/JKT/1021/0095
10. HEI 1 - T2

Stress vs Strain



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

[illegible]

(CPM Work No.)
11580

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

Revision No. : D

(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 Cikarang
Jl. Industri Selatan 7 Blok JJ NO. 7-03
17150 Cikarang
T. +6221883 7572, F. +6221883 7518
www.voestalpine.com/bwh

PT ALLALLOY CAHAYA DYNAWELD
JL. PANTAI INDAH SELATAN KOMP.
KAMAL MUJARA, 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./split	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		
Quantity	800,0 KG		

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							
Specimen preparation							
according to : ASTM E8 according to : AWS B4.0							
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							
Specimen preparation							
according to : ASTM E23 according to : AWS B4.0							
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 CP-equipment and does not require signature.

Authorized representative
Miftah Farid



Reviewed by,
Date
Signature
Oct 01, 2021

voestalpine

ONE CIPAHSA

(CPM Work No.)
11580

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

Revision No. : D

(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 Jendral Sudirman
Jl. Veteran Selatan 2 Blok A/102, 7-10
47000 Bekasi
T. +62(0)21 9422 7111 F. +62(0)21 7311
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./split	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		
Quantity	640,0 KG		

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 (Le = 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 CP-equipment and does not require signature.

Authorized representative
Mitah Farid



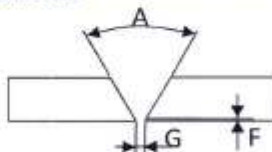
Reviewed by,
[Signature]
OCT 01, 2021

voestalpine

ONE STEP AHEAD

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Paha Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 48 of 85

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

 PT. HANAZONO Engineering Indonesia <i>We are always partner with you</i>		Welding Procedure Specification (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			
JOINTS (QW-402) Joint Design : See Joint Detail Root Spacing : See Joint Detail Backing : ☒ Yes ☐ No Backing Material : Weldmetal Other : N/A		Joint Detail  A = 50° (+10, -5) F = 0 - 2 mm G = 0 - 4 mm	
BASE METAL (QW-403) 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 : 5 mm - 40 mm Groove : Fillet : Unlimited Maximum Pass Thickness ≤ 1/2 in. (13mm) ☒ Yes ☐ No Other : N/A			
FILLER METALS (QW-404) Process : SMAW Spec No. (SFA) : 5.1 AWS. No. (Class) : E7018 F. No. : 4 A. No. : 1 Size of Filler Metals : See Below Table Weld Metal Thickness Range 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			 Nomor Registrasi Migas AIG-B-569/0231/2026
Date	February 27, 2026	February 27, 2026	

(CPM Work No.)
11580

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

Revision No. : D

(Vendor Work No.)
E2502

Purchase Order No. : 11580

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		Welding Procedure Specification (Section IX, ASME Boiler and Pressure Vessel Code, Edition 2025)																																							
POSITION (QW-405) Position of Groove : <u>ALL</u> Welding Progression : ☒ Up ☐ Down Position of Fillet : <u>All</u> Other : <u>N/A</u>					POST WELD HEAT TREATMENT (QW-407) Temperature Range : <u>N/A</u> Time Range : <u>N/A</u> Other : <u>N/A</u>																																				
PREHEAT (QW-406) Preheat Preheat Temp. Min. : <u>10 °C</u> Interpass Temp. Max : <u>250 °C</u> Preheat Maintenance : <u>N/A</u> Other : <u>N/A</u>					GAS (QW-408) <table border="1" style="width: 100%;"> <thead> <tr> <th></th> <th>Gas(es)</th> <th>(Mixture)</th> <th>Flowrate</th> </tr> </thead> <tbody> <tr> <td>Shielding</td> <td><u>N/A</u></td> <td><u>N/A</u></td> <td><u>N/A</u></td> </tr> <tr> <td>Trailing</td> <td><u>N/A</u></td> <td><u>N/A</u></td> <td><u>N/A</u></td> </tr> <tr> <td>Backing</td> <td><u>N/A</u></td> <td><u>N/A</u></td> <td><u>N/A</u></td> </tr> </tbody> </table>						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>																
	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 : <u>SMAW</u> Current & Polarity : <u>See Below Table</u> Amps (Range) : <u>See Below Table</u> Vols (Range) : <u>See Below Table</u> Tungsten Electrode Size and Type : <u>N/A</u> Electrode Wire Feed Speed Range : <u>N/A</u> Other : <u>N/A</u>																																									
TECHNIQUE (QW-410) String or Weave Bead : <u>Both</u> Orifice, Nozzle, or Gas Cup Size : <u>N/A</u> Initial & Interpass Cleaning : <u>Wire Brush & Grinding</u> Method of Back Gouging : <u>Air Arc Gouging or Grinding if required</u> Oscillation : <u>N/A</u> Contact Tube to Work Distance : <u>N/A</u> Multiple or single Pass : ☒ MULTI ☐ SINGLE Multiple or single Electrodes : ☐ MULTI ☒ SINGLE Peening : <u>N/A</u> Other : <u>N/A</u>																																									
<table border="1" style="width: 100%;"> <thead> <tr> <th rowspan="2">Weld Pass(es)</th> <th rowspan="2">Process</th> <th colspan="2">Filler Metal</th> <th rowspan="2">Current Type and Polarity</th> <th rowspan="2">Amps (Range)</th> <th rowspan="2">Wire Feed Speed (Range)</th> <th rowspan="2">Volts (Range)</th> <th rowspan="2">Travel Speed (Range) cm/min</th> <th rowspan="2">Remarks</th> </tr> <tr> <th>Classification</th> <th>Dia. (mm)</th> </tr> </thead> <tbody> <tr> <td>As Req'd</td> <td>SMAW</td> <td>E7018</td> <td>2,5, 3,2, 4,0</td> <td>DCEP</td> <td>80-150</td> <td>N/A</td> <td>20 - 30</td> <td>3 - 8</td> <td></td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>										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	80-150	N/A	20 - 30	3 - 8											
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	80-150	N/A	20 - 30	3 - 8																																	
Remarks :																																									
Approvals		Prepared By			Checked By			Approved By MIGAS																																	
Name		Andi Iskandar			Rusnandi																																				
Signature								Nomor Registrasi Migas : AYG - B - 569/0231/2016																																	
Date		February 27, 2026			February 27, 2026																																				

(CPM Work No.)
11580

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

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(Vendor Work No.)
E2502

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Head Office : Jl. Raya Bojonegara-Sendang No. 44 RT. 001/RW.001
Desa Kertasana, Kecamatan Bojonegara, Kabupaten Serang
Banten, Indonesia (42434)
Telp : +62-254-7850344/45/46/47
e-mail : project@hanazono.co.id

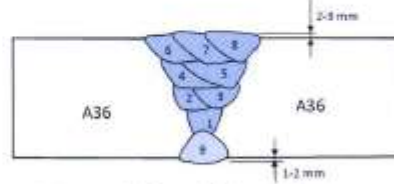
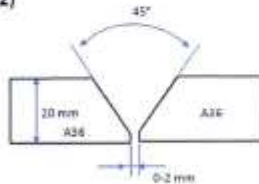
PAGE : 1 OF 2

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

GAS (QW-408)

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

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 -

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

Nomor Registrasi Migas

ATG-B-569/0251/2026

(CPM Work No.)
11580

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

Revision No. : D

(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 Kertassana, Kecamatan Bojonegara, Kabupaten Serang
Banten, Indonesia 42414
Telp : +62-254-7850344/45/46/47
e-mail : gpcert@hanazono.co.id

PAGE : 2 OF 2

PQR No. 04-PQR-HEH-MIGAS-26

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 ²)	Ultimate Total Load (kN)	Ultimate Unit Stress (N/mm ²)	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,

Reviewed By,

Approved By,
MIGAS


Andi Iskandar

Date : February 27, 2026

Nomor Registrasi Migas

AYG - B. 569/0231/2026

Date :

(CPM Work No.)
11580

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

Revision No. : D

(Vendor Work No.)
E2502

Purchase Order No. : 11580

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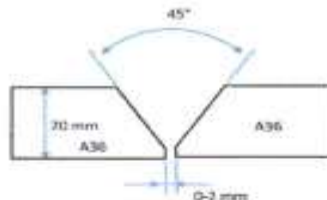


KEMENTERIAN ENERGI DAN SUMBER DAYA MINERAL REPUBLIK INDONESIA DIREKTORAT JENDRAL MINYAK DAN GAS BUMI

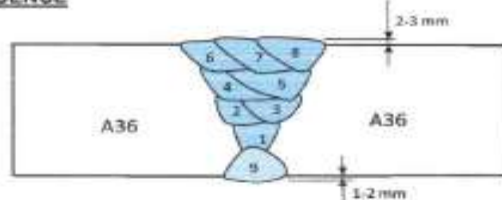
LAPORAN PENGUJIAN KUALIFIKASI PROSEDUR / JURU LAS / OPERATOR LAS

Nama Juru Las	: SAHRUL	No. Ujian	: -
Perusahaan	: PT. HEI	Project	: -
Tempat Pengujian	: WORKSHOP PT HEI	Tanggal Pengujian	: February 09, 2026
	: Cilegon	WPS No.	: 04-WPS-HEI-MIGAS-26
Standar yang dipakai	: ASME SECT IX:2025	Supporting PQR No.	: 04-PQR-HEI-MIGAS-26
Jenis mesin Las	: Miller	Ampere	: See Table
Proses Pengelasan	: SMAW	Voltage	: See Table
Jenis Arus Listrik	: DCEP		
Gas Pelindung	: N/A	Serbuk Las Pelindung	: N/A
Batas Aliran	: N/A		
Posisi Pengelasan	: 3G	Arah Pengelasan	: Uphill
Jenis Bahan	: Carbon Steel Plate	Pabrik	: N/A
(Pipa/Pelat)	: A36		
Diameter	: N/A	Tebal Dinding (Pipa/Pelat)	: 20 mm
		Pabrik	: N/A
Jenis Bahan Pengisi	: E7018	Pembersih	: grinding and Brushing
Panjang yang disambung	: 350 mm	Melepaskan Klem	: N/A
Jenis Klem	: None	Sudut Kampuh	: 45°
Penyerongan	: Single V GROOVE	Tinggi Las Muka	: 3 mm
Bukaan Las Muka	: 0 - 1 mm	Tinggi Las Akar	: 2 mm
Tinggi Las Muka	: 1 - 2 mm	Pemanasan Akhir	: N/A
Pemanasan Mula	: Ambient temperature	Backing Plate/Backweld	: Backweld
Interpass Temp. Range	: See Table		

SKETCH



SEQUENCE



No. Lapisan Pada Lasan	1	2	3	4	5	6	7
Jenis	E7018	E7018	E7018	E7018	E7018	E7018	E7018
Ukuran Kawat Las (mm)	3,2	3,2	3,2	3,2	3,2	3,2	3,2
Ampere, A	100	120	120	124	124	122	122
Volt, V	20	22	22	25	25	24	24
Mulai Mengelas	09.40	09.58	10.06	10.19	10.26	10.33	10.40
Selesai Mengelas	09.56	10.05	10.15	10.25	10.31	10.39	10.45
Durasi Waktu / Lapisan (min)	8.03	5.73	6.88	5.45	4.68	5.10	4.35
Kec.Pengelasan, mm/min	37,36	52,36	43,60	55,05	64,10	58,62	68,97
Heat Input, KJ/mm	3,21	3,03	3,63	3,38	2,90	2,99	2,55
Suhu Antar Sambungan °C	36	104	144	156	168	176	186
Selang Waktu Antara Lasan, min		2	1	4	1	2	1

No. Lapisan Pada Lasan	8	9					
Jenis	E7018	E7018					
Ukuran Kawat Las (mm)	3,2	3,2					
Ampere, A	122	120					
Volt, V	24	24					
Mulai Mengelas	10.46	11.15					
Selesai Mengelas	10.50	11.19					
Durasi Waktu / Lapisan (min)	4,60	4,32					
Kec.Pengelasan, mm/min	65,22	69,44					
Heat Input, KJ/mm	2,69	2,49					
Suhu Antar Sambungan °C	202	95					
Selang Waktu Antara Lasan, min		26					

(CPM Work No.)
11580

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PENGUJIAN VISUAL						
BENTUK CACAT LAS		LOKASI		UKURAN		KETERANGAN
None		None		None		None
MACAM CACAT : None						
HASIL UJIAN VISUAL : Accepted						
PENGUJIAN TIDAK RUSAK : RT						
HASIL UJI		NO. LAPORAN		TANGGAL		
RT : Lulus/ Tidak Lulus		01/RT/RPD/026		February 02, 2026		
UT : Lulus/ Tidak Lulus		N/A		N/A		
PT : Lulus/ Tidak Lulus		N/A		N/A		
HASIL UJI TIDAK MERUSAK : Accepted						
PENGUJIAN MERUSAK : Side Bend 4 ea, Tensile Test 2 ea						
TENSILE TEST						
NO. BATANG UJI	UKURAN		LUAS (mm ²)	BEBAN MAKSIMUM (kN)	KUAT TARIK kgf/mm ² (Mpa)	SIFAT CACAT DAN LOKASI
	LEBAR (mm)	TEBAL (mm)				
TENSION - 1	19.49	19.54	380.83	193.77	509	Ductile; Base Metal
TENSION - 2	19.45	19.56	380.46	192.54	508	Ductile; Base Metal
NICK BREAK TEST						
NO. BATANG UJI	CACAT		HASIL UJI			
	UKURAN (mm)					
NICK BREAK - 1	N/A					
NICK BREAK - 2	N/A					
BENDING TEST						
NO. BATANG UJI	CACAT		HASIL UJI			
	UKURAN (mm)					
SB1	150 mm x 10 mm		Accepted			
SB2	150 mm x 10 mm		Accepted			
SB3	150 mm x 10 mm		Accepted			
SB4	150 mm x 10 mm		Accepted			
HASIL PENGUJIAN MERUSAK : "LULUS" Laporan pengujian : HT/JKT/0226/0261						
DISIAPKAN OLEH QC		DIPERIKSA OLEH IWE		DIREVIEW OLEH QA/QC		DISETUJUI OLEH,
PT. ISTEK		PT. ISTEK		PT. HEI		MIGAS
						
(Ferdi)		(Andi Iskandar)		(Rusnandi)		(Puji Trijatmiko)
23-Feb-26		23-Feb-26		23-Feb-26		

PT. RETSA PUTRA DYME

NDT TECHNICAL & INSPECTION SERVICE

Head Office : Jl. Moch Ramhan No.117 Desa Siliwangi, Kecamatan Jombang, Cirebon-Jawa Barat 45157
Operasional Workshop : Link. Nyi Rambang RT.02/03 No.22 Sukmajaya Kecamatan Jombang, Cilagon - Banten
Email : retsaputradyme@gmail.com Mobile : 081298473433

RADIOGRAPHIC EXAMINATION REPORT

Client : PT HANAZONO ENGINEERING INDONESIA		Report No. : 01/RT/RPD/11/26		Radiographic Technique Sketch												
Project : PQR		Date : 09-02-26		☐ DWS ELONG ☐ DWS FIT												
Location :		Procedure No. :		☐ DWS CONTACT ☐ DWS PLATE												
Job / Contract No. :		Accept. Code : ASME IX		☐ DWS SUPERIMPOSED ☐ DWS PAIDNAME												
Type Material : A36	Radiation : Ir.192	Penetrant : ASTM 1B														
Thickness Mat'l : 20 mm	Focal Spot : 2x3 mm	Density : 2-4														
Pipe ☐ Plate ☒ : in/mm	Activity : 20 Ci	Un. Geometry : 0.5														
Weld Process : SMAW ☒ GTAW ☐	SFD : 15	Sensitivity : 2%														
☐ SAW ☐ FCAW	Exposure Time : 2.10	Screen Type : PB.0125														
☐ GMAW ☐ Other	Placement IQI : S/S	Film Type : 07														
Film Identification	No. Joint	Location	Type of Discontinuity										Film		Result	Remarks
			Welder Stamp	Burn Through	Crack	Excessive Reinforcement	Tungsten Inclusions	Slag Inclusions	Incomplete Fusion	Intermittent Penetration	Misalignment / Hi-Low	Porosity	Root Concavity	Undercut		

04/PQR/HEI/MIGAS/26

SAHRUL

36

A-B

1 PASS

TOTAL WELD :

TOTAL OF FILM USED :

1

Radiographer

QC/QA Inspector

Client Representative

Third Party

Date : 10-02-2026

Date :

Date :

Date :

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Paha Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 55 of 85



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

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Paha Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 56 of 85



Taman Teknis Blok A2 No. 11
Bumi Serayu Damai 19501,
Tangerang - Indonesia
Telp: +62 21 75081084
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 ²)	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. : D

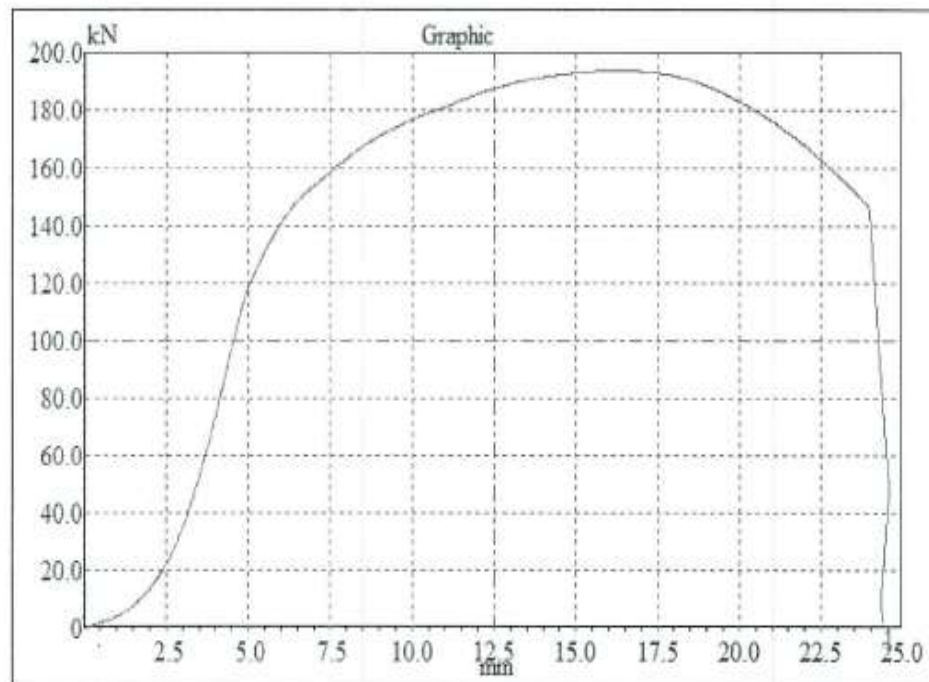
(Vendor Work No.)
E2502

Purchase Order No. : 11580

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

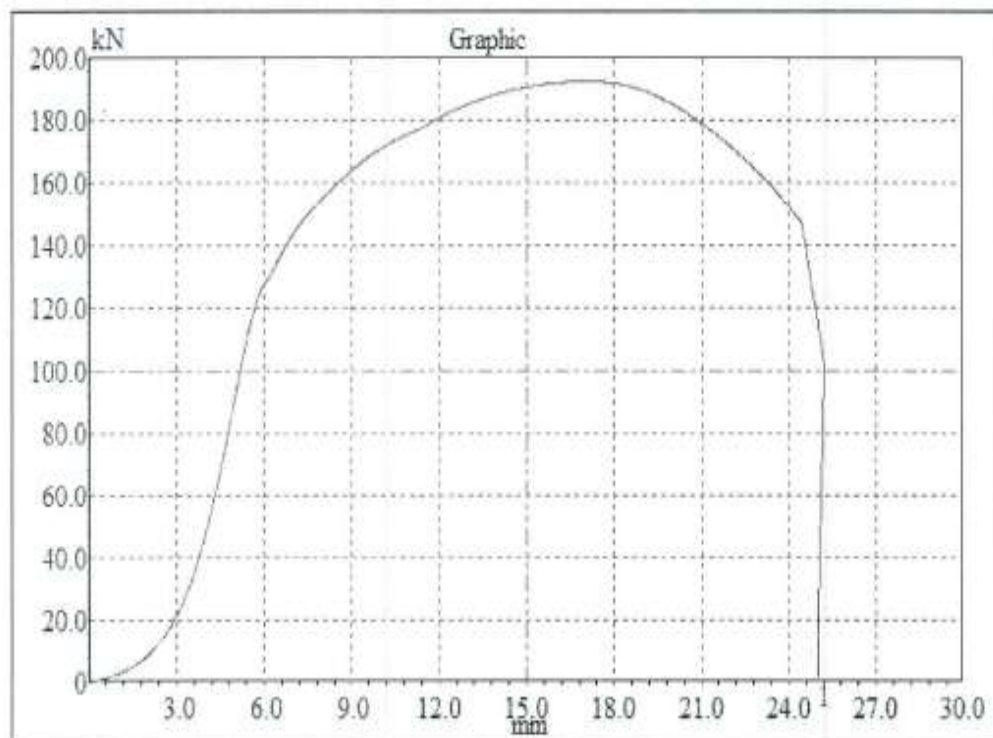
No.	Thickness mm	Width mm	Area mm ²	Max. Load kN	UTS N/mm ²
1	19.54	19.49	380.83	193.77	509



COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Paha Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 58 of 85

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

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



(CPM Work No.)
11580

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

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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 data 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

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(Vendor Work No.)
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PT. voestalpine Böhler Welding Asia Pacific

PT. voestalpine Böhler Welding Asia Pacific

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

www.voestalpine.com/welding

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	BÖHLER FOX S EV 50		
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 S 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.

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

[illegible]

PT. GUNAWAN DIANJAYA STEEL Tbk.

Surabaya - Indonesia

MILL TEST CERTIFICATE
ACC. TO EN10024 : 2004 3.1

Purchaser
KORINDO HEAVY INDUSTRY PT

Jl. Wisma Korindo Jl.MT.Haryono Kav.62 Pecenoran Jakarta Selatan DKI Jakarta Raya 12760

0-202-2022 PO. NO : 4000230328

HOT ROLLED STEEL PLATE

ASTM A38 - 14
SNC-D7-0901-2006

ASTM A8-17a

Head Office :
J. Margashipu No. 25A
Tantak Sonore - Asimrow - Surabays 60184
Phone : +62-31-7490508 (Hunting)
Fax : +62-31-7490581
e-mail : quality@gunawonsteel.com
Website : www.gunawonsteel.com

Page 12 of 12

Certificate No. GDS-QC-2022-1160

Date: May 31, 2022

Despatch Advice No. : LDO-2205-00243-00247

[illegible]

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.

6. WPS & PQR NO. 002/HEI/MIGAS/20



Office & Work Shop Address: Jl. Raya Bojonegara - Serang 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.	002/HEI/MIGAS/20	Date	01/10/2020 Supporting PQR No.(s) 002/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)	Gas (GTAW) / Base Nor Weld Metal (GTAW / SMAW)		
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.		See Joint Details	
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.	8	Group No.	-
OR		P. No.	1
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 ~ 19.52 mm	Fillet	All
Maximum Pass Thickness ≤ 1/4 in. (13mm)	(Yes) All	(No)	-
Other			
*FILLER METALS (QW - 404)			
	1	2	
	GTAW	SMAW	
Spec. No. (SFA)	5.9	5.4	
AWS No. (Class)	ER309L	E309L-16	
F - No.	6	5	
A - No.	8	8	
Size of Filler Metals	Ø 1.6 mm ~ 2.4 mm	Ø 3.2 ~ 4.0 mm	
Weld Metal			
Deposit Thickness:			
Groove	Max. 6 mm	Max. 13.52 mm	
Fillet	All	All	
Electrode Flux (Class)	N/A	N/A	
Flux Type	N/A	Lime Titania	
Flux Trade Name	N/A	N/A	
Consumable Insert	N/A	N/A	
Other	Manufacturer : BOHLER / AVESTA		
	Electrode Name : Bohler S CN 23/12-IG & Avesta 309L-16		
*Each base metal-filler metal combination should be specified individually.			

1 OF 6

AYG - 07981 / 0842 / 754

(CPM Work No.)
11580

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

Revision No. : D

(Vendor Work No.)
E2502

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WELDING PROCEDURE SPECIFICATION (WPS)

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

Welding Procedure Specification No. : 002/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 N / A
Time Range N / A

PREHEAT (QW - 406)

Preheat Temp. Min. 36 °C
Interpass Temp. Max. 150 °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	Argon	99,99%	7 - 15 LPM
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., Remanent, Corrosion, Hot Wire Addition, Technique, Process Torch Angle, etc.)
		Class	Dia.							
Root & Hot	GTAW	ER309L	1.6 ~ 2.4	DCEN	80 - 160	-	-	10 - 18	24 - 88	-
Fill & Capping	SMAW	E309L-16	3.2 ~ 4.0	DCEP	60 - 160	-	-	18 - 28	32 - 135	-

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.) 2.0 J
Tungsten Electrode Size and Type 1.6 ~ 2.4 mm & 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 with SS Material
Method of Back Gouging Back Grinding with SS Material
Oscillation N/A
Contact Tube to Work Distance 12 ~ 19 mm (GTAW)
Multiple or Single Pass (Per Side) Single & 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 SS grinding & Brushing

Nomor Registrasi Migas

ATG - 07981/0842/2020

(CPM Work No.)
11580

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

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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. : 002/HE/MIGAS/20

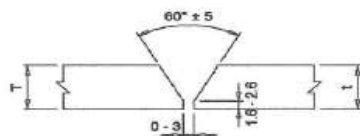
Rev. 0

JOINT DETAILS

SINGLE VEE GROOVE

$T = t$

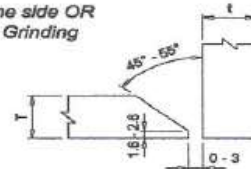
Welded from one side



SINGLE BEVEL - CORNER JOINT

$T = t$

Welded from one side OR
both side Back Grinding



SQUARE BUTT

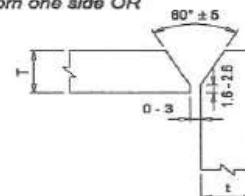
Welded from BOTH SIDES, $T = 6$ mm Max
Root gap, 0 - $\frac{1}{2}$



SINGLE VEE GROOVE

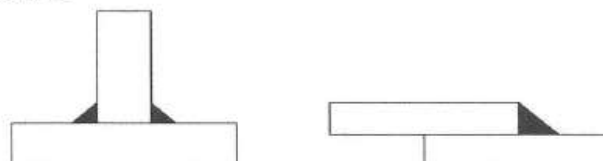
$T = t$

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 : ER309L / 5.9 & SMAW : E309L-16 / 5.4

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

Date : October 1, 2020

(CPM Work No.)
11580

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

Revision No. : D

(Vendor Work No.)
E2502

Purchase Order No. : 11580

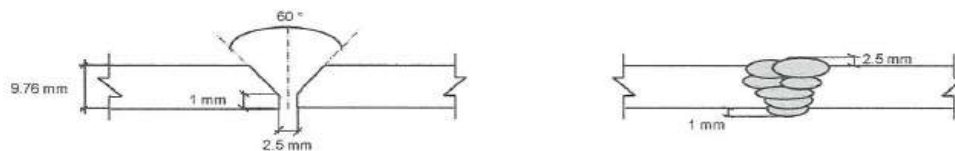
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PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

Organization Name **PT. HANAZONO ENGINEERING INDONESIA**
Procedure Qualification Record No. 002/HEI/MIGAS/20 Date 29/09/2020
WPS No. 002/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. SA-240 TO A516
Type or Grade, or UNS Number TP304 TO Gr. 70N
P-No. 8 Group No. 1 to P-No. 1 Group No. 2
Thickness of Test Coupon 9.76 mm
Diameter of Test Coupon N/A
Maximum Pass Thickness 5/16 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	Argon	99,99%	10 LPM

FILLER METAL (QW - 404)

SFA Specification	5.9	5.4
AWS Specification	ER309L	E309L-16
Filler Metal F-No.	6	5
Weld Metal Analysis A-No.	8	8
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	Lime Titania
Flux Trade Name	N/A	N/A
Weld Metal Thickness	3 mm	6,76 mm
Other	BOHLER S CN 23/12-IG	AVESTA 309L-16

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) & 5mm (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

PREHEAT (QW - 406)

Preheat Temperature 36°C
Interpass Temperature 150°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

(CPM Work No.)
11580

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

Revision No. : D

(Vendor Work No.)
E2502

Purchase Order No. : 11580

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PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

Procedure Qualification Record No. : 002/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	ER309L	2.4 mm	DCEN	80	10	24	2,0
2					167	14	72	1,9
3					100	21	63	2,0
4	SMAW	E309L-16	3.2 mm	DCEP	98	20	61	1,9
5					101	21	68	1,9
6					99	21	74	1,7
7					103	21	72	1,8

TENSILE TEST (QW - 160)

Specimen No.	Width (mm)	Thickness (mm)	Area (mm ²)	Ultimate Total Load (kN)	Ultimate Unit Stress (N/mm ²)	Type Failure & Location
T1	19,68	9,78	192,47	113,75	591	Fracture on Base Metal (CB)
T2	19,62	9,76	191,49	112,02	585	Fracture on Base Metal (CB)

GUIDE BEND TESTS (QW - 160)

Type and Figure No.	Result
SB1 - QW 462.2	No Open Discontinuity
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	
-Blank-						

Comments

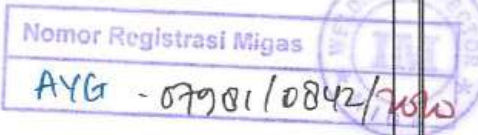
Nomor Registrasi Migas

ATG -07981/0842/2013

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 68 of 85



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. : 002/HEI/MIGAS/20					Rev. 0																																																																								
FILLET-WELD TEST (QW - 180) Result - Satisfactory : Yes ☐ No ☐ Penetration into Parent Metal : Yes ☐ No ☐ Macro - Result <u>None</u>																																																																													
HARDNESS TESTS <table border="1"> <thead> <tr> <th rowspan="3">Test No</th> <th rowspan="3">Test Location</th> <th colspan="3">Vickers Hardness Value HV 10, Kgf/mm²</th> <th rowspan="3">Remarks</th> </tr> <tr> <th colspan="3">12°</th> </tr> <tr> <th>Line 1</th> <th>Line 2</th> <th>Line 3</th> </tr> </thead> <tbody> <tr><td>---Blank---</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table>						Test No	Test Location	Vickers Hardness Value HV 10, Kgf/mm ²			Remarks	12°			Line 1	Line 2	Line 3	---Blank---																																																											
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Other Tests Type of Test <u>N/A</u> Deposit Analysis <u>N/A</u> Other <u>Radiography examination, Result : ACC, Report No. : 001/RT/HEI/IX/20 by PT. Rire Sanjaya Sakti</u> Welder's Name <u>ASMURI</u> Clock No. <u>-</u> Stamp No. <u>W - 01</u> Tests conducted by : <u>PT. HI-TEST</u> Laboratory Test No. : <u>HT/JKT/0920/0328</u> 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  Nomor Registrasi Migas <u>AYG - 07981/0842/2020</u> Date : September 29, 2020 Date : September 29, 2020																																																																													

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Paha Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 69 of 85

PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

Kawasan Industri Jababeka Cikarang
Jl. Industri Selatan 2 Blok JJ NO. 7-19
17530 Bekasi
T. +6221893 7572, F. +6221893 7519
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. : 2020-2047012236-30-20007-025

Rev. 0

Page 1 of 1

PO no.	ACD/AW-N/20/09/0794	of	07.09.2020
Order no.	1042004692		
Delivery note/pos./splitt	2047012236/000000/000030	of	21.09.2020
Product	GTAW rod/wire		
Trade name	BOHLER S CN 23/12-IG		
Standard designation	AWS A5.9 : ER309L ASME SFA5.9 : ER309L		
Dimension	GTAW 2,4 x 1000 mm		118955
Lot no.	20007		77254
Quantity	100,0 KG		JSE6A60W 0425

Chemical composition in % of the product

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N	FN WRC				
0,01	0,40	1,84	0,024	0,009	23,42	0,05	12,55	0,03	0,12	10				

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	≥ 320		≥ 520	≥ 30			
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	
-60°C		≥ 46					

The product BOHLER S CN 23/12-IG meets the requirements of the filler metal specification ASME sec II, part C, AWS A5.9 : ER309L when tested in accordance with that specification.

Town
Bekasi

Date
21.09.2020

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

Authorized representative
Miftah Farid

voestalpine

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 70 of 85

PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

Kawasan Industri Jababeka Cikarang
Jl. Industri Selatan 2 Blok JJ NO. 7-10
17536 Bekasi
T. +6221892 7572, F. +6221892 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. : 2020-2047012235-20-20582-025

Rev. 0

Page 1 of 1

PO no.	ACD/DN-N/20/08/0702	of	05.08.2020
Order no.	1042004626		
Delivery note/pos./splitt	2047012235/000000/000020	of	21.09.2020
Product	covered electrode		
Trade name	BOHLER FOX S 309L-16		
Standard designation	EN ISO 3581-A : E 23 12 L R 3 2 AWS A5.4 : E309L-16		
Dimension	SMAW 3,25 x 350 mm		118955
Lot no.	20582		77298
Quantity	24,6 KG		JSE6A00E 0425

Chemical composition in % of the weld metal

C	Si	Mn	P	S	Cr	Mo	Ni	Cu	N	FN WRC				
0,02	0,87	0,70	0,015	0,025	23,35	0,03	12,74	0,05	0,05	14				

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	≥ 320		≥ 520	≥ 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		≥ 35			AW		

The product BOHLER FOX S 309L-16 meets the requirements of the filler metal specification ASME sec II, part C, AWS A5.4 : E309L-16 when tested in accordance with that specification.

Town
Bekasi

Date
21.09.2020

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

Authorized representative
Miftah Farid

voestalpine

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
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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
Website : www.hittestlab.com



Testing Report

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

Customer	: PT. Hanazono Engineering Indonesia	Job No	: B20625
Address	: Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	No.	: HT/JKT/0920/0328
Reference Code	: ASME Sect. IX : 2019	Total of Page	: 1 of 2
Test Method	: ASTM A370-19	Date of Received	: 22 September 2020
Object to be tested	: (as received)	Date of Tested	: 29 September 2020
		PO No	: PO-E001-HTT-TOL-004
		Project Name	: --
		Sample Marking	: 9. HEI 2

One welded stainless to carbon steel plate joint test sample, size: 10 mm thickness, material spec: A 240-304 to A 516 Gr. 70N, PQR No. PQR002/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
Measured Thickness (mm)	9.78	9.76
Measured Width (mm)	19.68	19.62
Effective Area (mm²)	192.47	191.49
Ultimate Tensile Load (kN)	113.72	112.03
Ultimate Tensile Strength (N/mm²)	591	585
Location of Failure	Base Metal at 516 Gr. 70N	Base Metal at 516 Gr. 70N
Type of Failure	Ductile	Ductile

Testing Machine Used	: INSTRON 600 DX, Model: 600 DX, S/N: S2513, Capacity : 600 kN
Remark	: A : A 240-304 B : A 516 Gr. 70N
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

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : D
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 73 of 85



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
Website : www.hittestlab.com



Testing Report

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

Customer : PT. Hanazono Engineering Indonesia	Job No : B20625
Address : Jl. Bojonegara No. 44 Kertasana, Serang, Banten 42454	No. : HT/JKT/0920/0328
Reference Code : ASME Sect. IX : 2019	Total of Page : 2 of 2
Test Method : ASTM E190-14	Date of Received : 22 September 2020
Object to be tested : (as received)	Date of Tested : 29 September 2020
	PO No : PO-E001-HTT-TOL-004
	Project Name : --
	Sample Marking : 9. HEI 2

One welded stainless to carbon steel plate joint test sample, size: 10 mm thickness, material spec: A 240-304 to A 516 Gr. 70N, PQR No. PQR002/HEI/MIGAS/20, welding process: GTAW+SMAW, welding position: 1G, for Procedure Qualification Record Test.

Type of Test : Bending Test (Transverse Specimen)

Test Temperature : 25.1°C	Test Specimen Width : 38 mm
Test Weld Metal Thickness : 10 mm	Bend Angle : 180 Degree
Former Diameter : 40 mm	
Shoulder Distance : 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

- 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 06/01/2014

(CPM Work No.)
11580

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

Revision No. : D

(Vendor Work No.)
E2502

Purchase Order No. : 11580

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검사증명서 MILL TEST CERTIFICATE

주문번호/Order No. : P194500138
발주번호/PO No. :
품명/Commodity : STEEL PLATE
재질규격/Specification : ASTM A516-70N/ASME SA516-70N
고객사/Supplier : JUNGJIN
수요가/Customer : 탐스틸
검사증명서번호/Certificate No. : DP3-2-190608-022-001
발행일자/Date of issue : 2019-06-06

제품 치 수 Dimension 단위 Unit Inch: ", mm: Space	제품 번호 Product No	수량 Quantity	중량 Weight kg	재질번호 Heat No	인장시험 Tensile Test			경도시험 Hardness		화학성분(%) Chemical Composition																Remarks
					P S I T I O N	재감번호 Heat No	YPO2		TS	EL	HB	HR	C	Si	Mn	P	S	Cr	Ni	Cu	Mo	Nb	Ti	V		
							GL	N/mm²																	%	
10.00*3048*6036 *Specimen No.: DP08221216-a, DP08221215-d ** Normal Ized: 910 ° C, 30min	A670179-01, 02		2,188	PK115635	T 1	346	527	25	139	L	16	37	139	18	4	20	10	10	3	2	18	2				
	Sub Total (20)	3	4,376																							
19.00*3048*6036 *Specimen No.: DP08265721-a, DP08265721-d ** Normal Ized: 910 ° C, 35min	A673276-01		2,772	PK636468	T 1	343	531	27	142	L	17	38	144	18	4	20	10	10	5	1	2	2				
	Sub Total (40)	1	2,772																							
22.00*3048*6036 *Specimen No.: DP08265725-a, DP08265725-d ** Normal Ized: 910 ° C, 35min	A673334-01		3,209	PK636466	T 1	365	541	25	147	L	16	37	142	20	3	20	10	10	5	1	2	2				
	Sub Total (50)	1	3,209																							
25.00*3100*6036 *Specimen No.: DP08227613-a, DP08227613-d ** Normal Ized: 910 ° C, 45min	A673275-01		3,708	PK404319	T 1	352	529	27	149	L	15	33	144	14	3	20	140	190	12	1	16	26				
	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, if the amount of C, 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 : 1-Top, M-Middle, B-Bottom
* Division : L-Ladle Analysis, P-Product Analysis
* Sub (Sub Size, Heat Value, mm) : Blank-Full Size, 1-7.5*10, 2-5.0*10
* EL (Gauge Length, mm) : 1-200, 2-100, 3-80, 4-70, 5-50, 6-5.65*V, 7-5.0*V, 8-5.0*V
* Tr : Trace
* T(S) : T(S) (Sample) Al
* NR : Result : G-No Break, B-Break
* TTP (Through Thickness Position) : 1-Surface, 2-1/4T, 3-1/2T

본 주문서는 상기의 규격번호와 평면도로 사용시 평면도상 및 인장시험 등의 문제가 발생할 수 있으며, 본 검사증명서를 위조 또는 변조시 형사처리에 의해 처벌될 수 있습니다.

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

Surveyor to _____ Surveyor to _____ Surveyor to _____
Danglin Works, 25, Godeaegongdan 1-gil, Songak-eup, Danglin-si, Chungcheongnam-do, Republic of Korea/Quality Control Team, TEL. 041-351-4633
Chief of Quality Control Team _____
Page : 1/2



(CPM Work No.)
11580

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

Revision No. : D

(Vendor Work No.)
E2502

Purchase Order No. : 11580

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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
수요자/Customer : 합스틸

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	화학성분(%) Chemical Composition				비고 Remarks
				T, Al 3	S, Al 3	Ceq 3	B 4	
10.00*3048*6096 *Specimen No.: DP08221216-a, DP08221215-d ** Normalized: 910 °C, 30min	A670179-01, 02		2,188	33	398		1	
	Sub Total (20)	3	4,376					
	A673276-01		2,772	40	417		1	
19.00*3048*6096 *Specimen No.: DP08266721-a, DP08266721-d ** Normalized: 910 °C, 35min	Sub Total (40)	1	2,772					
	A673334-01		3,209	30	403		1	
	Sub Total (50)	1	3,209					
22.00*3048*6096 *Specimen No.: DP08266525-a, DP08266525-d ** Normalized: 910 °C, 35min	Sub Total (50)	1	3,708	37	424		1	
	A673275-01		3,708					
	Sub Total (60)	1	3,703					
* Tensile Test Direction - Transverse * Ceq = C+Mn/6+(Ni+Cu)/15+(Cr+Mo+V)/5 * Supply Condition - Normalized * Chemical Composition Unit : 2-x100, 3-x1000, 4-x10000 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. 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 * GI(Gauge Length, mm) : 1-200, 2-100, 3-80, 4-70, 5-50, 6-5.65A, 7-5d, 8-4d, 9-8d * T(S), Al : Total(Soluble) Al *Tr : Trace * NPS Result : G-No Break, B-Break * TTP(Through Thickness Position) : 1-Surface, 2-1/4T, 3-1/2T								

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

Surveyor to

Surveyor to

Surveyor to

Surveyor to

Chief of Quality Control Team

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

Page : 2/2



(CPM Work No.)
11580

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

Revision No. : D

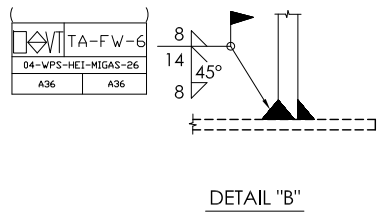
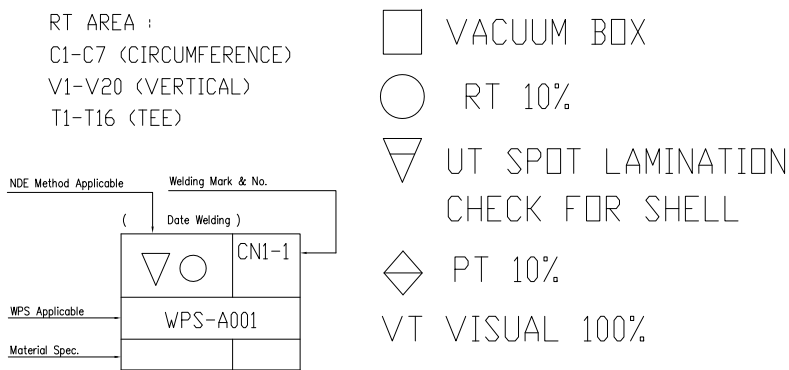
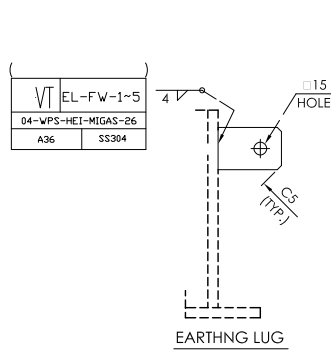
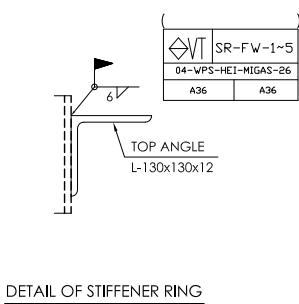
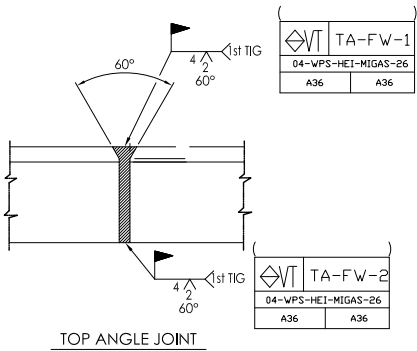
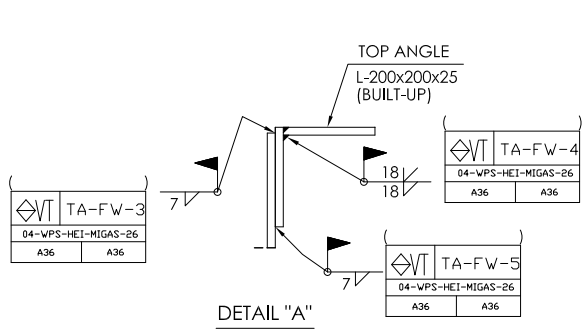
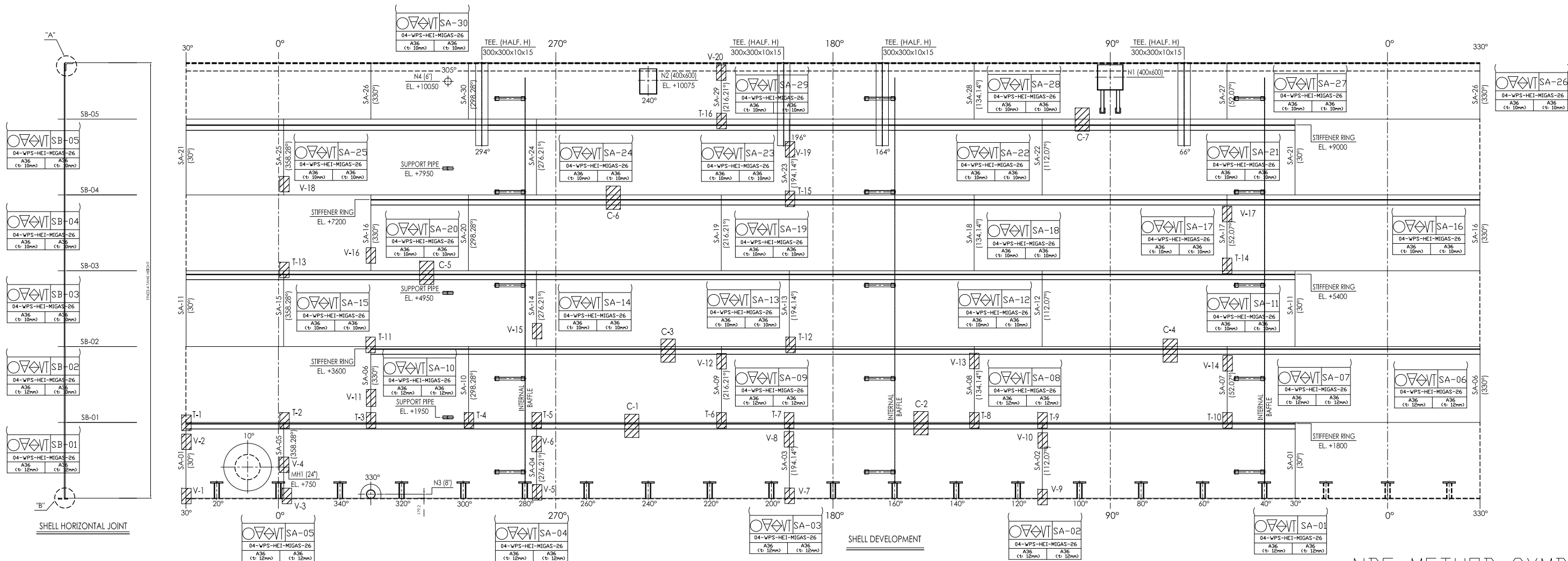
(Vendor Work No.)
E2502

Purchase Order No. : 11580

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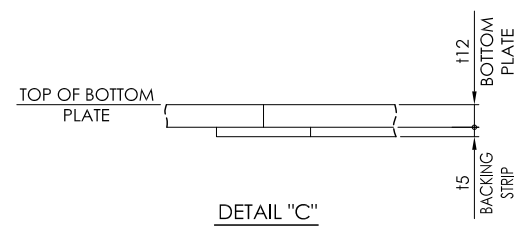
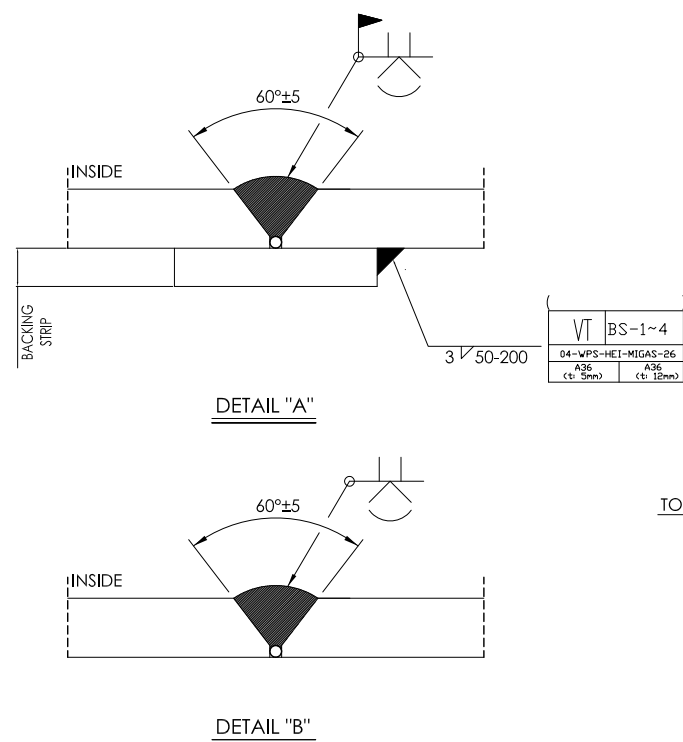
		INSPECTION CERTIFICATE 3.1 ISSUE DATE: 2017-08-26 ACCORDING TO EN 10204 CERTIFICATE NO IS2121 Rev 1									
		MANUFACTURER'S MARK BHS		INSPECTOR'S STAMP 		MELTING PROCESS E/AOD					
CUSTOMER: PT PARADISE PERKASA JL PANGERAN JAYAKARTA 66 KOMPLEK PESONA JAYAKARTA LESTARI BLOK B 6 MANGGA DUA SELATAN SAWAH BESAR JAYAKARTA PUSAT DKI JAKARTA 10730 Indonesia						ORDER No. BE05338		ITEM No. 11		DELIVERY NOTE No. DEL044196	
SPECIFICATIONS ASTM A240 / A240M-15a ASME BPVC-III SA240 / SA240M-2013						MATERIAL CODE 304L 304 304L 304		CUSTOMER ORDER No. 2117100086			
								REQUIREMENTS CASE BPC1031756 (1750 kg) BPC1031757 (2075 kg) BPC1031758 (2110 kg) Item No. : CERTIFIED TRUE COPY Signature : PT. PARADISE PERKASA			
TOLERANCE: ASTM/ASME No. 1 Finish, Hot rolled annealed and pickled						KURZNAME:		BEAT No.: 410812			
DIMENSIONS: 10 mm X 1220 mm X 2440 mm						QUANTITY: 25		MASS: 2928 Kg		MATERIAL No.: A0038966	
CHEMICAL COMPOSITION (%)											
	C	S	P	Mn	Si	Cr	Ni	N			
Min						17.5	8.0				
Max	0.030	0.030	0.045	2.00	0.75	19.5	10.5	0.10			
Actual	0.019	0.001	0.033	1.72	0.40	18.7	8.1	0.07			
MECHANICAL PROPERTIES											
TEMPERATURE	DIRECTION	POSITION	Rm MPa	Rp0.2 MPa	A50 %	HRBW HRBW					
Ambient	Transverse	Requirement Min	515	305	40	92					
		Max									
Ambient	Transverse	Head	643	316	49	85					
		Tail				88					
INTERGRANULAR CORROSION											
SPECIFICATION		RESULT		This material is free from mercury contamination. The reduction level established by this material is not greater than the normal background level. This document is issued without obligation or liability and may only be reproduced in full. Tests to verify label and quality have been made. Verwechtingscontrole is uitgesloten. Visual and instrumental control, no exception. Beschauungs- und Abmessung: ohne Ausnahme. The delivery is in accordance with the order. Die Lieferung entspricht den Bestellungen. This material meets the Hardness requirement of Nace MR-0175 & Nace MR-0103. Material has been PMI Tested. Rm = Tensile strength (UTS) Rp0.2 = Yield proof strength at 0.2% strain Rp1.0 = Yield proof strength at 1.0% strain A5 = Elongation with gauge length 5.65" (146mm) A5 = Elongation with gauge length 5.0mm HRBW = Rockwell hardness B scale Bahru Stainless 304 Bhd is certified with ISO 9001 & ISO 14001. BAHRU STAINLESS SDN BHD IS MEMBER OF ACEKINON GROUP							
ASTM A262 Practice E		PASS									
HEAT TREATMENT (SOLUTION ANNEALED)											
Anneal °C		Quench		BAHRU STAINLESS SDN BHD IS MEMBER OF ACEKINON GROUP							
1050 - 1100		AIR/SPRAY									
BAHRU STAINLESS PTD 4069 (PLOT 188), Jalan Rumbia 4 Tanjung Langsat Industrial Complex 81700 Pasir Gudang, Johor, Malaysia Swin Le Teoh QC ENGINEER											

- 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 1/9	
SHELL	A36	WPS NO : 04-WPS-HEI-MIGAS-26	SMAW	P1 to P1	REV	DATE	APPR	1	2
TOP ANGLE	A36				0	29/09/25			
STIFFENER RING	A36								
								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	
								NDE Map No.	
								E2502-NDE-PBY-001	
								REV.	

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



NDE Method Applicable	Welding Mark & No.	
	(Date Welding)	
	▽ ○	CNI-1
WPS Applicable	WPS-A001	
Material Spec.		

 VACUUM BOX
 UT SPOT LAMINATION
CHECK FOR BOTTOM
 PT 10%
VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :		File name :		CHANGE BY CAD SYSTEM ONLY										Sheet No./Total sheets 2/9											
BOTTOM PLATE BACKING STRIPE		A36 A36		WPS NO : 04-WPS-HEI-MIGAS-26 SMAW P1 to P1		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		 PT. HANAZONO Engineering Indonesia <i>We are always partner with you</i>					
														DRAFT				BENRIDHO									
														CHECK				RUSNANDI									
														APPR													
												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 No.		REV.			
																						NDE MAP BOTTOM LEACH TANK		E2502-NDE-PBY-001			

1. BOLT HOLE ORIENTATION

- ### # LIFTING LUG AND REMOVING OF JIG

NOZZLE ATTACHMENT WELDING OF DUCTING



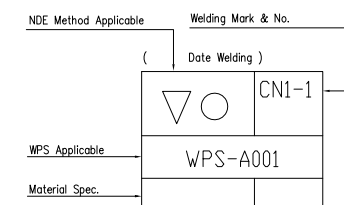
▽ UT SPOT

PT 10%

PT 100%

 PNEUMATIC TEST

VT VISUAL 100%

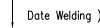
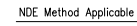
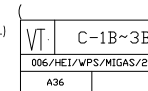
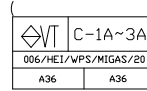
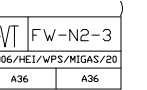
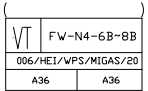
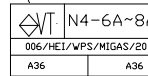
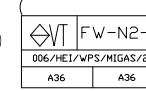
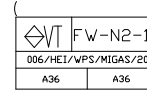
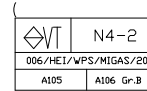
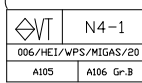
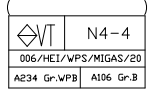


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HOOK A36		WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1	REV		DATE		APPR				Size of memory		PT. HANAZONO Engineering Indonesia <i>We are always partner with you</i>					
PIPE DAVIT A53 Gr.B			0		29/09/25						DRAFT			DATE		SIGN		
HANDLE A36											CHECK					BENRIDHO		
NOZZLE NECK A36											APPR					RUSNANDI		
PLATE FLANGE A36														Scale :		NTS		
					Name										NDE Map No.		REV.	
					NDE MAP MANHOLE LEACH TANK										E2502-NDE-PBY-001			

1. BOLT HOLE ORIENTATION

- ### # LIFTING LUG AND REMOVING OF JIG

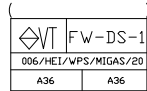
NOZZLE ATTACHMENT WELDING OF DUCTING



▽ UT SPOT

 PT 10%

VT VISUAL 100%



DETAIL "DS"

MATERIAL SPECIFICATION

LEGEND :

WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1

File name :	
-------------	--

CHANGE BY CAD SYSTEM ONLY

	DATE	SIGN
DRAFT		BENRID


PT. HANAZONO Engineering Indonesia
We are always partner with you

DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
--------------------	-----------------------------

TAG NO./LINE NO.	: LEACH TANK
REFER. DWG. NO.	: E2502, 200, DWG. 105

NDE Map No.	REV.
-------------	------

Name

NDE MAP NOZZLE 1-3 LEACH TANK

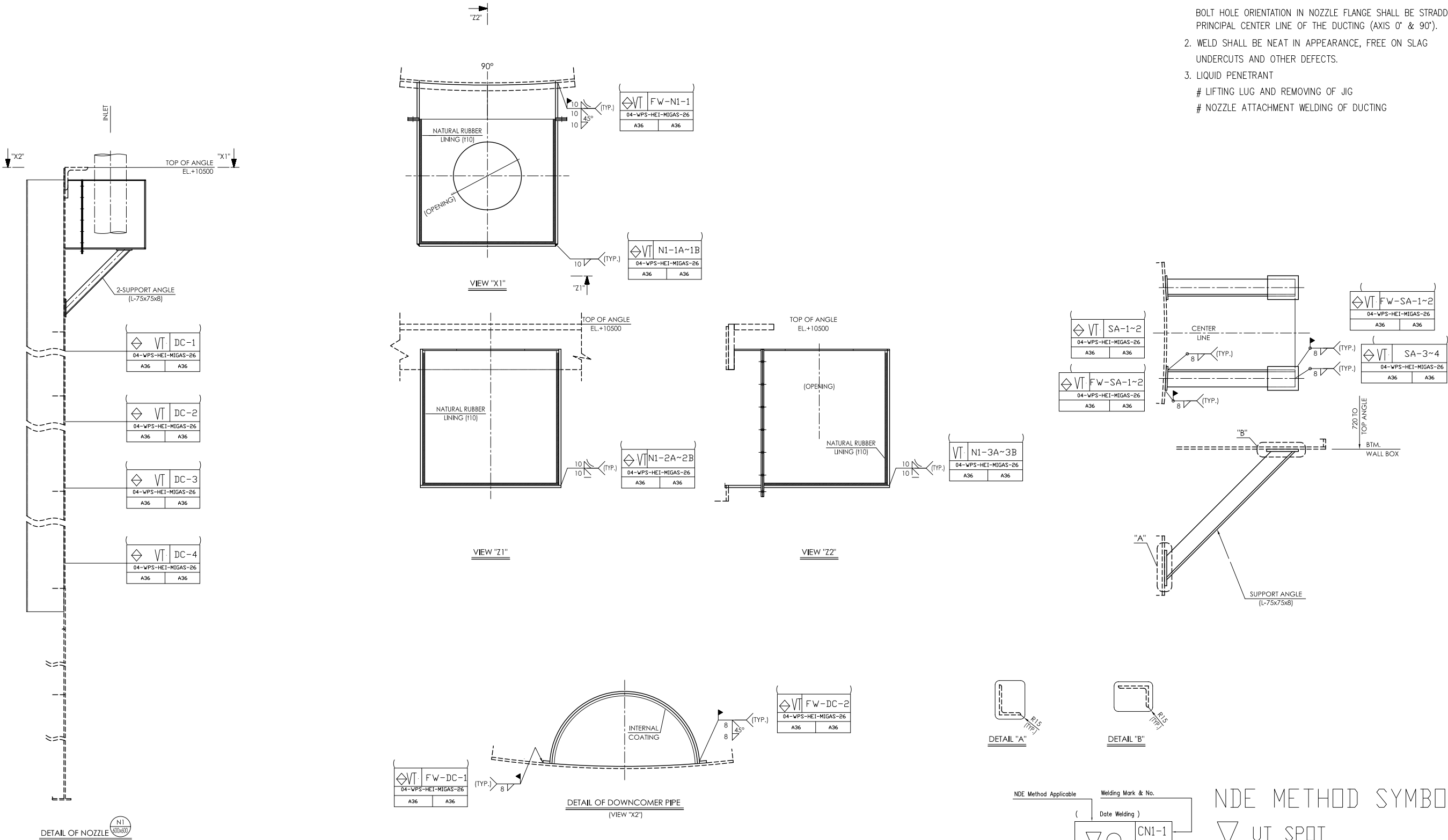
NDE Map No.

E2502-NDE-PBY-001

V.



- 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



NDE METHOD SYMBOL

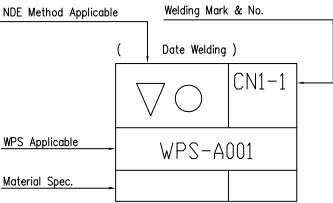
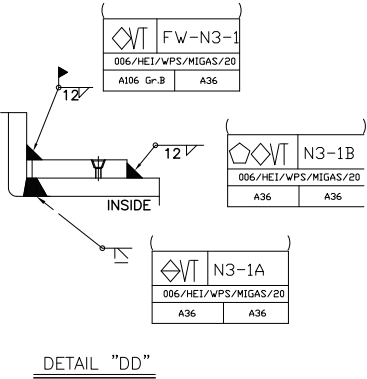
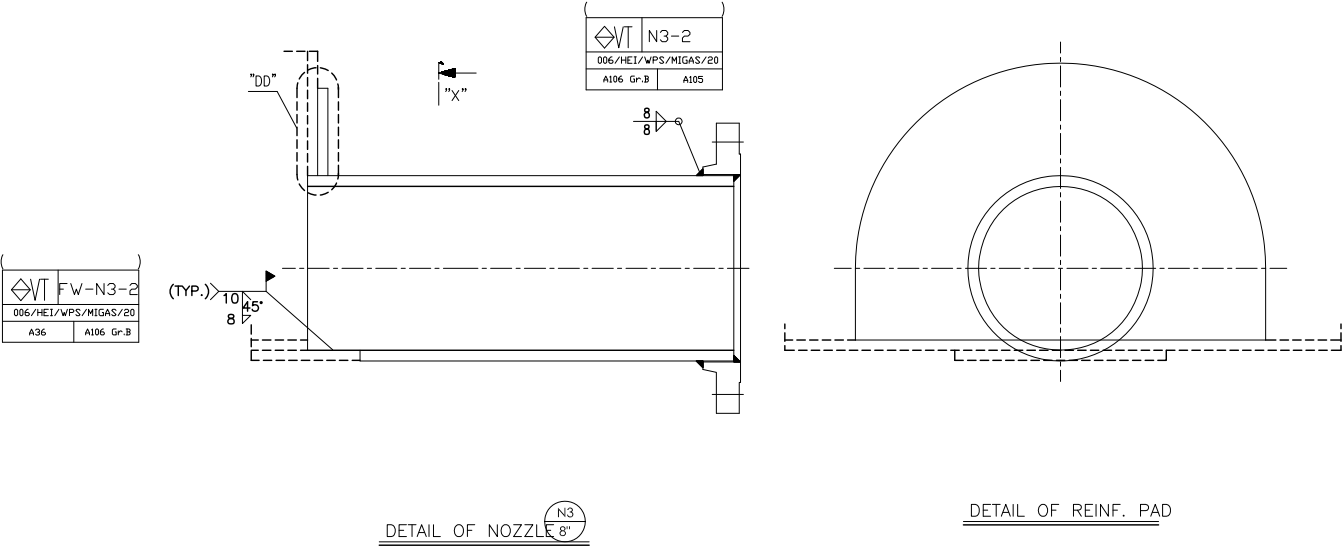
▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

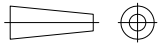
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												Size of memory			
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NOZZLE NECK	A106 Gr.B		0	29/09/25						DRAFT		BENRIDHO			
REINF. PAD	A36									CHECK		RUSNANDI			
CHANNEL	A36									APPR					
										Scale : NTS					
					Name NDE MAP NOZZLE 2-3 LEACH TANK								NDE Map No. E2502-NDE-PBY-001		REV. 

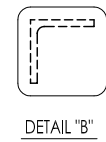
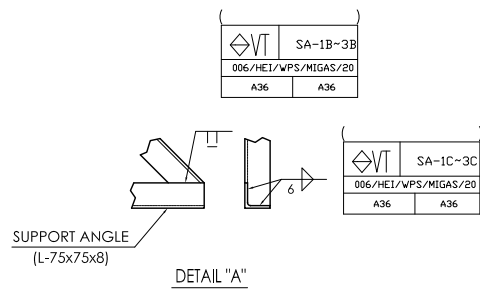
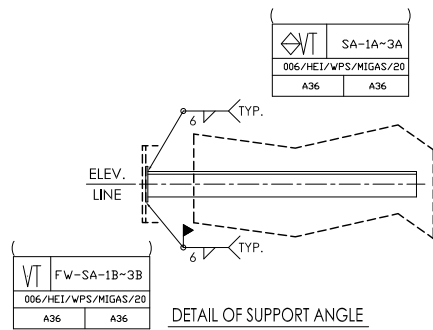
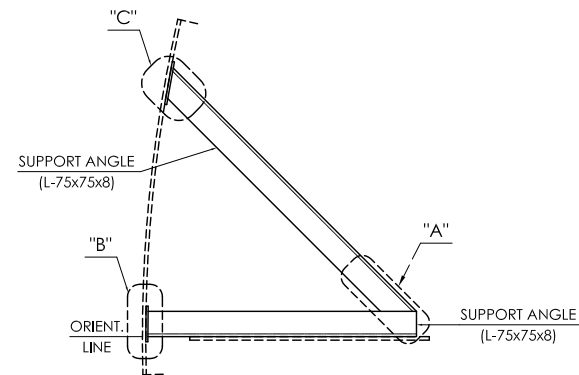
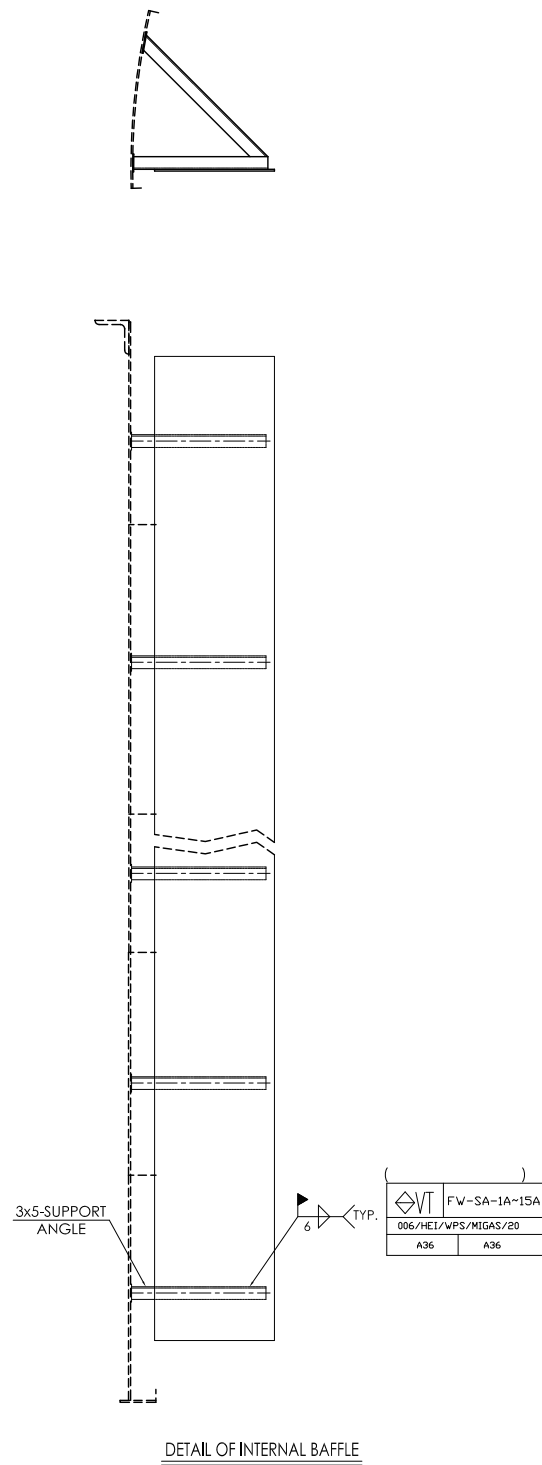
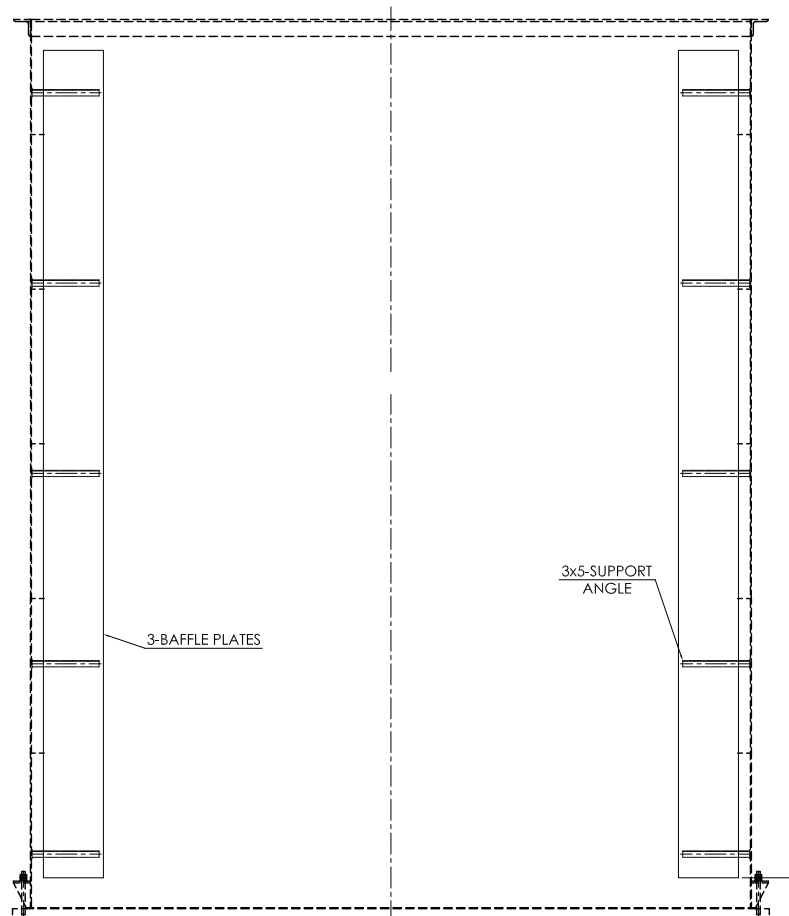
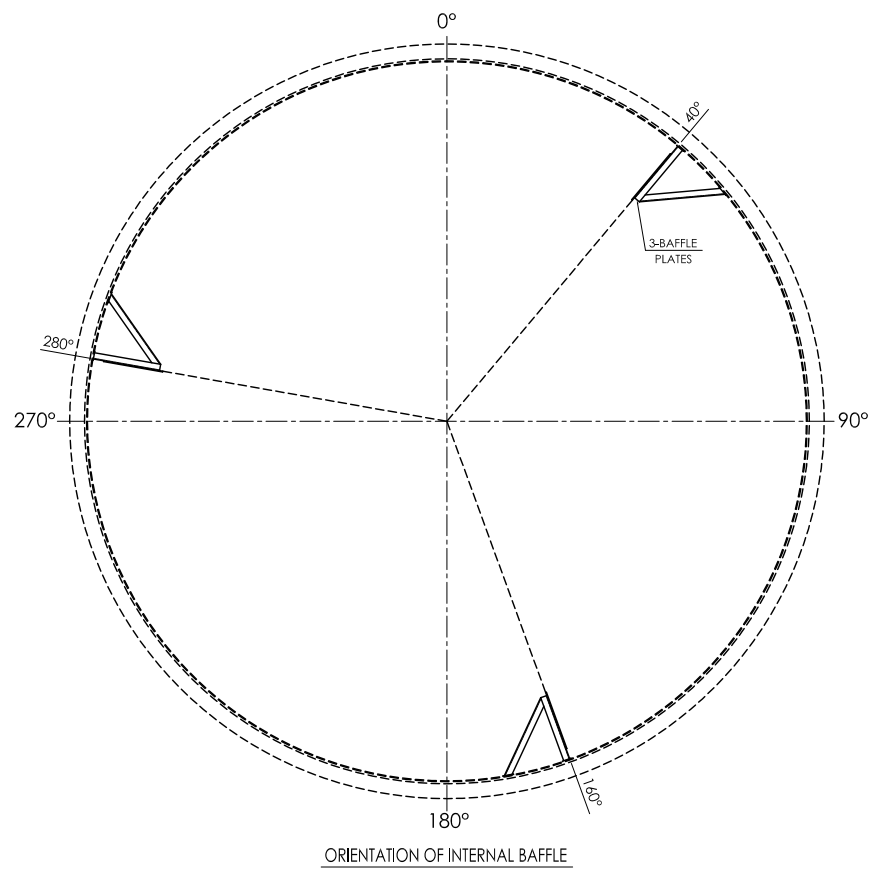
- GENERAL NOTES :
- BOLT HOLE ORIENTATION
BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
 - WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
 - LIQUID PENETRANT
LIFTING LUG AND REMOVING OF JIG
NOZZLE ATTACHMENT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



NDE METHOD SYMBOL

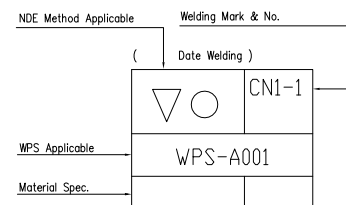
- ▽ UT SPOT
- ◇ PT 10%
- ◇ PT 100%
- ◇ PNEUMATIC TEST
- VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :	File name :				CHANGE BY CAD SYSTEM ONLY				Sheet No./Total sheets	6/9
FLANGE	A105		REV	DATE	APPR		1	2			Size of memory	
NOZZLE NECK	A106 Gr.B	WPS NO : 006/HEL/WPS/MIGAS/20 GTAW & SMAW P1 to P1	0	29/09/25							 PT. HANAZONO Engineering Indonesia <i>We are always partner with you</i> JOB NO. : E2502 DESIGN FOR PRODUCT : POBOYA 2000 TPD EXPANSION TAG NO./LINE NO. : LEACH TANK REFER DWG NO. : E2502-000-DWG-107	
REINF. PAD	A36											
			Name				NDE MAP NOZZLE 3-3 LEACH TANK				NDE Map No.	REV.
											E2502-NDE-PBY-001	



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%

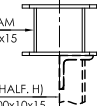
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INTERNAL BAFFLE	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1	REV	DATE	APPR		1	2	Deviation for dimensions without indication of tolerance in mm 1) cutting + non cutting machining 2) WELDMENT connecting + forging		DATE	SIGN	 PT. HANAZONO Engineering Indonesia <i>We are always partner with you</i>					
SUPPORT ANGLE	A36		0	29/09/25							DRAFT						BENRIDHO	
SUPPORT PAD	A36										CHECK		RUSNANDI	JOB NO. : E2502				
											APPR			DESIGN FOR PRODUCT : POBOYA 2000 TPD EXPANSION				
											Scale : NTS			TAG NO./LINE NO. : LEACH TANK				
														REFER DWG NO. : E2502-000-DWG-108				
					Name NDE MAP INTERNAL BAFFLE LEACH TANK								NDE Map No. E2502-NDE-PBY-001		REV. 			

1. BOLT HOLE ORIENTATION

2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.

LIFTING LUG AND REMOVING OF JIG

NOZZLE ATTACHMENT WELDING OF DUCTING



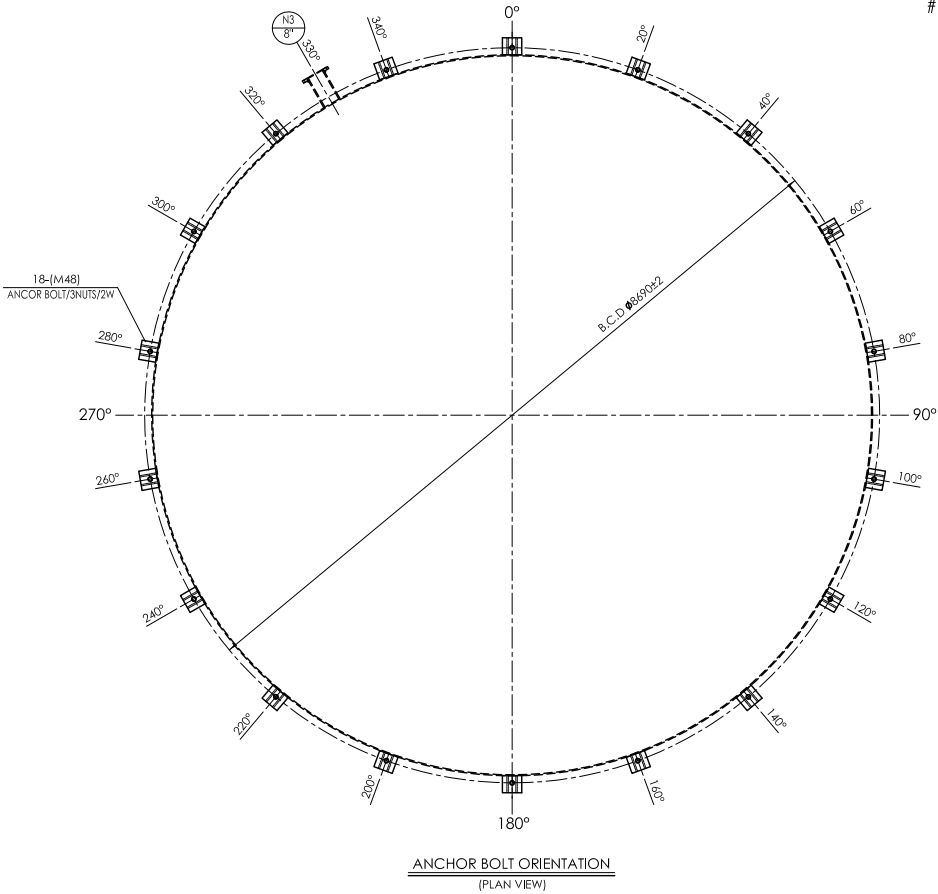
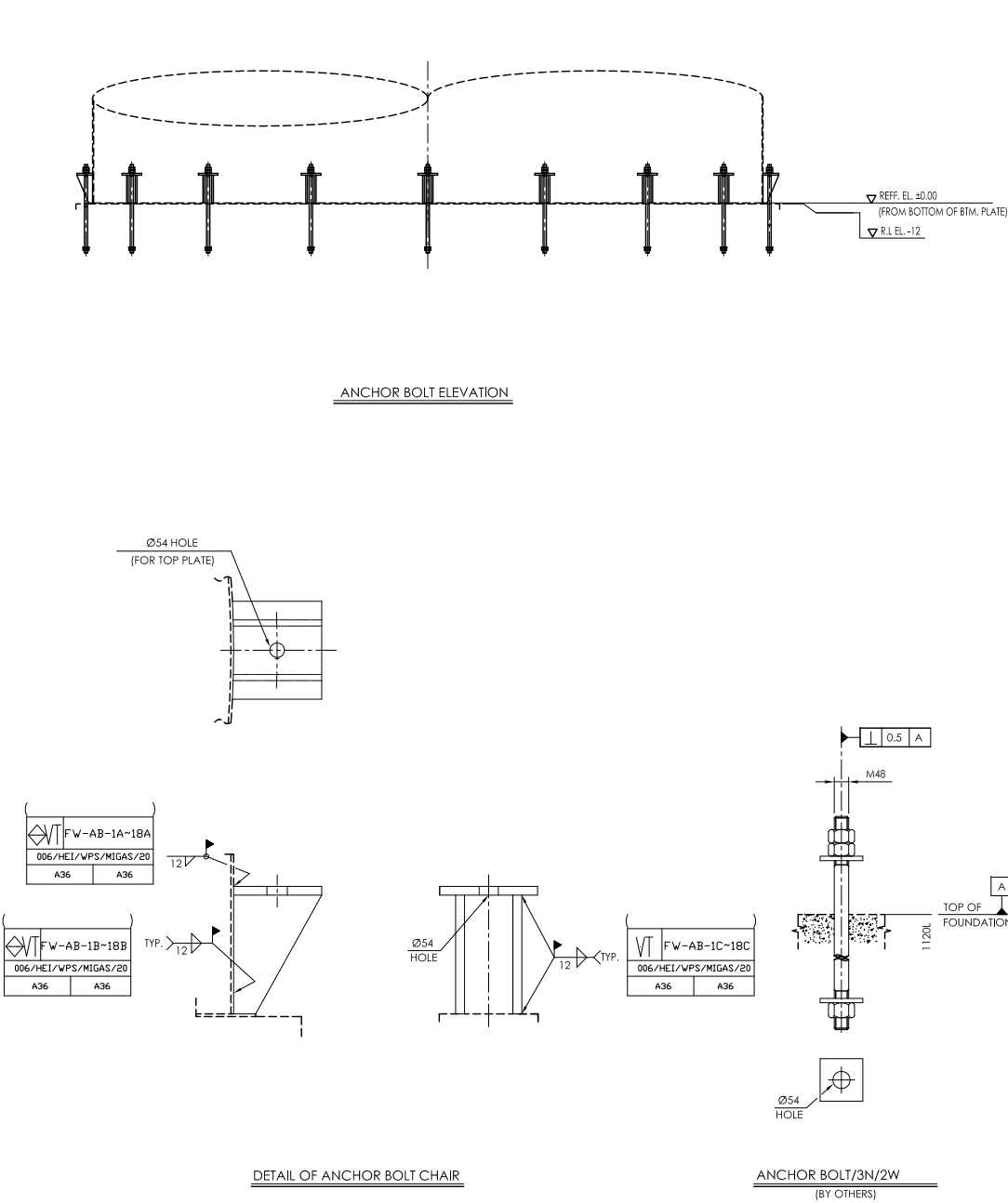
▽ UT SPOT

 PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :	File name :		CHANGE BY CAD SYSTEM ONLY					Sheet No./Total sheets 8/9					
TEE HALF A36		WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1	REV	DATE	APPR			Deviation for dimensions without indication of tolerance in mm 1) cutting + non cutting machining 2) WELDMENT connecting + forging		DATE	SIGN	 PT. HANAZONO Engineering Indonesia <i>We are always partner with you</i>	JOB NO. : E2502 DESIGN FOR PRODUCT : POBOYA 2000 TPD EXPANSION TAG NO./LINE NO. : LEACH TANK REFER DWG NO. : E2502-000-DWG-109		
SUPPORT BEAM A36			0	29/09/25			1		2	DRAFT				BENRIDHO	
										CHECK				RUSNANDI	
										APPR					
										Scale : NTS					
					Name NDE MAP EXTERNAL SUPPORT LEACH TANK							NDE Map No. E2502-NDE-PBY-001		REV. 	

- 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



NDE METHOD SYMBOL

▽ UT SPOT
◇ PT 10%
VT VISUAL 100%

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