

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 1 of 86

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	
	

						
A	September 22, 2025	Issue For Approval	Benridho	Rusnandi	Murasato	
REV	DATE ISSUED	ISSUE PURPOSE	PREPARE	CHECKED	APPROVED	AUTHORIZED

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 3 of 86

CONTENTS

Description	Page
1. WPS and PQR List	4
2. WPS No. : 001/HEI/WPS/MIGAS/21	5
3. WPS No. : 002/HEI/WPS/MIGAS/21	20
4. WPS No. : 006/HEI/WPS/MIGAS/20	36
5. WPS No. : 005/HEI/WPS/MIGAS/20	48
6. WPS No. : 008/HEI/WPS/MIGAS/21	65
7. Welding Map No. E2502-WMAP-PBY-001 Sheet 1 ~ Sheet 8	79

	POBOYA 2000 TPD EXPANSION PROJECT		
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004		Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580		Page 4 of 86

1. WPS AND PQR LIST

 PT. HANAZONO Engineering Indonesia We are always partner with you				WPS & PQR LIST In According ASME Section IX, ASME Boiler and Pressure Vessel Code										Document No	QC-WPS-L-2502-01		
														Project No.	2502		
														Revision No.	0		
														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.	001/HEI/WPS/MIGAS /21	001/HEI/PQR/MIGA S/21	1	1	GTAW	8.41	3	6	1	5.18	ER70S-6	1.5 ~ 16.82	6	6	1	5.18	All classifications EXX15/16/18/18 M/48
					SMAW		5.41	4	1	5.1	E7018-1H4R		10.82	4	1	5.1	
2.	002/HEI/WPS/MIGAS /21	002/HEI/PQR/MIGA S/21	1	1	GTAW	8.77	3	6	1	5.18	ER70S-6	1.5 ~ 17.54	6	6	1	5.18	All classifications EXX15/16/18/18 M/48
					SMAW		5.77	4	1	5.1	E7018-1H4R		11.54	4	1	5.1	
3.	006/HEI/WPS/MIGAS /20	006/HEI/PQR/MIGA S/20	1	1	GTAW	9.645	3	6	1	5.18	ER70S-6	1.5 ~ 19.29	6	6	1	5.18	All classifications EXX15/16/18/18 M/48
					SMAW		6.645	4	1	5.1	E7018		13.29	4	1	5.1	
4.	005/HEI/WPS/MIGAS /20	005/HEI/PQR/MIGA S/20	1	1	GTAW	9.73	3	6	1	5.18	ER70S-6	1.5 ~ 19.46	6	6	1	5.18	All classifications EXX15/16/18/18 M/48
					SMAW		6.73	4	1	5.1	E7018-1H4R		13.46	4	1	5.1	
5.	008/HEI/WPS/MIGAS /21	008/HEI/PQR/MIGA S/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

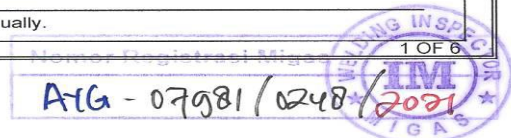
COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 5 of 86

2. WPS & PQR No. : 001/HEI/WPS/MIGAS/21 & 001/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 Section IX, ASME Boiler and Pressure Vessel Code																																																
Organization Name PT. HANAZONO ENGINEERING INDONESIA		By Quality Department																																														
Welding Procedure Specification No. 001/HEI/MIGAS/21		Date 17/01/2021 Supporting PQR No.(s) 001/HEI/MIGAS/21																																														
Revision No. 0		Date 11/01/2021																																														
Welding Process (es) GTAW & SMAW		Type (s) 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) Air (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. Sketches may be attached to illustrate joint design, weld layers, and bead sequence (e.g., for toughness procedures, for multiple process procedures, etc.)		Details See Joint Details																																														
*BASE METALS (QW - 403) P. No. - Group No. - to P. No. - Group No. - OR Specification type, grade, or UNS SS400 to Specification type, grade, or UNS SS400 OR Chem. Analysis and Mech. Prop - to Chem. Analysis and Mech. Prop - Thickness Range : Base Metal : Groove 1.5 ~ 16.82 mm Fillet All Maximum Pass Thickness $\leq \frac{1}{2}$ in. (13mm) (Yes) All (No) - Other -																																																
*FILLER METALS (QW - 404) <table border="1" style="width: 100%; border-collapse: collapse;"> <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;">E7018-1H4R</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;">ϕ 1.6 mm ~ 2.4 mm</td> <td style="text-align: center;">ϕ 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. 10.82 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 : BOHLER Electrode Name : Bohler S EMK 6 & Fox S EV 50-1 </td> </tr> </tbody> </table>					1 GTAW	2 SMAW	Spec. No. (SFA)	5.18	5.1	AWS No. (Class)	ER70S-6	E7018-1H4R	F - No.	6	4	A - No.	1	1	Size of Filler Metals	ϕ 1.6 mm ~ 2.4 mm	ϕ 3.2 ~ 4.0 mm	Weld Metal			Deposit Thickness:			Groove	Max. 6 mm	Max. 10.82 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	
	1 GTAW	2 SMAW																																														
Spec. No. (SFA)	5.18	5.1																																														
AWS No. (Class)	ER70S-6	E7018-1H4R																																														
F - No.	6	4																																														
A - No.	1	1																																														
Size of Filler Metals	ϕ 1.6 mm ~ 2.4 mm	ϕ 3.2 ~ 4.0 mm																																														
Weld Metal																																																
Deposit Thickness:																																																
Groove	Max. 6 mm	Max. 10.82 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.																																																



(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 6 of 86

WELDING PROCEDURE SPECIFICATION (WPS)

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

Welding Procedure Specification No. : 001/HEI/MIGAS/21

Rev. 0

POISITIONS (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>33 °C</u> Interpass Temp. Max. <u>250 °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., Remarks, Comments, Hot Wire Addition, Technique, Process Torch Angle, etc.)																		
		Class	Dia.																									
Root & Hot	GTAW	ER70S-6	1.6 ~ 2.4	DCEN	50 - 150	-	-	9 - 18	11 - 65	-																		
Fill & Capping	SMAW	E7018-1H4R	3.2 ~ 4.0	DCEP	80 - 190	-	-	19 - 28	38 - 140	-																		
Amps and volts, or power or energy range, should be specified for each electrode size, position, and thickness, etc. Pulsing Current <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>(Pure 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				Max. stringer or weaver within 2.5 time diameter of electrodes																								
Orifice, Nozzle, or Gas Cup Size				5, 6, or 7																								
Initial and Interpass Cleaning (Brushing, Grinding, etc.)				Brushing & Grinding																								
Method of Back Gouging				Back Grinding / Back Gouging																								
Oscillation				N/A																								
Contact Tube to Work Distance				12 ~ 19 mm (GTAW)																								
Multiple or Single Pass (Per Side)				Multiple																								
Multiple or Single electrode				Single																								
Electrode Spacing				N/A																								
Peening				N/A																								
Other				Welds shall be cleaned between each pass. When completed, remove all slag & projection with grinding & Brushing																								

Nomor Registrasi Migas

ATG - 07081/0248/2021

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 7 of 86

WELDING PROCEDURE SPECIFICATION (WPS)

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

Welding Procedure Specification No. : 001/HEI/MIGAS/21

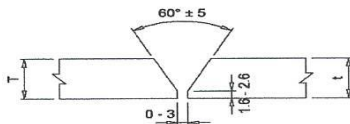
Rev. 0

JOINT DETAILS

SINGLE VEE GROOVE

$T = t$

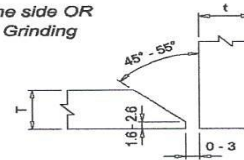
Welded from one side



SINGLE BEVEL - CORNER JOINT

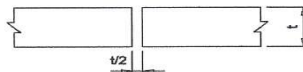
$T = t$

Welded from one side OR
both side Back Grinding



SQUARE BUTT

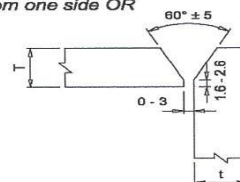
Welded from BOTH SIDES, $T = 6$ mm Max
Root gap, 0 - $t/2$



SINGLE VEE GROOVE

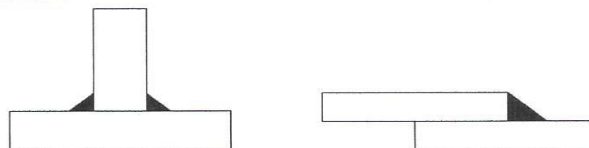
$T = t$

Welded from one side OR
both side



SINGLE OR DOUBLE FILLET

UNLIMITED



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

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

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

Organization Prepared by,
PT. HANAZONO ENG. INDONESIA



Date : January 17, 2021

Verified by
MINISTRY OF ENERGY AND MINERAL RESOURCES
DIRJEN MIGAS

Nomor Registrasi Migas

AYG - 07981/0248/2021

Date : January 17, 2021

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 8 of 86

PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

Organization Name **PT. HANAZONO ENGINEERING INDONESIA**

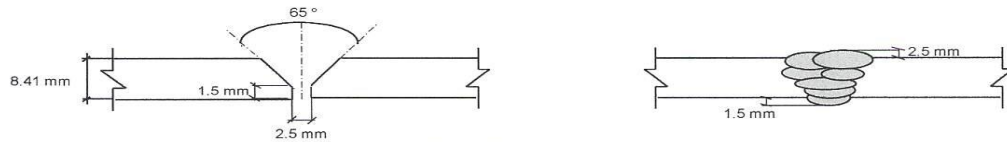
Procedure Qualification Record No. 001/HEI/MIGAS/21 Date 11/01/2021

WPS No. 001/HEI/MIGAS/21

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. SS400 to SS400
Type or Grade, or UNS Number -
P-No. - Group No. - to P-No. - Group No. -
Thickness of Test Coupon 8.41 mm
Diameter of Test Coupon N/A
Maximum Pass Thickness ≤ 1/2 in. (13mm)
Other

POSTWELD HEAT TREATMENT (QW - 407)

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

GAS (QW - 408)

	Percent Composition		
	Gas (es)	Mixture	Flow Rate
Shielding	Argon	99,98%	13 LPM
Trailing	-	-	-
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	5.41 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 3G
Weld Progression (Uphill, Downhill) Uphill
Other N/A

PREHEAT (QW - 406)

Preheat Temperature 33°C
Interpass Temperature 250°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

Memor Registrasi Migas
A-16 - 07901 / 0248 / 2021
4 OF 6

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 9 of 86

PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

Procedure Qualification Record No. : 001/HEI/MIGAS/21

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	92	9	27	1,8
2					95	10	30	1,9
3					88	20	47	2,2
4	SMAW	E7018-1H4R	3.2 mm	DCEP	95	20	53	2,2
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	19,13	8,41	160,88	81,73	508	Fracture on base metal
T2	19,13	8,42	161,07	81,50	506	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	0.96 mm Opening 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 - 07981/0248/2021

PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

Procedure Qualification Record No. : 001/HEI/MIGAS/21

Rev. 0

FILLET-WELD TEST (QW - 180)

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

Macro - Result None

HARDNESS TESTS

[illegible]

Other Tests

Type of Test	None
--------------	------

Deposit Analysis None

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

Welder's Name	ASMURI	Clock No.	-	Stamp No.	AM1703
---------------	---------------	-----------	---	-----------	---------------

Tests conducted by : **PT. Bintang Inspeksindo Indonesia** Laboratory Test No. : **BII/TR/0121/013**

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

AYG - 07901/0248

Date : January 12, 2021

Date : January 12, 2021



POBOYA 2000 TPD EXPANSION PROJECT



(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 11 of 86

Certificate No. : 171031-PPQ8IN-0029A1-0001
Date of Issue : Nov., 03, 2020

Mill Test Certificate

KRAKATAU poeco

Order No. : QBS100946Z

Supplier : -

Customer : -

PO No. : 401/SKM-YT/10/20

Commodity : PLATE

Spec & Type : JIS G3101 SS400

Size	Product No.	Quantity	Weight (kg)	Heat No.	Position	Tensile Test		Yield Point (MPa)		Elongation (%)		Chemical Composition				
9x124x13500	PK3331803-1804	2	1.938	5633487	T	325	450	28				C	Si	Mn	P	S
9x124x13500	PK3331782-1704	3	2.807	8633987	T	325	450	28				(%)	(%)	(%)	(%)	(%)
9x124x13500	PK3331801-1804	4	3.878	8633987	T	325	450	28								
9x124x13500	PK3331801-1804	4	3.878	8633987	T	325	450	28								
Sub Total (0.00)		13	12.501													

We hereby certify that the material herein has been made in accordance with the order and above specification. This material has been fully tested and found to be in accordance with the specification. This material is fine grained steel.

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

Surveyor To :

KRAKATAU POECO Jl. Atika, No. 2, Kawasan Industri Krakatau Cilegon, Banten, 42443, Indonesia

< PAGE : 1 >

Testing and Inspection Team Leader

NA SEN-NA

NA SEN-NA

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 12 of 86

T. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

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

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

Inspection certificate 3.1

as per : EN 10204
No. : 2020-2047011831-30-20098-025
Rev. 0 Page 1 of 1

PO no.	ACD/JK-N/20/04/0464	of	27.04.2020
Order no.	1042004411		
Delivery note/pos./splitt	2047011831/000000/000030	of	08.07.2020
Product	GTAW rod/wire		
Trade name	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		118955
Lot no.	20098		86356
Quantity	2500,0 KG		JU10B00W 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 II/Sched.F

Tensile test				according to : ASTM E8			
Specimen preparation				according to : AWS B4.0			
T	ReL / Rp 0,2 MPa	Rp 1,0 MPa	Rm MPa	A (Lo = 4d) %	Z %	WBH PWHT	Remarks
25°C	≥ 420		≥ 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 01-77-96 (SSC) and 02-84-96 (HIC).

own
kasi

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. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 13 of 86

PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

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

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

Inspection certificate 3.1

as per : EN 10204
No. : 2020-2047011900-30-20607-025
Rev. 0 Page 1 of 1

PO no.	ACD/BS-N/20/07/0624	of	13.07.2020
Order no.	1042004566		
Delivery note/pos./splitt	2047011900/000000/000030	of	20.07.2020
Product	covered electrode		
Trade name	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		118955
Lot no.	20607		46917
Quantity	3312,0 KG		JUPB010E 0425

Chemical composition in % of the weld metal

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

Mechanical properties

ASME II/Sched.F

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

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

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

Town
Bekasi

Date
27.07.2020

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

Authorized representative
Miftah Farid

voestalpine
ONE STEP AHEAD.

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 14 of 86



CERTIFICATE OF ANALYSIS FOR GAS

Customer : PT. Hanazono Engineering Indonesia Type Of Gas : **Argon UHP**
Certificate No : 080/AGA/XI/2020 Capacity : 6 m³
Date : 11 September 2020 Pressure : 150 Bar
No. S J : SJ022003300

Composition :
Argon : 99.999%
O₂ : < 5.0 ppm
N₂O : None
H₂O : None

SPESIFIKASI :

Argon : > 99.999 %

DATA FISIK :

Simbol Kimia : Ar
Titik Didih : - 185.72° C
Berat Jenis Relatif (Udara = 1) : 1.4
Berat Jenis Molekul : 39.95
Suhu Kritis : - 122.4° C
Berat Jenis Gas (@101.3 kPa&15° C) : 1.78 kg / m³
Berat Jenis Cairan (B.Pt) : 1393 kg / cm³
Isi Spesifikasi (@ 101.3 kPa&15° C) : 9.708 ft³ / Lb
Titik Api : Tidak Terbakar

Cylinder No : 2 Cylinder

54296							
54378							

Quality Control
PT. Anugrah Gasindo Abadi


(Zulqarnain)

LIQUID, GASES & EQUIPMENT

OXYGEN-ARGON-NITROGEN-ACETYLENE-CO₂-PROPANE-LPG

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 15 of 86

RADIOGRAPHY EXAMINATION REPORT

PT RIRINDO
Head Office : Jl. Willemsoeld II No. 1 - 3rd Flr
Bosch 17423 - Jawa Barat, Indonesia
Phone : +62-21 8243 8561 / 8241 6794
Fax : +62-21 8243 5168
Email : info@rirs.co.id Website : www.rirs.co.id

Client : PT RIRINDO

Contractor : PT HAJAZNO ENGINEERING INDONESIA

Project : PGR

Radiographic Procedure : SSF/RT/ASME/005

Application Code : ASM'S VII

Material Specification : SS 400/SS 400

SS 400/SA 36

Page 1 of 1

Report No. : 001/RT/PGR/HBJ/AM/20

Shooting Date : 30-12-2020

Date of Report : 31-12-2020

RT Tech : DWSS ☐ DWDT ☐ SWS ☐

RT Type : S Side ☐ F Side ☐

Sensitivity: Wt No. 7

F. Density: 2.4

U-sharpener: 0.09 mm

SPD : 361

mm / Inch

SSDF: 13

mm / Inch

SSD : 369

mm / Inch

Peny / Q1 : ASTM E

Type of Discontinuity

Surface

Indication

Crack

Incomplete

Penetration

Incomplete

Fusion

Slag

Inclusion

Slag

Concavity

Brum Thorough

Under Cut

Gas and

Worm Hole

Porosity

Others

Sensitivity

Range Density

Judgment

Remarks

25

35

ACC

ACC

ACC

ACC

ACC

ACC

ACC

ACC

ACC

ACC

ACC

ACC

ACC

ACC

ACC

ACC

ACC

Technician:

Total Welds/Item Used

Comments:

2 Joints

4" x 10" : 1

Sheets

4" x 15" : 2

Sheets

7" x 17" : 1

Sheets

Authorized Inspector:

Customer Rep:

Date:

Date:

Date:

Date:

Date:

Date:

Date:

Date:

Date:

Date:

Date:

Date:

Date:

Date:

Date:

Date:

Date:

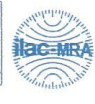
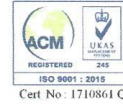
Date:

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 16 of 86



PT BINTANG INSPEKSINDO INDONESIA

Komplek Pergudangan EHA Blok B-02
Jl. Raya Legok Km 6 No.77, RT 002/001
Bojong Nangka, Kelapa Dua, Tangerang, Indonesia
Telp : 021 2222 7029
E-mail : marketing@bintanginspeksindo.com



Testing Report

Customer	: PT Hanazono Engineering Indonesia	Report Number	: BII/TR/0121/013
Address	: Jl. Raya Bojonegara No. 44 Ds. Kertasana Kecamatan Bojonegara, Kabupaten Serang Banten - Indonesia 42454	Total of Page	: 1 of 2
Tested for	: Welding Procedure Specification	Date of Received	: 05 Januari 2021
Test Method	: ASME Sect IX: 2019	Date of Tested	: 11 Januari 2021
Reference Code	: ASME Sect IX: 2019	Project Name	: -
Object to be tested	: (as received)	PO Number	: PO-E2006-BII-TES-014
Description	: Carbon steel plate welded test sample, Size: 9 mm thickness, Material Spec: SS 400 to SS 400, PQR No: 001/HEI/MIGAS/21	Sample Marking	: 12.HEI1
		Unique Code	: J2TD3
Type of Test	: Reduced Section Tensile Test (Transversal)		
Testing Machine Used	: COMPUTERIZED ELECTRO-HYDROLIC SERVO UNIVERSAL TESTING MACHINE Model : WAW-1000E, Capacity : 1000 kN		
Remarks	: -		

Environment Temp : $25 \pm 2^{\circ}\text{C}$

Specimen Number		Tensile 1	Tensile 2
Measured Thickness	a_0 (mm)	8.41	8.42
Measured Width	b_0 (mm)	19.13	19.13
Effective Area	A_0 (mm ²)	160.88	161.07
Ultimate Tensile Load	F_m (kN)	81.74	81.58
Ultimate Tensile Strength	R_m (N/mm ²)	508	506
Location of Failure		Base Metal	Base Metal
Type of Failure		Ductile	Ductile

Note: Hasil pengujian diatas hanya berlaku untuk sampel yang diuji

Test Conducted By	: Agnes Stephani
Checked By	: Albertus Tonggak Onny Juniardi
Witnessed By	: -

Date of Issued : 13 Januari 2021

Approved By

INSPEKSINDO INDONESIA
Albertus Tonggak Onny J.
Laboratory Manager

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2017)
Document may not be reproduced other than in full, except with the prior written approval of the issuing laboratory

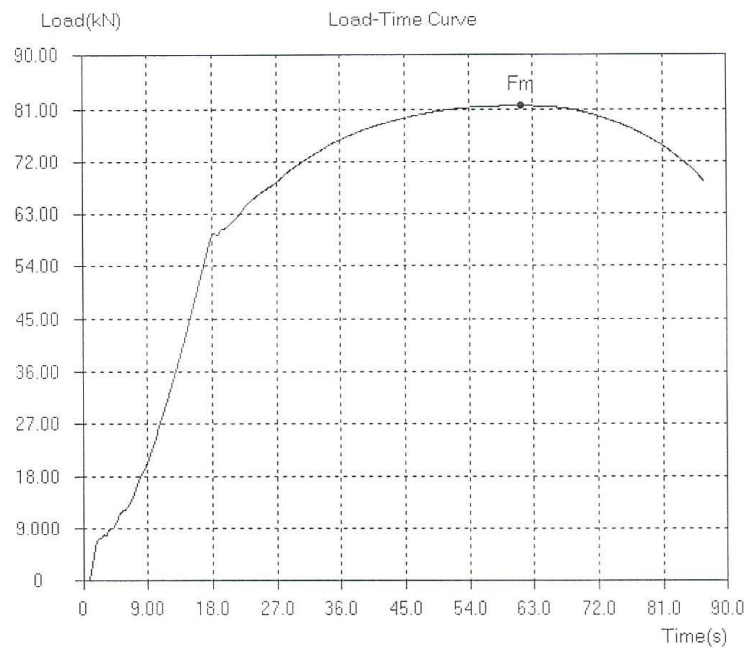
(FM-LAB-BII--Tensile Red Sec.1 -12 Rev.2, 07-12-2019)

	POBOYA 2000 TPD EXPANSION PROJECT		
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004		Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580		Page 17 of 86

PT HANAZONO ENGINEERING INDONESIA

1.HEI1-T1

SampleID	21.1HEI1T1	TestDate	1/11/2021
Type	Flat	Size(mm)	8.41*19.13
Ao(mm ²)	160.88	Fm(kN)	81.74
Rm(MPa)	508		

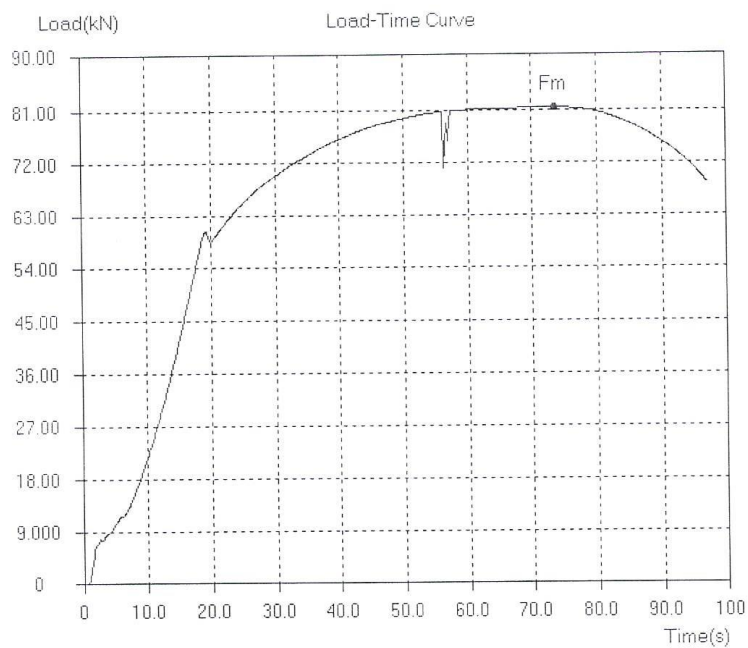


COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 18 of 86

PT HANAZONO ENGINEERING INDONESIA

1.HEI1-T2

SampleID	21.1HEI1T2	TestDate	1/11/2021
Type	Flat	Size(mm)	8.42*19.13
Ag(mm ²)	161.07	Fm(kN)	81.58
Rm(MPa)	506		



	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 19 of 86



PT BINTANG INSPEKSINDO INDONESIA

Komplek Pergudangan EHA Blok B-02
Jl. Raya Legok Km 6 No.77, RT 002/001
Bojong Nangka, Kelapa Dua, Tangerang, Indonesia
Telp : 021 2222 7029
E-mail : marketing@bintanginspeksindo.com



Testing Report

Customer	: PT Hanazono Engineering Indonesia	Report Number	: BII/TR/0121/013
Address	: Jl. Raya Bojonegara No. 44 Ds. Kertasana Kecamatan Bojonegara, Kabupaten Serang Banten - Indonesia 42454	Total of Page	: 2 of 2
Tested for	: Welding Procedure Specification	Date of Received	: 05 Januari 2021
Test Method	: ASME Sect IX: 2019	Date of Tested	: 11 Januari 2021
Reference Code	: ASME Sect IX: 2019	Project Name	: -
Object to be tested	: (as received)	PO Number	: PO-E2006-BII-TES-014
Description	: Carbon steel plate welded test sample, Size: 9 mm thickness, Material Spec: SS 400 to SS 400, PQR No: 001/HEI/MIGAS/21	Sample Marking	: 12.HEI1
		Unique Code	: J2TD3
Type of Test	: Bending Test (Transverse Welding)		
Testing Machine Used	: COMPUTERIZED ELECTRO-HYDRAULIC SERVO UNIVERSAL TESTING MACHINE Model : WAV-1000E, Capacity : 1000 kN		
Remarks	: -		

Environment Temp : 25 ± 2°C

Test Weldment Thickness	: 9 mm	Test Specimen Width	: 38 mm
Former Diameter	: 40 mm	Bend Angle	: 180 degree
Shoulder Distance	: 58 mm		

Specimen No.	Face Bend (1)	Face Bend (2)	Root Bend (1)	Root Bend (2)
Observation	No opening was observed	No opening was observed	No opening was observed	0.96 mm opening was observed
Result	Accepted	Accepted	Accepted	Accepted

Note: Hasil pengujian diatas hanya berlaku untuk sampel yang diuji

Test Conducted By : Agnes Stephani
Checked By : Albertus Tonggak Onny Juniardi
Witnessed By : -

Date of Issued : 13 Januari 2021

Approved By

INSPEKSINDO INDONESIA
Albertus Tonggak Onny J.
Laboratory Manager

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2017)
Document may not be reproduced other than in full, except with the prior written approval of the issuing laboratory
(FM-LAB-BII-Bend-01 Rev.2, 07-12-2019)

y.

Page 7 OF 6

Number Registered Migrants

AUG - 07081 / 0249 / 2021

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 21 of 86



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

WELDING PROCEDURE SPECIFICATION (WPS) In accordance with Section IX, ASME Boiler and Pressure Vessel Code																															
Welding Procedure Specification No. : 002/HEI/MIGAS/21										Rev. 0																					
POISITIONS (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>33 °C</u> Interpass Temp. Max. <u>250 °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" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: center;">Percent Composition</th> </tr> <tr> <th style="text-align: center;">Gas (es)</th> <th style="text-align: center;">Mixture</th> <th style="text-align: center;">Flow Rate</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Argon</td> <td style="text-align: center;">99,99%</td> <td style="text-align: center;">7 - 15 LPM</td> </tr> <tr> <td style="text-align: center;">Shielding</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> <tr> <td style="text-align: center;">Trailing</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> <tr> <td style="text-align: center;">Backing</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> <tr> <td style="text-align: center;">Other</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</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., Remarks, Comments, Hot Wire Addition, Technique, Process-Torch Angle, etc.)																					
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 <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>(Pure 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 Orifice, Nozzle, or Gas Cup Size Initial and Interpass Cleaning (Brushing, Grinding, etc.) Method of Back Gouging Oscillation Contact Tube to Work Distance Multiple or Single Pass (Per Side) Multiple or Single electrode Electrode Spacing Peening Other					<u>Max. stringer or weaver within 2.5 time diameter of electrodes</u> <u>5, 6, or 7</u> <u>Brushing & Grinding</u> <u>Back Grinding / Back Gouging</u> <u>N/A</u> <u>12 ~ 19 mm (GTAW)</u> <u>Multiple</u> <u>Single</u> <u>N/A</u> <u>N/A</u> <u>Welds shall be cleaned between each pass. When completed, remove all slag & projection with grinding & Brushing</u>																										



Nomor Registrasi Migas
AYG -07981/0249/2021

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 22 of 86

WELDING PROCEDURE SPECIFICATION (WPS)

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

Welding Procedure Specification No. : 002/HEI/MIGAS/21

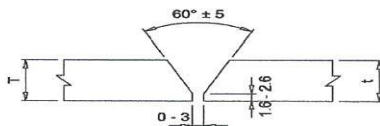
Rev. 0

JOINT DETAILS

SINGLE VEE GROOVE

T = t

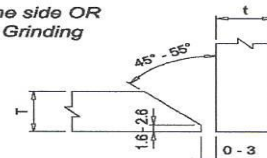
Welded from one side



SINGLE BEVEL - CORNER JOINT

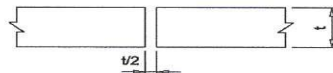
T = t

Welded from one side OR both side Back Grinding



SQUARE BUTT

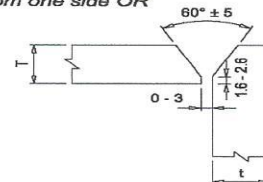
*Welded from BOTH SIDES, T = 6 mm Max
Root gap, 0 - t/2*



SINGLE VEE GROOVE

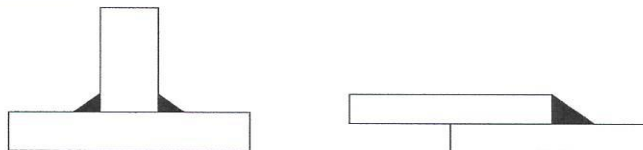
T = t

Welded from one side OR both side



SINGLE OR DOUBLE FILLET

UNLIMITED



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

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

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

Organization Prepared by,
PT. HANAZONO ENG. INDONESIA



Date : January 17, 2021

Verified by
MINISTRY OF ENERGY AND MINERAL RESOURCES
DIRJEN MIGAS

Nomor Registrasi Migas

Ayg - 07981/0249/2021

Date : January 17, 2021

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

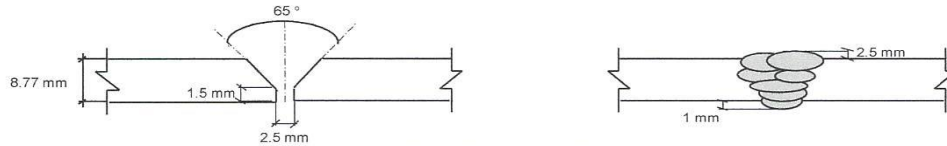
Page 23 of 86

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/21 Date 11/01/2021
WPS No. 001/HEI/MIGAS/21
Welding Process (es) GTAW & SMAW
Types (Manual, Automatic, Semi-Automatic) Manual

JOINTS (QW - 402)



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

BASE METAL (QW - 403)

Material Spec. SA36
Type or Grade, or UNS Number SS400
P-No. 1 Group No. 1 to P-No. - Group No. -
Thickness of Test Coupon 8.77 mm
Diameter of Test Coupon N/A
Maximum Pass Thickness ≤ 1/2 in. (13mm)
Other

POSTWELD HEAT TREATMENT (QW - 407)

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

GAS (QW - 408)

	Percent Composition		
	Gas (es)	Mixture	Flow Rate
Shielding	Argon	99,98%	13 LPM
Trailing	-	-	-
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	5.77 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 2G
Weld Progression (Uphill, Downhill) N/A
Other N/A

PREHEAT (QW - 406)

Preheat Temperature 33°C
Interpass Temperature 250°C
Other N/A

TECHNIQUE (QW - 410)

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

4 OF 6

Nomor Registrasi Migas
Arga - 07981 / 0249 / 2021

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 24 of 86

PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

Procedure Qualification Record No. : 002/HEI/MIGAS/21

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	95	9	27	1,9
2					100	10	30	2,0
3					95	20	49	2,3
4	SMAW	E7018-1H4R	3.2 mm	DCEP	95	20	53	2,2
5					95	20	52	2,2
6					90	19	50	2,1
7					90	19	52	2,0

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	19,16	8,76	167,84	83,42	497	Fracture on base metal A36
T2	19,17	8,88	170,23	84,77	498	Fracture on base metal A36

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 -07981/0249/2021

5 OF 6



POBOYA 2000 TPD EXPANSION PROJECT



(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 26 of 86

Certificate No. : 171031-FPQ8IN-0029A1-0001
Date of Issue : Nov, 03, 2020

Mill Test Certificate

PO No. : 401/SKM-YT/10/20

Commodity : PLATE

Spec & Type : JIS G3101 SS400

KRAKATAU posco

Order No. : Q8S1009462

Supplier : -

Customer : -

Size	Product No.	Quantity	Weight (kg)	Heat No.	Position	Tensile Test		Chemical Composition					
						Y _P	Y _S EL (#kN)	C (%)	Si (%)	Mn (%)	P (%)	S (%)	
9-124x13500	PK3331103-1804	2	1.938	SK33487	T	325	450	28	0.1268	0.2316	0.648	0.0123	0.0018
9-124x13500	PK3331102-1704	3	2.007	SK33487	T	325	450	28	0.1269	0.2346	0.648	0.0123	0.0018
9-124x13500	PK3331101-1804	4	3.876	SK33487	T	326	450	28	0.1269	0.2346	0.648	0.0123	0.0018
9-124x13500	PK3331101-1804	4	3.876	SK33487	T	325	450	29	0.1269	0.236	0.648	0.0123	0.0018
Sub Total (016)		13	12.597 (kg)										

Position: T: Top, M: Middle, B: Bottom
Tensile Test: Direction: Transversal, Gauge Length: 200mm (Rectangular),
Y_P Method: Upper Point
Division: L: Ladle Analysis
Supply Condition: As-Rolled unless otherwise Heat Treated.

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

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

Surveyor To :

N/A

KRAKATAU POSCO Jl. Afrika No 2, Kawasan Industri Krakatau Cilegon, Banten, 42443, Indonesia

Testing and Inspection Team Leader

NA SEON-HA

Page 1

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 27 of 86

PT. GUNAWAN DIANJAYA STEEL Tbk.

Surabaya - Indonesia

Head Office :
J. Margono No. 20A
Tembak Sari - Jember - Surabaya 60184
Phone : +62-31-760000 (Pusat)
Fax : +62-31-760001
Email : info@gunawandsteel.com
Website : www.gunawandsteel.com

MILL TEST CERTIFICATE
ACC TO EN10028-2:2004 S1

Pembuat : CV. MITRA MUDA MANDIRI

Order No. : Perm Permits Registry 2 Bsk 1.124 No.38 RT.002 RW.018 Cempaka Utara

Order No. : 0-781-2020

PO NO : 00051818-POW000

Material : HOT ROLLED STEEL PLATE

Specification : ASTM A58 - 14

Tolerance : ASTM A6 - 17a

Heat Number	Plate Number	Quantity	Dimensions (mm)			Weight (MT)	Ladle Analysis (%)														Tensile Test				Impact Value			Reference						
			T	W	L		x 10 ⁻²				x 10 ⁻³				x 10 ⁻³						Test No.	Y.S. N/mm ²	T.S. N/mm ²	El % 100mm 2mm	la Joulle (^o C)									
							C	Si	Mn	P	S	Nb	Co	Cr	Ni	Mo	V	Al	Ti	N					I	II	III		Avg					
105063	G 21-22	2	9	2438	9600	3.674	14	15	55	15	14	2	2	2	2	2	2	2	1	1	1	1	1	2	27	2	5	J5	291	428	26			
203639	L 21-22	2	"	"	"	3.674	13	17	54	14	9	2	1	1	1	1	1	1	1	1	1	1	1	2	27	2	6	H3	304	411	29			
51917	P 22	1	12	2438	9600	2.305	17	20	89	12	3	0	2	3	2	10	1	32	0	2								P1	344	471	26			
	P 31-32	2	"	"	"	4.410																												
	P 41-42	2	"	"	"	4.410																												
1555	H 3	1	16	2438	12700	3.889	18	19	112	12	3	0	1	3	2	20	1	33	0	2								H4	337	484	28			
52322	Q 2	1	"	"	"	3.889	18	19	112	10	6	0	2	3	2	10	1	33	0	3								Q4	385	504	26			
52364	H 2	1	"	"	"	3.889	18	20	113	9	3	0	2	3	2	10	1	36	0	2								H4	373	508	27			
	H 3	1	"	"	"	3.889																												
	H 4	1	"	"	"	3.889																												
		14				37.518																												

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 28 of 86

PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

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

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

Inspection certificate 3.1

as per : EN 10204

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

Rev. 0 Page 1 of 1

PO no.	ACD/JK-N/20/04/0464	of	27.04.2020
Order no.	1042004411		
Delivery note/pos./splitt	2047011831/000000/000030	of	08.07.2020
Product	GTAW rod/wire		
Trade name	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		118955
Lot no.	20098		86356
Quantity	2500,0 KG		JU10B00W 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 II/Sched.F

Tensile test					according to : ASTM E8		
Specimen preparation					according to : AWS B4.0		
T	ReL / Rp 0,2 MPa	Rp 1,0 MPa	Rm MPa	A (Lo = 4d) %	Z %	WBH PWHT	Remarks
25°C	≥ 420		≥ 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 01-77-96 (SSC) and 02-84-96 (HIC).

Town
Bekasi

Date
13.07.2020

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

Authorized representative
Miftah Farid

voestalpine
ONE STEP AHEAD.

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 29 of 86

PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

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

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

Inspection certificate 3.1

as per : EN 10204

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

Rev. 0 Page 1 of 1

PO no.	ACD/BS-N/20/07/0624	of	13.07.2020
Order no.	1042004566		
Delivery note/pos./splitt	2047011900/000000/000030	of	20.07.2020
Product	covered electrode		
Trade name	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		118955
Lot no.	20607		46917
Quantity	3312,0 KG		JUP8010E 0425

Chemical composition in % of the weld metal

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

Mechanical properties

ASME II/Sched.F

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

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

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

Town
Bekasi

Date
27.07.2020

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

Authorized representative
Miftah Farid

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 30 of 86



CERTIFICATE OF ANALYSIS FOR GAS

Customer : PT. Hanazono Engineering Indonesia Type Of Gas : **Argon UHP**
Certificate No : 080/AGA/XI/2020 Capacity : 6 m³
Date : 11 September 2020 Pressure : 150 Bar
No. S J : SJ022003300

Composition :
Argon : 99.999%
O2 : < 5.0 ppm
N2O : None
H2O : None

SPESIFIKASI :

Argon : > 99.999 %

DATA FISIK :

Simbol Kimia : Ar
Titik Didih : - 185.72° C
Berat Jenis Relatif(Udara = 1) : 1.4
Berat Jenis Molekul : 39.95
Suhu Kritis : - 122.4° C
Berat Jenis Gas (@ 101.3 kPa&15° C) : 1.78 kg / m³
Berat Jenis Cairan (B.Pt) : 1393 kg / cm³
Isi Spesifikasi (@ 101.3 kPa&15° C) : 9.708 ft³ / Lb
Titik Api : Tidak Terbakar

Cylinder No : 2 Cylinder

54296							
54378							

Quality Control
PT. Anugrah Gasindo Abadi


(Zulqarnain)

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 31 of 86

RADIOGRAPHY EXAMINATION REPORT

Head Office : PT. HANAZEND ENGINEERING INDONESIA
Jl. Widyadarmas Blok D1 No. 1 - 2nd Floor
Bekasi 17413 - Jawa Barat, Indonesia
Phone : +62 31 8243 8561 / 8241 6794
Fax : +62 31 8243 5168
Email : admin@hazend.com Website : www.hazend.com

Client : PT. PERTAMINA
Contractor : PT. HANAZEND ENGINEERING INDONESIA
Project : PQR
Radiography Procedure : ESS/R1-ASME/003
Application Code : ASME VIII
Material Specification : SS 400/SS 400
Material Specification : SS 400/SA 36

Job No. :
Work Order / Request No. :
Location : W/S PT. HANAZEND

Report No. : 001/RT/PQR/HBI/NT/20
Shooting Date : 20-12-2020
Date of Report : 21-12-2020

RT Tech : DWSI
RT Type : S Side
Sensitivity : Wt. No. 7
F.Density : 2.4
F.Density : 2.4

SPD : 381
SSDP : 13
SPD : 389
Penetration : 0.09 mm

Screen Type : LEAD
Back / Front Thickness : 0.125 mm
Double / Single Lead :
Pen Type : AC/DC
Pulse Type : AC/DC

Exposure Source : IR-192
F/S Source Size : 2.7 x 2.1 mm
Activity : 51 Ci
Exp. Time : 30 Min/Sec

FLUO SEQUENCE
Location Marker
4 X 10" 4 X 15" 7 X 17"

Welder Stamp
W. AM 1703
W. AM 1703

Material State Thick
Tub 9 mm
Tub 9 mm

Joint No.
PQR002/HBI/MIGAS/24
PQR001/HBI/MIGAS/24

Identification
MIGAS TEST

Comments :
a) Welds/Flm Used : 2
4" x 10" : 2 Sheets
4" x 15" : 2 Sheets
7" x 17" : 2 Sheets

Authorized Inspector :
Customer Rep. :
Date : 21/12/2020

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 32 of 86



PT BINTANG INSPEKSINDO INDONESIA

Komplek Pergudangan EHA Blok B-02
Jl. Raya Legok Km 6 No.77, RT 002/001
Bojong Nangka, Kelapa Dua, Tangerang, Indonesia
Telp : 021 2222 7029
E-mail : marketing@bintanginspeksindo.com



Testing Report

Customer	: PT Hanazono Engineering Indonesia	Report Number	: BII/TR/0121/014
Address	: Jl. Raya Bojonegara No. 44 Ds. Kertasana Kecamatan Bojonegara, Kabupaten Serang Banten - Indonesia 42454	Total of Page	: 1 of 2
Tested for	: Welding Procedure Specification	Date of Received	: 05 Januari 2021
Test Method	: ASME Sect IX: 2019	Date of Tested	: 11 Januari 2021
Reference Code	: ASME Sect IX: 2019	Project Name	: -
Object to be tested	: (as received)	PO Number	: PO-E2006-BII-TES-014
Description	: Carbon steel plate welded test sample, Size: 9 mm thickness, Material Spec: SS 400 to ASTM A36, PQR No: 002/HEI/MIGAS/21	Sample Marking	: 12.HEI2
		Unique Code	: Z10UH
Type of Test	: Reduced Section Tensile Test (Transversal)		
Testing Machine Used	: COMPUTERIZED ELECTRO-HYDROLIC SERVO UNIVERSAL TESTING MACHINE Model : WAW-1000E, Capacity : 1000 kN		
Remarks	: -		

Environment Temp : $25 \pm 2^{\circ}\text{C}$

Specimen Number		Tensile 1	Tensile 2
Measured Thickness	a_0 (mm)	8.76	8.88
Measured Width	b_0 (mm)	19.16	19.17
Effective Area	A_0 (mm ²)	167.84	170.23
Ultimate Tensile Load	F_m (kN)	83.46	84.72
Ultimate Tensile Strength	R_m (N/mm ²)	497	498
Location of Failure		Base Metal A36	Base Metal A36
Type of Failure		Ductile	Ductile

Note: Hasil pengujian diatas hanya berlaku untuk sampel yang diuji

Test Conducted By : Agnes Stephani
Checked By : Albertus Tonggak Onny Juniardi
Witnessed By : -

Date of Issued : 13 Januari 2021

Approved By

INSPEKSINDO INDONESIA
Albertus Tonggak Onny J.
Laboratory Manager

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 33 of 86

PT HANAZONO ENGINEERING INDONESIA

1.HEI2-T1

SampleID	21.1HEI2T1	TestDate	1/11/2021
Type	Flat	Size(mm)	8.76*19.16
Ao(mm ²)	167.84	Fm(kN)	83.46
Rm(MPa)	497		



(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

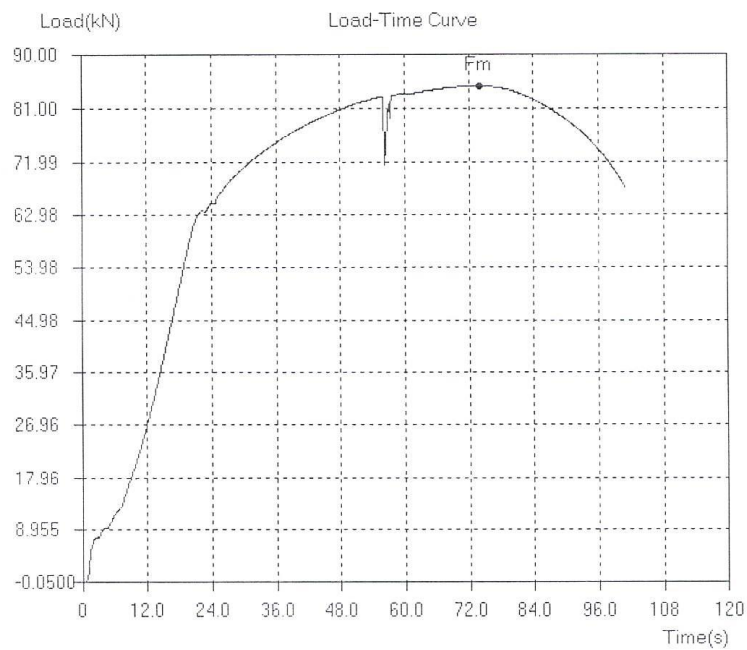
Purchase Order No. : 11580

Page 34 of 86

PT HANAZONO ENGINEERING INDONESIA

1.HEI2-T2

SampleID	21.1HEI2T2	TestDate	1/11/2021
Type	Flat	Size(mm)	8.88*19.17
Ac(mm ²)	170.23	Fm(kN)	84.72
Rm(MPa)	498		



	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 35 of 86



PT BINTANG INSPEKSINDO INDONESIA

Komplek Pergudangan EHA Blok B-02
Jl. Raya Legok Km 6 No.77, RT 002/001
Bojong Nangka, Kelapa Dua, Tangerang, Indonesia
Telp : 021 2222 7029
E-mail : marketing@bintanginspeksindo.com



Testing Report

Customer	: PT Hanazono Engineering Indonesia	Report Number	: BII/TR/0121/014
Address	: Jl. Raya Bojonegara No. 44 Ds. Kertasana Kecamatan Bojonegara, Kabupaten Serang Banten - Indonesia 42454	Total of Page	: 2 of 2
Tested for	: Welding Procedure Specification	Date of Received	: 05 Januari 2021
Test Method	: ASME Sect IX: 2019	Date of Tested	: 11 Januari 2021
Reference Code	: ASME Sect IX: 2019	Project Name	: -
Object to be tested	: (as received)	PO Number	: PO-E2006-BII-TES-014
Description	: Carbon steel plate welded test sample, Size: 9 mm thickness, Material Spec: SS 400 to ASTM A36, PQR No: 002/HEI/MIGAS/21	Sample Marking	: 12.HEI2
Type of Test	: Bending Test (Transverse Welding)	Unique Code	: Z10UH
Testing Machine Used	: COMPUTERIZED ELECTRO-HYDRAULIC SERVO UNIVERSAL TESTING MACHINE Model : WAW-1000E, Capacity : 1000 kN		
Remarks	: -		

Environment Temp : 25 ± 2°C

Test Weldment Thickness	: 9 mm	Test Specimen Width	: 38 mm
Former Diameter	: 40 mm	Bend Angle	: 180 degree
Shoulder Distance	: 58 mm		

Specimen No.	Face Bend (1)	Face Bend (2)	Root Bend (1)	Root Bend (2)
Observation	No opening was observed	No opening was observed	No opening was observed	No opening was observed
Result	Accepted	Accepted	Accepted	Accepted

Note: Hasil pengujian diatas hanya berlaku untuk sampel yang diuji

Test Conducted By	: Agnes Stephani
Checked By	: Albertus Tonggak Onny Juniardi
Witnessed By	: -

Date of Issued : 13 Januari 2021

Approved By

INSPEKSINDO INDONESIA
Albertus Tonggak Onny J.
Laboratory Manager

The results reported herein have been performed in accordance with the laboratory's terms of accreditation under Komite Akreditasi Nasional (ISO/IEC 17025:2017)
Document may not be reproduced other than in full, except with the prior written approval of the issuing laboratory
(FM-LAB-BII-Bend-01 Rev.2, 07-12-2019)

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 36 of 86

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



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

WELDING PROCEDURE SPECIFICATION (WPS) In accordance with Section IX, ASME Boiler and Pressure Vessel Code			
Organization Name PT. HANAZONO ENGINEERING INDONESIA		By Quality Department	
Welding Procedure Specification No. 006/HEI/MIGAS/20		Date 01/10/2020 Supporting PQR No.(s) 006/HEI/MIGAS/20	
Revision No. 0		Date 01/10/2020	
Welding Process (es) GTAW & SMAW		Type (s) Manual	
(Automatic, Manual, Machine or Semi-Auto)			
JOINT (QW - 402) Joint Design Single Vee or Any Root Spacing 0 ~ 3 mm Backing With / Without Backing Material (Type) Air (GTAW) / Base Nor Weld Metal (GTAW / SMAW)		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 $\leq \frac{1}{8}$ in. (13mm) (Yes) All		(No)	-
Other _____			
*FILLER METALS (QW - 404)			
	1	2	
	GTAW	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	ϕ 1.6 mm ~ 2.4 mm	ϕ 3.2 ~ 4.0 mm	
Weld Metal			
Deposit Thickness:			
Groove	Max. 6 mm	Max. 13.29 mm	
Fillet	All	All	
Electrode Flux (Class)	N/A	N/A	
Flux Type	N/A	Low Hydrogen	
Flux Trade Name	N/A	N/A	
Consumable Insert	N/A	N/A	
Other	Manufacturer : ESAB Electrode Name : OK Tigrod 12.64 & OK 48.04		
*Each base metal-filler metal combination should be specified individually.			

Nomor Registrasi **1 OF 6**

AYG - 07081 / 0844 / wv

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 37 of 86

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

POISITIONS (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. 34 °C
Interpass Temp. Max. 260 °C
Preheat Maintenance N/A *)
Other _____
(Continuous or special heating, where applicable, should be specified)

GAS (QW - 408)

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

ELECTRICAL CHARACTERISTIC (QW - 409)

Weld Pass(es)	Process	Filler Metal		Current Type & Polarity	Amps. (Range)	Wire Feed Speed (Range)	Energy or Power (Range)	Volts (Range)	Travel Speed (Range)	Other (e.g., Remarks, Comments, Hot Wire Addition, Technique, Process, Torch Angle, etc.)
		Class	Dia.							
Root & Hot	GTAW	ER70S-6	1.6 ~ 2.4	DCEN	80 - 160	-	-	9 - 18	18 - 72	-
Fill & Capping	SMAW	E7018	3.2 / 4.0	DCEP	80 - 190	-	-	19 - 24	38 - 112	-

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

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

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

Other N/A

TECHNIQUE (QW - 410)

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

Nomor Registrasi Migas

A4G - 07901 / 0844 / 2020

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 38 of 86

WELDING PROCEDURE SPECIFICATION (WPS)

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

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

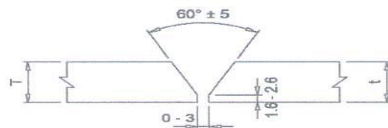
Rev. 0

JOINT DETAILS

SINGLE VEE GROOVE

T = t

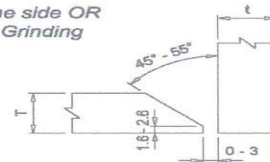
Welded from one side



SINGLE BEVEL - CORNER JOINT

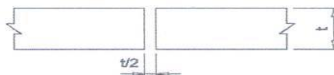
T = t

*Welded from one side OR
both side Back Grinding*



SQUARE BUTT

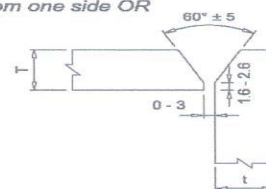
*Welded from BOTH SIDES, T = 6 mm Max
Root gap, 0 - t/2*



SINGLE VEE GROOVE

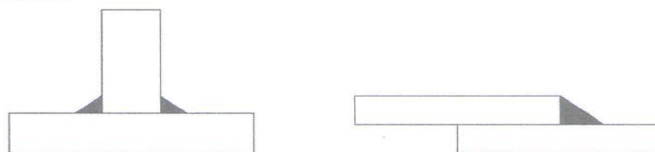
T = t

*Welded from one side OR
both side*



SINGLE OR DOUBLE FILLET

UNLIMITED



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

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

Organization Prepared by,
PT. HANAZONO ENG. INDONESIA

Verified by
MINISTRY OF ENERGY AND MINERAL RESOURCES
DIRJEN MIGAS

[Signature]
Date: October 1, 2020

Nomor Registrasi Migas

[Signature]
Date: October 1, 2020

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

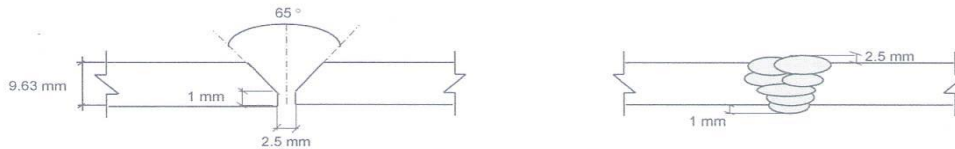
Page 39 of 86

PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

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

JOINTS (QW - 402)



Groove Design of Test Coupon

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

BASE METAL (QW - 403)

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

POSTWELD HEAT TREATMENT (QW - 407)

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

GAS (QW - 408)

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

FILLER METAL (QW - 404)

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

ELECTRICAL CHARACTERISTIC (QW - 409)

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

POSITION (QW - 405)

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

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 6

Ara - 07081 1084 / 2020

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 40 of 86

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 - 07001 / 0044 / 2020

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 43 of 86



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

Date: 2020-02-12

Certificate number: EC25919813 rev. 0

Our order:

Your order:

Our reference:

Your reference:

Customer number:

NA

Your fax number:

Customer order date:

Your e-mail:

Invoice address

Receiver of certificate

Delivery address

NA

DELIVERY

Lot number:

PLU02009

Quantity:

PRODUCT

CHEMICAL COMPOSITION

Brand:

ESAB

Description:

OK 48.04 3.2x400mm

Item number:

480432HNR0

Actual results: acc to EN 10204 - 3.1

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%

CLASSIFICATIONS

SFA/AWS A5.1: E7018

EN ISO 2560-A: E 42 4 B 32 H5

MECHANICAL PROPERTIES

Typical data: acc to EN 10204 - 2.2

Standard:

Auxiliary:

Condition:

TENSILE

<u>ReL</u>	<u>Rm</u>	<u>A5</u>
480 MPa	560 MPa	28 %

IMPACT

<u>Temp</u>	-30 °C	-40 °C
<u>KV</u>	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

Miftakhudin Zaeni

Quality Assurance Manager

Validation - Others

J-P Emoult

Product Manager

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 44 of 86



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

Date: 2019-11-22

Certificate number: EC25830081 rev. 0

Our order:

Your order:

Our reference:

Your reference:

Customer number:

NA

Your fax number:

Customer order date:

Your e-mail:

Invoice address

Receiver of certificate

Delivery address

NA

DELIVERY

Lot number:

PVT21611205

Quantity:

PRODUCT

CHEMICAL COMPOSITION

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

Actual results: acc to EN 10204 - 3.1

CLASSIFICATIONS

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

Wire/strip

Auxiliary:

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

MECHANICAL PROPERTIES

Typical data: acc to EN 10204 - 2.2

Standard: EN

Auxiliary: I1

Condition:

TENSILE

<u>ReL</u>	<u>Rm</u>	<u>A4-A5</u>
525 MPa	595 MPa	26 %

IMPACT

<u>Temp</u>	-40 °C
<u>KV</u>	150 J

COMMENTS

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

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

Validation - Chemical Analysis

Josef Moravek

Quality Manager

Validation - Others

Jose Abal Lopez,H. Rasmuson

Product Manager,



PT. GUNUNG RAJA PAKSI

Plate Mill

MILL TEST CERTIFICATE

Acc to EN 10204 - 3.1

Head Office & Factory

Imam Bonjol 4, Warung Bungkuk, Desa Sukadamar
Kubang Barat, Pekasi, West Java, Indonesia

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

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

[illegible]

REMARKS:

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

ACKNOWLEDGED BY:

2017年12月15日

USWATUN KHAISANAH
QUALITY ASSURANCE

ORP.FM.QA.12

9501-51056

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 46 of 86



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 (mm²)	187.88	189.05
Ultimate Tensile Load (kN)	108.25	109.89
Ultimate Tensile Strength (N/mm²)	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

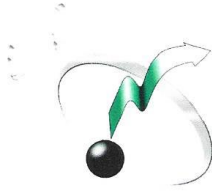
- The report is prepared for the sole use of the Client and is prepared based upon the item submitted, the Services required by the Client and the conditions under which the Services are performed by PT. Hi-Test.
- The Report is not intended to be representative of similar or equivalent Services on similar 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.
- The Report may not be reproduced in part or in full unless approval in writing has been given by PT. Hi-Test.
- PT. Hi-Test shall under no circumstances be liable to the Client or its agents, servants or representatives, in contract, tort (including negligence or breach of statutory duty) or otherwise for any direct or indirect loss or damage suffered by the Client. Its agents, servants or representatives howsoever arising or whether connected with the Services provided by PT. Hi-Test herein.

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

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

Date of Issued 06/01/2014

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 47 of 86



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	: 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 6

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

Type of Test : Bending Test (Transverse Specimen)

Test Temperature	: 25.1°C	Test Specimen Width	: 38 mm
Test Weld Ment 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	Discontinuity 1.73 mm of Opening was Observed	Accepted

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

Remark : --

Test Conducted By : Canra Latipolia, ST

Witnessed By :

Approved Signatory


Suhadi, ST
Laboratory Manager

Term & Conditions

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

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

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

Date of issued 06/01/2014

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 48 of 86

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



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

WELDING PROCEDURE SPECIFICATION (WPS) In accordance with Section IX, ASME Boiler and Pressure Vessel Code			
Organization Name PT. HANAZONO ENGINEERING INDONESIA		By Quality Department	
Welding Procedure Specification No. 005/HEI/MIGAS/20		Date 01/10/2020	Supporting PQR No.(s) 005HEI/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) Joint Design Single Vee or Any Root Spacing 0 ~ 3 mm Backing With / Without Backing Material (Type) Air (GTAW) / Base Nor Weld Metal (GTAW / SMAW)		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 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 : 9.73 ~ 15.73 mm (Impact Limit), 1.5 ~ 19.46			
Base Metal : Groove -		mm (W/O Impact)	Fillet All
Maximum Pass Thickness $\leq \frac{1}{2}$ in. (13mm)		(Yes) All	(No) -
Other -			
*FILLER METALS (QW - 404)			
	1	2	
	GTAW	SMAW	
Spec. No. (SFA)	5.18	5.1	
AWS No. (Class)	ER70S-6	E7018-1H4R	
F - No.	6	4	
A - No.	1	1	
Size of Filler Metals	ϕ 1.6 mm ~ 2.4 mm	ϕ 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

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 49 of 86



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

WELDING PROCEDURE SPECIFICATION (WPS)

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

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

Rev. 0

POSITIONS (QW - 405)

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

POSTWELD HEAT TREATMENT (QW - 407)

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

PREHEAT (QW - 406)

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

GAS (QW - 408)

Percent Composition		
Gas (es)	Mixture	Flow Rate
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., Remarks, Heat Wire Addition, Technique, Process Torch Angle, etc.)
		Class	Dia.							
Root & Hot	GTAW	ER70S-6	1.6 ~ 2.4	DCEN	50 - 150	-	-	9 - 18	11 - 65	-
Fill & Capping	SMAW	E7018-1H4R	3.2 / 4.0	DCEP	80 - 190	-	-	19 - 28	38 - 140	-

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

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

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

Other N/A

TECHNIQUE (QW - 410)

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

Nomor Registrasi Migas

AYG - 07001 / 0845 / 2020

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 50 of 86

WELDING PROCEDURE SPECIFICATION (WPS)

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

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

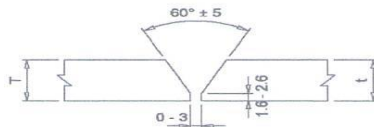
Rev. 0

JOINT DETAILS

SINGLE VEE GROOVE

$T = t$

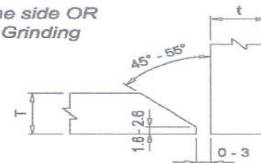
Welded from one side



SINGLE BEVEL - CORNER JOINT

$T = t$

Welded from one side OR
both side Back Grinding



SQUARE BUTT

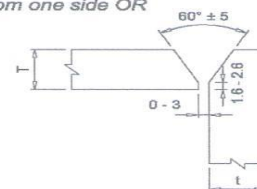
Welded from BOTH SIDES, $T = 6 \text{ mm Max}$
Root gap, 0 - $t/2$



SINGLE VEE GROOVE

$T = t$

Welded from one side OR
both side



SINGLE OR DOUBLE FILLET

UNLIMITED



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

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

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

Organization Prepared by,
PT. HANAZONO ENG. INDONESIA


Date : October 1, 2020

Verified by
MINISTRY OF ENERGY AND MINERAL RESOURCES
DIRJEN MIGAS

Nomor Registrasi Migas

AYG - 07901 10045/2020

Date : October 1, 2020

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 51 of 86



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**

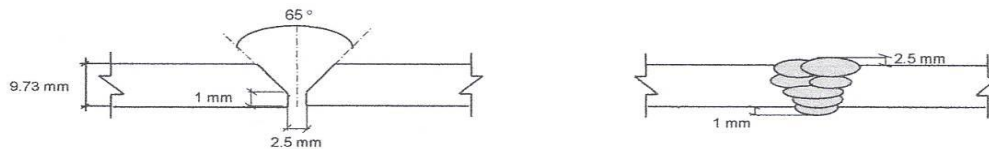
Procedure Qualification Record No. 005/HEI/MIGAS/20 Date 29/09/2020

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

AYG - 079801 / 0845 / 2020

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 52 of 86



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

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

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

PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld Test Coupon

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

Rev. 0

WELDING PARAMETER

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

TENSILE TEST (QW - 160)

Specimen No.	Width (mm)	Thickness (mm)	Area (mm 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 - 07981/0805/2020

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 53 of 86



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

PROCEDURE QUALIFICATION RECORD (PQR)																																																																																			
Record Actual Conditions Used to Weld Test Coupon																																																																																			
Procedure Qualification Record No. : 005/HEI/MIGAS/20					Rev. 0																																																																														
FILLET-WELD TEST (QW - 180) Result - Satisfactory : Yes ☐ No ☐ Penetration into Parent Metal : Yes ☐ No ☐ Macro - Result <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, Kg/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>1</td> <td rowspan="4">HAZ 1</td> <td>170</td> <td>169</td> <td>167</td> <td></td> </tr> <tr> <td>2</td> <td>175</td> <td>173</td> <td>171</td> <td></td> </tr> <tr> <td>3</td> <td>187</td> <td>176</td> <td>174</td> <td></td> </tr> <tr> <td>4</td> <td>179</td> <td>168</td> <td>177</td> <td></td> </tr> <tr> <td>5</td> <td rowspan="2">Weld Metal</td> <td>183</td> <td>171</td> <td>172</td> <td></td> </tr> <tr> <td>6</td> <td>187</td> <td>180</td> <td>175</td> <td></td> </tr> <tr> <td>7</td> <td rowspan="3">HAZ 2</td> <td>218</td> <td>175</td> <td>181</td> <td></td> </tr> <tr> <td>8</td> <td>212</td> <td>172</td> <td>178</td> <td></td> </tr> <tr> <td>9</td> <td>205</td> <td>168</td> <td>175</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, Kg/mm ²			Remarks	12°			Line 1	Line 2	Line 3	1	HAZ 1	170	169	167		2	175	173	171		3	187	176	174		4	179	168	177		5	Weld Metal	183	171	172		6	187	180	175		7	HAZ 2	218	175	181		8	212	172	178		9	205	168	175																			
Test No	Test Location	Vickers Hardness Value HV 10, Kg/mm ²			Remarks																																																																														
		12°																																																																																	
		Line 1	Line 2	Line 3																																																																															
1	HAZ 1	170	169	167																																																																															
2		175	173	171																																																																															
3		187	176	174																																																																															
4		179	168	177																																																																															
5	Weld Metal	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 <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/0920/0331</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  Date : September 29, 2020 Nomor Registrasi Migas AYG - 07981684r/2020 Date : September 29, 2020																																																																																			

(CPM Work No.)
11580

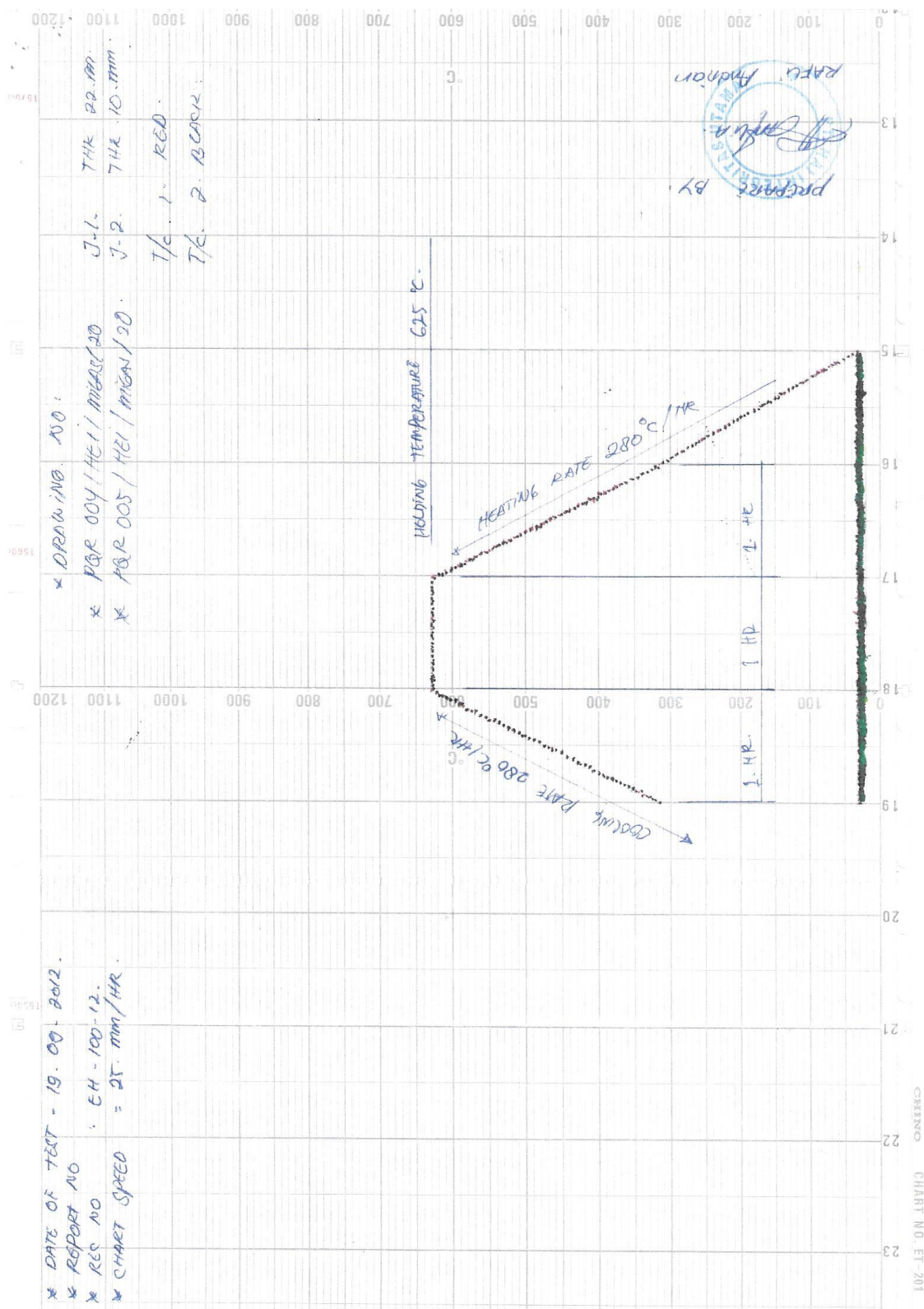
Project Doc. No.: E2502-000-PRC-004

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 54 of 86



COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 55 of 86



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/0920/0331
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 (mm²)	189.73	190.22
Ultimate Tensile Load (kN)	108.39	107.96
Ultimate Tensile Strength (N/mm²)	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


JKT

Suhadi, ST
Laboratory Manager

Term & Conditions

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

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

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

Date of Issued 06/01/2014

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 56 of 86



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/0920/0331
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 Ment 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

Term & Conditions

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

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

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

Date of Issued 06/01/2014

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 57 of 86



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



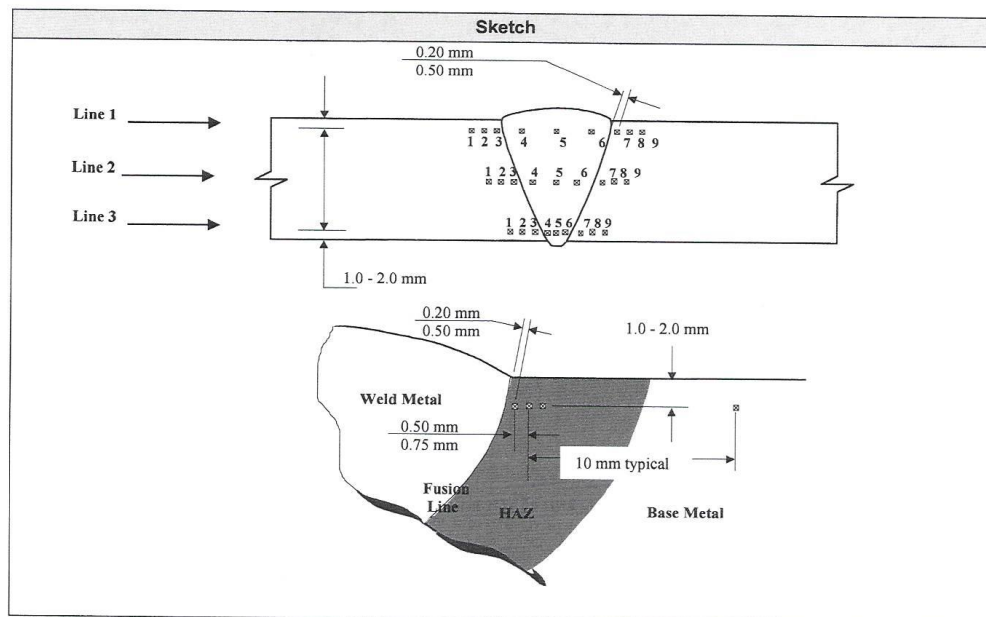
Testing Report

(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/0920/0331
Reference Code : ASME Sect. IX : 2019	Total of Page : 3 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



Approved Signatory


JKT

Suhadi ST
Laboratory Manager

Term & Conditions

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

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

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

Date of issued 06/01/2014

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 58 of 86



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/0920/0331
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

Sukmahadi, 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.
- PT. Hi-Test agrees to use reasonable diligence in the performance of the Services but no warranties are given and none may be implied directly or indirectly relating to the Services, the Report or the facilities of PT. Hi-Test.
- The Report may not be reproduced in part or in full unless approval in writing has been given by PT. Hi-Test.
- PT. Hi-Test shall under no circumstances be liable to the Client or its agents, servants or representatives, in contract, tort (including negligence or breach of statutory duty) or otherwise for any direct or indirect loss or damage suffered by the Client, its agents, servants or representatives howsoever arising or whether connected with the Services provided by PT. Hi-Test herein.

Form No: HT/QM-F/CHARPY – MAT/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

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 59 of 86



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/0920/0331
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/


JKT

Suhadi, ST
Laboratory Manager

Term & Conditions

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

Form No: HT/QM-F-HARDNESS-RESULT/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. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 60 of 86

RADIOGRAPHY EXAMINATION REPORT

Read Office: Jl. Wilkawa No.111 Mer.1 - Jatis Ashi
Bekasi 17423 - Jawa Barat, Indonesia
Phone: +62-21-8243 5561 / 8241 5794
Fax: +62-21-8243 5168
Email: admin@rsasid.com website: www.rsasid.com

Client : PT. HAMA2000 ENGINEERING INDONESIA		Job No. : PQR		Report No. : 001/RT/HEI/UK/20	
Contractor : PQR		Work Order / Request No. : -		Shooting Date : 18-09-2020	
Project : PQR		Location : WVS - Cilegon		Date of Report : 19-09-2020	
Radiographic Procedure : RS3/RT-ASME/003		Radiation Source : IR-192		RT Tech : DWSC DWDC SWEL	
Application Code : ASME VII		F/S Source Size : 2.7 x 2.5 mm		RT Type : S Side F Side	
Material Specification : 340304/A 240.304 A		Activity : 20 Ci		Sensitivity: W No.8 F.D. 2-4	
Material Specification : 316 GR 70W AS16 GR		Exp. Time : 20 Min/Sec		Under Cut : 0.5 mm	
Material Specification : 70N A 36/ A 36		Exp. Time : 20 Min/Sec		Sensitivity : ASTM 1B	

Identification	Joint No.	Material Size Thick	FILM SEQUENCE		Welder Stamp	Type of Discontinuity										Remarks				
			4"x10"	4"x15"		7"x17"	Surface Indication	Crack	Incomplete Penetration	Incomplete Fusion	Slag Inclusion	Slag Convexity	Burn Through	Under Cut	Gas and Worn Hole		Porosity	Others	Sensitivity	Range Density
PQR/001/HEI/NIGAS/20	-	Thk 45 mm				W											9	2B-3.2	ACC	
PQR/002/HEI/NIGAS/20	-	Thk 10 mm				W											9	2B-3.2	ACC	
PQR/003/HEI/NIGAS/20	-	Thk 10 mm				W											9	2B-3.2	ACC	
PQR/004/HEI/NIGAS/20	-	Thk 22 mm				W											9	2B-3.2	ACC	
PQR/005/HEI/NIGAS/20	-	Thk 10 mm				W											9	2B-3.0	ACC	
PQR/006/HEI/NIGAS/20	-	Thk 10 mm				W											9	2B-3.1	ACC	
PQR/007/HEI/NIGAS/20	-	Thk 22 mm				W											9	2B-3.5	ACC	

Technician:		Radiographer:		QA/QC Approved:		Authorized Inspector:		Customer Rep.:	
Total Welds/Film Used : 7 Joints		Date: 20/09/20		Date: 20/09/20		Date: 20/09/20		Date: 20/09/20	



검 사 증 서
MILL TEST CERTIFICATE

주문번호/Order No. : P194500138

관주번호/PO No. :

: STEEL PLATE
 품명/Commodity

제품규격/Specification : ASTM A516-70

교객사/Supplier : JUNGJIN

수요가/Customer : 탑스틸

연구사실증서번호/ Certificate No. : DP3-2-190606-022-001

: 2019-06-06

[illegible]

Specimen No.: α -Tension, β -Hardeness
Position: T-Top, M-Middle, B-Bottom
Division: L-Ladle Analysis, P-Product Analysis
Sub/Sub Size, Real Value, mm: 1-7.5-10, 2-5.0-10
Sub/Sub Size, Real Value, mm: Blank-Full Size, 1-7.5-10, 2-5.0-10
G1 (Gauge Length, mm): 2-100, 3-80, 4-70, 5-50, 6-55.4A,
7-55.4B, 8-49, 9-88
T75d, 8-49, 9-88
AT: Trace
NRI Result: No Break, B-Break
TPI (Through Thickness Position): 1-Surface, 2-1/AT, 3-1/2T

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 FM0175 Hardness only.

* 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

www.dongkuk.co.kr

Chief of Quality Control Team

Surveyor to

Surveyor to

Surveyor to

Surveyor to

Page : 2/2

-351-4633

c of Korea/C

-еуп. Данди

Dangjin Work

Page : 2/2

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 62 of 86



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

제품 치수 Dimension 단위 Unit Inch: ", mm: Space	제품 번호 Product No	수량 Quantity	중량 Weight kg	재강번호 Heat No	인장시험 Tensile test				경도시험 Hardness		화합성분(%) Chemical Composition															Remarks
					P S	Tensile test			D V	H B	Chemical Composition															
						YPO2	TS	EL			C	Si	Mn	P	S	Cr	Ni	Mo	Nb	Ti	V					
																						GL	N/mm ²	%		
10.00*3048*6096 *Specimen No: DP08221216-a, DP08221215-d ** Normalized: 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*6096 *Specimen No: DP08227619-a, DP08227612-d ** Normalized: 910 °C, 35min	A673276-01		2,772	PK696499	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*6096 *Specimen No: DP08226625-a, DP08226625-d ** Normalized: 910 °C, 30min	A673334-01		3,209	PK696496	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*6096 *Specimen No: DP08227613-a, DP08227613-d ** Normalized: 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) in accordance with the 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.

* Tensile Test Direction- Transverse
* Ceq = C+Mn/6+(Ni+Cu)/15+(Cr+Mo)/5
* Chemical Composition Unit: 2-x100, 3-x1000, 4-x10000

* Specimen No.: a-Tension, d-Hardness
* Position: T-Top, M-Middle, B-Bottom
* Division: L-Ladle Analysis, P-Product Analysis
* Sub(Sub Size, Real Value, mm): Blank-Full Size, 1-7.5+10, 2-5.0+10, 3-2.5+5, 4-1.5+2.5
* GL(Gauge Length, mm): 1-200, 2-100, 3-60, 4-70, 5-50, 6-3.55VA, 7-3.15VA, 8-1.5VA
* TS: Total(Soluble) AI *Tr: Trace
* NPL Result: G-No Break, B-Break
* TTR(Through Thickness Position): 1-Surface, 2-1/4T, 3-1/2T

본 주인증업체의 규격용도와 타용도로 사용시 재질순상 및 인장시험의 문제가 발생할 수 있으며, 본 검사증명서를 위조 또는 변조시 형사처벌에 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: _____
Chief of Quality Control Team: _____
Page: 1/2

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 63 of 86

PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

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

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

Inspection certificate 3.1

as per : EN 10204

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

Rev. 0

Page 1 of 1

PO no.	ACD/BS-N/20/07/0624	of	13.07.2020
Order no.	1042004566		
Delivery note/pos./splitt	2047011900/000000/000030	of	20.07.2020
Product	covered electrode		
Trade name	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		

118855
46917
JUPB010E
0425

Chemical composition in % of the weld metal

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

Mechanical properties

ASME II/Sched.F

Tensile test								according to : ASTM E8							
Specimen preparation								according to : AWS B4.0							
T	ReL / Rp 0,2	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

voestalpine
ONE STEP AHEAD.

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 64 of 86



PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

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

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

Inspection certificate 3.1

as per : EN 10204

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

Rev. 0

Page 1 of 1

PO no.	ACD/JK-N/20/04/0464	of	27.04.2020
Order no.	1042004411		
Delivery note/pos./splitt	2047011831/000000/000030	of	08.07.2020
Product	GTAW rod/wire		
Trade name	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		118955
Lot no.	20098		86356
Quantity	2500,0 KG		JU10B00W 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 II/Sched.F

Tensile test					according to : ASTM E8		
Specimen preparation					according to : AWS B4.0		
T	ReL / Rp 0,2 MPa	Rp 1,0 MPa	Rm MPa	A (Lo = 4d) %	Z %	WBH PWHT	Remarks
25°C	≥ 420		≥ 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 01-77-96 (SSC) and 02-84-96 (HIC).

Town
Bekasi

Date
13.07.2020

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

Authorized representative
Miftah Farid

voestalpine
ONE STEP AHEAD.

AYG-07001/0055/2021

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 66 of 86

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 be specified)	

GAS (QW - 408)

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

ELECTRICAL CHARACTERISTIC (QW - 409)

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

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

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

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

Other N/A

TECHNIQUE (QW - 410)

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

AYG 07001/0015/2021

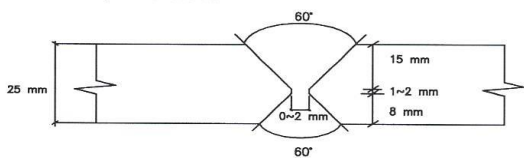
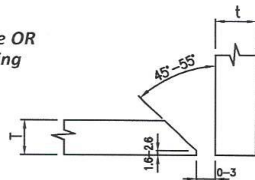
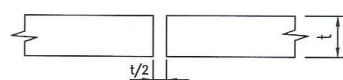
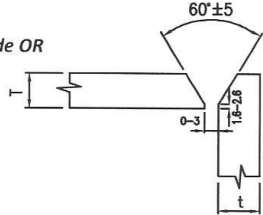
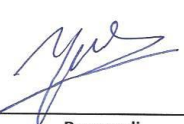
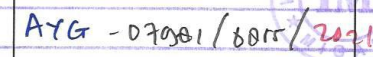
COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 67 of 86



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			
Welding Procedure Specification No. : 008/HEI/WPS/MIGAS/21			Page No : 3 of 3
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	Nomor Registrasi Migas 
Date : Nov 03, 2021	Date : Nov 3, 2021	Date : Nov 03, 2021	Date :

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 68 of 86

PROCEDURE QUALIFICATION RECORD (PQR)

Record Actual Conditions Used to Weld test Coupon

Page No : 1 of 3

Organization Name **PT. HANAZONO ENGINEERING INDONESIA**

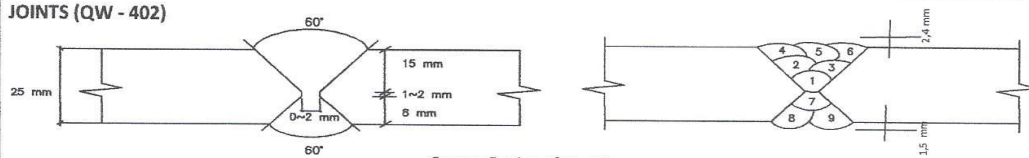
Procedure Qualification Record No. **008/HEI/PQR/MIGAS/21** Date **October 11, 2021**

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**

PREHEAT (QW - 406)

Preheat Temperature **55 °C**
Interpass Temperature **230 °C**
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**

AYG - 07901 / 0015 / 2021

(CPM Work No.)
11580

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

Revision No. : A

(Vendor Work No.)
E2502

Purchase Order No. : 11580

Page 69 of 86

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

Nomor Registrasi Migas

AYG - 07081 / 0015 / 2021

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 71 of 86



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 term & 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


Suhadi, ST
Laboratory Manager

Term & Conditions

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

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

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

Date of Issued 06/01/2014

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 72 of 86



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	: 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	: 2 of 2
Test Method	: ASTM E190-14	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 : Bending Test (Transverse Specimen)

Test Temperature	: 26.1°C	Test Specimen Width	: 10 mm
Test Weld Ment 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: Daventry England, S/N: DG 8881, Capacity: 700 Bar

Remark : --

Test Conducted By : Deri Rizki Ramadhan, ST

Witnessed By :

Approved Signatory

Suhadi, ST
Laboratory Manager

Term & Conditions

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

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

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

Date of Issued 06/01/2014

	POBOYA 2000 TPD EXPANSION PROJECT	
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 73 of 86

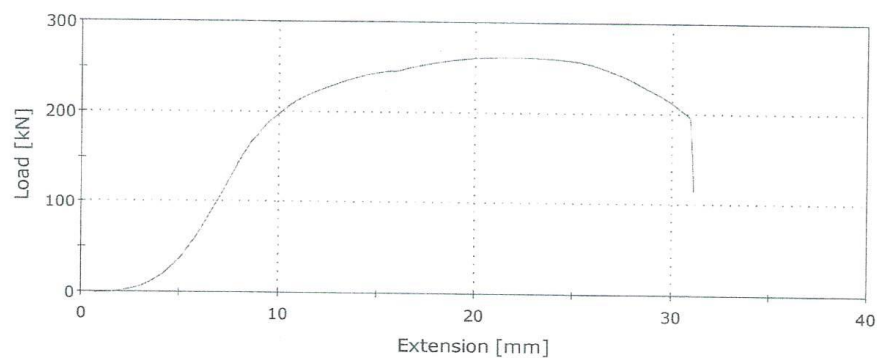
Tuesday, October 19, 2021

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

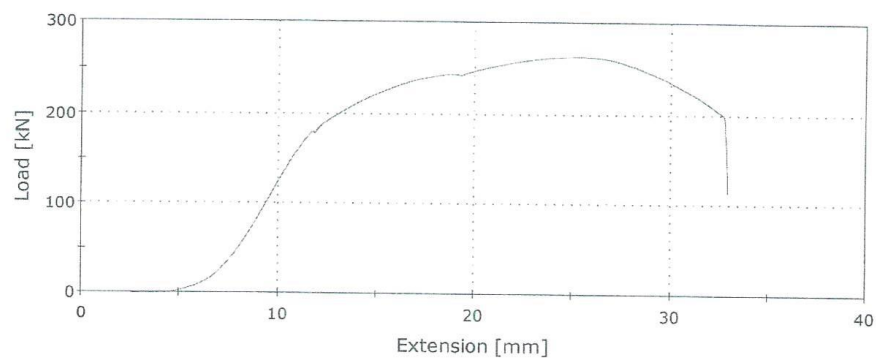
COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 74 of 86

Tuesday, October 19, 2021

PT. HI-TEST

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

Stress vs Strain



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

PT GUNUNG RAJA PAKSI Tbk
SHAPING TOMORROW
Plate Mill

MILL TEST CERTIFICATE

[illegible]

RADIOGRAPHY EXAMINATION REPORT

Head Office: 81, Wabawa Road, 1st Floor, 2nd and 3rd
 Block, 37423, Jaava Barat, Indonesia
Phone: +62-21 8243 5561 / 8241 5794
Fax: +62-21 8243 5168
Email: sales@wasko.id Website: www.wasko.id

[illegible]

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 77 of 86

PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

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

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

Inspection certificate 3.1

as per : EN 10204

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

Rev. 0

Page 1 of 1

PO no.	ACD/GT-N/21/03/0190	of	09.03.2021
Order no.	1042005117		
Delivery note/pos./splitt	2047013281/000000/000010	of	16.03.2021
Product	covered electrode		
Trade name	BOHLER FOX S EV 50-1		
Standard designation	ISO 2560-B : E 49 18-1 A U H 5 ISO 2560-A : E 42 5 B 42 H5 AWS A5.1/SFA 5.1 : E7018-1H4R		
Dimension	SMAW 4,00 x 350 mm		
Lot no.	20969		118555
Quantity	800,0 KG		80634 JUF6010E 0425

Chemical composition in % of the weld metal

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

Mechanical properties

EN 10204: 2.2

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

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

Town
Bekasi

Date
18.03.2021

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

Authorized representative
Miftah Farid



Reviewed by,
DA/ee
Kamari
09/01/2021

voestalpine

ONE STEP AHEAD.

COMO ENGINEERS	POBOYA 2000 TPD EXPANSION PROJECT	 PT Citra Palu Minerals
(CPM Work No.) 11580	Project Doc. No.: E2502-000-PRC-004	Revision No. : A
(Vendor Work No.) E2502	Purchase Order No. : 11580	Page 78 of 86

PT. voestalpine Böhler Welding Asia Pacific

voestalpine Böhler Welding Asia Pacific

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

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

Inspection certificate 3.1

as per : EN 10204

No. : 2021-2047013367-20-20981-025

Rev. 0

Page 1 of 1

PO no.	ACD/YG-N/21/02/0114	of	15.02.2021
Order no.	1042005053		
Delivery note/pos./splitt	2047013367/000000/000020	of	25.03.2021
Product	covered electrode		
Trade name	BOHLER FOX S EV 50-1		
Standard designation	ISO 2560-B : E 49 18-1 A U H 5 ISO 2560-A : E 42 5 B 42 H5 AWS A5.1/SFA 5.1 : E7018-1H4R		
Dimension	SMAW 3,25 x 350 mm		
Lot no.	20981		
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 (Lo = 4d)	Z	WBH	Remarks							
	MPa	MPa	MPa	%	%	PWHT								
25°C	470		570	30		AW								
Impact test								according to : ASTM E23						
Specimen preparation								according to : AWS B4.0						
T	Impact energy	Average	Lateral expansion	Shear fracture	WBH	Remarks								
	KV / J	KV / J	mm	%	PWHT									
-50°C		90			AW									

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

Town
Bekasi

Date
05.04.2021

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

Authorized representative
Miftah Farid

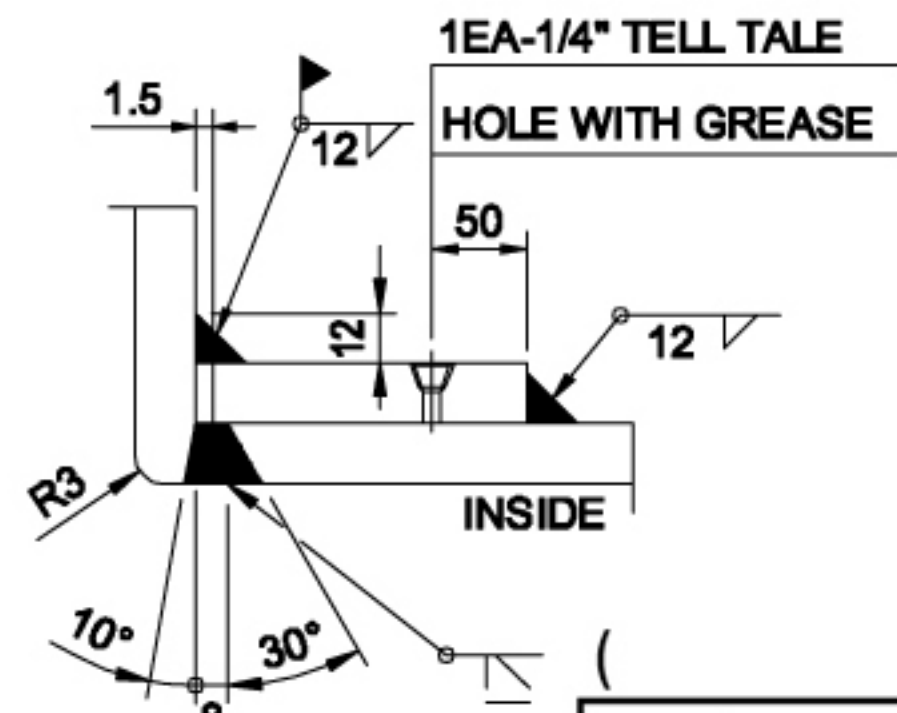


Reviewed by,
fernanadi
OCT 01, 2021

voestalpine
ONE STEP AHEAD

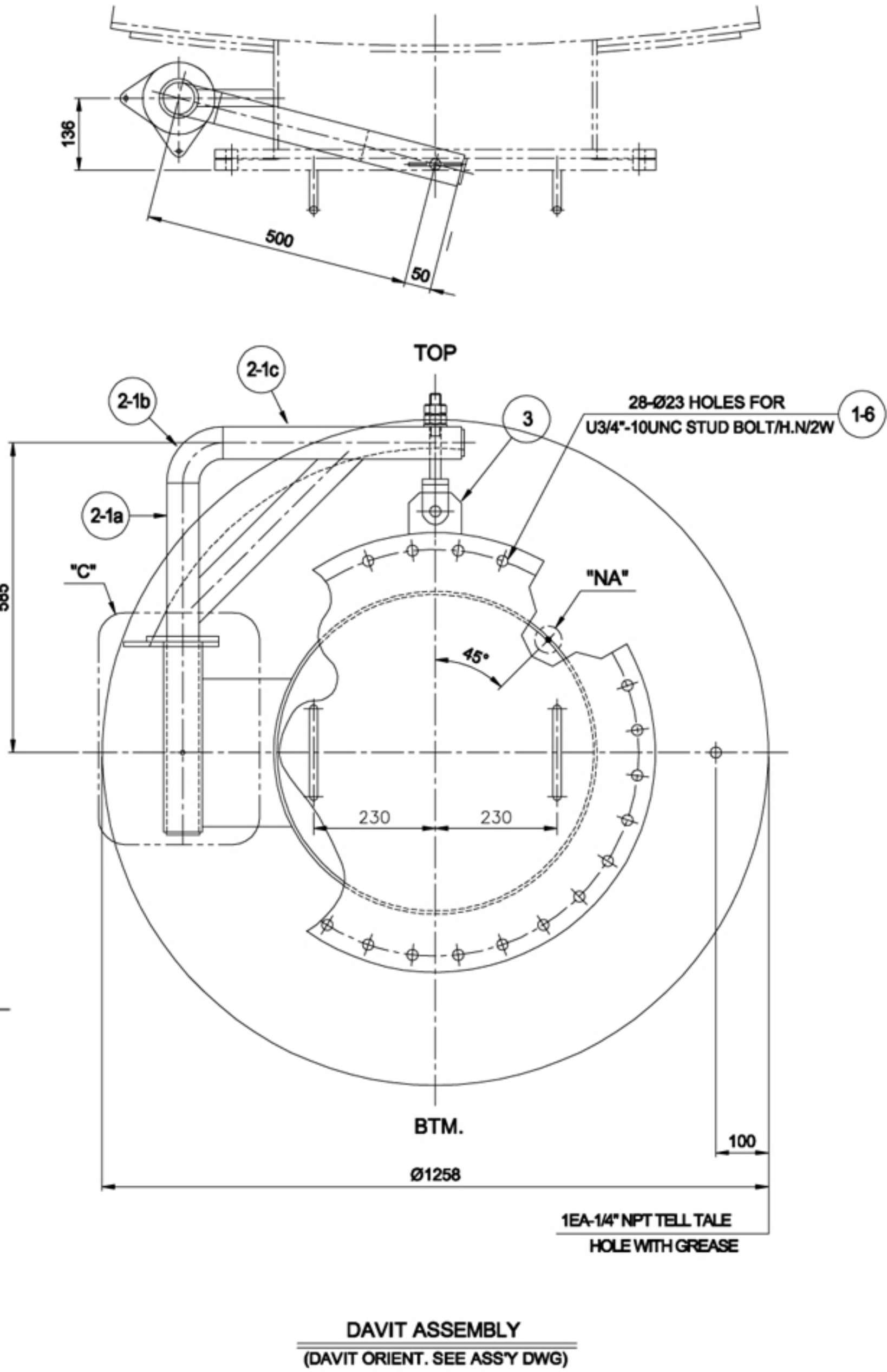
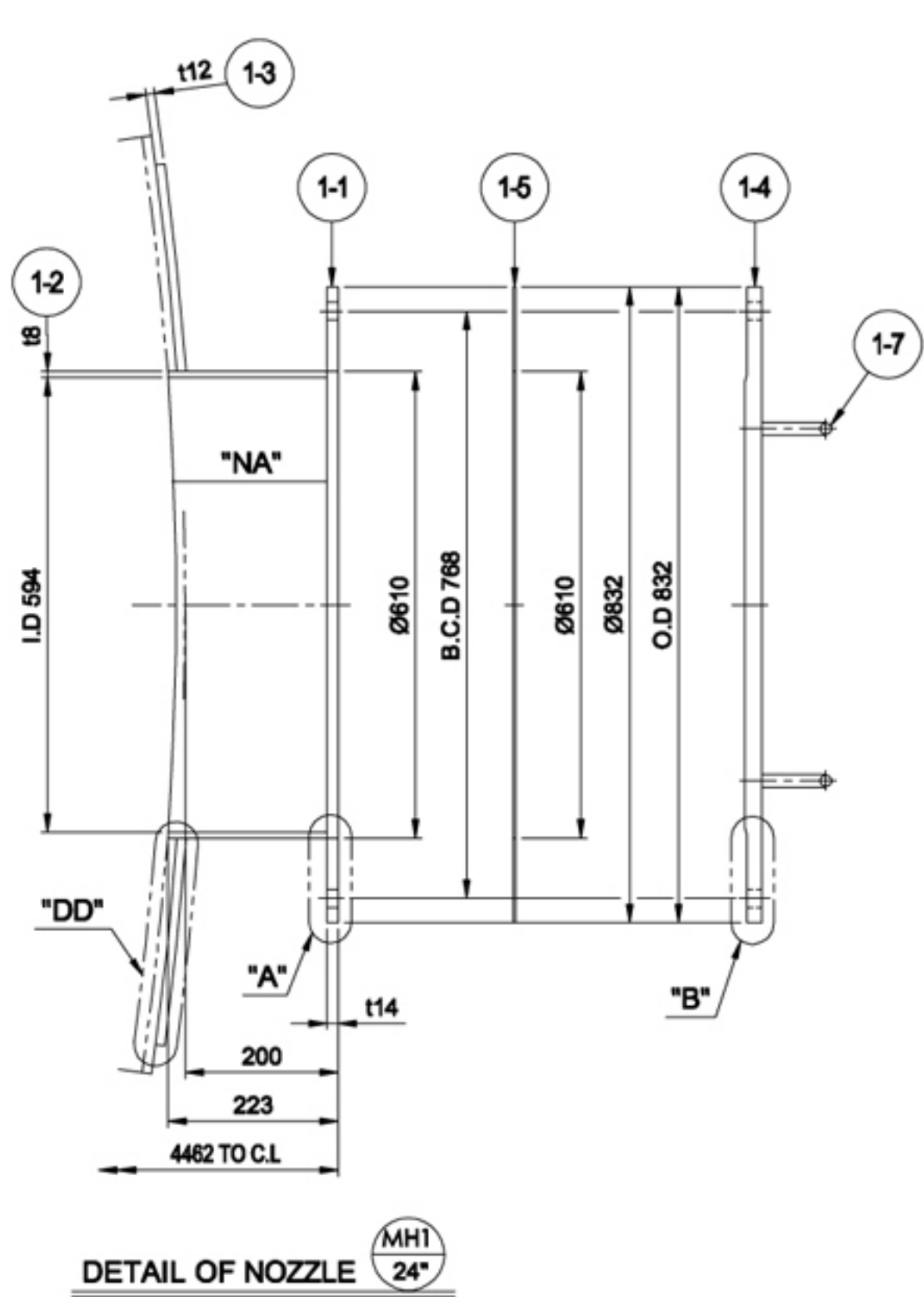
- GENERAL NOTES :
- 1. BOLT HOLE ORIENTATION
BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
 - 2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
 - 3. LIQUID PENETRANT
LIFTING LUG AND REMOVING OF JIG
NOZZLE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

VT	MH1-1
006/HEI/WPS/MIGAS/20	
A36	A36



VT	MH1-2
006/HEI/WPS/MIGAS/20	
A36	A36

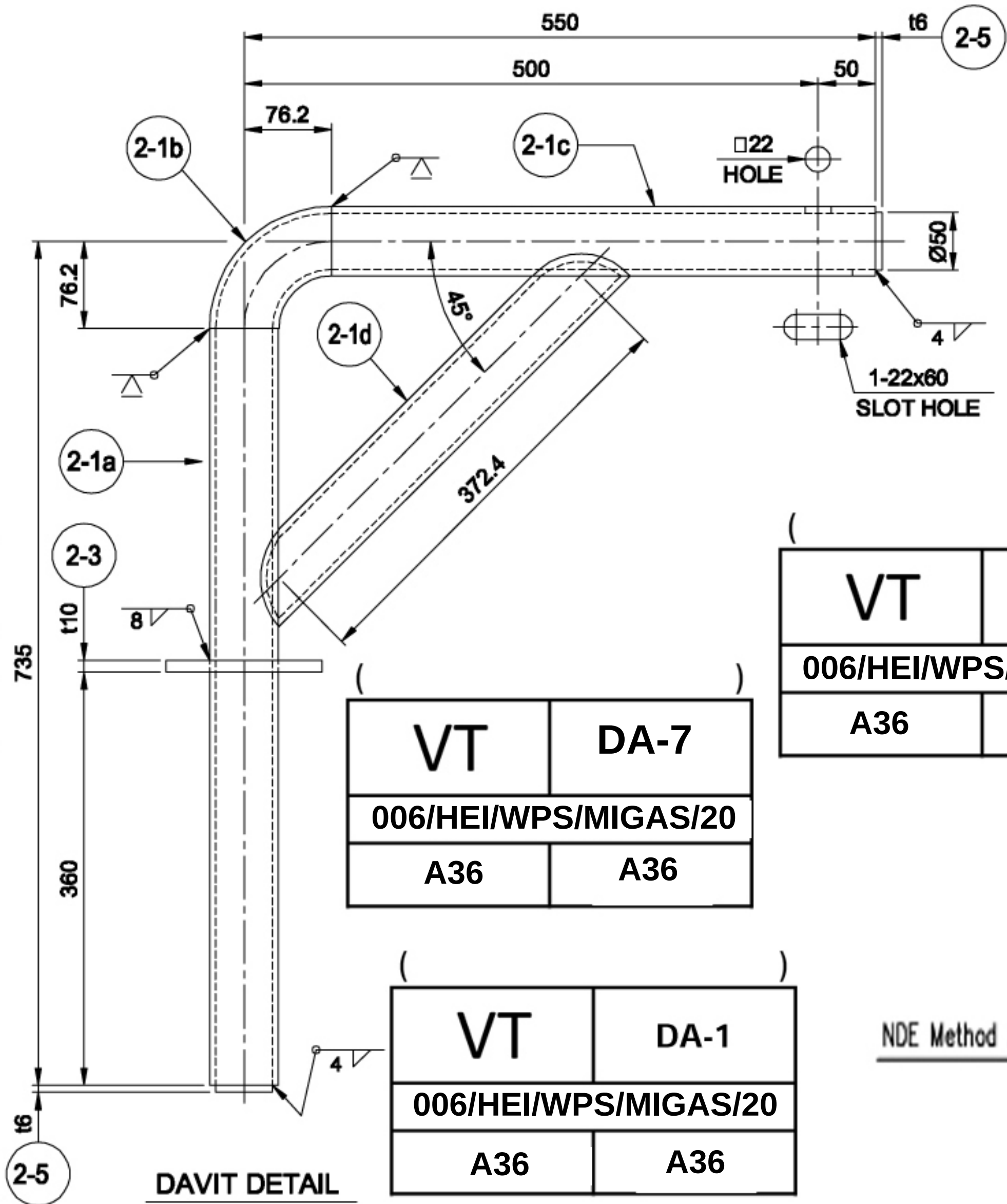
VT	MH1-3
006/HEI/WPS/MIGAS/20	
A36	A36



VT	DA-3
006/HEI/WPS/MIGAS/20	
A53	A53

VT	DA-2
006/HEI/WPS/MIGAS/20	
A36	A36

VT	DA-4
006/HEI/WPS/MIGAS/20	
A53	A53



VT	DA-5
006/HEI/WPS/MIGAS/20	
A36	A36

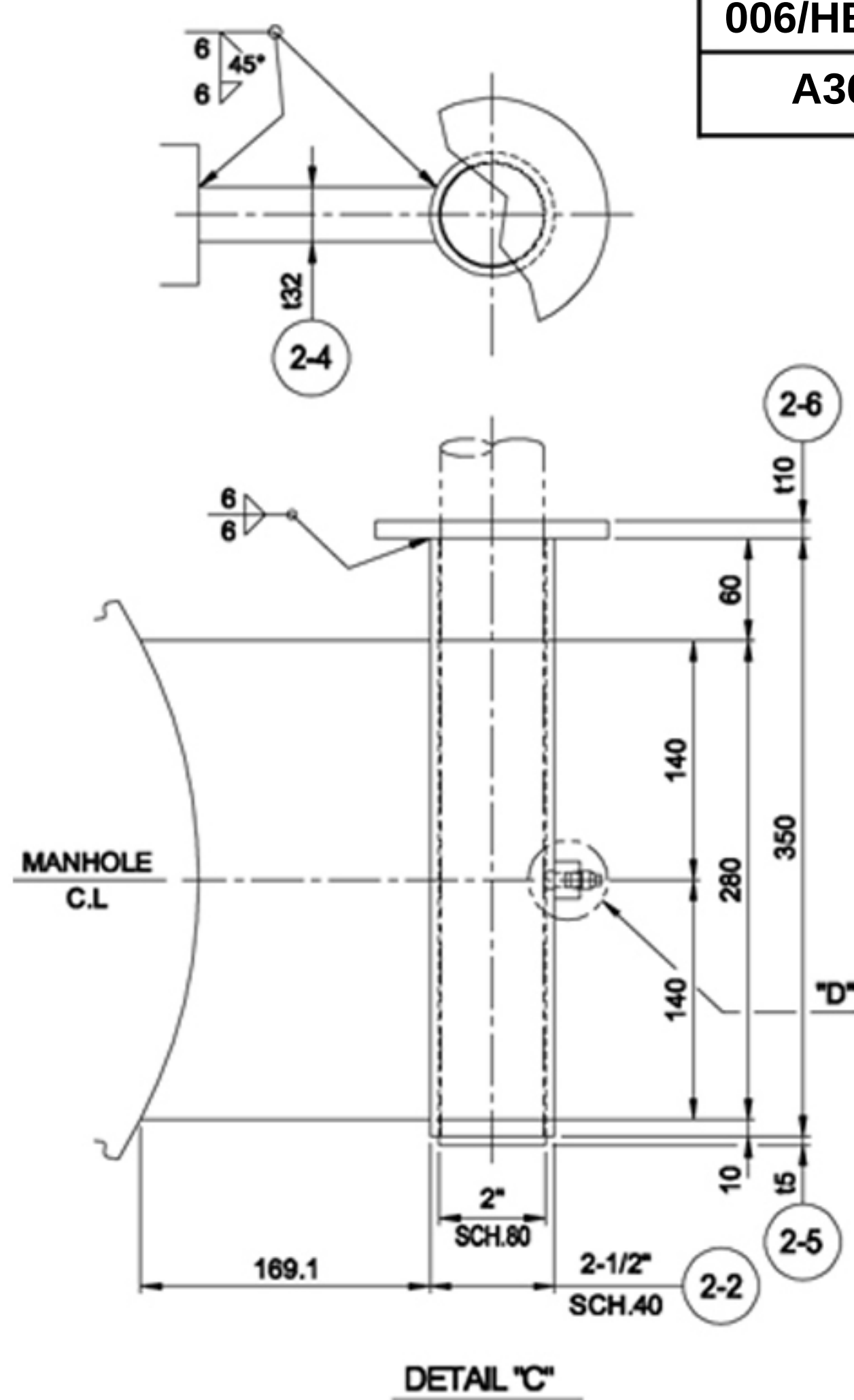
VT	DA-6
006/HEI/WPS/MIGAS/20	
A36	A36

VT	DA-7
006/HEI/WPS/MIGAS/20	
A36	A36

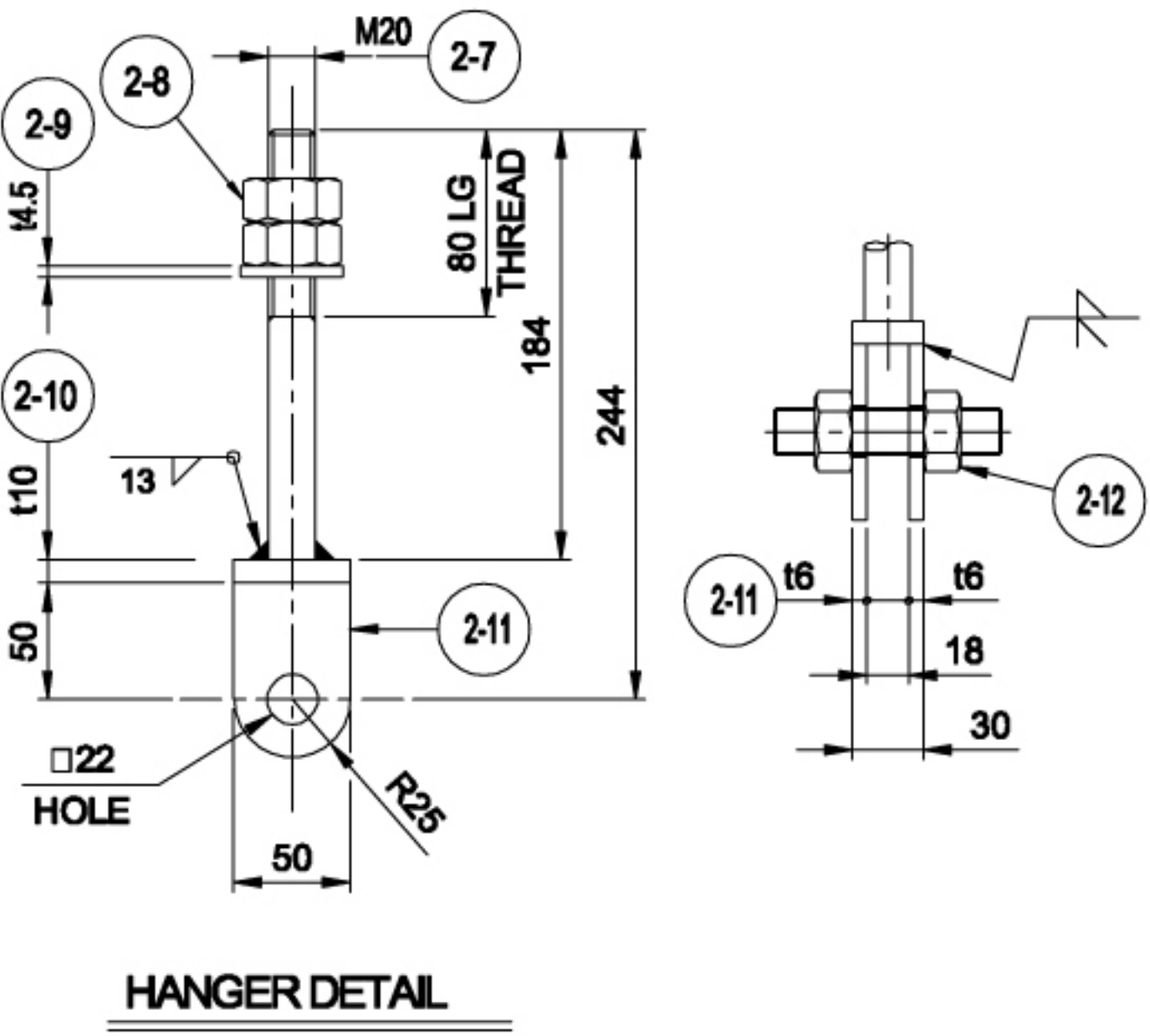
VT	DA-1
006/HEI/WPS/MIGAS/20	
A36	A36

VT	DA-8
006/HEI/WPS/MIGAS/20	
A36	A36

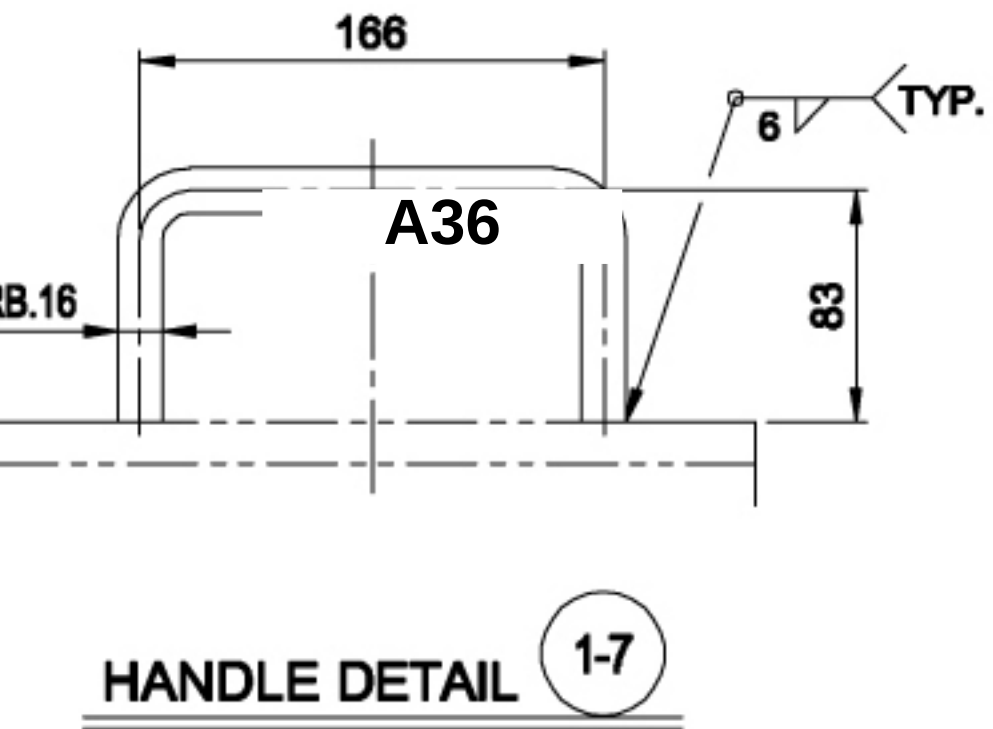
VT	DA-9
006/HEI/WPS/MIGAS/20	
A36	A36



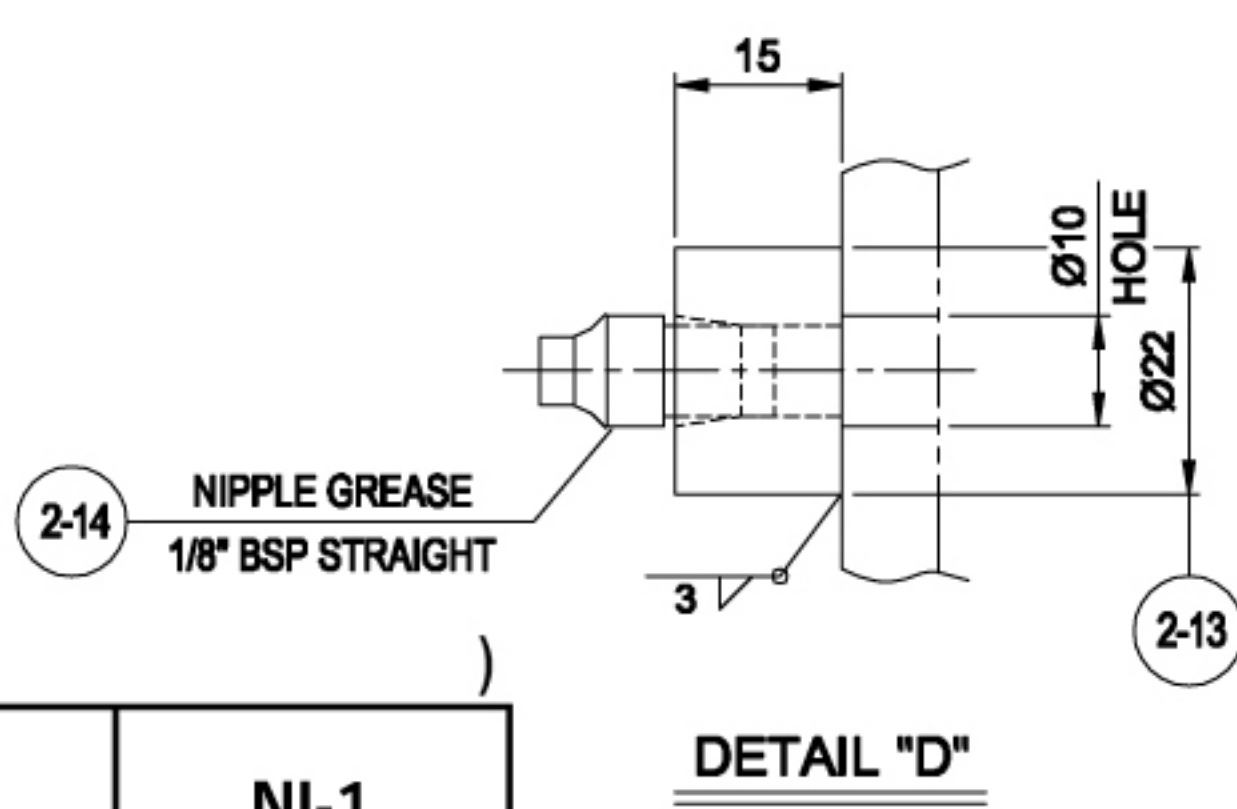
VT	HG-1
006/HEI/WPS/MIGAS/20	
A36	A36



VT	HA-1
006/HEI/WPS/MIGAS/20	
A36	A36



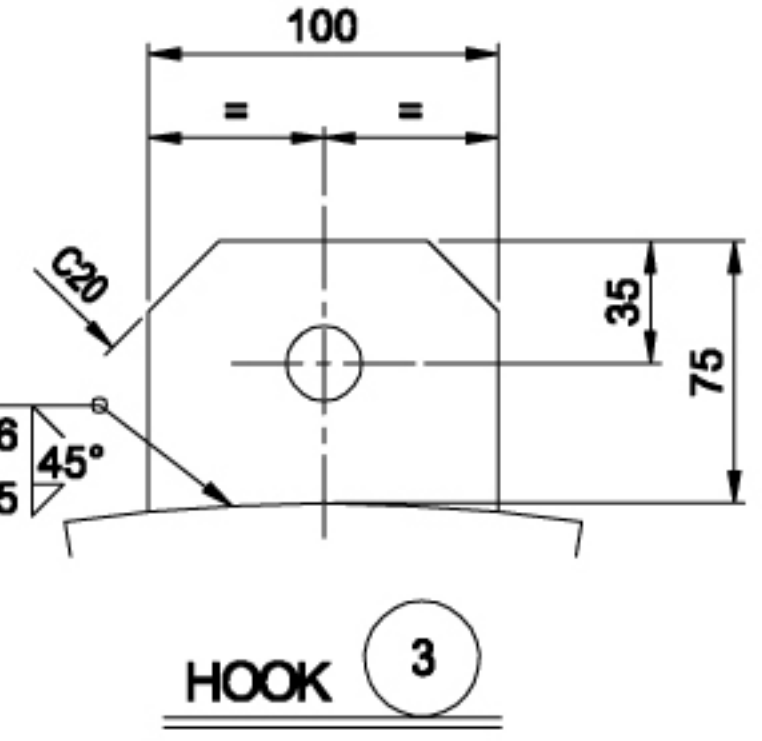
VT	NI-1
006/HEI/WPS/MIGAS/20	
A53	A53



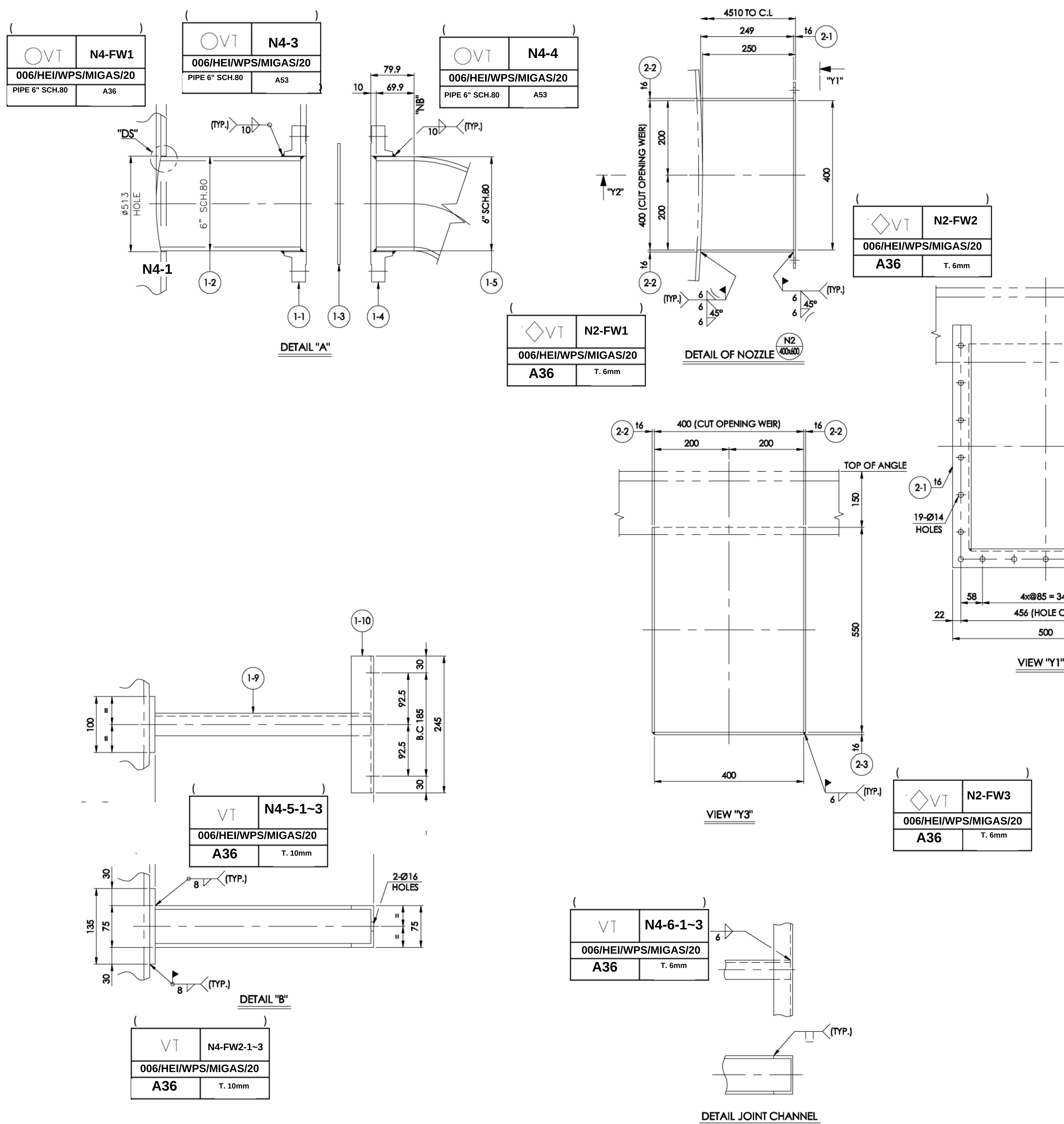
NDE Method Applicable	Welding Mark & No.
WPS Applicable	Date Welding
Material Spec.	
	CVN-1
	WPS-A001

- NDE METHOD SYMBOL
- RT (SPOT)
 - UT 10%
 - DPT 10%
 - MPI 10%
 - VT VISUAL 100%

VT	HO-1
006/HEI/WPS/MIGAS/20	
A36	A36

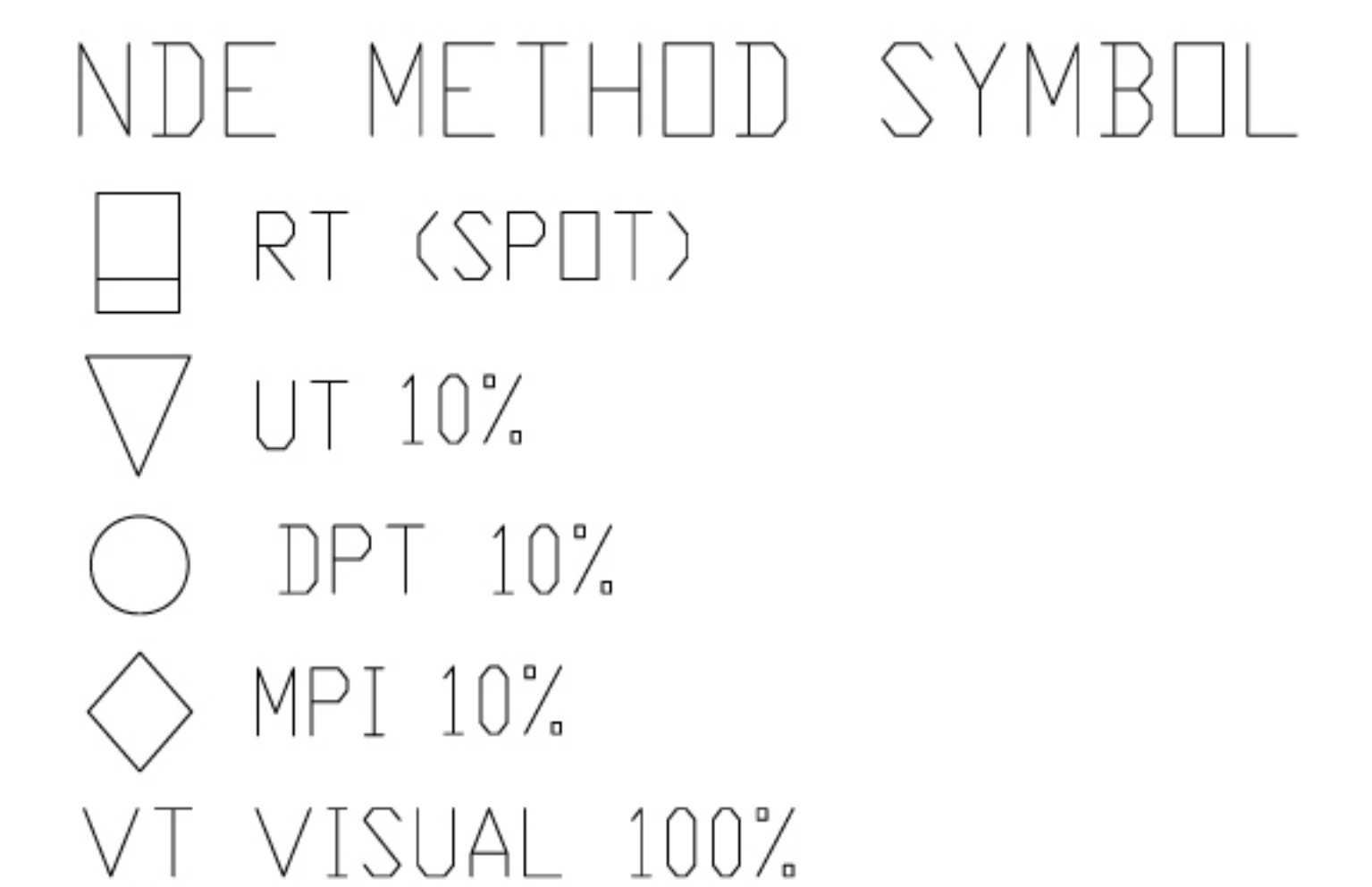
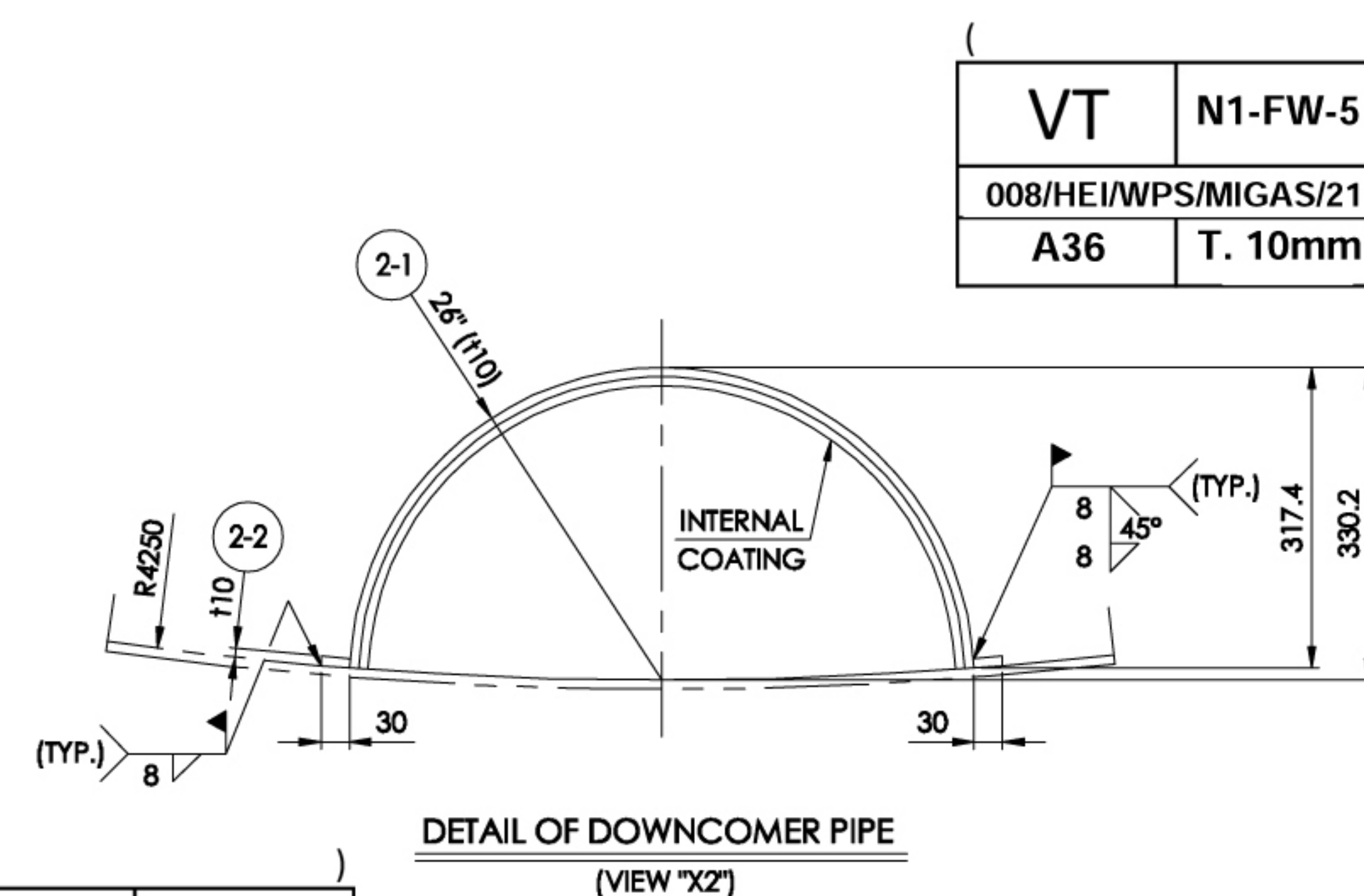
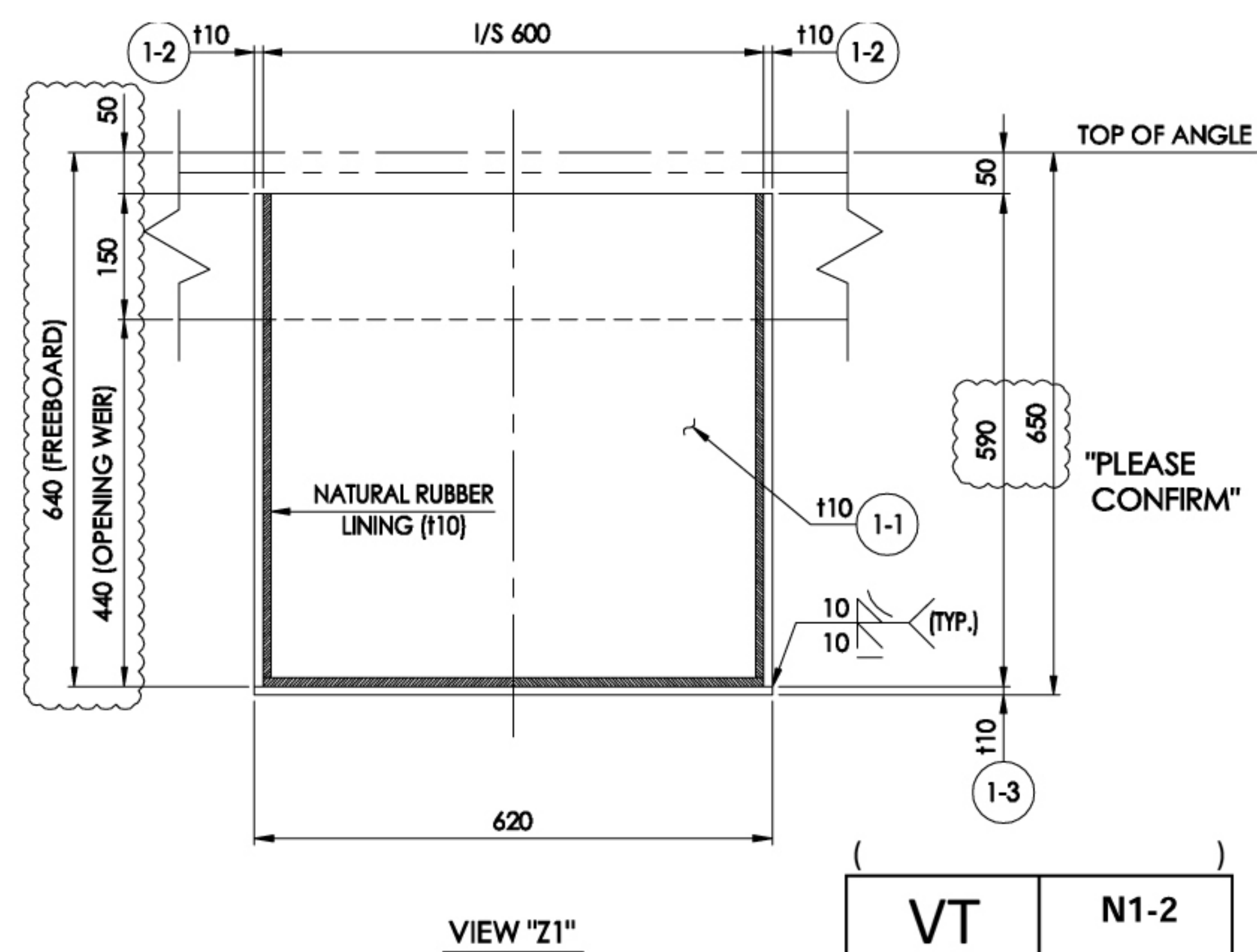


MATERIAL SPECIFICATION		LEGEND :		File name :		CHANGE BY CAD SYSTEM ONLY				Sheet No./Total sheets 3/8				
SHELL A36		WPS NO. :006/HEI/WPS/MIGAS/20 GTAW&SMAW P1 to P1		REV	DATE	APPR		1	2		DATE	SIGN	 PT. HANAZONO Engineering Indonesia <i>We are always partner with you</i>	
TOP ANGLE A36				0	29/09/25						DRAFT			BENRIDHO
STIFFENER RING A36											CHECK			RUSNANDI
											APPR			
											Scale :		NTS	
						Name						WPS Map No.		REV.
						WELDING MAP LEACH TANK						E2502-WMAP-PBY-001		



VT VISUAL 100%

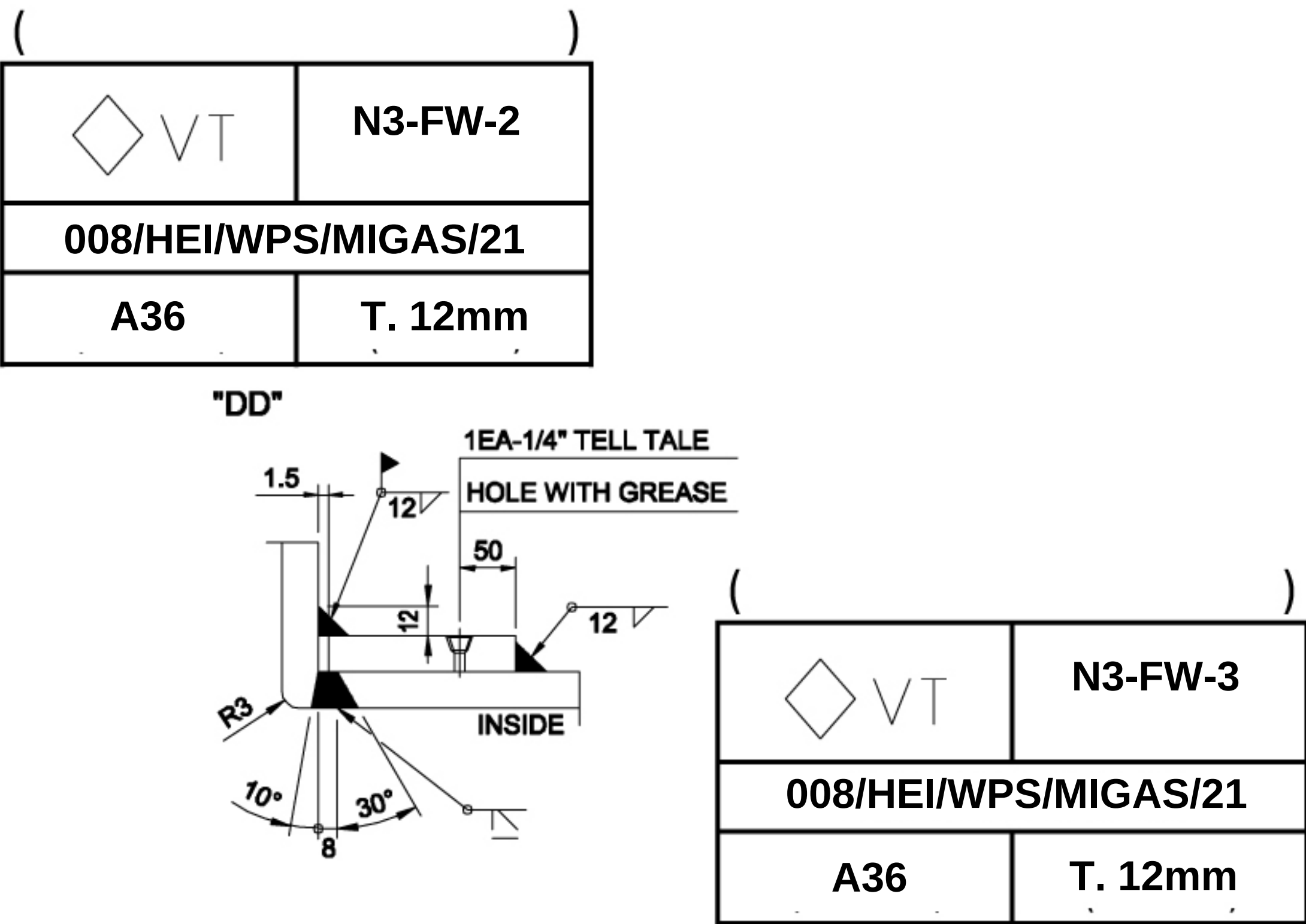
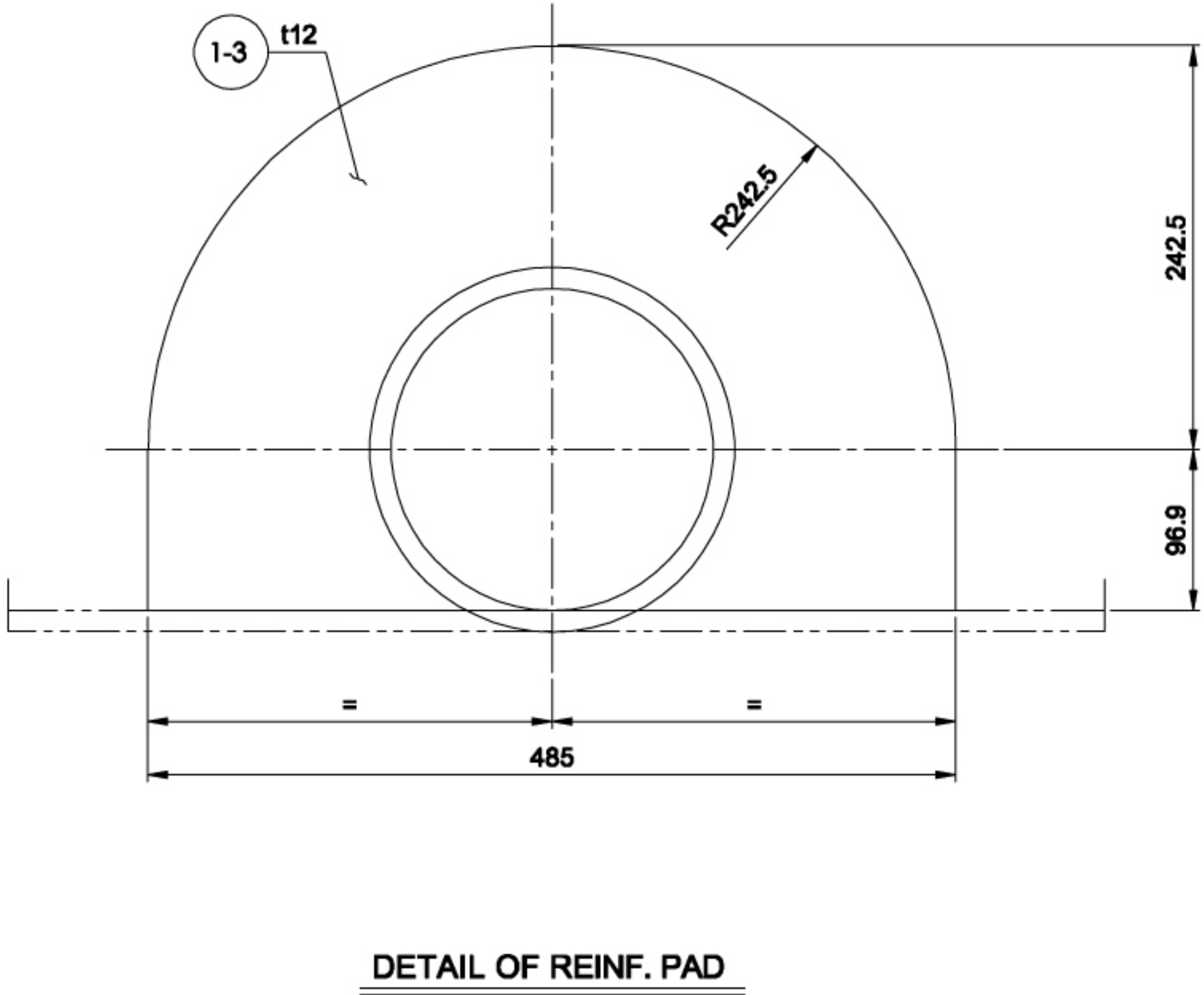
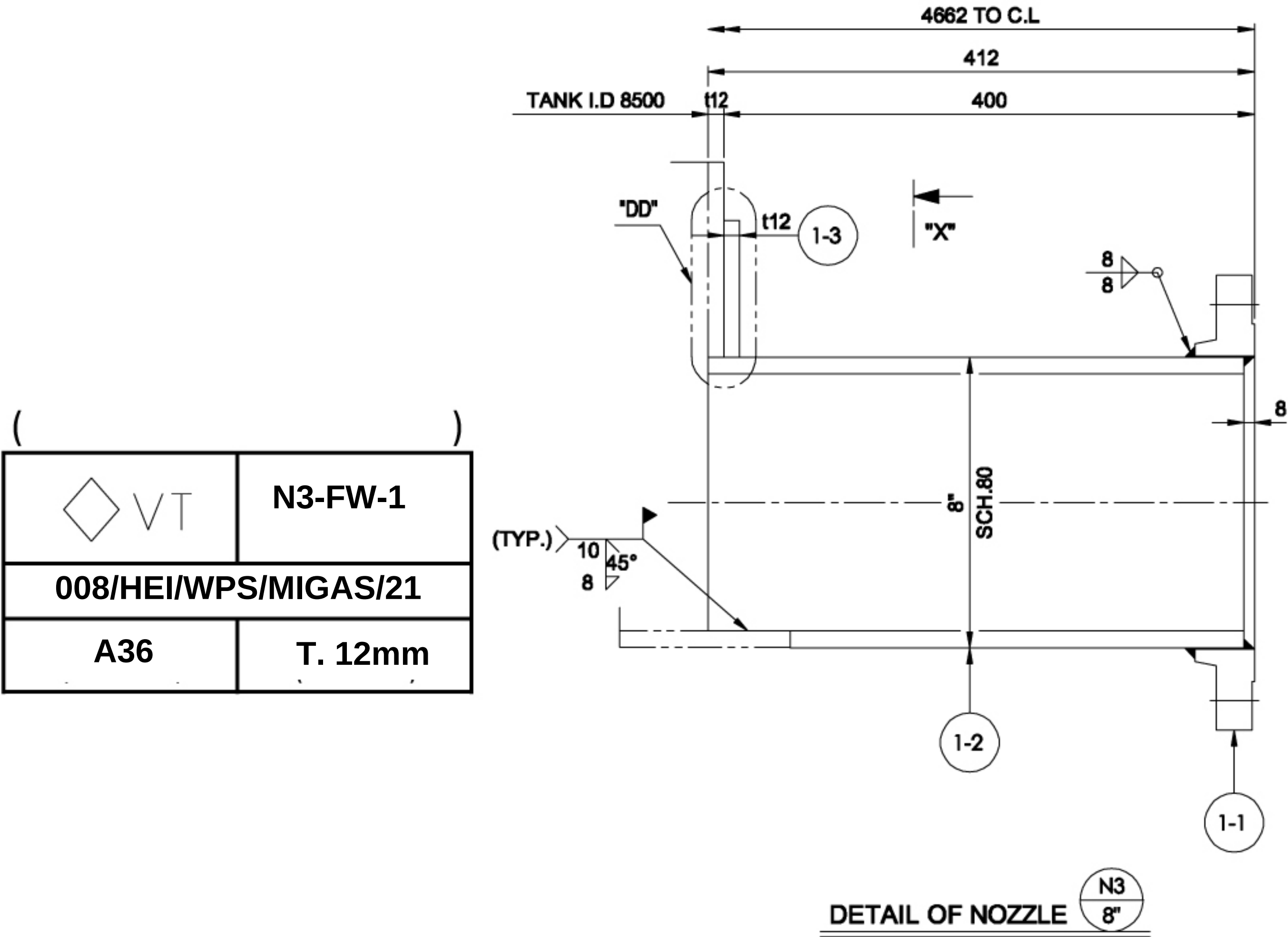
MATERIAL SPECIFICATION		LEGEND :		File name :				CHANGE BY CAD SYSTEM ONLY				Sheet No./Total sheets		4/8															
NOZZLE PIPE		A53		WPS NO : 006/HEI/WPS/MIGAS/20		GTAW & SMAW		P1 to P1		REV		DATE		APPR		1		2		Deviation for dimensions without indication of tolerance in mm 1) cutting + non cutting machining 2) WELDMENT conecting + forging		DATE		SIGN		PT. HANAZONO Engineering Indonesia We are always partner with you			
								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	
																								REFER DWG NO.				: E2502-4420-TK-101	
																						Scale :		NTS		WPS Map No.			
																								E2502-WMAP-PBY-001		REV.			



-  RT (SPOT)
 UT 10%
 DPT 10%
 MPI 10%
 VT VISUAL 100

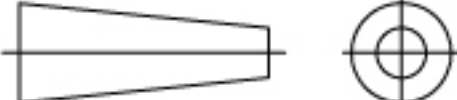
MATERIAL SPECIFICATION			LEGEND :			File name :			CHANGE BY CAD SYSTEM ONLY					Sheet No./Total sheets		5/8									
PLATE FLANGE SIDE WALL BOX BTM. WALL BOX DOWNCOMER PIPE A36 A36 A36 A106			WPS NO : 006/HEI/WPS/MIGAS/20 008/HEI/WPS/MIGAS/21 GTAW & SMAW SMAW P1 to P1 P1 to P1			REV		DATE		APPR		1		2		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>			
						0		29/09/25										DRAFT						BENRIDHO	
																		CHECK						RUSNANDI	
																		APPR							
																				Scale :				NTS	
								Name WELDING MAP LEACH TANK										WPS Map No. E2502-WMAP-PBY-001		REV. 					

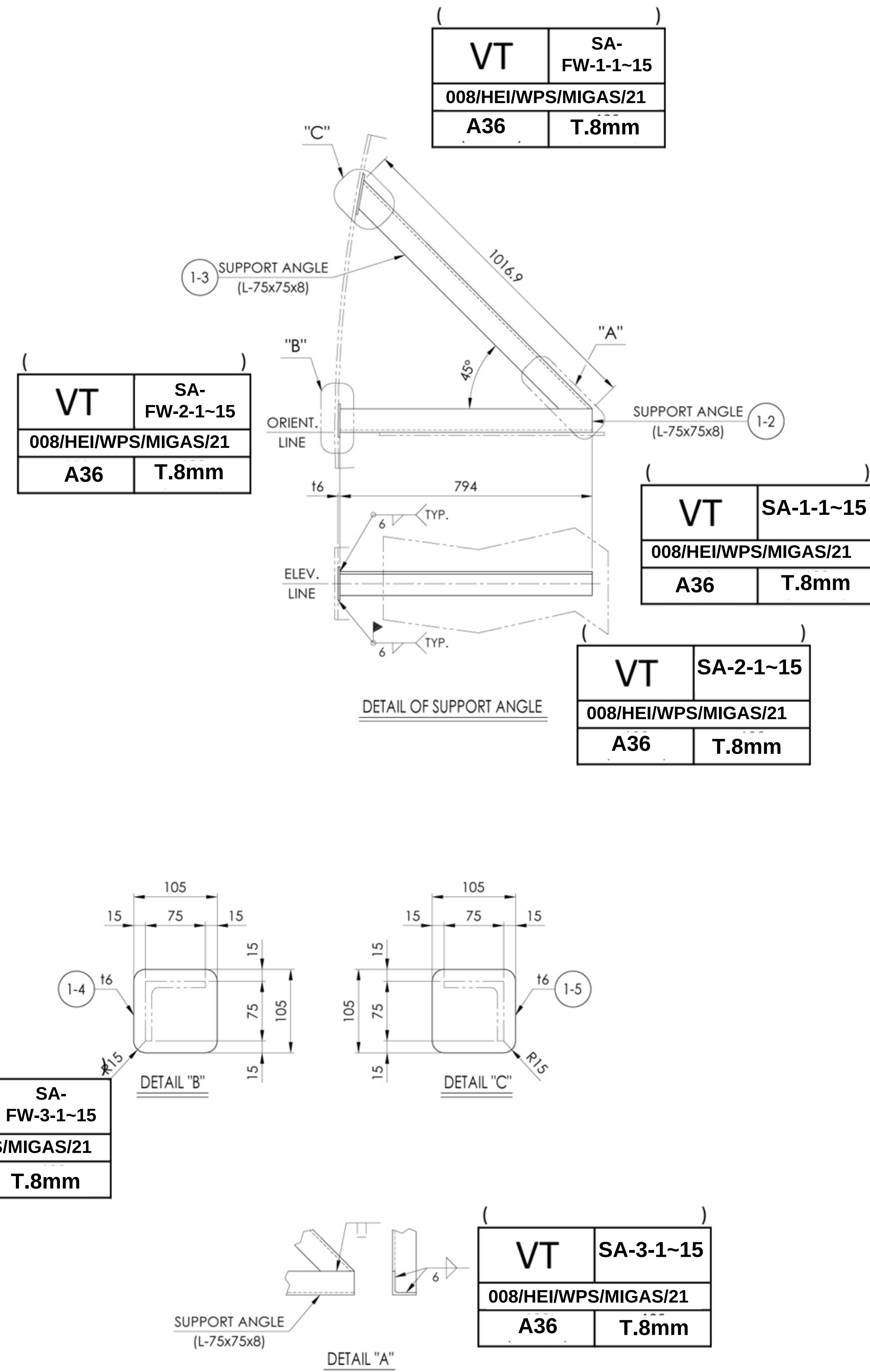
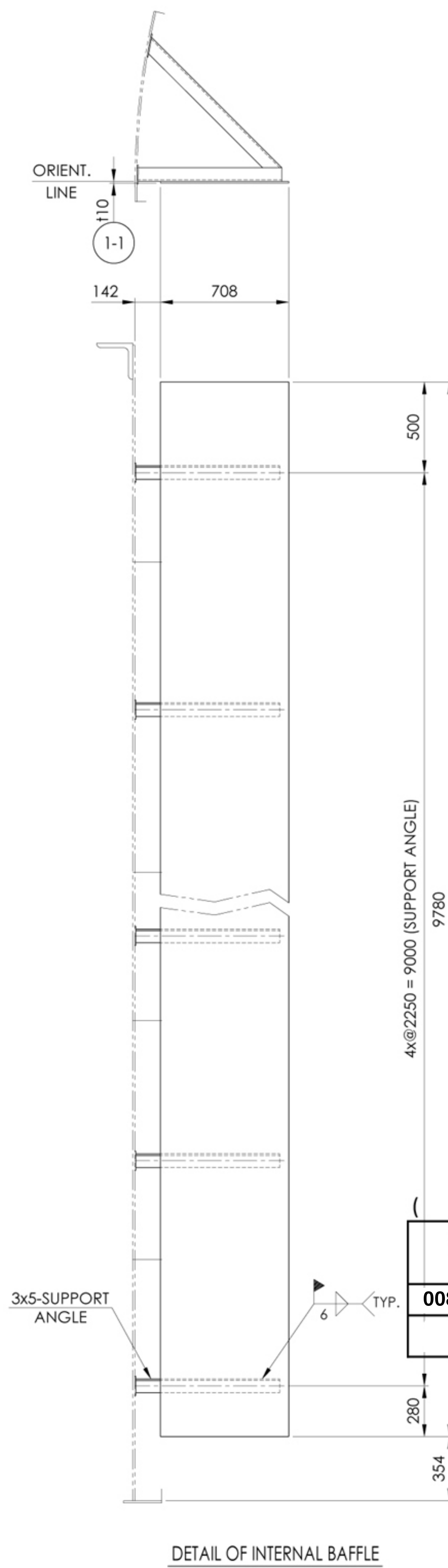
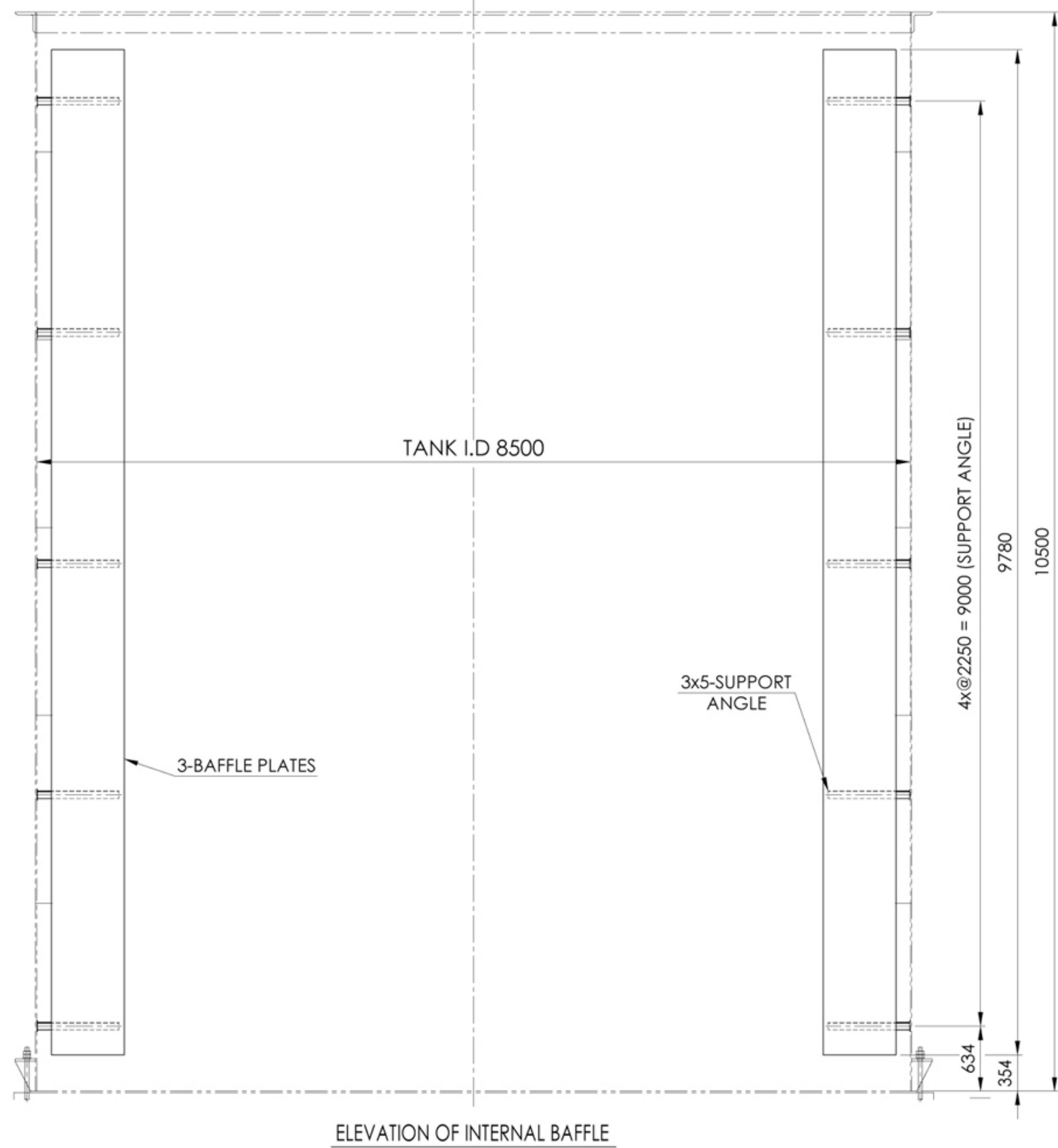
- GENERAL NOTES :
- BOLT HOLE ORIENTATION
BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
 - WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
 - LIQUID PENETRANT
LIFTING LUG AND REMOVING OF JIG
NOZZLE ATTACHMENT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



NDE METHOD SYMBOL

- RT (SPOT) (S)
- ▽ UT 10%
- DPT 10%
- ◇ MPI 10%
- VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :	File name :		CHANGE BY CAD SYSTEM ONLY							Sheet No./Total sheets 6/8				
SHELL A36		WPS NO :008/HEI/WPS/MIGAS/21 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	Size of memory			
			0	29/09/25						DRAFT		BENRIDHO	 PT. HANAZONO Engineering Indonesia <i>We are always partner with you</i>			
										CHECK		RUSNANDI				
										APPR			JOB NO. : E2502			
										Scale : NTS			DESIGN FOR PRODUCT : POBOYA 2000 TPD EXPANSION			
													TAG NO./LINE NO. : LEACH TANK			
													REFER DWG NO. : E2502-4420-TK-101			
					Name WELDING MAP LEACH TANK								WPS Map No. E2502-WMAP-PBY-001		REV. 	



The diagram illustrates the components of a welding symbol and their associated labels:

- NDE Method Applicable:** Points to the top left of the symbol.
- Welding Mark & No.:** Points to the top right of the symbol, specifically to the text "CNI-1".
- (Date Welding):** Points to the top center of the symbol, specifically to the text "(10/10/2010)".
- WPS Applicable:** Points to the bottom left of the symbol, specifically to the text "WPS-A001".
- Material Spec.:** Points to the bottom center of the symbol.

The welding symbol itself is a rectangular box divided into four quadrants:

- Top Left:** Contains a triangle and a circle.
- Top Right:** Contains the text "CNI-1".
- Bottom Left:** Contains the text "WPS-A001".
- Bottom Right:** Is empty.

 RT (SPOT) (S)
 UT 10%
 DPT 10%
 MPI 10%
 VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :		File name :		CHANGE BY CAD SYSTEM ONLY				Sheet No./Total sheets 7/8	
ANGLE 75x75x8		WPS NO :008/HEI/WPS/MIGAS/21 SMAW P1 to P1		REV		DATE		APPR		Size of memory	
				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. : E2502-4420-TK-101	
										Scale : NTS WPS Map No. : E2502-WMAP-PBY-001	
										Name : WELDING MAP LEACH TANK REV. : 	
											

0