NDE PROCEDURE With NDE 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-007**

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	

CPM PT Citra Palu Minerals

REV	DATE ISSUED	ISSUE PURPOSE	PREPARE	CHECKED	APPROVED	AUTHORIZED
C	April 10, 2026	Issue For Approval	Benridho	Rusnandi	Murasato	
B	Desember 30, 2025	Issue For Approval	Benridho	Rusnandi	Murasato	
A	December 02, 2025	Issue For Approval	Benridho	Rusnandi	Murasato	

Revision History

REV. No.	DATE	DESCRIPTION	REVISION BY
A	Dec 02, 2025	First Issue	BR
B	Dec 30, 2025	Add Radiography at NDE MAP	BR
C	April 10, 2026	Change of NDE Company	BR

CONTENTS

PAGE

1. LIQUID PENETRANT EXAMINATION PROCEDURE

NDT PROCEDURE
PENETRANT TESTING (API 560)
DOCUMENT NO. ACM-P-NDT-PT01-API650 REV: 00

Prepared By	Reviewed By	Reviewed and Approved By
		
Name: Taqwim Achsananto	Name: Bagus Tri Atmoyo	Name: Mondera Amir
Position: NDT Lev II	Position: Director	Position: ASNT NDT Lev III (Cert No 336574)
Date: 06 April 2026	Date: 06 April 2026	Date: 06 April 2026

Revision Status

Revision No.	Effective Date	Description / Summary of Revision
00	06 April 2026	Initial Issue

Contents

1. PURPOSE

1.1. The purpose of this procedure is to establish the requirements for liquid penetrant testing of metallic materials.

1.2. This procedure provides a system of general conditions and specific instructions as an aid to qualified personnel required to perform penetrant inspection.

1.3. This Procedure is applicable for the temperature of test surface shall be 40 ℉ – 125 ℉ (5 ° - 52 ℃)

2. SCOPE

2.1. This procedure gives the methods, techniques, quality, and reporting requirements necessary for the liquid penetrant inspection of materials using the solvent removable colour contrast method / fluorescent method.

2.2. This procedure covers the liquid penetrant inspection of non-porous ferrous and non- ferrous metallic materials including fusion welded butt joints in plate and pipe welds.

2.3. This is the Company approved procedure and shall be adhered to at all times except where the Client or Contract Document specifies other requirements.

3. REFERENCES

3.1. ASME SEC V: 2023 article 1, 6 & 24 - Nondestructive Examination

3.2. ASME VIII, Division 1: 2023 - Rules for the Construction of Pressure Vessels

3.3. ASME VIII, Division 2: 2023- Rules for the construction of pressure vessels- Alternative rule

3.4. ASTM E165:2012 – Standard Practice for Liquid penetrant examination

3.5. API 650:2020 – Welded Tank for Oil Storage.

3.6. SHELL DEP 34.51.01.33_Spec_2017-02_A01 – Field Erected Above Ground Vertical Storage Tanks

4. RESPONSIBILITIES

4.1 The Director / General Manager shall be responsible for ensuring that the necessary resources are available for the requirements of this procedure to be carried out.

4.2 Operations Management shall be responsible for ensuring that the requirements of this procedure are fully implemented at all times.

4.3 Employees involved in the implementation of this procedure shall be responsible for adherence to the requirements stated within.

4.4 The NDT Coordinator/ Team Leader shall

a. Provide the guidance for NDT Personnel at all the Levels
b. Interface daily with the client/ contractor about work priorities and progress of project
c. Actively Participate in client programs, planning and strategy sessions
d. Work closely with Client to identify and remove obstacles
e. Actively Participate with client safety initiatives. Incidents investigations etc.

4.5 The Responsibility of Level II shall be:

a. Set up, calibrate and verify equipment settings
b. Conduct tests to ensure quality or detect discontinuities (defects) using NDT methods of inspection.
c. Establish techniques for proper examination of objects under inspection, ensuring strict adherence to safety regulations.
d. Apply testing criteria in accordance with applicable specifications or standards and evaluate results.
e. Organize and report test results.
f. Perform other job, related tasks as assigned by management.
g. Interface daily with the contractors about work priorities and progress of projects
h. Actively participate in client safety initiatives, incident investigations, etc.
i. Advice any non-conformities identified.

4.6 The Responsibility of Level III shall be:

a. Establish, review for editorial and technical correctness and validate NDT instructions and procedures
b. Interpret codes, standards, specifications and procedures
c. Designate the particular test methods, techniques and procedures to be used, within the scope and limitations of any certification held
d. Manage in house personnel certifications.

5. DEFINITIONS

5.1 ACM – PT. AGUNG CIPTA MUTU INDONESIA

5.2 Client – Those companies, Organizations or Individuals to which ACM is contracted to provide Services.

5.3 Contract – The form of agreement for the provision of the Services to the Client by ACM.

5.4 Services – All things provided under the Contract including all activities to be carried out by the ACM for the client.

6. PROCEDURE INSTRUCTIONS

6.1 PERSONNEL QUALIFICATIONS

6.1.1 The NDT Inspector shall be trained, qualified and certified to a minimum NDT Level I or II, reference to SNT-TC-1 A, “Recommended Practice for Non-Destructive Testing Personnel Qualification and Certification”, OR international equivalent, i.e., ISO 9712, PCN, CSWIP in the applicable NDT method.

6.1.2 The NDT Inspector possess NDT Level I, should work under the supervision of the NDT Level 2 or 3.

6.1.3 All the NDT personnel have vision to be able to read a jaeger Type 1 standard chart at a distance of not less than 300 mm (12 in.) and is capable of distinguishing and differentiating contrast between the colors used. Examiners shall be checked annually to ensure that they meet these requirements.

6.2 TESTING MEDIA

6.2.1 Testing media from a recognized manufacturer shall be used.

6.2.2 Recognized manufacturers include Nabakem, Magnaflux and Ardrox.

6.2.3 When nickel based alloys are to be examined, testing media are to be certified as containing less than one per cent (1%) sulphur.

6.2.4 When stainless steel are to be examined, testing media are to be certified containing less than one per cent (1%) chloride & fluoride.

6.2.5 All the chemicals from the same manufacturer, intermixing of the chemicals not acceptable.

6.3 INSPECTION PROCEDURE

6.3.1 Surface Preparation & Pre-cleaning:

a. All surfaces within 25mm of the area to be examined shall be free of grease, clean, dry, and free or irregularities which could mask, or be confused with, an indication. Blasting surfaces before liquid penetrant inspection shall be prohibited.
b. Only solvent-based cleaner and remover from an approved manufacturer/supplier shall be used for cleaning prior to penetrant inspection.
c. Drying of the pre-cleaned surfaces shall be accomplished by normal evaporation. A minimum of five (5) minutes shall be allowed before applying the penetrant.
d. The temperature of the surface being examined shall be within the range of 5° to 52° C throughout the examination period.
e. Surface preparation by grinding, machining or other method may be necessary where surface irregularities could mask indications.

6.3.2 Application of Dye Penetrant.

a. The penetrant shall be applied to the surface being examined.
b. The area being examined shall be maintained wet with the penetrant for a minimum of five (5) minutes dwell time.
c. The penetrant may be applied by brushing or spraying.

6.3.3 Excess Penetrant Removal

a. After the prescribed dwell time, the excess penetrant shall be removed, insofar as possible, by using wipes of clean, lint-free material, repeating the operation until most traces of penetrant have been removed.

b. Using a lint-free material, slightly moistened with solvent, wipe the surface until all remaining traces of excess penetrant have been removed.
c. Should the wiping step is not effective as evidenced by difficulty in removing excess penetrant, clean the part and repeat the cleaning and application of penetrant step.
d. Directly spraying the surface with the solvent following the application of penetrant and prior to developing is prohibited.
e. To minimize the removal of penetrant care shall be taken to avoid the use of excessive solvent.

6.3.4 Drying & Application of Developer (Non-Aqueous)

a. Dry the surface following solvent wipe-off of excess penetrant by normal evaporation within 2 to 5 minutes.
b. Prior to developer application, the developer shall be thoroughly agitated to ensure adequate dispersion of suspended particles.
c. Non-aqueous developer shall only be applied on dry surface by spraying and normal evaporation dry.
d. Developer shall be applied, as a thin even film, from a distance of not less than 30cm from the test surface and thick enough to provide a contrasting background.

6.3.5 Development & Inspection

a. Examination should begin as the developer is being applied and shall continue for a minimum of seven (7) minutes after the developer appears dry (i.e. solvent carriers have evaporated).
b. If bleed-out does-not alter the inspection results, development periods of up to thirty (30) minutes are permitted.
c. The inspected area shall be free from interfering debris.
d. Viewing conditions for colour contrast method- the area under inspection shall be illuminated by daylight or artificial light from either a normal tungsten filament lamp or a fluorescent tube, to a level of illumination not less than 1076 lux so as to enable a proper evaluation to be made of the indications revealed. The viewing conditions shall be such that no glare will be experienced during inspection on the component. The light intensity shall be verified by a calibrated light meter.
e. Viewing condition for fluorescent method, it shall be performed in a darkened area. Examiners shall be in a darkened area for at least 5 min prior to performing examinations to enable their eyes to adapt to dark viewing. Glasses or lenses worn by examiners shall not be photochromic or exhibit any fluorescence. Black (UV-A) lights shall achieve a minimum of 1000µW/cm^2 on the surface of the part being examined throughout the examination and white light is limited to 20lux. The black light intensity shall be verified by a calibrated radiometer
f. In those cases, where residual penetrant or developer could interfere with subsequent processing or with service requirements, post cleaning is required. It is particularly important where residual penetrant inspection materials might combine with other factors in service to produce corrosion or interfere with welding operations.
g. Solvent-based remover/cleaner shall be used for post inspection cleaning. The cleaner can be directly sprayed to component for post cleaning.

Final interpretation shall be made not less than 10 min nor more than 60 min after the requirements of T-675.3 in ASME Sec. V Article 6(Developing Time) are satisfied

6.4 EVALUATION OF INDICATIONS

6.4.1 All indications shall be investigated to the extent that the Inspector can evaluate such indications in terms of the applicable acceptance criteria.

- As a guide, this can be achieved by using either a fluorescent tube of 8OW at a distance of approximately 1m or a tungsten filament pearl lamp of 100W at a distance of approximately 0.2m.

6.4.2 Relevant indications are those which result from mechanical discontinuities. Such indications include.

- Cracks.
- Linear indications – those indications in which the length is more than three times the width.
- Rounded indications or indications which are circular or elliptical with the length less than three times the width.

6.4.3 Non-relevant indications include:

- Localized surface imperfections, such as may occur from machining marks or surface conditions. These are not relevant to the detection of unacceptable discontinuities and shall not be reported.

6.4.4 Any questionable or doubtful indications shall be retested to verify that actual discontinuities are present

6.5 ACCEPTANCE STANDARDS

6.5.1 The acceptance standards for the interpretation of items inspected shall be Client requirements or the Contract Document.

6.5.2 The acceptance/ rejection criteria and evaluations of all indications shall be in accordance to the appropriate codes, Shell's DEP, API-650, ASME Sec V Article 6, or ASME Sec VIII Div. 1 Appendix 8 (See the attachment 7.3)

6.6 EXAMINATION OF REPAIRS

6.6.1 Repairs shall be re-examined by the same procedure used for the original examination.

6.7 POST INSPECTION CLEANING

6.7.1 When required, post inspection cleaning shall be accomplished by removal of residual penetrant materials by flushing with solvent then finally wiping with rags.

6.8 REPORTING

6.8.1 Reporting requirements will be as specified by the Client or the Contract Document.

6.8.2 Compilation of report shall be according but not limited to the following:

(a) Job Order Card (if applicable)
(b) Client Information (if applicable)
(c) Inspection Report (See the attachment 7.2)

6.9 SAFETY

6.9.1 Care shall be exercised during inspection with due regard to the fact that penetrant materials may have relatively toxic and flammable properties. Manufacturer's Material Safety Data Sheets shall be referred to and familiarized with the precautions in handling, use and first aids requirements before usage.

6.9.2 Manufacturer's recommendations shall be followed at all times.

6.9.3 Smoking is prohibited while performing liquid penetrant inspection.

6.9.4 Controlled conditions shall be established for correct disposal of pressurized aerosol cans.

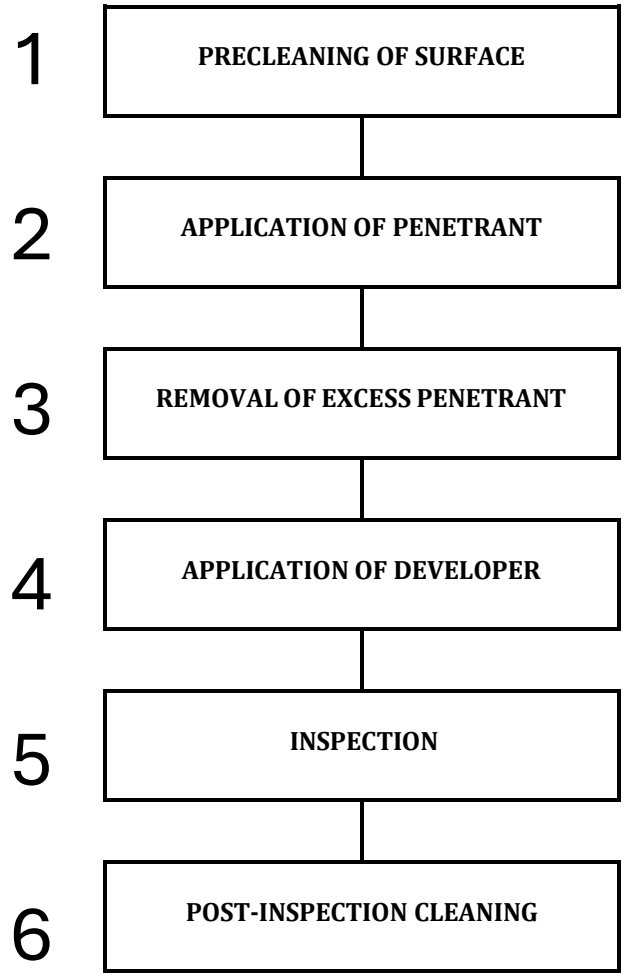
6.9.5 When using UV-A Source, care shall be taken to ensure that unfiltered radiation from UV-A source does not directly reach the eyes of the operators. Do not use the UV-A source if the filter is broken and loose. Cracked or broken reflectors, filters, glasses, or lenses shall be replaced immediately.

7. ATTACHMENT

7.1 PROCESS FLOW CHART
7.2 INSPECTION REPORT
7.3 ACCEPTANCE CRITERIA

ATTACHMENT 7.1

PROCESS FLOW CHART



ATTACHMENT 7.2
Report Format

PT. AGUNG CIPTA MUTU INDONESIA

DYE PENETRANT INSPECTION REPORT

Client	:	**Report No.**	:
Project	:	**RFI No.**	:
Contract No.	:	**Test Date**	:
Location	:	**Page No.**	: of

PROCEDURE No. :	**APPLICABLE CODES :**	**ACCEPTANCE CRITERIA :**

Inspection Method	: ☐ Color Contrast	☐ Fluorescent	Light Intensity	:
Type	: ☐ Solvent Removable	☐ Water Washable	Light Source	:
Penetrant Application		☐ Brushing	Testing Temperature	:
Developer Type		☐ Dry	Dwell Time	:
Chemical Brand	:		Developing Time	:
Penetrant	:	Cleaner :	Interpretation Time	:
Developer	:	Remover :		

Surface Preparation	: ☐ As Welded	☐ As Grinded	☐ After Machined	☐ Other : -	
Stage of Examination	: ☐ After Welding	☐ After PWHT	☐ After Hydrotest	☐ After Repair	☐ Back Gouging
Scope of Examination	: ☐ Base Material	☐ Weld Part	☐ Edge Preparation		
Material	:		Welding Process :		
Drawing/Weld Map No.	:				

RESULT

No.	Joint No.	Welder ID	Dimension (mm)	Discontinuities			Result	Remarks
				Defect Type	Length (mm)	Loc. From 0 Datum		

Note :

Legend :

L	: Linear Indication		ACC	: Accepted	
NL	: Non Linear Indication		REJ	: Rejected	
CR	: Crack		NRI	: Non Relevant Indication	

Examined By :	Reviewed & Approved By NDT Level III	Contractor	Client	3rd Party
Name : Date :	Name : Date :	Name : Date :	Name : Date :	Name : Date :

WB-TR-001 Rev.1 Dye Penetrant Inspection Report

ATTACHMENT 7.3

Acceptance Criteria ASME Sec VIII Div. 1 Appendix 8

MANDATORY APPENDIX 8
METHODS FOR LIQUID PENETRANT EXAMINATION (PT)

NOTE: Satisfactory application of this method of examination requires special skills in the techniques involved and in interpreting the results. The requirements specified herein presume application by suitably experienced personnel.

8-1 SCOPE

(a) This Appendix describes methods which shall be employed whenever liquid penetrant examination is specified in this Division.

(b) Section V, Article 6 shall be applied for detail requirements in methods and procedures, unless otherwise specified within this Appendix.

(c) Liquid penetrant examination shall be performed in accordance with a written procedure, certified by the Manufacturer to be in accordance with the requirements of Section V, Article 1, T-150.

(d) Documentation showing that the required examinations have been performed and that the results are acceptable shall be made available to the Inspector.

8-2 CERTIFICATION OF COMPETENCY OF NONDESTRUCTIVE EXAMINATION PERSONNEL

The manufacturer shall certify that each liquid penetrant examiner meets the following requirements.

(a) He has vision, with correction if necessary, to enable him to read a Jaeger Type No. 2 Standard Chart at a distance of not less than 12 in. (300 mm), and is capable of distinguishing and differentiating contrast between colors used. These requirements shall be checked annually.

(b) He is competent in the techniques of the liquid penetrant examination method for which he is certified, including making the examination and interpreting and evaluating the results, except that, where the examination method consists of more than one operation, he may be certified as being qualified only for one or more of these operations.

8-3 EVALUATION OF INDICATIONS

An indication of an imperfection may be larger than the imperfection that causes it; however, the size of the indication is the basis for acceptance evaluation. Only indications with major dimensions greater than $^{1}/_{16}$ in. (1.5 mm) shall be considered relevant.

(a) A linear indication is one having a length greater than three times the width.

(b) A rounded indication is one of circular or elliptical shape with the length equal to or less than three times the width.

(c) Any questionable or doubtful indications shall be reexamined to determine whether or not they are relevant.

8-4 ACCEPTANCE STANDARDS

These acceptance standards shall apply unless other more restrictive standards are specified for specific materials or applications within this Division.

All surfaces to be examined shall be free of:

(a) relevant linear indications;

(b) relevant rounded indications greater than $^{3}/_{16}$ in. (5 mm);

(c) four or more relevant rounded indications in a line separated by $^{1}/_{16}$ in. (1.5 mm) or less (edge to edge).

8-5 REPAIR REQUIREMENTS

Unacceptable imperfections shall be repaired and reexamination made to assure removal or reduction to an acceptable size. Whenever an imperfection is repaired by chipping or grinding and subsequent repair by welding is not required, the excavated area shall be blended into the surrounding surface so as to avoid sharp notches, crevices, or corners. Where welding is required after repair of an imperfection, the area shall be cleaned and welding performed in accordance with a qualified welding procedure.

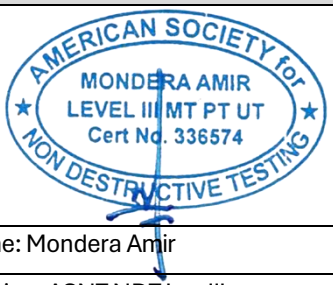
(a) Treatment of Indications Believed Nonrelevant. Any indication which is believed to be nonrelevant shall be regarded as an imperfection unless it is shown by reexamination by the same method or by the use of other nondestructive methods and/or by surface conditioning that no unacceptable imperfection is present.

(b) Examination of Areas From Which Defects Have Been Removed. After a defect is thought to have been removed and prior to making weld repairs, the area shall be examined by suitable methods to ensure it has been removed or reduced to an acceptably sized imperfection.

(c) Reexamination of Repair Areas. After repairs have been made, the repaired area shall be blended into the surrounding surface so as to avoid sharp notches, crevices, or corners and reexamined by the liquid penetrant method and by all other methods of examination that were originally required for the affected area, except that, when the depth of repair is less than the radiographic sensitivity required, reradiography may be omitted.

2. MAGNETIC PARTICLE EXAMINATION PROCEDURE

NDT PROCEDURE
MAGNETIC PARTICLE TESTING (API 650)
DOCUMENT NO. ACM-P-NDT-MT-01-API650 REV: 00

Prepared By	Reviewed By	Reviewed and Approved By
		
Name: Taqwim Achsananto	Name: Bagus Tri Atmoyo	Name: Mondera Amir
Position: NDT Lev II	Position: Director	Position: ASNT NDT Lev III (Cert No 336574)
Date: 06 April 2026	Date: 06 April 2026	Date: 06 April 2026

Revision Status

Revision No.	Effective Date	Description / Summary of Revision
00	06 April 2026	Initial Issue

Contents

1. PURPOSE

1.1 The purpose of this procedure is to establish the requirements for magnetic particle inspection of ferromagnetic materials.

2. SCOPE

2.1 This procedure gives the methods, techniques, quality, and reporting requirements necessary for the magnetic particle inspection of ferromagnetic materials using fluorescent (refer Clause 6.5)/ Black magnetic Particle (refer Clause 6.4).

2.2 This procedure covers the magnetic particle inspection of ferromagnetic materials including fusion welded butt joints in plate and pipe welds, using the magnetic flow technique with A.C /DC. electromagnet and Permanent magnet yoke.

2.3 This procedure provides a system of general conditions and specific instructions as an aid to qualified personnel required to perform magnet particle inspection, using A.C/D.C Electromagnet and permanent magnet yokes.

2.4 This is the company approved procedure and shall be adhered to at all times except where the Client or Contract specifies other requirements.

3. REFERENCES

3.1 ASME Section V: 2023 - Article 1, 7– Nondestructive Examination

3.2 ASME VIII, Division 1: 2023 - Rules for the Construction of Pressure Vessels

3.3 ASME VIII, Division 2: 2023- Rules for the construction of pressure vessels- Alternative rule

3.4 ASTM E709: 2021 - Standard Guide for Magnetic Particle Examination

3.5 SNT – TC – 1A – ASNT Recommended Practice for Qualification and Certification Personnel, 2024 Edition.

3.6 API 650: 2020 - Welded Steel Tank used for fuel Storage Inspection, Repair, Alteration & Reconstruction

3.7 SHELL DEP 34.51.01.33_Spec_2017-02_A01 – Field Erected Above Ground Vertical Storage Tanks

4. RESPONSIBILITIES

4.1 The Director / General Manager shall be responsible for ensuring that the necessary resources are available for the requirements of this procedure to be carried out.

4.2 Operations Management shall be responsible for ensuring that the requirements of this procedure are fully implemented at all times.

4.3 Employees involved in the implementation of this procedure shall be responsible for adherence to the requirements stated within.

4.4 The NDT Coordinator / Team Leader shall

a. Provide guidance for NDT personnel at all levels.
b. Interface daily with the client / contractors about work priorities and progress of projects
c. Actively participate in client programs, planning and strategy sessions
d. Work closely with client to identify and remove obstacles
e. Actively participate in client safety initiatives, incident investigations, etc.

4.5 The Responsibility of Level II shall be:

a. Set up, calibrate and verify equipment settings
b. Conduct tests to ensure quality or detect discontinuities (defects) using NDT methods of inspection.
c. Establish techniques for proper examination of objects under inspection, ensuring strict adherence to safety regulations.
d. Apply testing criteria in accordance with applicable specifications or standards and evaluate results.
e. Organize and report test results.
f. Perform other job related tasks as assigned by management.
g. Interface daily with the contractors about work priorities and progress of projects
h. Actively participate in client safety initiatives, incident investigations, etc.
i. Advice any non-conformities identified.

4.6 The Responsibility of Level III shall be:

a. Establish, review for editorial and technical correctness and validate NDT instructions and procedures
b. Interpret codes, standards, specifications and procedures
c. Designate the particular test methods, techniques and procedures to be used, Within the scope and limitations of any certification held
d. Manage in house personnel certifications

4.7 SAFETY

a. Care shall be exercised during inspection with due regard to the fact that the inspection media may have relatively toxic and flammable properties.
b. Manufacturer's recommendations shall be followed at all times.

c. Smoking is prohibited while performing magnetic particle inspection.

d. Controlled conditions shall be established for correct disposal of pressurized aerosol cans.

e. Suitable precautions should be taken when using electrical equipment to avoid arcing, sparking or localized over-heating.

f. When using UV-A Source, care shall be taken to ensure that unfiltered radiation from UV-A source does not directly reach the eyes of the operators. Do not use the UV-A source if the filter is broken and loose. Cracked or broken reflectors, filters, glasses, or lenses shall be replaced immediately.

5. DEFINITIONS

5.1 ACM – PT. AGUNG CIPTA MUTU INDONESIA

5.2 Client – Those companies, Organizations or Individuals to which the ACM is contracted to provide Services.

5.3 Contract – The form of agreement for the provision of the Services to the Client by the ACM.

5.4 Services – All things provided under the Contract including all activities to be carried out by the ACM for the client.

6. PROCEDURE

6.1 PERSONNEL QUALIFICATIONS

6.1.1 The NDT Inspector shall be trained, qualified and certified to a minimum ASNT (third party) Level II, reference to SNT-TC-1A, ‘‘Recommended Practice for Non-Destructive Testing Personnel Qualification and Certification’’, OR international equivalent, i.e., ISO 9712, PCN, CSWIP in the applicable NDT method.

6.1.2 All the NDT personnel have vision to be able to read a jaeger Type 1 standard chart at a distance of not less than 300 mm (12 in.) and is capable of distinguishing and differentiating contrast between the colors used. Examiners shall be checked annually to ensure that they meet these requirements.

6.2 EQUIPMENT AND TESTING MEDIA

6.2.1 An A.C. /DC electromagnet yoke or Permanent Magnet having a minimum lifting power of 4.5kg / 18kg (DC/permanent Magnet) of ferritic steel with the poles set at the intended test spacing shall be used.

6.2.2 However, for A.C./D.C. electromagnet Yoke use on as required basis, i.e. call – out basis, a magnetic lifting power function check shall be carried – out prior to use and documented using the same form as in 6.2.1 indicating the intended purpose. The yoke shall be calibrated in 180 days.

6.2.3 Testing media from a recognized manufacturer shall be used.

6.2.4 Recognized manufacturers include Nabakem, Hyperbd, Magnaflux and Chemetall or equivalent.

6.2.5 Magnetic field indicator and / Burmah Castrol strips.

6.2.6 White light meter/ Radiometer, shall be calibrated once in a year.

6.2.7 Residual Field Indicator, shall be calibrated once in a year.

6.3 PRELIMINARY EXAMINATION

6.3.1 Before the magnetic examination is conducted, examination of the surface shall be visually examined to locate the surface discontinuity.

6.4 INSPECTION PROCEDURE (Visible Color Contrast Magnetic Particle Method)

6.4.1 All surfaces within 25mm of the area to be examined shall be free of grease, clean, dry, and free of irregularities which could mask, or be confused with an indication.

6.4.1.1 Any coating on the surface need to be removed prior to magnetic particle examination.

6.4.1.2 All high strength steel welds shall be tested after 48 hours of completion of welding, all low strength steel welds shall be tested after 24 hours upon completion of welding. No welds be inspected prior to the minimum specified hours.

6.4.2 Only solvent-based cleaner and remover from an approved manufacturer shall be used for cleaning prior to application of the White contrast paint with black magnetic Ink or dry Magnetic particle.

6.4.3 Drying of the pre-cleaned surfaces shall be accomplished by normal evaporation. A minimum of five (5) minutes shall be allowed before applying of white contrast paint.

6.4.4 The temperature of the surface being examined shall not exceed 57°C throughout the examination period.

6.4.5 A Burmah Castrol Strip, or pie gauge shall be placed near the test area during the first test of the shift and three line indications shall be shown to ensure flux Direction.

6.4.6 White contrast paint shall be applied by Spraying, in controlled passes at a distance of 15 – 30 cm to give an opaque coating which provides adequate contrast with the test surface.

6.4.7 Adequate time will be allowed for the White Contrast paint to dry before examination.

6.4.8 Inspection shall be performed using the continuous method, that is the magnet is in place and operating whilst the magnetic ink is being applied by Spraying.

6.4.9 A Burmah Castrol Strip shall be placed aligned parallel with the direction of any discontinuities on the test surface.

6.4.10 The inspected area shall be considered to be not greater than the circle inscribed between the pole pieces.

6.4.11 The examination coverage shall be as below:

The contact spacing shall be within the range of 75mm up to 203mm.For the yoke method lateral examination area shall be limited to a maximum of ¼ of the contact spacing on either side of the shortest line between the contact spacing to ensure the area under the contact is examined.

For weld inspections, the weld and at least 25 mm of base material on each side of the weld shall be examined where possible.

Perform at least two (2) separate examinations on each area. During the second examination, the lines of magnetic flux shall be approximately perpendicular to those used during the first examination forming an “X” pattern.

All examination shall be conducted with sufficient field overlap at least 25mm to ensure 100% coverage at the required sensitivity"

6.4.12 The inspected area shall be free from interfering debris.

6.4.13 Viewing conditions

For Black magnetic ink -The area under inspection shall be illuminated by daylight or artificial light from either a normal tungsten filament lamp or a fluorescent tube, to a level of illumination not less than 1076 lux so as to enable a proper evaluation to be made of the indications revealed. The viewing conditions shall be such that no glare will be experienced during inspection of the component. The light intensity shall be verified by a calibrated light meter.

6.4.14 In those cases, where residual ink or paint could interfere with subsequent processing or with service requirements, post cleaning is required. It is particularly important where residual inspection materials might combine with other factors in service to produce corrosion or interfere with welding operations.

6.4.15 Solvent-based remover/cleaner shall be used for post inspection cleaning.

6.5 INSPECTION PROCEDURE (Fluorescent Magnetic Particle Method)

6.5.1 All surfaces within 25mm of the area to be examined shall be free of grease, clean, dry, and free of irregularities which could mask, or be confused with an indication.

6.5.1.1 Any coating on the surface need to be removed prior to magnetic particle examination.

6.5.1.2 All high strength steel welds shall be tested after 48 hours of completion of welding, all low strength steel welds shall be tested after 24 hours upon completion of welding. No welds be inspected prior to the minimum specified hours.

6.5.2 Only solvent-based cleaner and remover from an approved manufacturer shall be used for cleaning prior to application of the Fluorescent Magnetic Particle.

6.5.3 Drying of the pre-cleaned surfaces shall be accomplished by normal evaporation. A minimum of five (5) minutes shall be allowed.

6.5.4 The temperature of the surface being examined shall not exceed 57°C throughout the examination period.

6.5.5 A Burmah Castrol Strip, or pie gauge shall be placed near the test area during the first test of the shift and three line indications shall be shown to ensure flux Direction.

6.5.6 Inspection shall be performed using the continuous method, that is the magnet is in place and operating whilst the Fluorescent magnetic ink is being applied by Spraying.

6.5.7 A Burmah Castrol Strip shall be placed aligned parallel with the direction of any discontinuities on the test surface.

6.5.8 The inspected area shall be considered to be not greater than the circle inscribed between the pole pieces.

6.5.9 The examination coverage shall be as below:

The contact spacing shall be within the range of 75mm up to 203mm.For the yoke method lateral examination area shall be limited to a maximum of ¼ of the contact spacing on either side of the shortest line between the contact spacing to ensure the area under the contact is examined.

For weld inspections, the weld and at least 25 mm of base material on each side of the weld shall be examined where possible.

Perform at least two (2) separate examinations on each area. During the second examination, the lines of magnetic flux shall be approximately perpendicular to those used during the first examination forming an “X” pattern.

All examination shall be conducted with sufficient field overlap at least 25mm to ensure 100% coverage at the required sensitivity.

6.5.10 The inspected area shall be free from interfering debris.

6.5.11 Viewing conditions

For Fluorescent ink - The examination shall be performed in the darkened under the UV-A light with an irradiance not less than 1000μW/cm^2 and the white light shall not be more than 20 lux inside the inspection booth. The UV-A light intensity on the surface of the component being tested shall be verified using a calibrated radiometer.

The technician shall be in the darkened area for at least 5 minutes for dark adaptation before starting examination. He shall not wear photo sensitive glasses. Black light shall be warmed up for at least 5 minutes prior to measurement of intensity and performing job

6.5.12 In those cases, where residual ink or paint could interfere with subsequent processing or with service requirements, post cleaning is required. It is particularly important where residual inspection materials might combine with other factors in service to produce corrosion or interfere with welding operations.

6.5.13 Solvent-based remover/cleaner shall be used for post inspection cleaning.

6.6 EVALUATION OF INDICATIONS

6.6.1 All indications shall be investigated to the extent that the Inspector can evaluate such indications in terms of the applicable acceptance criteria.

6.6.2 Relevant indications are those which result from mechanical discontinuities. Such indications shall include the following:

- Cracks.
- Linear indications – those indications in which the length is more than three times the width.
- Rounded indications or indications which are circular or elliptical with the length less than three times the width.

6.6.3 Non-relevant indications include: -

- Localized surface imperfections, such as may occur from machining marks or surface conditions. These are not relevant to the detection of unacceptable discontinuities and shall not be reported.

6.6.4 Any questionable or doubtful indications shall be retested to verify whether or not actual discontinuities are present.

6.6.5 As a guide, the light intensity shall be achieved by using either a fluorescent tube of 8OW at a distance of approximately 1m or a tungsten filament pearl lamp of 100W at a distance of approximately 0.2m.

6.6.6 Broad area of particle accumulation which might mask indications from discontinuities are prohibited. Clean and reexamine such areas.

6.7 ACCEPTANCE STANDARDS

6.7.1 The acceptance standards for the interpretation of items inspected shall be Client requirements or the Contract Document.

6.7.2 If no Client requirements or Contract Document are available, the acceptance criteria shall be followed as per ASME Section VIII Div. 1, Appendix-6, Paragraphs 6-3, 6-4, and 6-5.

6.8 EXAMINATION OF REPAIRS

6.8.1 Repairs shall be re-examined by the same procedure used for the original examination.

6.9 POST INSPECTION CLEANING & DEMAGNETIZATION

6.9.1 When required, post inspection cleaning shall be accomplished to remove residual inspection materials by flushing with solvent then finally wiping with rags.

6.9.2 Demagnetization can be done by energizing the magnet and pulling away from the specimen (Implying Reverse the current /Reduce the field).

6.9.3 The residual magnetic field shall be verified with the residual field meter.

6.10 REPORTING

6.10.1 Reporting requirements shall be as specified by the Client or the Contract Document.

6.10.2 Sample report shall be submitted and reviewed by the client.

6.10.3 Compilation of report shall be according but not limited to the following:

(a) Job Order Card (if applicable)
(b) Client Information (if applicable)
(c) Inspection Report (See Attachment 7.3)

6.10.4 If the weld is rejected, the certified NDE Examiner shall mark the defective area to be repaired on the base metal near the rejected weld. He will generate a detailed sketch for rejectable indications.

7. ATTACHMENTS:

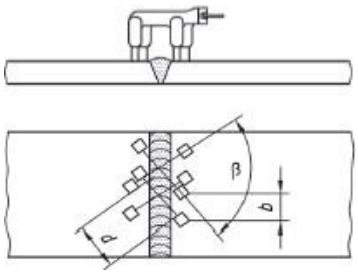
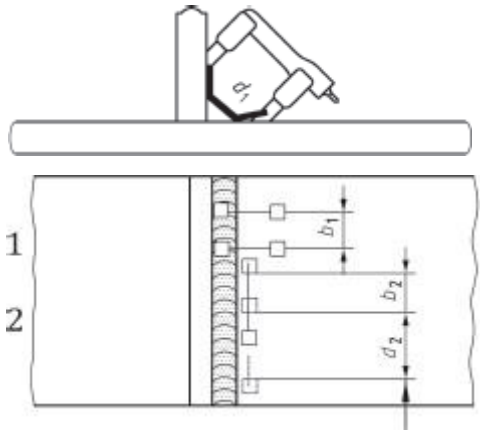
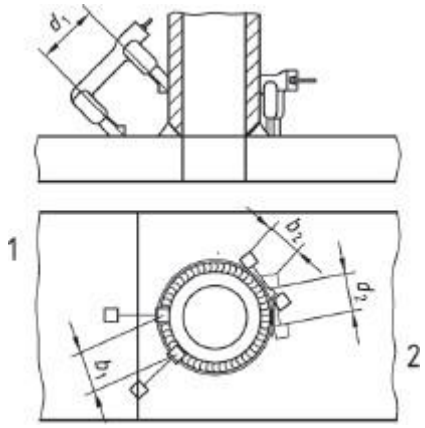
7.1 Typical Magnetizing techniques for Yoke Position

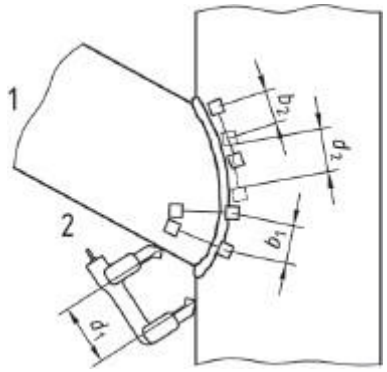
7.2 Acceptance Criteria ASME Sec VIII Div. 1 Appendix 6, Paragraphs 6-3, 6-4, and 6.5.

7.3 Report Format

ATTACHMENT 7.1

Typical Magnetizing techniques for Yoke Position

Typical Magnetizing Techniques for Yoke		
	Material Type *Ferromagnetic Material*	*Dimension in mm*
1		$d \geq 75$ $b \leq d/2$ $\beta \approx 90º$
2		$d_1 \geq 75$ $b_1 \leq d_1/2$ $b_2 \leq d_2 - 50$ $d_2 \geq 75$
3		$d_1 \geq 75$ $d_2 \geq 75$ $b_1 \leq d_1/2$ $b_2 \leq d_2 - 50$

4		$d_1 \geq 75$ $d_2 > 75$ $b_1 \leq d_1/2$ $b_2 \leq d_2 - 50$

ATTACHMENT 7.2

Acceptance Criteria ASME Sec VIII Div. 1 Appendix 6

MANDATORY APPENDIX 6
METHODS FOR MAGNETIC PARTICLE EXAMINATION (MT)

6-1 SCOPE

(a) This Appendix provides for procedures which shall be followed whenever magnetic particle examination is specified in this Division.

(b) Article 7 of Section V shall be applied for the detail requirements in methods and procedures, and the additional requirements specified within this Appendix.

(c) Magnetic particle examination shall be performed in accordance with a written procedure, certified by the Manufacturer to be in accordance with the requirements of T-150 of Section V.

(d) Documentation showing that the required examinations have been performed and that the results are acceptable shall be made available to the Inspector.

6-2 CERTIFICATION OF COMPETENCY FOR NONDESTRUCTIVE EXAMINATION PERSONNEL

The manufacturer shall certify that each magnetic particle examiner meets the following requirements:

(a) He/she has vision, with correction if necessary, to enable him/her to read a Jaeger Type No. 2 Standard Chart at a distance of not less than 12 in., and is capable of distinguishing and differentiating contrast between colors used. These requirements shall be checked annually.

(b) He/she is competent in the techniques of the magnetic particle examination method for which he/she is certified, including making the examination and interpreting and evaluating the results, except that where the examination method consists of more than one operation, he/she may be certified as being qualified only for one or more of these operations.

6-3 EVALUATION OF INDICATIONS

Indications will be revealed by retention of magnetic particles. All such indications are not necessarily imperfections, however, since excessive surface roughness, magnetic permeability variations (such as at the edge of heat affected zones), etc., may produce similar indications.

An indication of an imperfection may be larger than the imperfection that causes it; however, the size of the indication is the basis for acceptance evaluation. Only indications which have any dimension greater than $^{1}/_{16}$ in. (1.5 mm) shall be considered relevant.

(a) A linear indication is one having a length greater than three times the width.

(b) A rounded indication is one of circular or elliptical shape with a length equal to or less than three times its width.

(c) Any questionable or doubtful indications shall be reexamined to determine whether or not they are relevant.

6-4 ACCEPTANCE STANDARDS

These acceptance standards shall apply unless other more restrictive standards are specified for specific materials or applications within this Division.

All surfaces to be examined shall be free of:

(a) relevant linear indications;

(b) relevant rounded indications greater than $^{3}/_{16}$ in. (5 mm);

(c) four or more relevant rounded indications in a line separated by $^{1}/_{16}$ in. (1.5 mm) or less, edge to edge.

6-5 REPAIR REQUIREMENTS

The defect shall be removed or reduced to an imperfection of acceptable size. Whenever an imperfection is removed by chipping or grinding and subsequent repair by welding is not required, the excavated area shall be blended into the surrounding surface so as to avoid sharp notches, crevices, or corners. Where welding is required after removal of an imperfection, the area shall be cleaned and welding performed in accordance with a qualified welding procedure.

(a) Treatment of Indications Believed Nonrelevant. Any indication which is believed to be nonrelevant shall be regarded as an imperfection unless it is shown by reexamination by the same method or by the use of other nondestructive methods and/or by surface conditioning that no unacceptable imperfection is present.

(b) Examination of Areas From Which Imperfections Have Been Removed. After a defect is thought to have been removed and prior to making weld repairs, the area shall be examined by suitable methods to ensure it has been removed or reduced to an acceptably sized imperfection.

(c) *Reexamination of Repair Areas.* After repairs have been made, the repaired area shall be blended into the surrounding surface so as to avoid sharp notches, crevices, or corners and reexamined by the magnetic particle method and by all other methods of examination that were originally required for the affected area, except that, when the depth of repair is less than the radiographic sensitivity required, reradiography may be omitted.

ATTACHMENT 7.4
Report Format

PT. AGUNG CIPTA MUTU INDONESIA

MAGNETIC PARTICLE INSPECTION REPORT

Client	:	**Report No.**	:
Project	:	**Request No.:**	:
PO Number	:	**Test Date**	:
Contractor	:	**Page No.**	: of

PROCEDURE No. :	**APPLICABLE CODES :**	**ACCEPTANCE CRITERIA :**

MT Equipment	:	S/N No.	:	Calibration Weight	:
Current Type	:	Amperage	:	Sensitivity	:
Inspection Method	: ☐ Wet Visible	☐ Dry Visible	☐ Wet Fluorescent	Pole Spacing	:
	: ☐ Continuous	☐ Residual		Testing Temperature	:
Demagnetization	: ☐ Yes	☐ No		Light Intensity	:
Chemical Brand	:	Contrast Paint	:	Light Source	:
		Black Ink	:	Light meter S/N	:

Surface Preparation	: ☐ As Welded	☐ As Grinded	☐ After Machined	☐ Other :		
Stage of Examination	: ☐ After Welding	☐ After PWHT	☐ After Hydrotest	☐ After Repair	☐ Back Gouging	
Scope of Examination	: ☐ Base Material	☐ Weld Part	☐ Edge Preparation			
Material	:		Drawing No.	:		
Welding Process	:		Joint Type	:		

RESULT

No.	Joint No.	Line Class	Spool No.	Welder No.	Dimension (mm)	Discontinuities			Result	Remarks
						Defect Type	Length (mm)	Loc. From 0 Datum		

Note :

Legend :

L	: Linear Indication	ACC	: Accepted
NL	: Non Linear Indication	REJ	: Rejected
CR	: Crack	NRI	: Non Relevant Indication

Examined By :	Reviewed & Approved By NDT Level III	Contractor	Client	3rd Party
Name : Date :	Name : Date :	Name : Date :	Name : Date :	Name : Date :

WB-TR-002 Rev.1 Magnetic Particle Inspection Report

3. ULTRASONIC EXAMINATION PROCEDURE

NDT PROCEDURE
ULTRASONIC TESTING (API 560)
DOCUMENT NO. ACM-P-NDT-UT01-API 650 REV: 00

Prepared By	Reviewed By	Reviewed and Approved By
		
Name: Muhammad Septiyansyah Putra	Name: Bagus Tri Atmoyo	Name: Mondera Amir
Position: NDT Lev II	Position: Director	Position: ASNT NDT Lev III (Cert No 336574)
Date: 06 April 2026	Date: 06 April 2026	Date: 06 April 2026

Revision Status

Revision No.	Effective Date	Description / Summary of Revision
00	06 April 2026	Initial Issue

Contents

1. PURPOSE

1.1 The purpose of this procedure is to establish the requirements for the detection of defects and corrosion in welds & other product forms *(plates, pipe, forged components, cast material etc.)* using ultrasonic testing.

1.2 This procedure provides a system of general conditions and specific instructions as an aid to qualified personnel required to perform ultrasonic inspection.

2. SCOPE

2.1 This procedure gives the methods, techniques, quality, and reporting requirements necessary for the ultrasonic testing of welds using the ultrasonic pulse-echo technique.

2.2 This procedure covers the ultrasonic testing of structural and piping welds inclusive of the parent metal, weld metal and heat affected zone with angle and normal beam, and parent metal for lamination with normal beam.

2.3 This is the Company approved procedure and shall be adhered to at all times except where the Client or Contract specifies other requirements.

3. DEFINITIONS

3.1 ACM – PT. AGUNG CIPTA MUTU INDONESIA

3.2 Client – Those Companies, Organizations or Individuals to which the ACM is contracted to provide Services.

3.3 Contract – The form of agreement for the provision of the Services to the Client by the ACM.

3.4 Services – All things provided under the Contract including all activities to be carried out by the ACM for the client.

4. REFERENCES

4.1 ASME SEC V Article 4: 2023 - Boiler and pressure Vessel Code section for Non-destructive Examination

4.2 ASME VIII: 2023 Division. 1, 2 - Rules for the Construction Boiler and Pressure Vessels

4.3 ASME IX: 2023 - Qualification Standard for Welding and Brazing Procedures, Welders, Brazers and Welding Brazing Operators

4.4 SNT – TC – 1A - ASNT Recommended Practice for Qualification and Certification Personnel, 2024 Edition.

4.5 API 650: 2020 - Welded Steel Tank used for fuel Storage Inspection, Repair, Alteration & Reconstruction

4.6 SHELL DEP 34.51.01.33_Spec_2017-02_A01 - Field Erected Above Ground Vertical Storage Tanks

5. RESPONSIBILITIES

5.1 The Director / General Manager shall be responsible for ensuring that the necessary resources are made available for the requirements of this procedure to be carried out in a safe manner.

5.2 Department head shall be responsible for ensuring that the requirements of this procedure are fully implemented at all times.

5.3 All employees involved in the implementation of this procedure shall be responsible for adherence to the requirements stated within.

6. PROCEDURE INSTRUCTIONS

6.1 PERSONNEL QUALIFICATIONS

6.1.1 TRAINING, QUALIFICATION AND CERTIFICATION

6.1.1.1 *The NDT Inspector shall be trained, qualified and certified to a minimum of ASNT Level II in for the particular product forms (Welds, Casting..etc sectors)accordance with ASNT's SNT-TC-1A, "Recommended Practice for Non-Destructive Testing Personnel Qualification and Certification", or international equivalent, i.e., PCN or CSWIP Schemes in the applicable NDT method and other specific requirements of Client if any.*

6.2 EQUIPMENT

6.2.1 ULTRASONIC INSTRUMENT

6.2.1.1 Only pulse echo type ultrasonic flaw detectors which incorporate "A" scan CRT presentation *with direct contact coupling* shall be used.

6.2.1.2 The instrument shall be capable of fulfilling the following performance criteria

(a) Screen height linearity shall not exceed ± 5% deviation of full scale reading for all values from 20 to 80% full scale height.

(b) Amplitude control linearity shall be within the permissible tolerances as mentioned below.

Indication set at % of Full Screen	dB Control Change	Indication Limits % of Full Screen
80%	-6dB	35 to 45%
80%	-12dB	15 to 25%
40%	+6dB	65 to 95%
20%	+12dB	65 to 95%

The checks shall be carried out every 1 year for digital instruments & every 3 months for Analog instruments.

6.2.1.3 To enable the performance of instruments to be monitored, each instrument shall have a unique serial number.

6.2.1.4 All the original calibration certificates held at the Company Head Office ,a photocopy to accompany each ultrasonic instrument while using at sites.

6.2.1.5 Instruments that do not meet the requirements shall be withdrawn from service until corrected.

6.2.2 PROBES

6.2.2.1 Compressional straight beam probes and Shear wave angle probes shall have a nominal frequency of 1.0 MHz to 5.0 MHz has been used.

6.2.2.3 The frequency chosen shall be as high as possible consistent with obtaining satisfactory transmission.

6.2.2.4 Both compressional straight beam probes and shear wave angle beam probes shall have

the ability to resolve clearly 3 indications from the IOW calibration block.

6.2.2.5 Probe crystals may be either round, square or rectangular. Both single and twin crystal probes may be used.

6.2.2.6 The following shall be established for each probe :-

(a) An accurate probe index rechecked before each ultrasonic operation.

(b) Probe beam angle with an accuracy of ± 2° of the nominal probe angle.

6.2.2.7 The following shall be used as a guide for selecting the probe Frequency :-

THICKNESS RANGE	*PRODUCT FORMS*	*FREQUENCY*
COMPRESSION WAVE		
Upto 60 mm	*Plate,Pipe*	*4 or 5 MHz*
Upto 60mm	*Casting/coarse grain material*	*2MHz*
Greater than 60mm	*Plate,Pipe*	*2MHz*
Greater than 60mm	*Casting*	*1MHz*
SHEAR WAVE		
10-35mm	*Welds*	*4-5MHz*
Above 35 mm	*Welds*	*2-2.25 Mhz*

6.2.3 COUPLANT

6.2.3.1 The couplant used shall be capable of ensuring maximum ultrasound transmission.

6.2.3.2 The couplant used shall be the same for both calibration and examination.

6.2.3.3 Cellulose paste, liquid soap, glycerine, light machine oil or suitable equivalent may be used providing they are non-injurious to material under test.

6.2.4 REFERENCE AND CALIBRATION STANDARDS

6.2.4.1 Calibration blocks shall be of substantially the same material as that under test.

6.2.4.2 The following calibration blocks shall be used for calibration of equipment :-

(a) International Institute of Welding V1 block.
(b) Miniature Block / V2 block
(c) Institute of Welding IOW-Beam Profile Block
(d) ASME 19mm distance amplitude curve (D.A.C.) block
(e) ASME 38 mm distance amplitude curve (D.A.C.) block

6.3 INFORMATION REQUIREMENTS

6.3.1 The NDT Operator shall be supplied with the following details of the item to be examined before testing commences :-

(a) Material type.
(b) Joint details.
(c) Welding process.
(d) P.W.H.T. (if any).

(e) Any repairs carried out previous to the test.

6.3.2 The NDT Operator shall verify the extent of examination coverage and record any limitation of the test on the Test Report.

6.4 SURFACE CONDITION

6.4.1 Surfaces used for testing shall be free from weld spatter, scale or other irregularities which could impair adequate acoustic coupling.

6.4.2 Depending on the profile and condition of the weld face, dressing may be necessary to avoid the production of confusing surface echoes.

6.4.3 When the selected ultrasonic beam cannot cover the full cross section of the weld without the probe impinging up on the weld face, the weld face shall be ground smooth *to proceed with testing on approval from the relevant contracting authority, else* a limitation will be noted on the Test Report.

6.5 CALIBRATION FOR EXAMINATION

6.5.1 The Reject control shall be turned off for calibration and during examination.

6.5.2 Calibration shall be conducted for sensitivity and beam path distance prior to commencement of testing.

6.5.3 Recalibration shall be carried out after a change of operator, *change in test parameters, at the end of each inspection* or when the electrical circuit is disturbed in any way which includes the following:-

(a) Transducer change.
(b) Battery change.
(c) Electrical outlet change.
(d) Coaxial cable change.
(e) Power failure.

If any deviations are found during the above checks, corrections shall be carried out and all the previous examinations until the last correct calibration shall be repeated.

6.5.4 (a) Calibration for straight beam testing shall encompass and present at least two material thicknesses on the CRT screen.

(b) Sensitivity shall be adjusted so that the second back wall reflection is 80% full screen height.

6.5.5 Time base calibration for angle beam testing shall be adjusted to represent the maximum sound path distance covered.

6.5.6 Sensitivity levels of shear wave probes shall be in accordance with the relevant Specification.

6.5.7 The noise Level during Weld Examination excluding spurious surface indications shall be 12 dB below the relevant evaluation level.

6.6 MEASUREMENT OF TRANSFER LOSS

6.6.1 Transfer loss values shall be included within the standard sensitivity examination level.

6.6.2 Transfer loss measurement shall be made as follows :-

(a) Two angled probes of same type shall be used, one transmitting, one receiving. Position both probes at one full skip distance on V1 calibration block, maximize signal to 80% full screen height, and note dB setting.

(b) Repeat sequence on material to be examined, without altering instrument sensitivity.

(c) Measure the difference in dB setting.

(d) The difference in dB's between comparable peaks is the transfer loss value and shall be either added or subtracted as necessary to the standard examination sensitivity.

6.7 TESTING PROCEDURES

6.7.1 Prior to examination all specimens shall be marked with a reference datum line.

6.7.2 Parent Metal Examination

(a) The area of the parent metal *on either side of the weld* used for scanning shall be checked for laminations prior to angle probe testing using a compression wave probe.

(b) The area to be checked shall be large enough to detect laminar defects that could interfere with shear wave propagation.

(c) The lamination scan shall be carried out regardless of whether the parent metal has been ultrasonically tested previously.

(d) During the lamination scan attenuation characteristics, material thickness and any flaws found shall be noted and recorded if necessary.

(e) Sensitivity level shall be as described in 6.5.4.

(f) Evaluation of indications shall be made using the 6dB drop technique.

6.7.3 Shear Wave Examination

(a) Standard sensitivities shall be in accordance with the relevant Specification. All examination sensitivities shall be conducted at 6 dB above standard sensitivity.
(b) The length of the scans shall be selected in such a way that the ultrasonic energy travels through the weld and the H.A.Z
(c) All scans must overlap by 10% crystal diameter
(d) Scanning speed shall not exceed 152 mm/sec.
(e) A Zig-Zag scanning pattern shall be employed throughout.
(f) All flaws shall be evaluated at standard sensitivity.
(g) The sizing of flaws shall be carried out using the beam boundary technique.
(h) Height of flaws shall be sized by the 20 dB drop technique and length shall be sized by the 6 dB drop technique.
(i) Unless otherwise specified 100% of the weld length shall be tested.

6.8 SCANNING TECHNIQUES

6.8.1 The maximum scanning rate shall be 150mm per second.

6.8.2 Scanning techniques shall consist of :-

(a) Compression probe scan of parent material in accordance with 6.7.2.
(b) Angle beam scan of weld metal using appropriate angled probes.

6.8.3 As a minimum each pass of the probe shall overlap a minimum of 10% of the transducer width.

6.8.4 For scanning purposes, the sensitivity shall be set 6 dB higher than the standard sensitivity. When an indication is noted, the sensitivity shall be adjusted to the standard sensitivity.

6.8.5 Whenever feasible the examination shall be carried out from both sides of the weld.

6.8.6 The beam shall be pointed at the weld length normally.

6.8.7 As a minimum two (2) different angle probes shall be used.

6.8.8 In addition the 45° probe shall be used for "angled" scanning of the weld to search for transverse flaws.

6.8.9 For illustrations of scanning techniques see Attachment 7.1

6.9 ACCEPTANCE – REJECTION CRITERIA:

6.9.1 Ultrasonic Examination in Lieu of Radiography

When ultrasonic examination is applied in order to fulfill the requirement of Clause 7.3.2.1 in API 650, the provisions of Annex U Shall apply.

6.9.2 Ultrasonic Examination NOT in Lieu of Radiography

6.9.2.1 When the radiographic method is applied in order to fulfill the requirement of Clause 7.3.2.1 in API 650, then any ultrasonic examination specified shall be in accordance with this section.

6.9.2.2 The method of examination shall be in accordance with Section V, Article 4, of the ASME code.

6.9.2.3 Ultrasonic examination shall be performed in accordance with a written procedure that is certified by the Manufacturer to be in compliance with the applicable requirements of Section V of the ASME Code.

6.9.2.4 Examiners who perform ultrasonic examinations under this section shall be qualified and certified by the Manufacturers as meeting the requirements of certification as generally outlined in Level II or Level III of ASNT SNT-TC-1A(including applicable supplements). Level-I personnel may be used if they are given written acceptance/rejection criteria prepared by Level-II or Level-III personnel. In additional, all Level-I personnel shall be under the direct supervision of Level-II or Level-III personnel.

6.9.2.5 Acceptance standards shall be agreed upon by the purchaser and the Manufacturer.

A) TANK WELDS:

Reflectors that produce a response greater than 20% of the reference level shall be investigated. Alternatively, for methods or techniques that do not use amplitude recording levels, sized reflectors longer than 40 % of the acceptable surface or subsurface flaws in Table U.1a shall be investigated. When the reflector is determined to be a flaw, the flaw shall be evaluated and acceptance criteria of API 650 as applicable shall apply.

Flaw Sizing

Flaws shall be sized using automated, computer-based data acquisition or by a supplemental manual technique that has been demonstrated to perform acceptably. The dimensions of the flaw shall be defined by the rectangle that fully contains the area of the flaw. The length (*l*) of the flaw shall be drawn parallel to the inside pressure-retaining surface of the component. The height (*h*) of the flaw shall be drawn normal to the inside pressure-retaining surface.

Flaw Categorization

If the space between the surface and the flaw in the through-thickness direction is less than one-half the measured height of the flaw, then the flaw shall be categorized as a surface flaw with flaw height extending to the surface of the material.

Grouping of Multiple Flaws

Discontinuous flaws that are oriented primarily in parallel planes shall be considered to lie in a single plane if the distance between the adjacent planes is equal to or less than 13mm (1/2in). If the space between two flaws aligned along the axis of weld is less than the length of the longer of the two, the flaws shall be considered a single flaw.

If the space between two flaws aligned in the through-thickness direction is less than the height of the flaw of greater height, the two flaws shall be considered a single flaw.

1) For a specific job acceptance criterion, shall be used provided by client.

2) In case client, doesn't provide acceptance limit for defects; the below mentioned acceptance criteria shall be used on client's approval.
   Imperfections that are interpreted to be crack, lack of fusion, or incomplete penetration are unacceptable regardless of length.
   Other Imperfections are interpreted based on the acceptance criteria as per API 650 Table U.1a and U.1b.

Flaw Documentation

In addition to the data record prescribed as follows:

a) For automated computer-based scans, data shall be recorded using the same system essential variables, specified value or range of values, used for the demonstration of the procedure.
b) For manual scans, results shall be documented in a written report.

Written documentation shall be produced for each unacceptable flaw and those acceptable flaws that

either exceed 50% of reference level for amplitude-based techniques or exceed 75% of the acceptable length for non-amplitude techniques.

6.10 EXAMINATION OF REPAIRS

6.10.1 Repairs shall be re-examined using the same procedure utilized for the original examination.

6.10.2 The extent of the examination shall include the repaired area of the weld plus 100mm at either end of the repaired section.

6.10.3 A new report, with relevant repair number, shall be written for all repaired welds retested.

6.11 POST INSPECTION CLEANING

6.11.1 When required, post inspection cleaning shall be accomplished to remove residual inspection materials (couplant) by flushing with a solvent based cleaner then finally wiping with rags.

6.12 REPORTING

6.12.1 Reporting requirements shall be as specified by the Client or the Contract Document.

6.12.2 Reports shall be completed for each and every examination on the same day that testing was carried out.

6.12.3 Indications shall be sentenced in accordance with the applicable Specification and shall be supported by drawings indicating size i.e. length, cross section and orientation.

6.12.4 Flaws shall be classified as planar, linear or spherical and every effort shall be made to state the nature of the defect.

6.12.5 In the absence of 6.12.1, compilation of report shall be according but not limited to the following : -

(a) Job Order Card (if applicable)

(b) Client Information (if applicable)

(c) Inspection Reports (Attachment 7.2)

6.13 SAFETY

6.13.1 Care shall be exercised during inspection with due regard to the fact that the standard Ultrasonic Flaw Detectors used by the Company are NOT considered intrinsically safe and Hot Work Permits shall be required for hazardous areas.

7. ATTACHMENTS

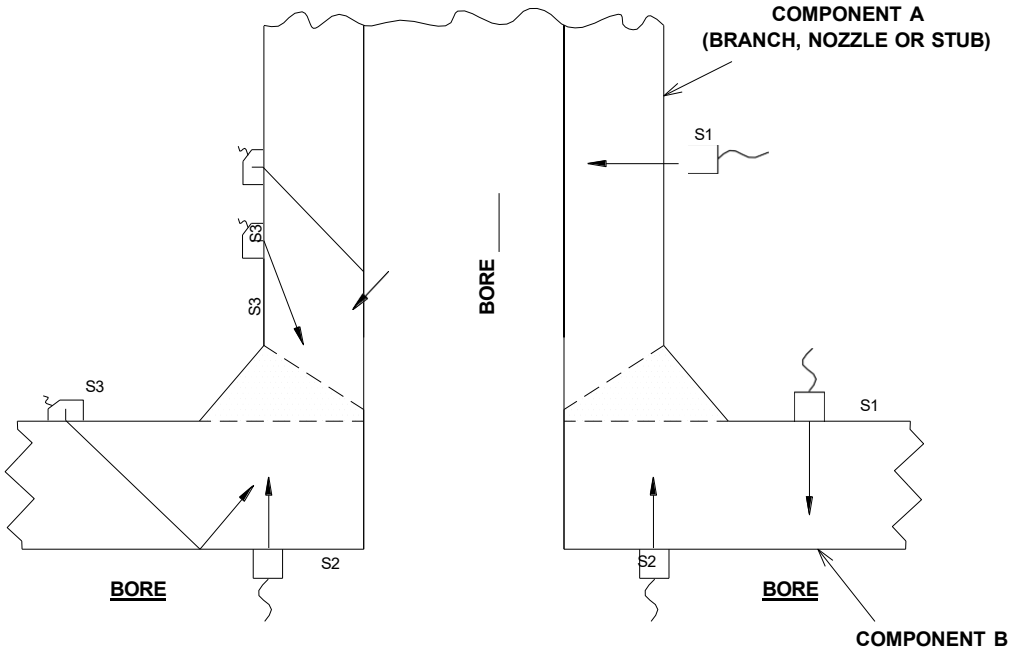
7.1. Illustration of Scanning Techniques

7.2. Sample Report Format

7.3. Acceptance Criteria based on API 650 Table U.1a & U.1b for tanking.

ATTACHMENT 7.1
ILLUSTRATION OF SCANING TECHNIQUES

A - NOZZLE SET ON WELD



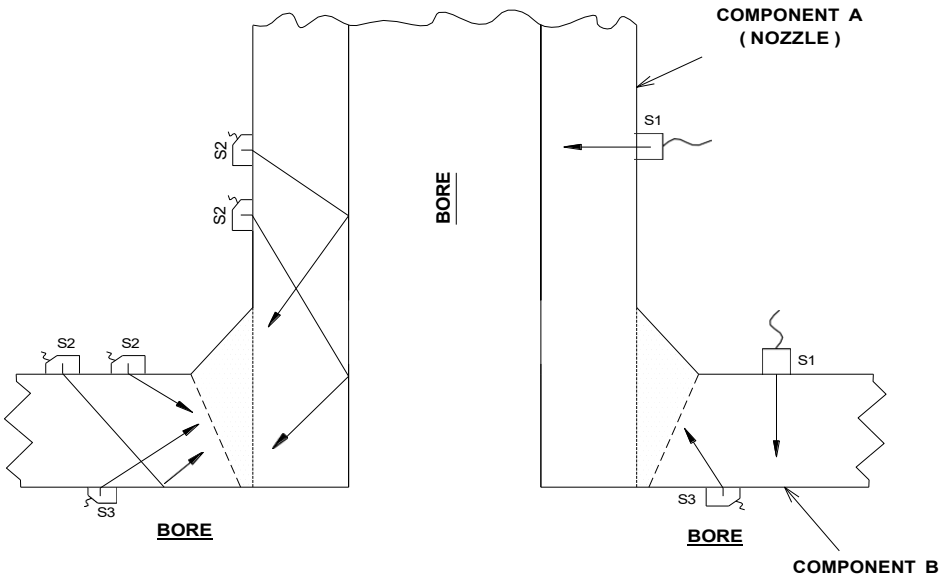
(A) 0º compression probe scan S1 on parent metal to check for laminations and to verify wall thicknesses. The side wall component B shall be scanned from the bore of B wherever possible using 0º compression probe (scan S2).

(B) Angle probe scan S3 (minimum of 3 Probes - 45º, 60º, 70º) from weld cap between the half and full skip distance plus weld cap width for full coverage.

NOTE : Sound beam to be maintained perpendicular to the weld axis while scanning.

ATTACHMENT 7.1
ILLUSTRATION OF SCANING TECHNIQUES

B - NOZZLE SET THROUGH WELD



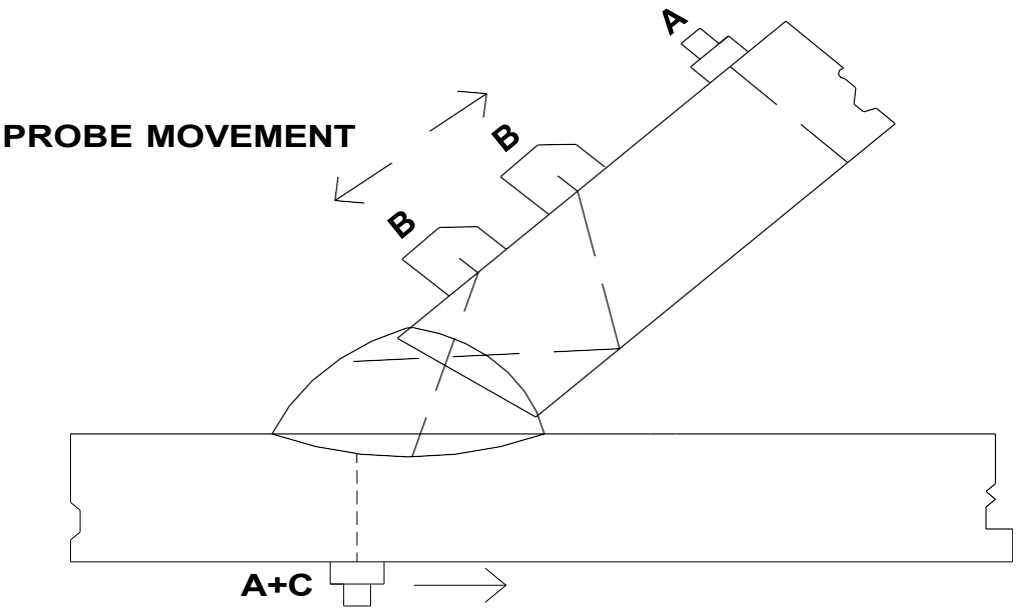
(A) 0º compression probe scan S1 on parent metal to check for laminations and to verify wall thicknesses.

(B) Angle probe scan S2 (minimum of 3 Probes - 45º, 60º, 70º) from weld cap between the half and full skip distance plus weld cap width for full coverage. Where possible the side wall of component B shall be scanned from the bore of component B (scan S3).

NOTE : Sound beam to be maintained perpendicular to the weld axis while scanning.

ATTACHMENT 7.1
ILLUSTRATION OF SCANING TECHNIQUES

C - TYPICAL "Y" (NODE) WELD



A

& C both are 0 Degree Probe

Sound Beam will cover 100% of the weld Area

(A) 0º compression probe scan on parent metal to check for laminations and to verify wall thicknesses.

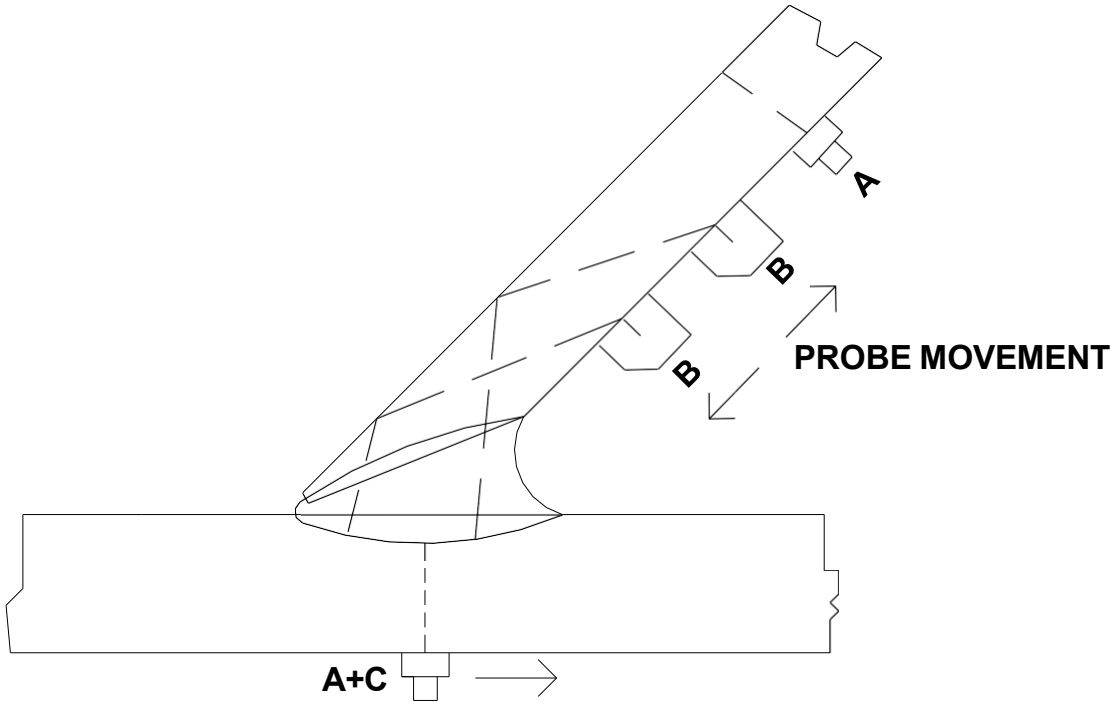
(B) Angle probe scan (minimum of 3 Probes - 45º, 60º, 70º) from weld cap to full skip distance plus weld cap width for full coverage.

(C) 0º compression probe scan to check for fusion defects (when accessible).

NOTE : Sound beam to be maintained perpendicular to the weld axis while scanning.

ATTACHMENT 7.1
ILLUSTRATION OF SCANING TECHNIQUES

D - TYPICAL "Y" (NODE) WELD



A

& C both are 0 Degree Probe

Sound Beam will cover 100% of the weld Area

(A) 0º compression probe scan on parent metal to check for laminations and to verify wall thicknesses.

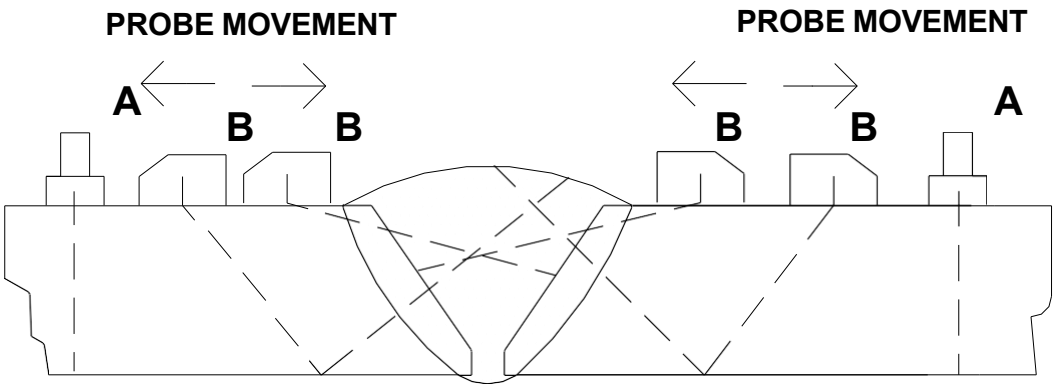
(B) Angle probe scan (minimum of 3 Probes - 45º, 60º, 70º) from weld cap to full skip distance plus weld cap width for full coverage.

(C) 0º compression probe scan to check for fusion defects (when accessible).

NOTE : Sound beam to be maintained perpendicular to the weld axis while scanning.

ATTACHMENT 7.1
ILLUSTRATION OF SCANING TECHNIQUES

E - SINGLE "V" BUTT WELD

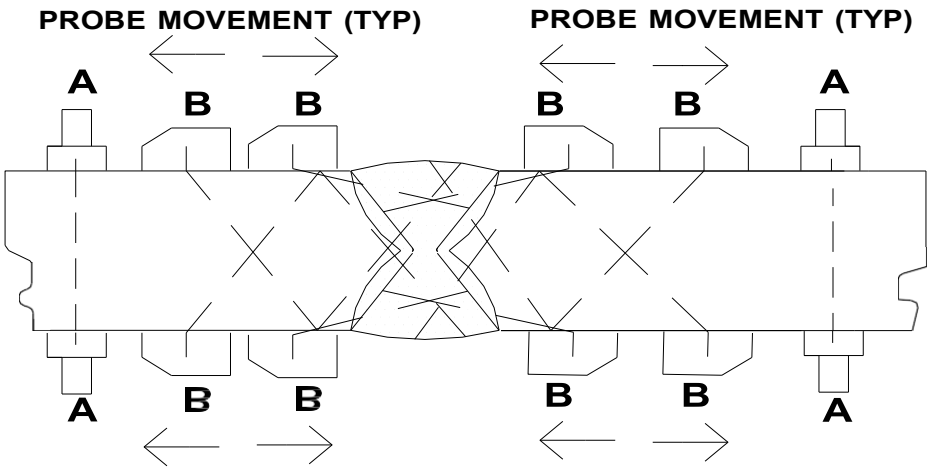


(B) 0º compression probe scan on parent metal to check for laminations and to verify wall thicknesses.

(B) Angle probe scan (minimum of 3 probes – 45º, 60º, 70º) from weld cap to full skip distance plus weld cap width for full coverage.

ATTACHMENT 7.1
ILLUSTRATION OF SCANING TECHNIQUES

F - DOUBLE "V" BUTT WELD

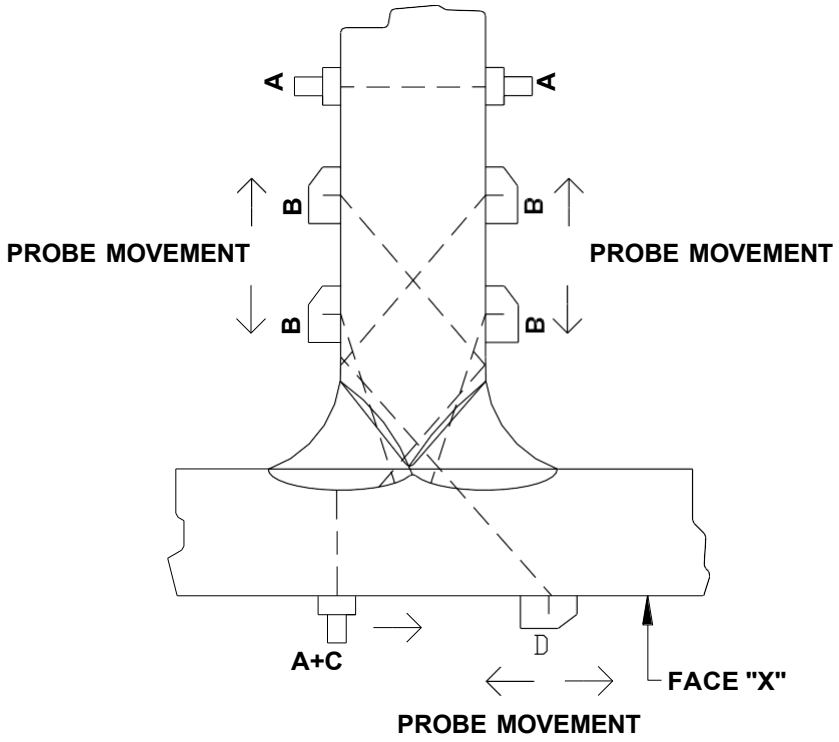


(A) 0º compression probe scan on parent metal to check for laminations and to verify wall thicknesses.

(B) Angle probe scan (minimum of 3 probes - 45º, 60º, 70º) from weld cap to full skip distance plus weld cap width for full coverage.

ATTACHMENT 7.1
ILLUSTRATION OF SCANING TECHNIQUES

G - TYPICAL "T" WELD



A & C both are 0 Degree Probe

Sound Beam will cover 100% of the weld Area

(A) 0º compression probe scan on parent metal to check for laminations and to verify wall thicknesses.

(B) Angle probe scan (minimum of 3 probes - 45º, 60º, 70º) from weld cap to full skip distance plus weld cap width for full coverage.

(C) 0º compression probe scan on face "X" to check for fusion defects when accessible.

(D) Additional angle probe scan (minimum of 2 probes) on face "X" when accessible.

ATTACHMENT 7.2

Sample Report Format

PT. AGUNG CIPTA MUTU INDONESIA

ULTRASONIC INSPECTION REPORT

Client	:	**Report No.**	:
Project	:	**RFI No.**	:
Contract No.	:	**Test Date**	:
Location	:	**Page No.**	: of

PROCEDURE No. :	APPLICABLE CODES :	ACCEPTANCE CRITERIA :

UT Equipment	:	Testing Temperature	:
S/N No.	:	Couplant	:
Calibration Validity	:	Scanning Technique	:
Calibration Block	:	Sensitivity	:
Reference Block	:		

Probe Angle	Serial No.	Freq. (MHz.)	Type	Size (mm)	Reference (dB)	TR Loss (dB)	Scan (dB)	Range/F.S.L. (mm)

Surface Preparation : ☐ As Welded ☐ As Grinded ☐ After Machined ☐ Other _____

Stage of Examination : ☐ After Welding ☐ After PWHT ☐ After Hydrotest ☐ After Repair ☐ Back Gouging

Scope of Examination : ☐ Base Material ☐ Weld Part ☐ Edge Preparation

Joint Detail : Weld Conf. : Welding Process :

Material : Drawing/Weld Map No. :

RESULT

No.	Joint No.	Welder ID	Dimension (mm)	Discontinuities					Result
				Defect Type	Depth (mm)	Length (mm)	Loc. From 0 Datum (mm)	Respon to DAC (dB)	

Note :

Legend :

P : Planar (PL)
CL : Cylidnrical
R : Rounded (RN)
ACC : Accepted
REJ : Rejected

Examined By :	Reviewed & Approved By NDT Level III	Contractor	Client	3rd Party
Name : Date :	Name : Date :	Name : Date :	Name : Date :	Name : Date :

WB-TR-003 Rev.1 Ultrasonic Inspection Report

ATTACHMENT 7.3 – ACCEPTANCE CRITERIA

AS per API 650 Table U.1a and U. 1b

Table U.1b—Flaw Acceptance Criteria for UT Indications May be Used for All Materials (USC)

All dimensions in inches

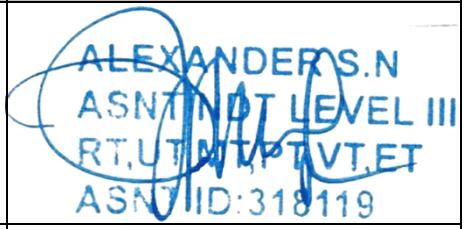
Thickness at Weld (t)[a]	MAXIMUM ACCEPTABLE FLAW LENGTHS—(l)							
	For Surface Flaw[b] With Height, (h) No Greater Than			For SubSurface Flaw With Height, (h) No Greater Than				
	0.08	0.10	0.12	0.08	0.12	0.16	0.2	0.24
0.25 < 0.375	0.30	0.15	0.12	0.20	0.12	Not allowed	Not allowed	Not allowed
0.375 to < 0.50	0.30	0.30	0.15	0.55	0.20	0.15	Not allowed	Not allowed
0.50 to < 0.75	0.30	0.30	0.15	1.50	0.30	0.20	0.15	0.10
0.75 to < 1.0	0.30	0.30	0.15	3.00	0.50	0.30	0.25	0.20
1.0 to < 1.25	0.35	0.30	0.15	4.00	0.80	0.35	0.30	0.25
1.25 to < 1.50	0.35	0.30	0.15	5.00	1.20	0.40	0.30	0.30
1.50 to < 1.75	0.35	0.30	0.15	6.00	1.50	0.40	0.35	0.30

[a] t = thickness of the weld excluding any allowable reinforcement. For a butt weld joining members having different thickness at the weld, t is the thinner of the two.

[b] Any surface flaw, to be deemed acceptable, must satisfy both the size limitations of this table and additionally satisfy the MT/PT characterization limitations of U.6.6.2.

4. RADIOGRAPHIC EXAMINATION PROCEDURE

NDT PROCEDURE
RADIOGRAPHIC TESTING (API 560)
DOCUMENT NO. ACM-P-NDT-RT01-API650 REV: 00

Prepared By	Reviewed By	Reviewed and Approved By
		
Name: Taqwim Achsananto	Name: Bagus Tri Atmoyo	Name: Alexander S Napitupulu
Position: NDT Lev II	Position: NDT Lev II	Position: ASNT NDT Lev III (Cert No 318119)
Date: 06 April 2026	Date: 06 April 2026	Date: 06 April 2026

Revision Status

Revision No.	Effective Date	Description / Summary of Revision
00	06 April 2026	Initial Issue

Contents

1. PURPOSE

1.1 To establish the requirements for radiographic inspection utilizing Gamma radiography.

1.2 To provide a system of general conditions and specific instructions as an aid to qualified personnel required to perform radiographic inspection.

2. SCOPE

2.1 This procedure gives the methods, techniques, quality, and reporting requirements necessary for the radiographic inspection of fusion welded butt joints in steel.

2.2 This is the Company approved procedure and shall be adhered to at all times except where the Client or Contract specifies other requirements.

3. DEFINITIONS

3.1 ACM – PT. AGUNG CIPTA MUTU INDONESIA

3.2 Client – Those Companies, Organizations or Individuals to which the ACM is contracted to provide Services.

3.3 Contract – The form of agreement for the provision of the Services to the Client by the ACM.

3.4 Services – All things provided under the Contract including all Activities to be carried out by the Company for the Client

3.6 General Definitions – For the purpose of this procedure the definitions given in ISO 9000 / ISO 17025 shall apply.

4. REFERENCES

4.1 ASME V Article 2, Ed 2023 - Boiler and pressure Vessel Code section for Non-Destructive Examination

4.2 ASTM E94-04,2010 - Standard Guide for Radiographic Examination

4.3 API 650: 2020 - Welded Steel Tank used for fuel Storage Inspection, Repair, Alteration & Reconstruction

4.4 ASME VIII, Division 1,2 & 3: 2023 - Rules for the Construction of Pressure Vessels Division 1, 2 & 3

4.5 ASME IX, Ed 2023 - Qualification Standard for Welding and Brazing Procedures, Welders, Brazers and Welding & Brazing Operators

4.6 SNT – TC – 1A – ASNT Recommended Practice for Qualification and Certification Personnel, 2024 Edition.

4.7 SHELL DEP 34.51.01.33_Gen_Feb 2021 – Field Erected Above Ground Vertical Storage Tanks

4.8 SHELL DEP 34.51.01.36_Gen_Feb 2021 – Shop Fabricated Vertical Storage Tanks

5 RESPONSIBILITIES

5.1 The Director / General Manager shall be responsible for ensuring that the necessary resources are made available for the requirements of this procedure to be carried out.

5.2 Operation Management shall be responsible for ensuring that the requirements of this procedure are fully implemented at all times.

5.3 All employees involved in the implementation of this procedure shall be responsible for adherence to the requirements stated within.

5.4 The Radiation Safety Officer License holder as appropriate (RSO) shall be responsible for ensuring that all radiographic operations are carried out in a safe manner and shall be the focal point for any radiation related matters.

5.5 The RSO shall be responsible to advise and notify the management on the potential hazards of radiological work on all areas, authorization and training of persons involved in ionizing radiation, implementation of radiation safety measures to be made available in an emergency, including drills. All other responsibilities are detailed in the Job Description Record duly signed by the RSO prior to commencement of work.

5.6 The Radiographer / NDT Inspector shall be responsible to perform Radiographic operations within the scope of his RT qualifications and with due consideration to all safety rules and regulations. All other responsibilities are detailed in the Job Description Record duly signed by the Radiographer prior to commencement of work.

5.7 Assistant Radiographer shall be responsible to provide assistance to the Radiographer in the production of radiographs in accordance with company procedures and specifications. All other responsibilities are detailed in the Job Description Record duly signed by the Assistant Radiographer prior to commencement of work.

5.8 All radiographic film interpretations shall be performed by a qualified NDT Level II or Level III in Radiographic Testing.

6 PROCEDURE INSTRUCTIONS

6.1 GENERAL

6.1.1 Any surface irregularities, backing rings or strips of such size or configuration that may interfere with interpretation of the radiography may be removed.

6.1.2 Subject to client approval, grinding may be carried out so that these irregularities cannot be confused with discontinuities.

6.1.3 Gamma radiography will be utilized except when otherwise specified by the Client or the Contract documents.

6.2 RADIATION SOURCES

6.2.1 The radiation energy employed for any radiographic technique shall achieve the density and IQI Requirements of this procedure.
The radiation source used in accordance with this document for gamma source.

Gamma Ray – Sentinal 880 Delta projector or equivalent.
Typical sizes of Gamma Ray Source available from the approved supplier are,
1.5 x 2.0mm
2.0 X 2.0mm
2.5 x 2.0mm
3.0 X 2.0mm
3.0X2.7mm

The equipment manufacturer's or Supplier's publications such as technical manuals, decay curves/ Exposure curves or written statements documenting the actual or maximum source size/ focal spot shall be acceptable as source size verification.

6.3 QUALITY OF RADIOGRAPH

6.3.1 a. The manual method of processing shall be utilized for this procedure and normal development time shall be between 5 to 8 minutes at 20°C (68°F).

However, when temperature is higher or lower than the normal 20°C (68°F), manufacturer's recommended development time versus temperature charts shall be consulted. Room temperature and chemical temperature shall be recorded at the time of film processing. Manufacturer's recommendation shall be followed, likewise, for stop bath, rinse, fixation, washing and drying conditions.

b. Fim processing solution replacement shall be in accordance with manufacturer's recommendation such as Kodak, Agfa, etc. Manufacturer's recommendation literature shall be available in all darkrooms.

Standard Guide for controlling the quality of industrial Radiographic Film Processing, SE-999 or standard Guide for Radiographic Examination, SE-94, may be used as a guide for processing film, except that Section 8.1 of SE-999 is not required.

c. Replacement of film processing solution shall be in accordance with manufacturer's recommendation and the Radiographer shall accomplish the Chemical Change Out record.

d. Manufacturer's recommendation shall be adhered to at all times.

e. In any time, film processing solution shall be discarded after three months because of aerial oxidation and the buildup of gelatin, sludge, and solid impurities.

6.3.2 All radiographs shall be free from mechanical, chemical or other spurious indications to the extent that they cannot mask or be confused with the image of any discontinuity in the object being radiographed.

6.3.3 Such spurious indications included but are not limited to;

a. Fogging
b. Processing defects such as water or chemical marks
c. Scratches, finger marks, crimps, static, smudges and tears.
d. Loss of details due to poor screen film contact.
e. False indications due to defective screens.

6.3.4 Film Drying

a. Manual drying can vary from still air drying at ambient temperature to as high as 60°C (140°F) with air circulated by a fan.
b. Take precaution to tighten the film on hangers so it cannot touch the Dryers.
c. Too hot a drying temperature at low humidity can result in uneven drying and should be avoided.
d. Film manufacturer's recommendation shall be consulted for drying Conditions.

6.5 RADIOGRAPHIC FILM

6.5.1 ASTM Type 1 Radiographic film as described below shall be used for Gamma Rays

TABLE 1

FILM TYPE	COMMERCIAL NAME	FILM FACTOR	SPEED	CONTRAS	GRAIN
1	AGFA D2/Kodak M100	8/6.1	SLOW	VERY HIGH	ULTRA FINE
1	Agfa D4/Kodak MX 125	3.0/4.4	MEDIUM	VERY HIGH	VERY FINE
1	AGFA D5/Kodak T 200	1.5/2.6	MEDIUM	HIGH	VERY FINE

Recommended temperature at 20°C to 24°C in Kodak Industrex developer for 4mints developing time.

6.6 SCREENS

6.6.1 Intensifying screens shall be of the lead type only. The thickness ranges for screens using various radiation energies are given below.

THICKNESS (mm)

RADIATION	FRONT SCREEN	BACK SCREEN
GAMMA-RAYS		
Iridium 192/Cesium 137	0.027(min)-0.160(max.)	0.027(min)
Ytterbium 169/Thulium 170	0.050(min)-0.160(max.)	0.027(min)

6.6.2 In addition to intensifying action, the back lead screens are used as protection against back-scattered radiation and their thickness is only important for this function.

6.6.3 If there is any question about the adequacy of protection from back-scattered radiation, a lead letter B with minimum dimensions of 13mm height and 1.5mm in thickness, should be attached to the back of the cassette or film holder, and a radiograph made in the normal manner. If the image of this symbol appears on the radiograph as a light image on a darker background, it is an indication that protection against back-scattered radiation is insufficient and that additional precautions must be taken. A dark image of the "B" on a lighter background is not cause for rejection.

6.6.4 Film cassettes and screens shall be kept clean and free from damaged. Dirt may cause exposure artifacts in the radiographs and such dirt may be transferred to the loading bench and subsequently to other screens.

6.7 DENSITY LIMITATIONS

6.7.1 The film density through the area of interest of the radiographic image shall be 2.0 minimum and 4.0 maximum for Gamma Rays.

6.7.2 A densitometer checked against a step wedge film strip of known density every 90 days shall be used for measuring the density of radiographs.

6.8 GEOMETRICAL UNSHARPNESS

6.8.1 The maximum acceptable value for geometrical Unsharpness for Radiography shall be as follows:

Material Thickness Range (mm)	Under 50	50 - 75	Greater Than 75 - 100	Greater Than 100
Maximum Ug (mm)	0.51	0.76	1.02	1.78

NOTE: Material thickness is the thickness on which the IQI is based.

6.8.2 Geometrical unsharpness (µg) will be calculated using the following formula;-

$$\frac{\text{Source Size x object to film distance}}{\text{Source to object distance}}$$

6.9 IDENTIFICATION OF RADIOGRAPHS

6.9.1 A system of radiographic identification shall be used to produce a permanent and traceable record of radiographs to individual welds.

6.9.2 The radiograph shall be identified using lead letters/numbers and the identification shall include

a. Project/Contract Number.
b. Drawing/Sheet or Line Number.
c. Weld Number / Test Point Number
d. Organization's symbol or name.
e. Pipe Diameter and Schedule in Material Size and Thickness.
f. Material Type.
g. Date of Radiograph.

6.10 LOCATION MARKERS

6.10.1 Location markers shall be in the form of metric number tapes.

6.10.2 The start position shall be marked in such a manner permitting area of interest on the radiograph to be accurately located.
Each radiograph shall clearly show a minimum of 150 mm (6 in.) of weld length. The film shall be centered on the weld and shall be of sufficient width to permit adequate space for the location of identification marks and an image quality indicator (IQI) penetrometer.

6.10.3 Location Markers requirement provided as per the Clause T-275 of ASME Sec V Article 2 shall be covered. For reference Location Marker Sketches in Figure T-275 (See Attachment 7.13)

6.11 FILM LAYOUT

6.11.1 Typical film layout will include the information required in 6.9.2 above.

6.12 IMAGE QUALITY INDICATOR (I.Q.I)

6.12.1 The image Quality Indicator material shall have similar radiographic absorption characteristics to that of the material under examination, i.e. use steel for steel, aluminum for aluminum, etc.

6.12.2 The DIN 54109 wire type I.Q.I., ASTM Wire Type or its equivalent shall be used.

6.12.3 If the density of the radiograph through the area of interest varies by more than minus 15% or plus 30% *from the density adjacent to the designated wire of an IQI* and is still within the density requirements defined in 6.7 than an additional I.Q.I. shall be placed *for each exceptional area or areas and the radiograph*.

6.12.4 When more than one film is used in a single exposure, an I.Q.I. image shall be present on each film, except where a panoramic exposure is taken, when a minimum of three equally spaced I.Q.I.s shall be used.

6.12.5 The I.Q.I. shall be placed across the weld so that the wires are at 90^{o} to the weld seam.

6.12.6 The I.Q.I. shall be placed at the edge of the diagnostic film length with the thinnest wire outermost.

6.12.7 The I.Q.I. shall be placed on the source side. Where inaccessibility prevents placing the I.Q.I. on the source side, it shall be placed on the film side in contact with the part being examined.

6.12.8 Wire range from the DIN IQI series 1-7, 6-12 or 10-16 shall be selected in accordance with the following guidelines:

i) Component thickness up to 19mm ———— IQI series 10-16
ii) Component thickness 16 to 45mm ———— IQI series 6-12
iii) Component thickness over 40mm ———— IQI series 1-7

6.13 SENSITIVITY REQUIREMENTS

6.13.1 Radiography shall be performed with a technique of sufficient sensitivity to display the essential wire of a wire type IQI. The essential wire requirements of ASTM/ DIN Wire Type on the Source / Film Sides are as mentioned below.

Nominal Single Wall Material Thickness Range mm	Source Side		Film Side	
	DIN Wire Type Essential wire	ASTM Wire Type Essential wire	DIN Wire Type Essential wire	ASTM Wire Type Essential wire
Upto 6.4 incl	13	5	14	4
Over 6.4 through 9.5	12	6	13	5
Over 9.5 through 12.7	11	7	12	6
Over 12.7 through 19.0	10	8	11	7
Over 19.0 through 25.4	9	9	10	8
Over 25.4 through 38.1	8	10	9	9
Over 38.1 through 50.8	7	11	8	10

6.13.2 Where the inaccessibility prevents placement of the I.Q.I. on the source side, a film side i.e. shall be used, with a lead letter “F” denoting Film side.

6.13.4 If Gamma radiography is stipulated for a particular project and it’s use on certain combination of diameter and specimen thickness, makes it *impossible* to attain the sensitivity levels required then a reference radiograph shall be made, under conditions monitored by the Company, and the attained quality levels shall be the standard for those combination/s of diameter and material thickness providing said standard is acceptable to the Company.

6.14 ALLOWABLE REINFORCEMENT

6.14.1 Allowable reinforcement shall be within specification requirements for cap reinforcement and root penetration.

6.15 RADIOGRAPHIC EXPOSURE TECHNIQUES

6.15.1 The radiographic exposure technique shall be in accordance with table below:

REF NO	EXPOSURE METHOD	RADIATION EMPLOYED	ASTM FILM TYPE	PIPE DIAMETER O.D. (mm)	REFERENCE
1,2,3,4	DWSI	GAMMA-RAYS	1	88.9 & above	ATTACHMENT 7.1 & 7.2
5,6	DWDI	GAMMA-RAYS	1	Below 88.9	ATTACHMENT 7.3 & 7.4
7,8	DWDI (SUPERIMPOSED)	GAMMA-RAYS	1	Below 88.9	ATTACHMENT 7.5 & 7.6
9,10,11,12	SWSI (PANORAMIC)	GAMMA-RAYS	1	168.3 & above	ATTACHMENT 7.7 & 7.8
13,14,15,16	SWSI (PLATE)	GAMMA-RAYS	1	NA	ATTACHMENT 7.9 & 7.10

6.15.2 SINGLE WALL VIEWING

6.15.2.1 Circumference butt welds greater than 89 mm outside diameter shall be performed with single wall viewing only.

6.15.3 DOUBLE WALL VIEWING

6.15.3.1 Butt welds in piping with outside diameters up to 89 mm shall be radiographed using a technique in which radiation passes through two walls and both walls of the weld are viewed together.

6.16 VIEWING OF RADIOGRAPHS

6.16.1 Viewing facilities shall provide subdued background lighting of an intensity that will not cause troublesome reflection on the radiographic film.

6.16.2 The viewer used for radiographic interpretation shall incorporate a high intensity light source.

6.17 REPORTING

6.17.1 Reporting requirements will be as specified by the Client or the Contract Document.

6.17.2 If the Client or Contract Document reporting requirements are not available the standard Radiographic report shall be used. As a minimum, the requirement provided as per T-291 of ASME Sec V shall be covered.

6.17.3 Compilation of report shall be according but not limited to the following:

a. Job Order Card (if applicable)

b. Client Information(if applicable)

c. Inspection Reports (Attachment 7.11)

6.18 ACCEPTANCE STANDARDS

The acceptance/rejection criteria and evaluations of all indications shall be in accordance to the appropriate codes, API 650 Based on ASME Sec VIII, Paragraph UW- 51(b).

6.19 PERSONNEL QUALIFICATIONS

6.19.1 RADIOGRAPHER

6.19.1.1 Radiographers shall be trained, qualified and certified to a minimum ASNT Level II, reference to ASNT-TC-1A, Recommended Practice for Non-destructive Testing Personnel Qualification and Certification", OR international equivalent, i.e., PCN or ISO 9712 qualified radiographer.

6.19.2 ASSISTANT RADIOGRAPHER

6.19.2.1 Assistant Radiographers shall be trained, qualified and certified to a minimum ASNT Level I, and shall work only under the direct supervision of a Level II trained radiographer.

6.20 FILM HANDLING, STORAGE AND RECORDS

6.20.1 Radiographs shall be stored together and held for a minimum period of one year after acceptance or completion of the work unless otherwise specified by the Client or Contract Document.

6.20.2 New Film / Unexposed

a. New film or unexposed film should be stored in a manner protected from the effects of light pressure, excessive heat, excessive humidity, damaging fumes or Vapours, or penetrating radiation.
b. Film manufacturer's recommendation should be followed on film Storage.

6.20.3 Exposed Film

a. Exposed or processed film should be kept in a film envelope provided by the manufacturer.
b. All other requirements on storage and handling shall be in accordance with manufacturer's recommendation purposes.

Note: It is a common practice that Client kept the used film for their documentation purposes.

6.21 RADIATION SAFETY

6.21.1 Radiation Safety requirements shall be as specified in the latest revision of the *Radiation Safety Manual*.

6.21.2 In General radiography shall be performed with the use of a collimator except when performing the panoramic technique or when limitation with collimator is noticed.

7 ATTACHMENTS

7.1 Explanatory Notes for Technique Nos. 1, 2, 3 & 4

7.2 Diagram for Technique Nos. 1, 2, 3 & 4

7.3 Explanatory Notes for Technique Nos. 5 & 6

7.4 Diagram for Technique Nos. 5 & 6

7.5 Explanatory Notes for Technique Nos. 7 & 8

7.6 Diagram for Technique Nos. 7 & 8

7.7 Explanatory Notes for Technique Nos. 9, 10, 11 & 12

7.8 Diagram for Technique Nos. 9, 10, 11 & 12

7.9 Explanatory Notes for Technique Nos. 13, 14, 15 & 16

7.10 Diagram for Technique Nos. 13, 14, 15 & 16

7.11 Sample Report Format

7.12 Acceptance Criteria ASME Sec VIII, Paragraph UW-51(b).

7.13 Location Marker Sketches Figure T-275 in ASME Sec V Article 2

ATTACHMENT 7.1
EXPLANATORY NOTES FOR TECHNIQUE NOS. 1, 2, 3 & 4

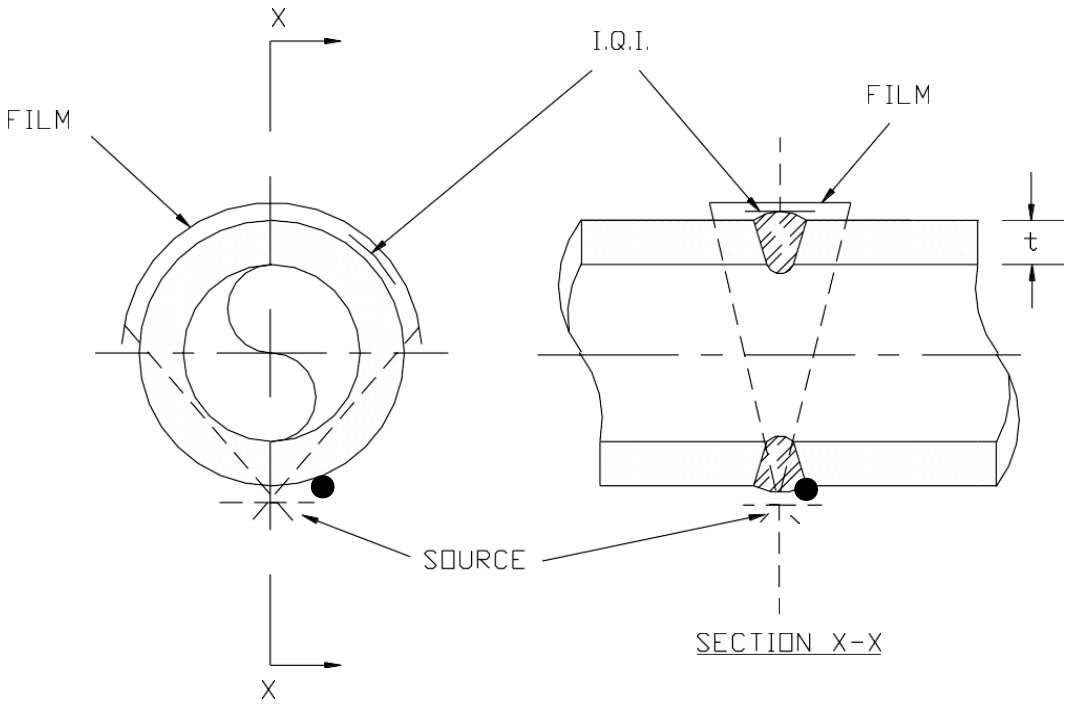
ALIGNMENT OF RADIATION BEAM :

The x-ray tube/source of radiation shall be positioned so that the center of the projected beam passes through the center of the section being examined and shall be offset from the plane through the weld by the minimum distance necessary to prevent the image of one side of the weld confusing the image of the other side. The film shall be placed diametrically opposite the source of radiation, inclose contact with the weld.

NO. OF EXPOSURES :

1. For pipe outside diameter 88.9 mm and above, for schedule 160 and Double extra strong, a minimum of four exposures shall be made for gamma radiography supported by diagnostic film length calculations. For all other wall thickness, a minimum of three exposures shall be made.

ATTACHMENT 7.2
DIAGRAM FOR TECHNIQUE NOS. 1, 2, 3 & 4 DOUBLE WALL SINGLE IMAGE



ATTACHMENT 7.3
EXPLANATORY NOTES FOR TECHNIQUE NOS. 5 & 6

MINIMUM SOURCE TO FILM DISTANCE (SFD) AND FOCAL POINT TO FILM DISTANCE (FFD) :

The x-ray tube/source of radiation shall be positioned so that a minimum geometric unsharpness is achievable. *A minimum SFD of 6 times the OD of the Pipe has been found to have satisfactorily met the Geometric unsharpness requirements for the common source size of 2.0 x 2.0 mm*

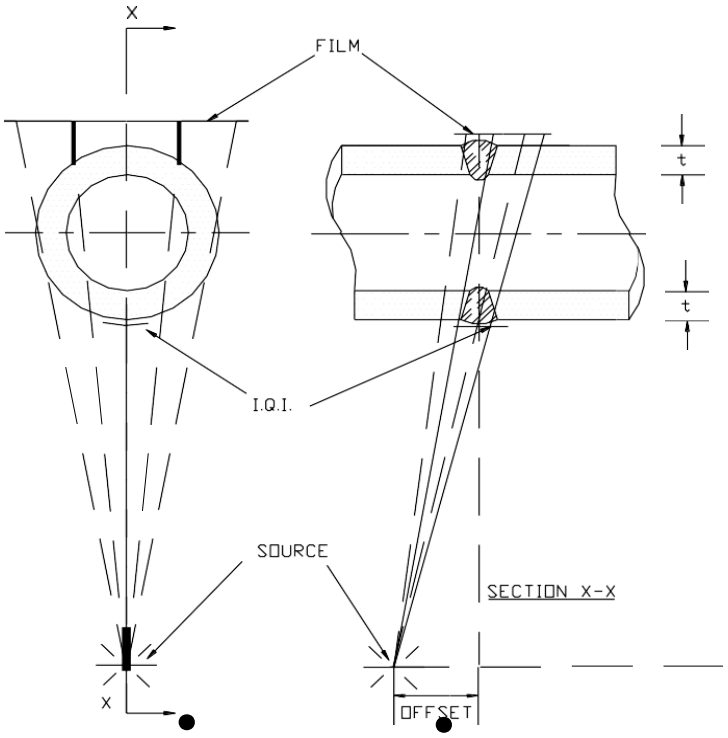
ALIGNMENT OF RADIATION BEAM :

The x-ray tube/source of radiation shall be positioned so that the center of the projected beam passes through the center of the pipe in the plane of the weld. The x-ray tube/source of radiation will be offset by the minimum amount required to provide a viewable elliptical image of two pipe walls on one exposure. At no time shall the minimum offset be less than one fifth (20%) of the source to film distance (SFD) *or* focal point to film distance (FFD). The film shall be placed diametrically opposite the source of radiation, in close contact with the weld as a "flat" cassette allows.

NO. OF EXPOSURES :

For Gamma radiography minimum of two exposures, at 90° apart, shall be made

ATTACHMENT 7.4
DIAGRAM FOR TECHNIQUE NOS. 5 & 6
DOUBLE WALL DOUBLE IMAGE



ATTACHMENT 7.5
EXPLANATORY NOTES FOR TECHNIQUE NOS. 7 & 8

MINIMUM SOURCE TO FILM DISTANCE (SFD) AND FOCAL POINT TO FILM DISTANCE (FFD) :

The source of radiation shall be positioned so that a minimum *SFD /FFD of 300 mm or the minimumSFD to meet Geometric unsharpness requirements whichever is greater* is maintained.

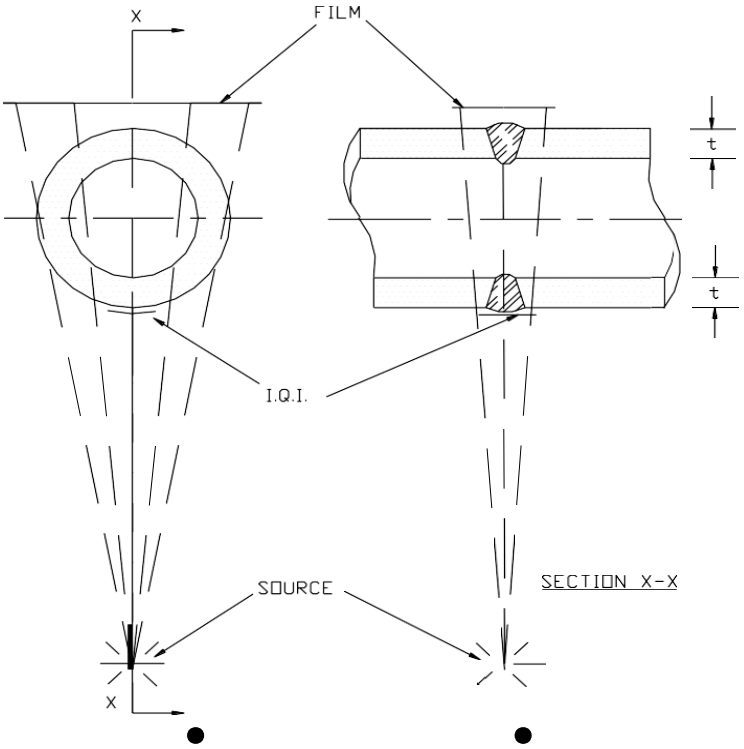
ALIGNMENT OF RADIATION BEAM :

The source of radiation shall be positioned so that the center of the projected beam passes through the center of the pipe in the plane of the weld, such that the images of the two sides of the weld are superimposed.

NO. OF EXPOSURES :

For Gamma radiography minimum three exposures, at 120° apart, shall be made

ATTACHMENT 7.6
DIAGRAM FOR TECHNIQUE NOS. 7 & 8
DOUBLE WALL DOUBLE IMAGE (SUPERIMPOSED)



ATTACHMENT 7.7
EXPLANATORY NOTES FOR TECHNIQUE NOS. 9, 10, 11 & 12

ALIGNMENT OF RADIATION BEAM :

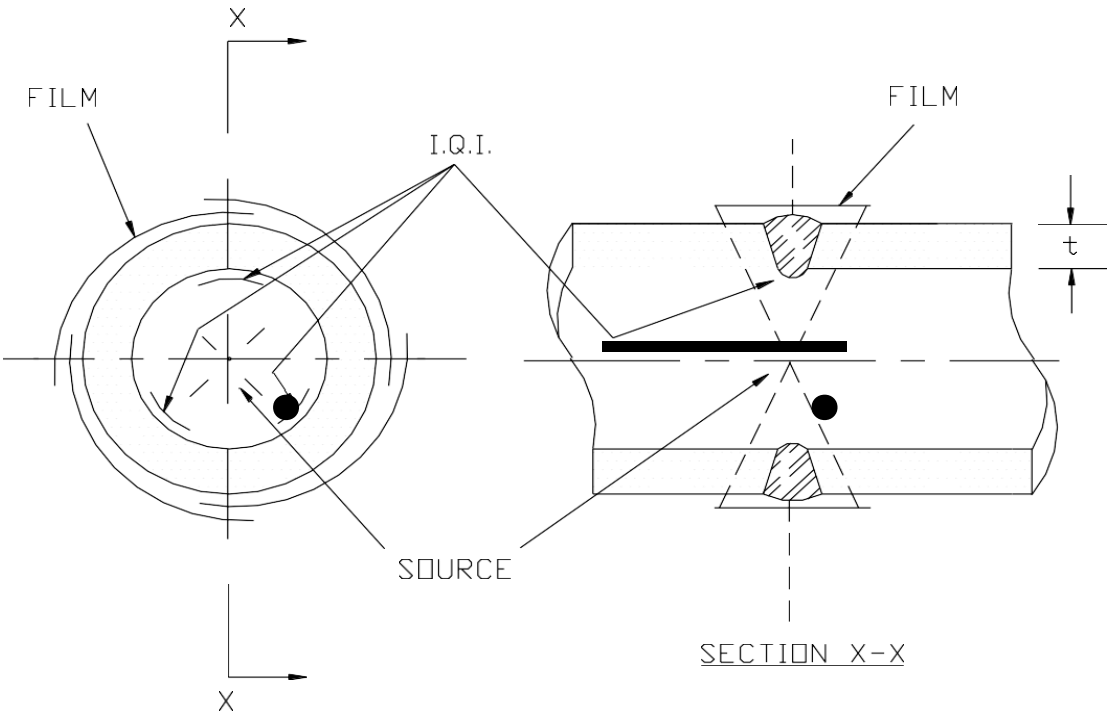
The source of radiation shall be positioned so that the center of the projected beam passes through the center of the weld under examination and the beam shall be normal to the pipe surface.

NO. OF EXPOSURES :

Gamma Radiography

The whole of the circumference weld may be examined in one exposure.

ATTACHMENT 7.8
DIAGRAM FOR TECHNIQUE NOS. 9, 10, 11 & 12
SINGLE WALL SINGLE IMAGE (PANORAMIC)



ATTACHMENT 7.9
EXPLANATORY NOTES FOR TECHNIQUE NOS. 13, 14, 15 & 16

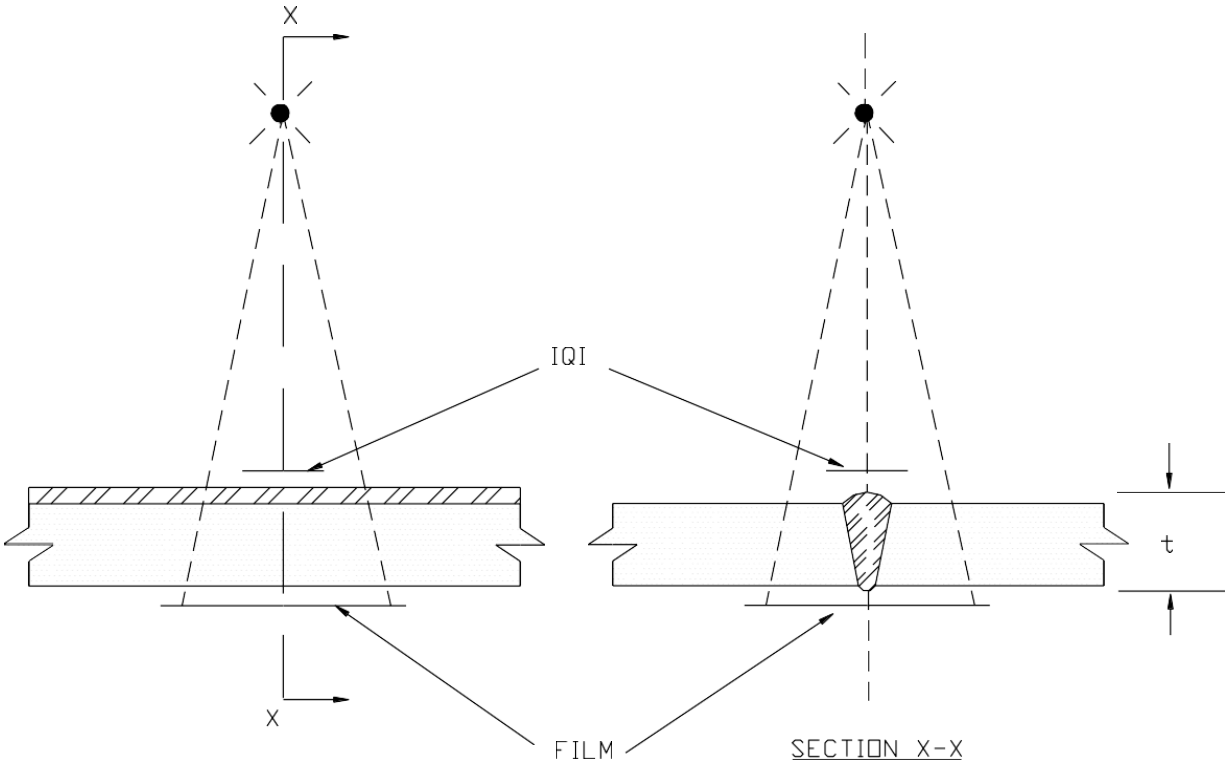
ALIGNMENT OF RADIATION BEAM :

The source of radiation shall be positioned so that the center of the projected beam passes throughthe center of the weld under examination and shall be normal to the plate surface at the point.

LENGTH OF WELD THAT MAY BE EXAMINED WITH ONE EXPOSURE :

Any length of weld may be examined provided that the FFD/SFD is at least equal to the total lengthof film being exposed in a single plane and that the density at the outer edges of the area of interestdoes not vary by more than minus 15% from the maximum density at the center of the area under examination.

ATTACHMENT 7.10
DIAGRAM FOR TECHNIQUE NOS. 13, 14, 15 & 16
SINGLE WALL SINGLE IMAGE (PLATE)



ATTACHMENT 7.11: SAMPLE TEST REPORT

PT. AGUNG CIPTA MUTU INDONESIA

RADIOGRAPHIC TESTING REPORT

Client	:	**Report No.**	:
Project	:	**Request No.**	:
Job No.	:	**Test Date**	:
Contractor	:	**Page No.**	: of

PROCEDURE No. :	APPLICABLE CODES :	ACCEPTANCE CRITERIA :

Source	: ☐ X-Ray ☐ Ir 192 ☐ Co 60	Film Brand / Type	:
Activity	:	Film Size	:
Focal Size	:	Intensifying Screen(Lead)	:
Tube Voltage	: - Tube Amperage : -	Location Marker Placement	: ☐ Source Side ☐ Film Side
IQI Type	:	Technique	:
Sensitivity	:	SFD	:
Density	:	Weld Reinforcement (Cap + Root)	:
IQI Location	:		
Surface Preparation	: ☐ As Welded ☐ As Grinded	☐ After Machined	☐ Other _____
Stage of Examination	: ☐ After Welding ☐ After PWHT	☐ After Hydrotest	☐ After Repair ☐ Back Gouging
Scope of Examination	: ☐ Base Material ☐ Weld Part	☐ Edge Preparation	☐
Joint Detail	:	Material	:
Weld Configuration	:	Isometric Drawing No.	:
Line Class	:		

RESULT

No.	Joint No.	Spool No.	Film						Welder No.	Welding Process	Pipe/Plate				Discontinuities		Comply to Code	
			Section	Density			Density Variation				OD Dia. (inch)	SCH	BT-Base Metal Thickness (mm)	WT -Weld Thickness (Base Metal + Reinforcement) (mm)	Defect Type	Length (mm)	Yes	No
				MIN	IQI	MAX	MIN	MAX										

Note :
-

Legend :	CR : Concave Root	CRI : Clustered rounded Indication	SC : Surface Concavity
ACC : Accepted	R : Rounded Indication	ARI : Aligned Rounded Indication	SI : Slag Inclusion
REP : Repair	LI : Linear Indication	SP : Scattered Porosity	C : Crack
RS : Re shoot	ERF : Excess Root Penetration	TI : Tungsten Inclusion	LF : Lack of Fusion
BT : Burn Through	IP : Incomplete Penetration	UC : Undercut	WH : Worm Hole

Interpret by :	NDT Level III	Contractor	Client	Others (If Any)
Name :	Name :	Name :	Name :	Name :
Date :	Date :	Date :	Date :	Date :

WB-TR-004 Rev.1 Radiographic Testing Report

ATTACHMENT 7.12: Acceptance Criteria ASME Sec VIII, Paragraph UW-51(b) UW-51 (b) RADIOGRAPHIC EXAMINATION OF WELDED JOINTS

(b) Indications revealed by radiography within a weld that exceed the following criteria are unacceptable and therefore are defects. Defects shall be repaired as provided in UW-38, and the repaired area shall be reexamined. In lieu of reexamination by radiography, the repaired weld may be ultrasonically examined in accordance with Mandatory Appendix 12 at the Manufacturer's option. For material thicknesses in excess of 1 in. (25 mm), the concurrence of the user shall be obtained. This ultrasonic examination shall be noted under Remarks on the Manufacturer's Data Report Form:

(1) any indication characterized as a crack or zone of incomplete fusion or penetration;

(2) any other elongated indication on the radiograph which has length greater than:

(-a) $\frac{1}{4}$ in. (6 mm) for t up to $\frac{3}{4}$ in. (19 mm)

(-b) $\frac{1}{3}t$ for t from $\frac{3}{4}$ in. (19 mm) to $2\frac{1}{4}$ in. (57 mm)

(-c) $\frac{3}{4}$ in. (19 mm) for t over $2\frac{1}{4}$ in. (57 mm)

where

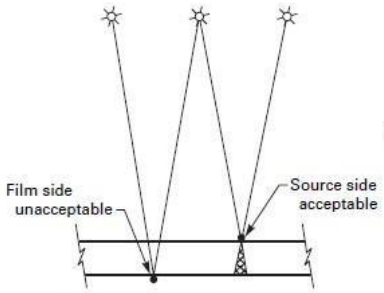
t = the thickness of the weld excluding any allowable reinforcement. For a butt weld joining two members having different thicknesses at the weld, t is the thinner of these two thicknesses. If a full penetration weld includes a fillet weld, the thickness of the throat of the fillet shall be included in t.

(3) any group of aligned indications that have an aggregate length greater than t in a length of $12t$, except when the distance between the successive imperfections exceeds $6L$ where L is the length of the longest imperfection in the group;

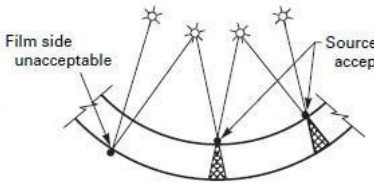
(4) rounded indications in excess of that specified by the acceptance standards given in Mandatory Appendix 4.

ATTACHMENT 7.13: Location Marker Sketches Figure T-275 in ASME Sec V Article 2

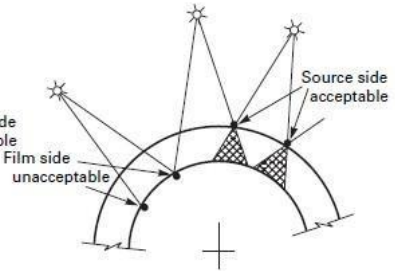
Figure T-275
Location Marker Sketches



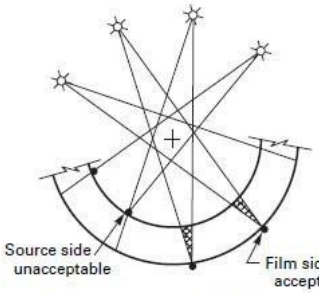
Flat component or longitudinal seam
[See T-275.1(a)(1)]
[See sketch (e) for alternate]
(a)



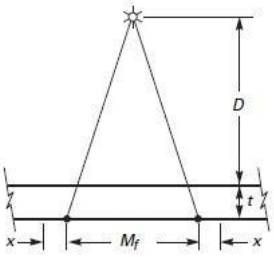
Curved components with radiation source to film distance less than radius of component
[See T-275.1(a)(2)]
(b)



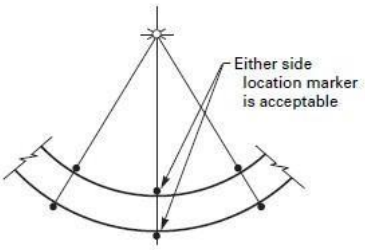
Curved components with convex surface towards radiation source
[See T-275.1(a)(3)]
(c)



Curved components with radiation source to film distance greater than radius of curvature
[See T-275.1(b)(1)]
(d)



Source side marker alternate
Flat component or logitudinal seam
$x = (t / D)(M_f / 2)$
x = additional required coverage beyond film side location marker
t = component thickness
M_f = film side location marker interval
D = source to component distance
[See T-275.1(b)(2)]
(e)



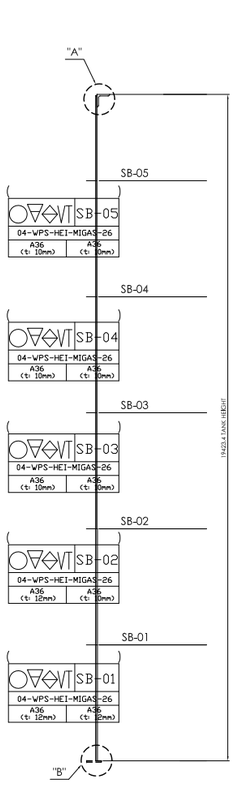
Curved components with radiation source at center curvature
[See T-275.1(c)]
(f)

LEGEND:
Radiation source —
Location marker —
Component center —

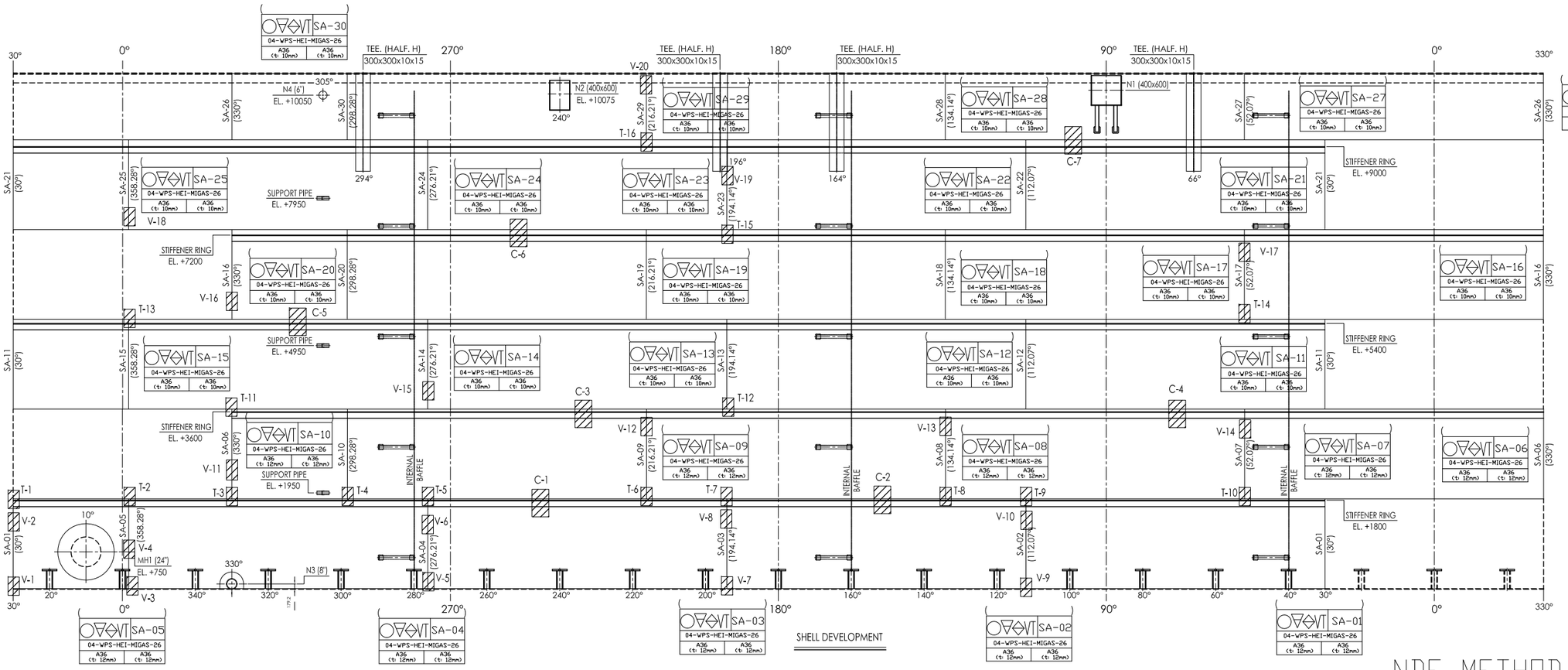
5. NDE MAP NO. : E2502-NDE-PBY-001

GENERAL NOTES :

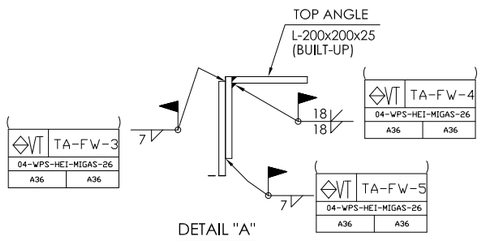
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   |# NOZZLE ATTACHMENT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



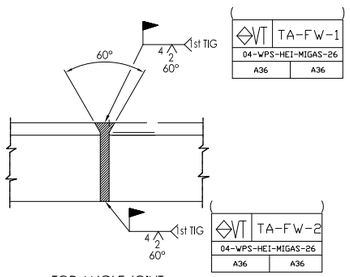
SHELL HORIZONTAL JOINT



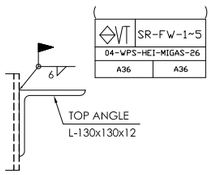
SHELL DEVELOPMENT



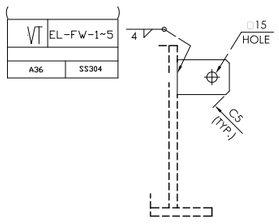
DETAIL "A"



TOP ANGLE JOINT

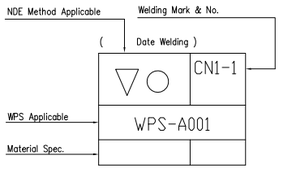


DETAIL OF STIFFENER RING



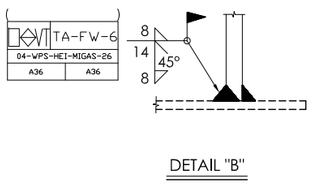
EARTHNG LUG

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



NDE METHOD SYMBOL

- VACUUM BOX
- RT 10%
- UT SPOT LAMINATION CHECK FOR SHELL
- PT 10%
- VT VISUAL 100%



DETAIL "B"

MATERIAL SPECIFICATION	
SHELL	A36
TOP ANGLE	A36
STIFFENER RING	A36

LEGEND :

WPS NO : 04-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name: NDE MAP SHELL LEACH TANK

Sheet No./Total sheets	1/9
Size of memory	

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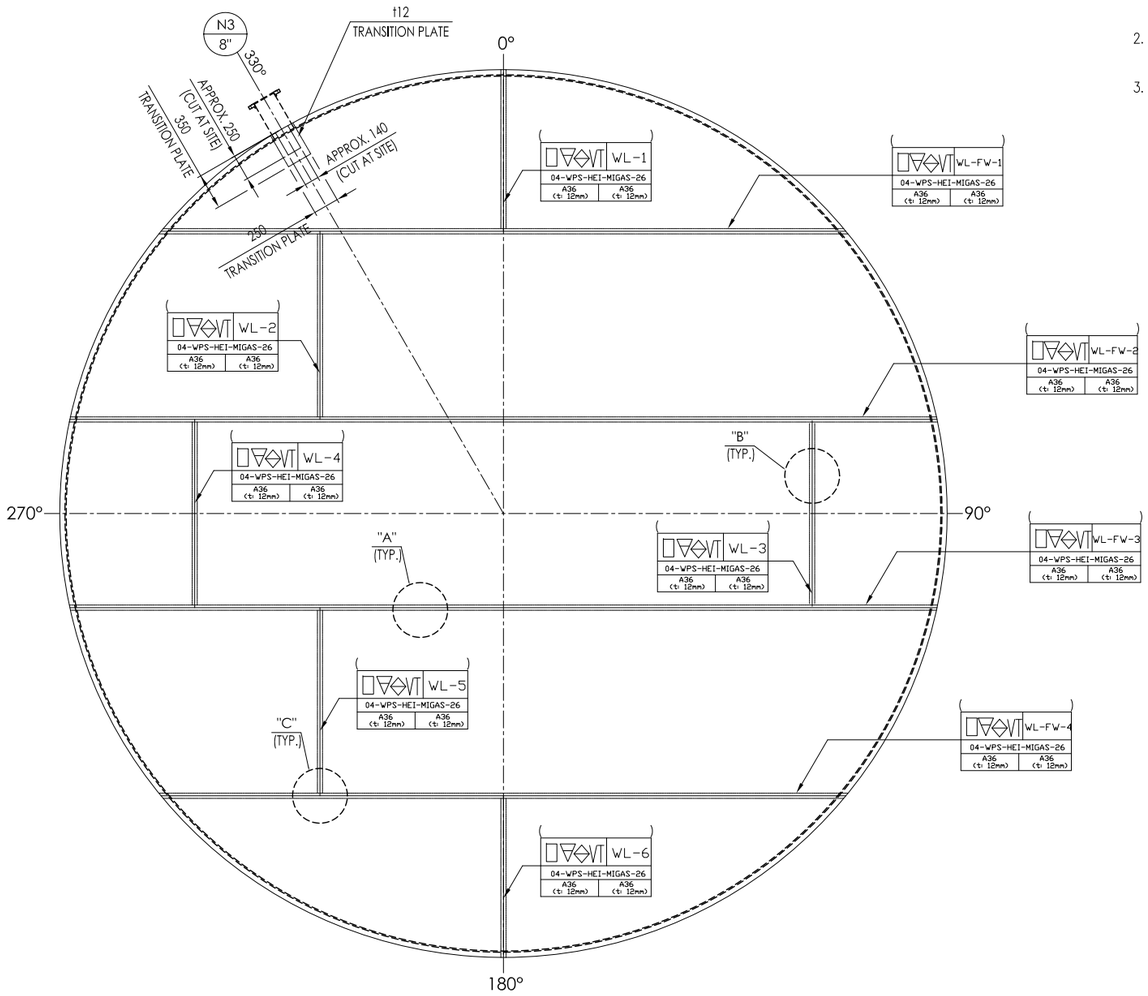
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: LEACH TANK
REFER DWG NO.	: E2502-000-DWG-102

NDE Map No.: E2502-NDE-PBY-001

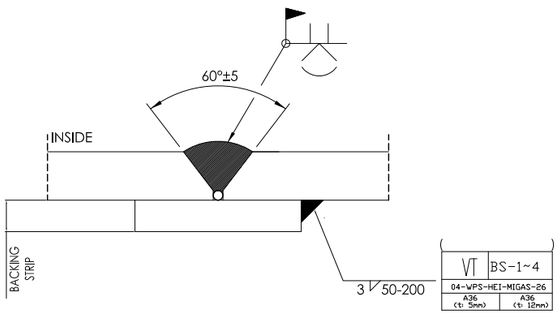
REV.: 0

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



BOTTOM PLATE ARRANGEMENT



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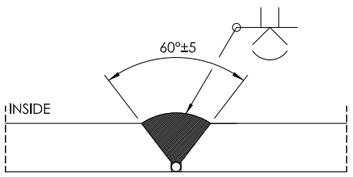

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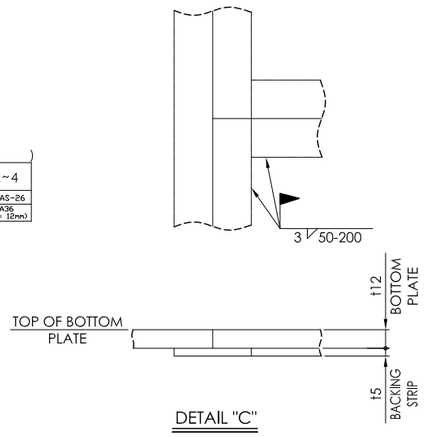

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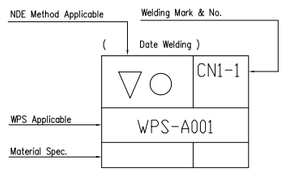

NDE METHOD SYMBOL

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

MATERIAL SPECIFICATION		LEGEND :
BOTTOM PLATE	A36	WPS NO : 04-WPS-HEI-MIGAS-26 SMAW P1 to P1
BACKING STRIPE	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name: NDE MAP BOTTOM LEACH TANK

Sheet No./Total sheets	2/9
Size of memory	

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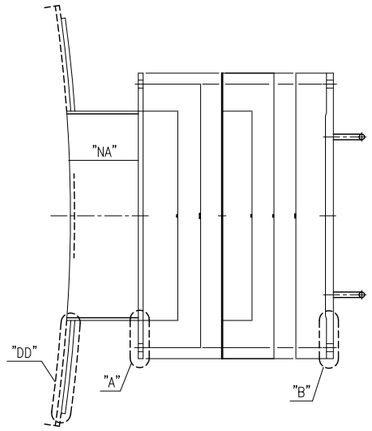
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: LEACH TANK
REFER DWG NO.	: E2502-000-DWG-103

NDE Map No. E2502-NDE-PBY-001

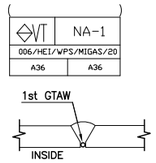
REV. 0

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



DETAIL OF NOZZLE (MH1) 24"



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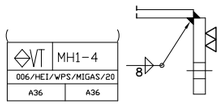

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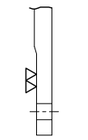
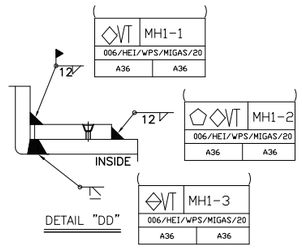
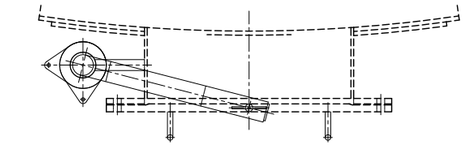
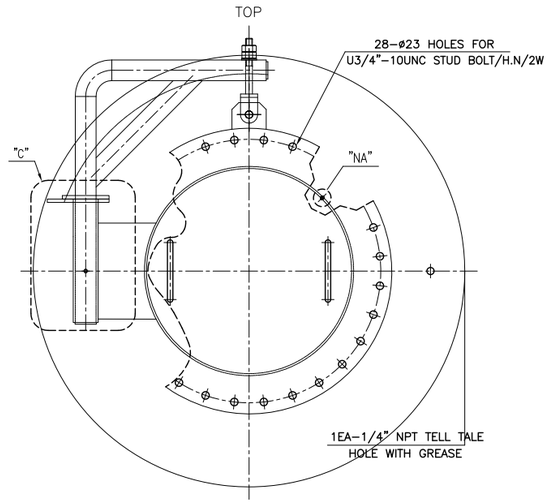


DETAIL "B"

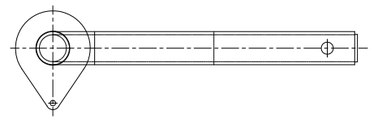


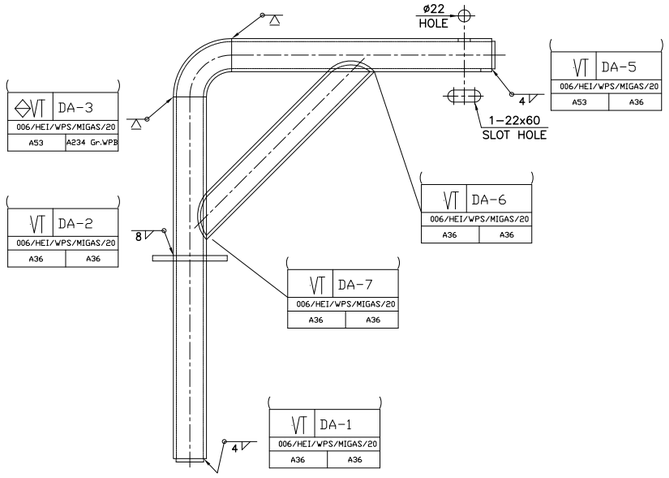
DETAIL "DD"



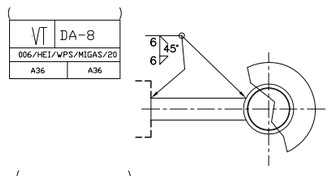


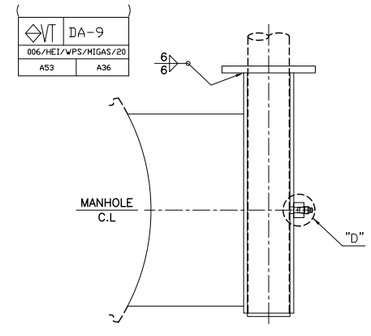
DAVIT ASSEMBLY
(DAVIT ORIENT. SEE ASS'Y DWG)



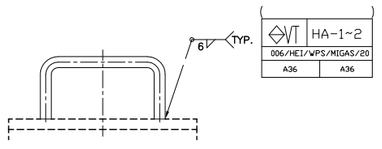


DAVIT DETAIL

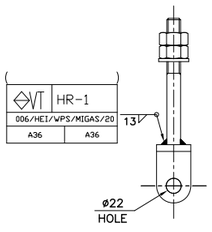




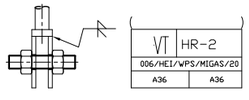
DETAIL "C"

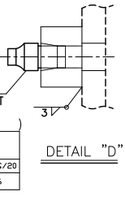


HANDLE DETAIL

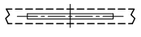


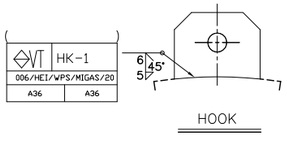
HANGER DETAIL





DETAIL "D"



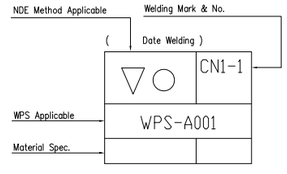


HOOK

NDE METHOD SYMBOL

- UT SPOT
- PT 10%
- PT 100%
- PNEUMATIC TEST

VT VISUAL 100%



MATERIAL SPECIFICATION	
HOOK	A36
PIPE DAVIT	A53 Gr.B
HANDLE	A36
NOZZLE NECK	A36
PLATE FLANGE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP MANHOLE LEACH TANK

Sheet No./Total sheets	3/9
Size of memory	

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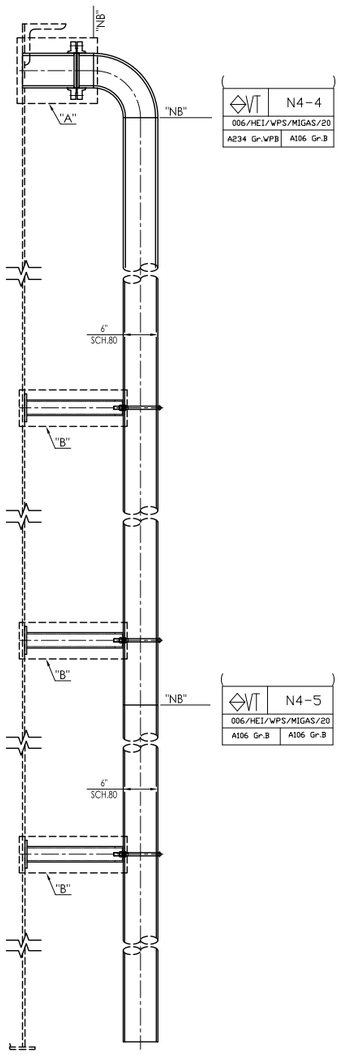
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: LEACH TANK
REFER DWG NO.	: E2502-000-DWG-104

NDE Map No.
E2502-NDE-PBY-001

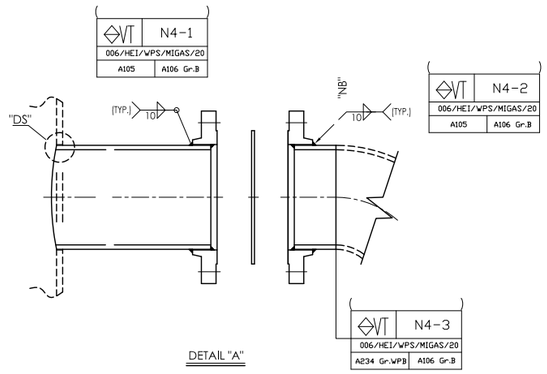
REV.
0

GENERAL NOTES :

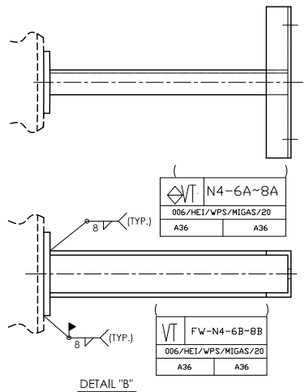
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



DETAIL OF NOZZLE N4 6"



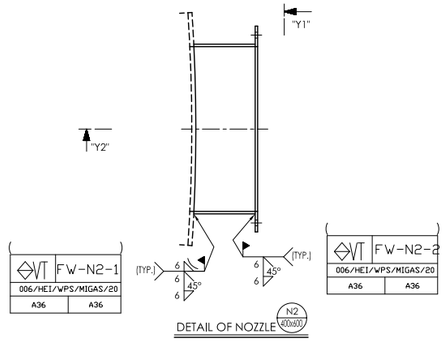
DETAIL "A"



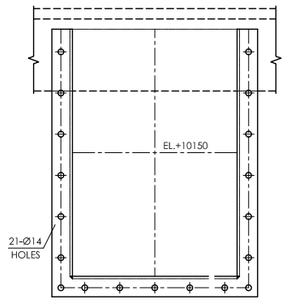
DETAIL "B"

DETAIL "DS"

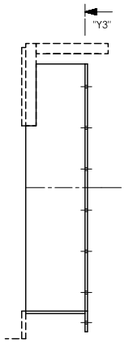
DETAIL "NB"



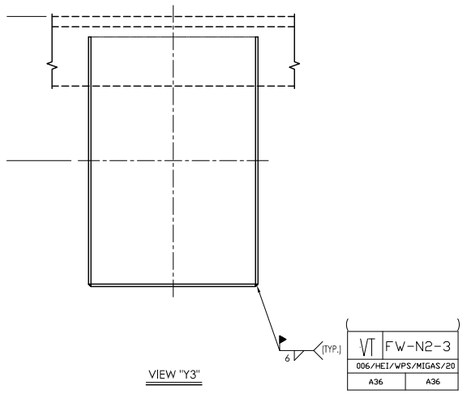
DETAIL OF NOZZLE N2 300x60



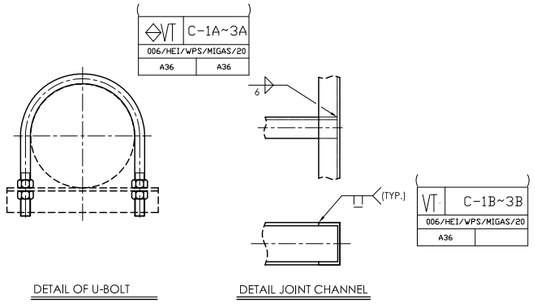
VIEW "Y1"



VIEW "Y2"

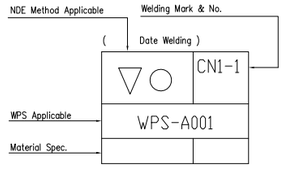


VIEW "Y3"



DETAIL OF U-BOLT

DETAIL JOINT CHANNEL



NDE METHOD SYMBOL

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

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 1-3 LEACH TANK

Sheet No./Total sheets	4/9
Size of memory	

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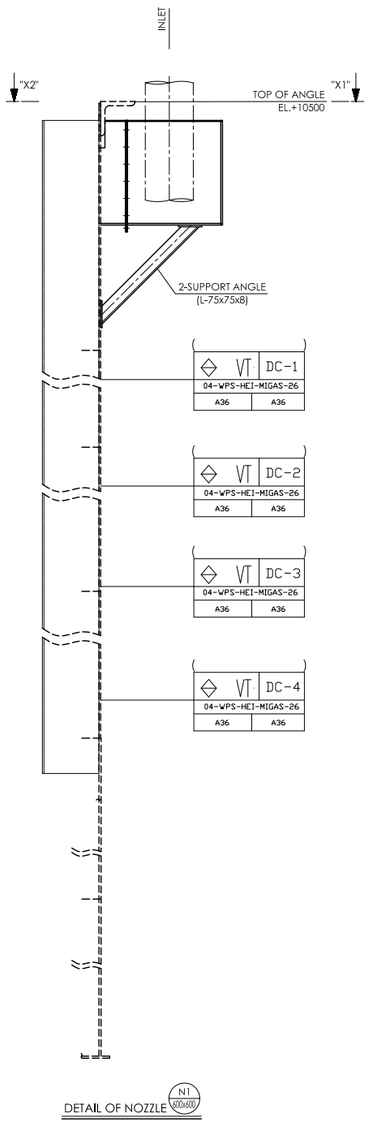
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: LEACH TANK
REFER DWG NO.	: E2502-000-DWG-105

NDE Map No.
E2502-NDE-PBY-001

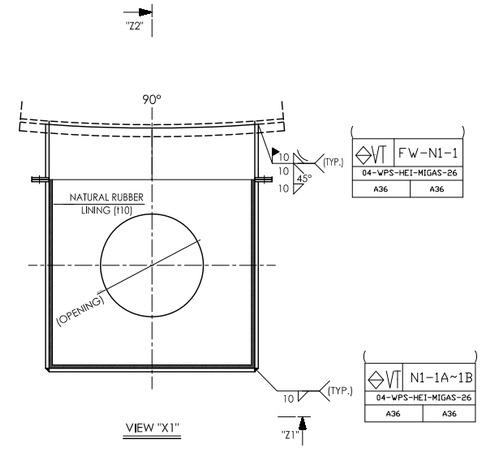
REV.
0

GENERAL NOTES :

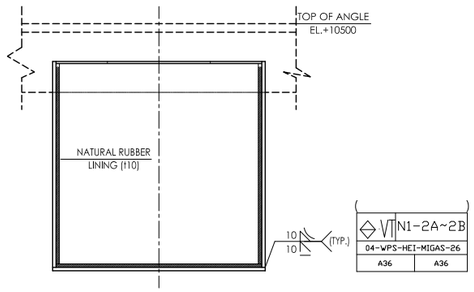
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



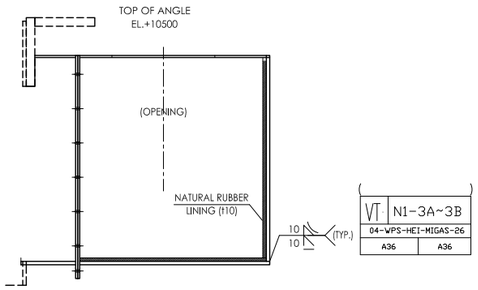
DETAIL OF NOZZLE



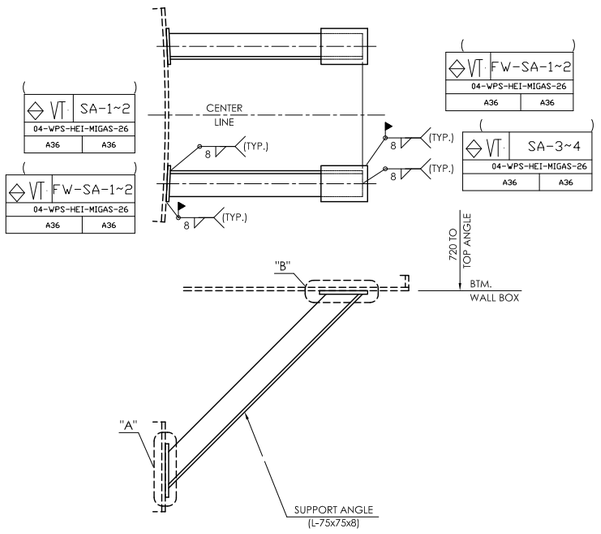
VIEW "X1"

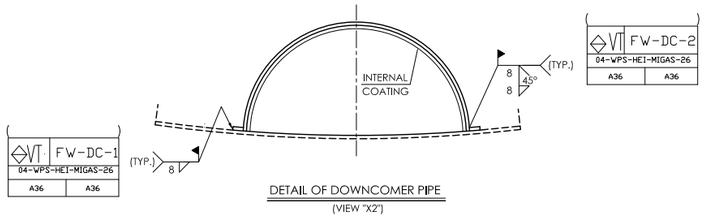


VIEW "Z1"

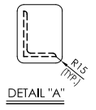


VIEW "Z2"

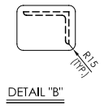




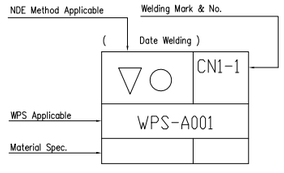
DETAIL OF DOWNCOMER PIPE
(VIEW "X2")



DETAIL "A"



DETAIL "B"



NDE METHOD SYMBOL

▽ UT SPOT
◈ PT 10%
VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

WPS NO : 04-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 2-3 LEACH TANK

Sheet No./Total sheets	5/9
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: LEACH TANK
REFER DWG NO.	: E2502-000-DWG-106

NDE Map No.
E2502-NDE-PBY-001

REV.
0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

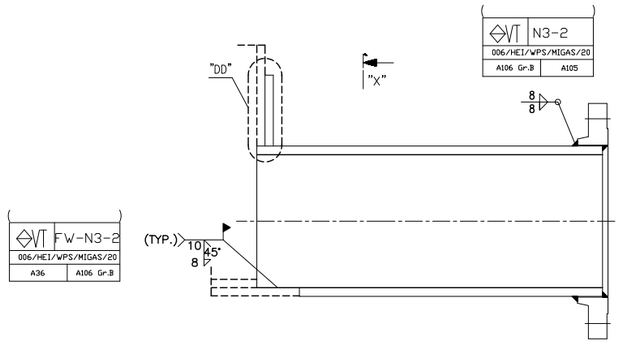
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

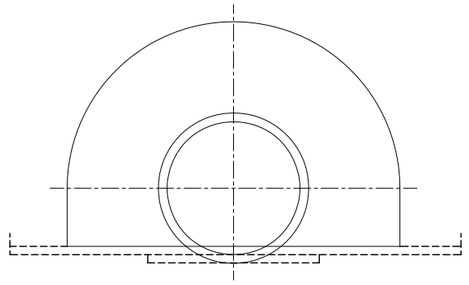
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

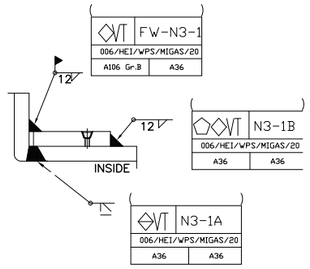
   # NOZZLE ATTACHMENT WELDING OF DUCTING



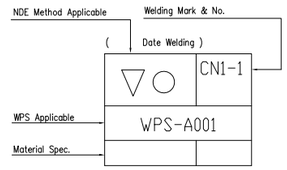
DETAIL OF NOZZLE N3 8"



DETAIL OF REINF. PAD



DETAIL "DD"



NDE METHOD SYMBOL

- ▽ UT SPOT
- ◇ PT 10%
- ◆ PT 100%
- ⬠ PNEUMATIC TEST

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name

NDE MAP NOZZLE 3-3 LEACH TANK

Sheet No./Total sheets	6/9
Size of memory	

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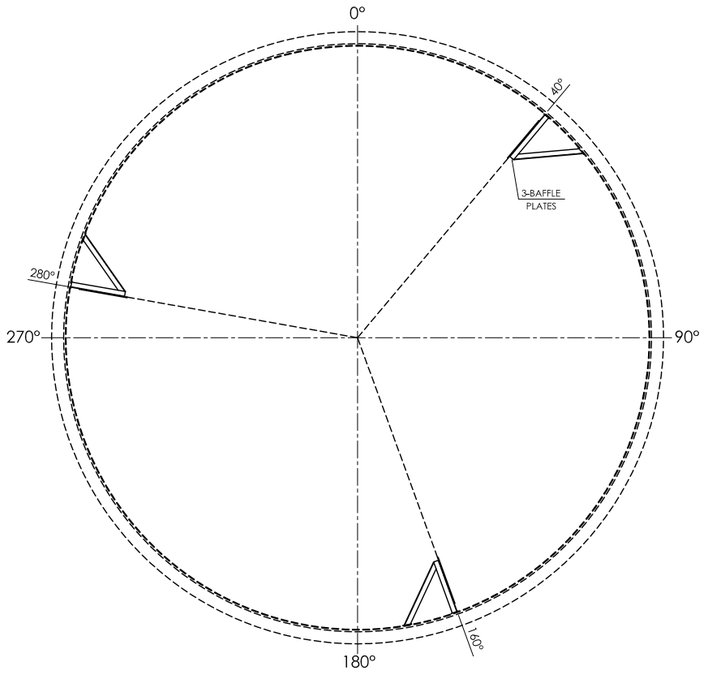
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: LEACH TANK
REFER DWG NO.	: E2502-000-DWG-107

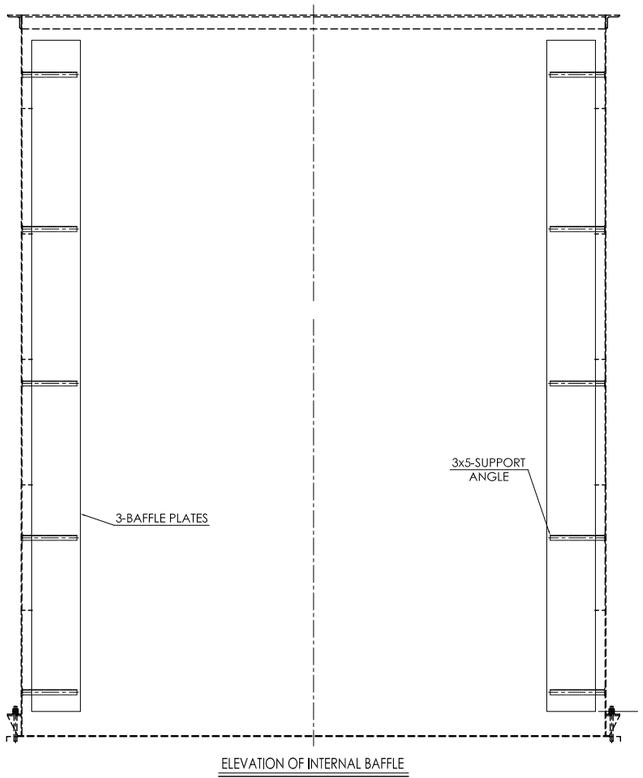
NDE Map No.

E2502-NDE-PBY-001

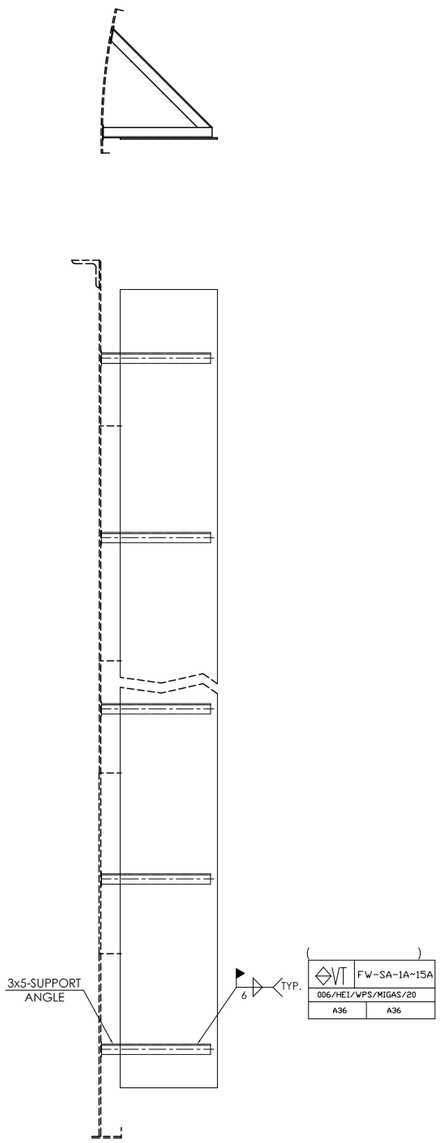
REV. 0



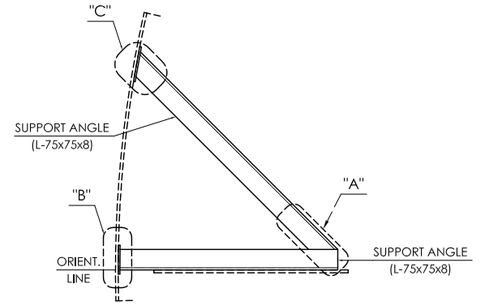
ORIENTATION OF INTERNAL BAFFLE

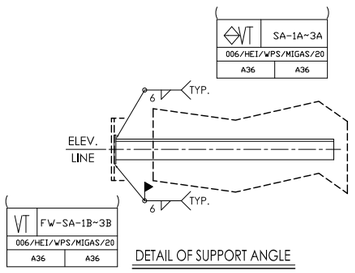


ELEVATION OF INTERNAL BAFFLE

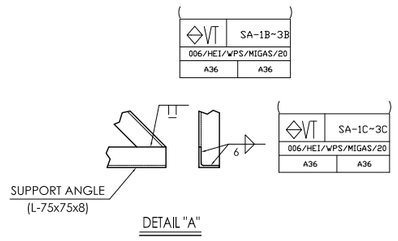


DETAIL OF INTERNAL BAFFLE





DETAIL OF SUPPORT ANGLE



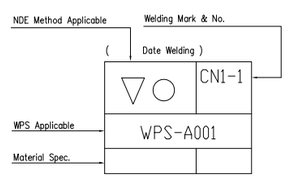
DETAIL "A"

DETAIL "B"

DETAIL "C"

GENERAL NOTES :

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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
INTERNAL BAFFLE	A36
SUPPORT ANGLE	A36
SUPPORT PAD	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name

NDE MAP INTERNAL BAFFLE LEACH TANK

Sheet No./Total sheets	7/9
Size of memory	

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

NDE Map No.	REV.
E2502-NDE-PBY-001	0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

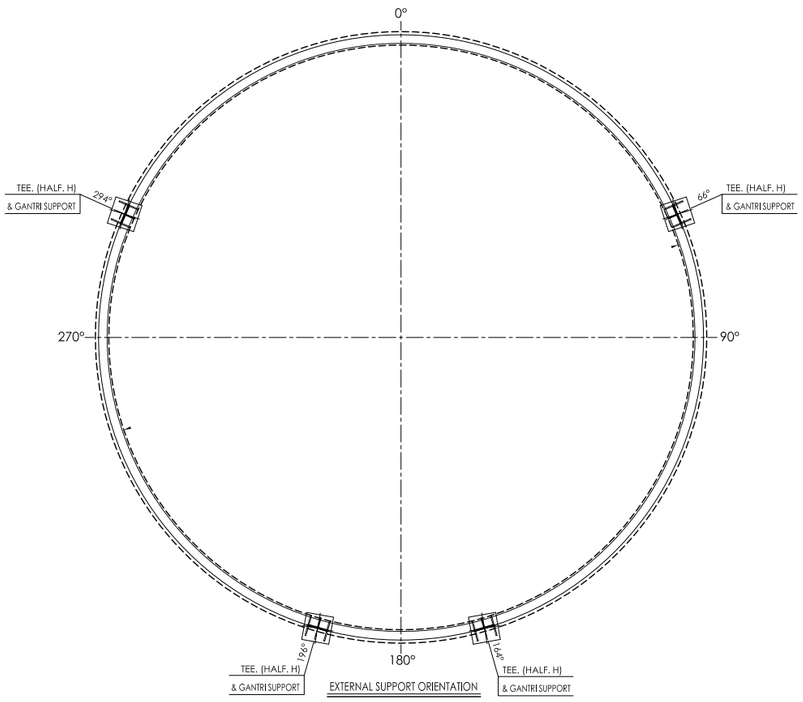
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

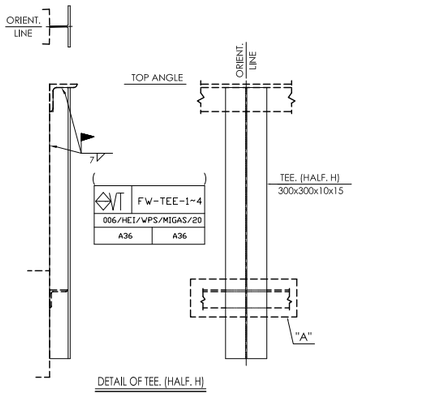
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

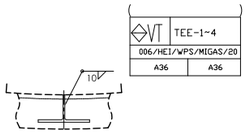
   # NOZZLE ATTACHMENT WELDING OF DUCTING



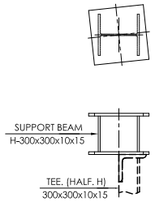
EXTERNAL SUPPORT ORIENTATION



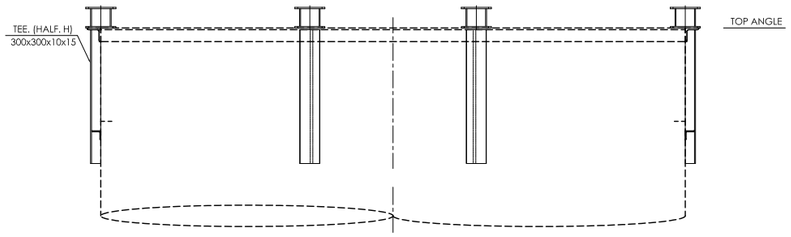
DETAIL OF TEE. (HALF. H)



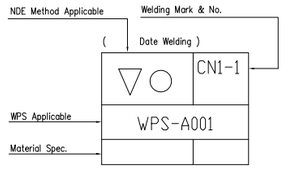
DETAIL "A"



DETAIL OF GANTRI SUPPORT



EXTERNAL SUPPORT ELEVATION



NDE METHOD SYMBOL

▽ UT SPOT

◈ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
TEE HALF	A36
SUPPORT BEAM	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name: NDE MAP EXTERNAL SUPPORT LEACH TANK

Sheet No./Total sheets	8/9
Size of memory	

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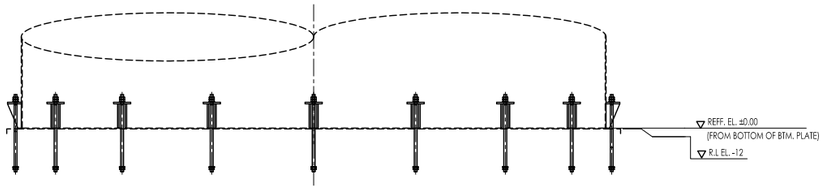
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: LEACH TANK
REFER DWG NO.	: E2502-000-DWG-109

NDE Map No.: E2502-NDE-PBY-001

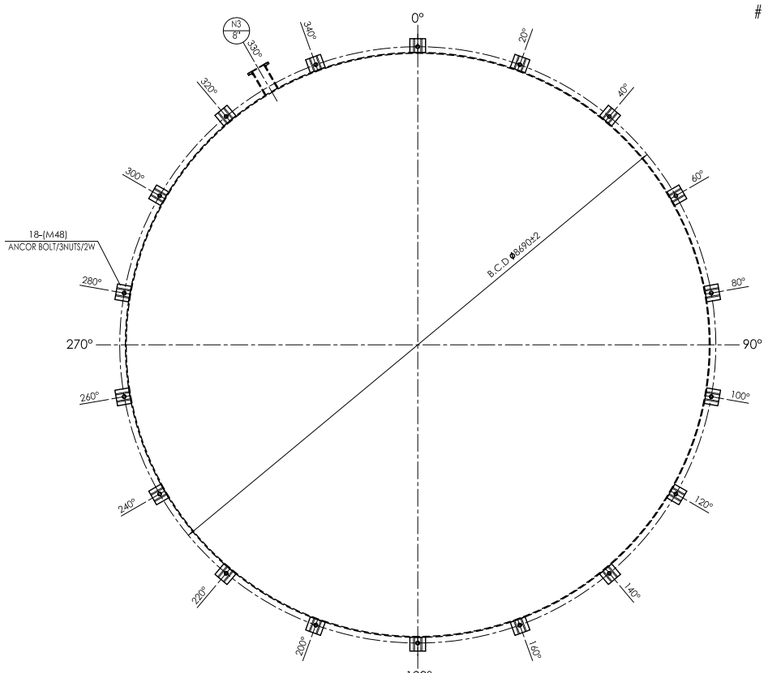
REV.: 0

GENERAL NOTES :

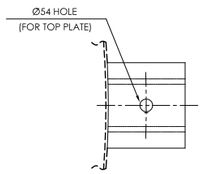
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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

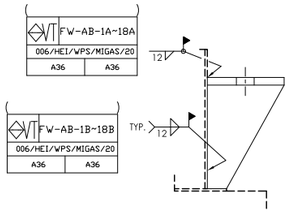


ANCHOR BOLT ELEVATION

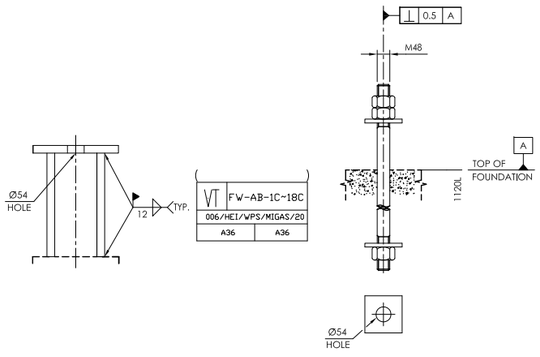


ANCHOR BOLT ORIENTATION
(PLAN VIEW)

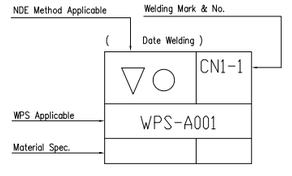




DETAIL OF ANCHOR BOLT CHAIR



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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
TOP PLATE	A36
GUSSET PLATE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP ANCHOR BOLT LEACH TANK

Sheet No./Total sheets	9/9
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: LEACH TANK
REFER DWG NO.	: E2502-000-DWG-111

NDE Map No.
E2502-NDE-PBY-001

REV.
0

6. NDE MAP NO. : E2502-NDE-PBY-002

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

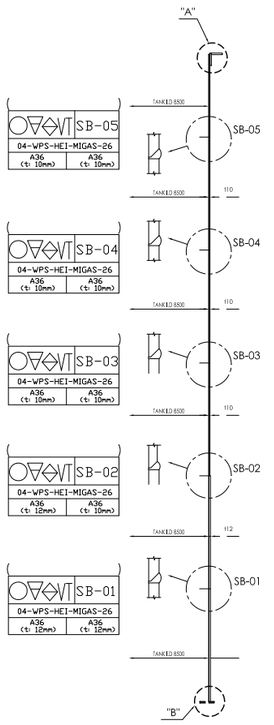
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

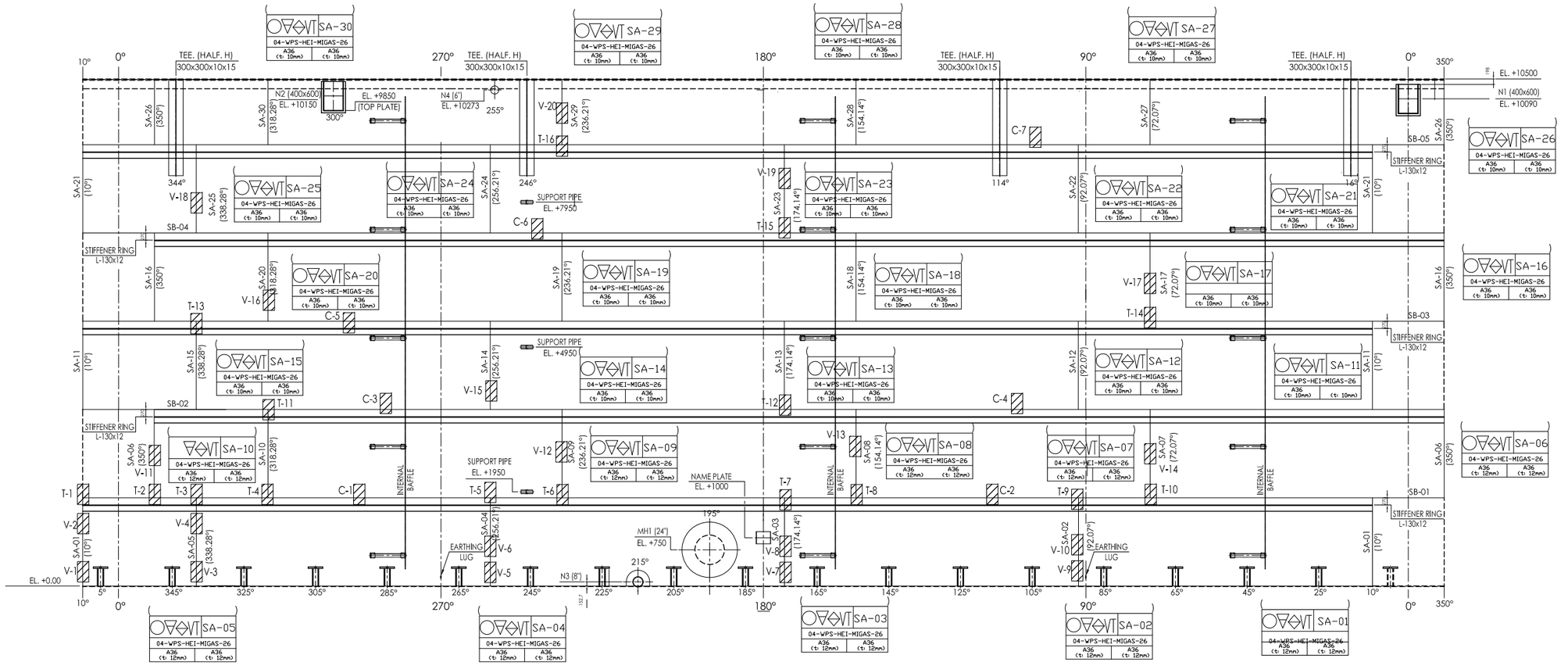
3. LIQUID PENETRANT

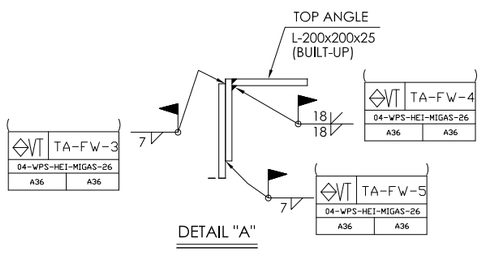
   # LIFTING LUG AND REMOVING OF JIG

   |# NOZZLE ATTACHMENT WELDING OF DUCTING

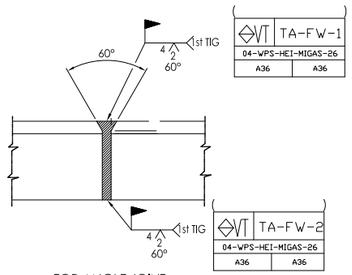


SHELL HORIZONTAL JOINT



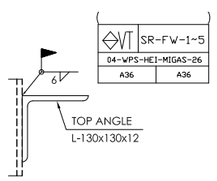


DETAIL "A"

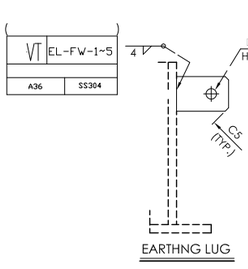


TOP ANGLE JOINT

SHELL DEVELOPMENT

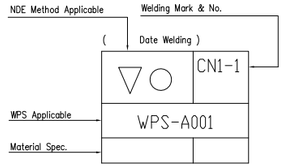


DETAIL OF STIFFENER RING



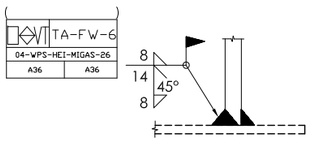
EARTHNG LUG

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



NDE METHOD SYMBOL

- □ VACUUM BOX
- ○ RT 10%
- ▽ UT SPOT LAMINATION CHECK FOR SHELL
- ◇ PT 10%
- VT VISUAL 100%



DETAIL "B"

MATERIAL SPECIFICATION	
SHELL	A36
TOP ANGLE	A36
STIFFENER RING	A36

LEGEND :

WPS NO : 008/HEI/WPS/MIGAS/21 SMAW P1 to P1
006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP SHELL ADSORPTION TANK 1

Sheet No./Total sheets	1/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-202

NDE Map No.
E2502-NDE-PBY-002

REV.
0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

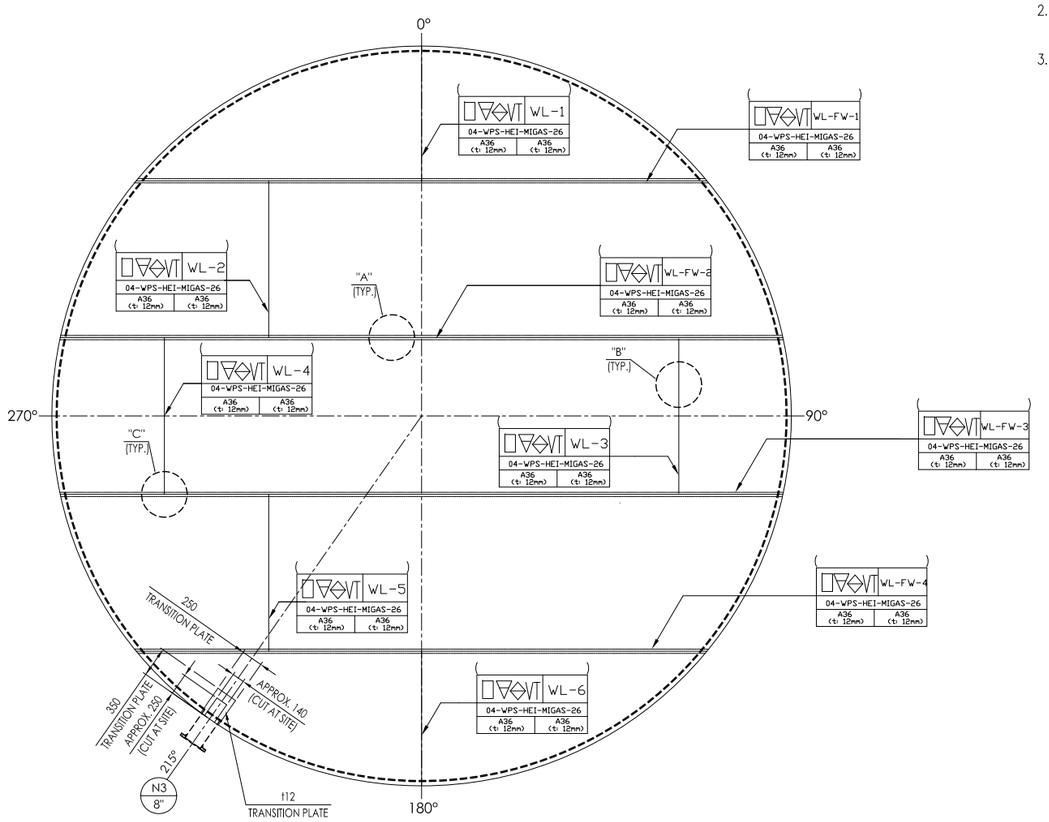
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

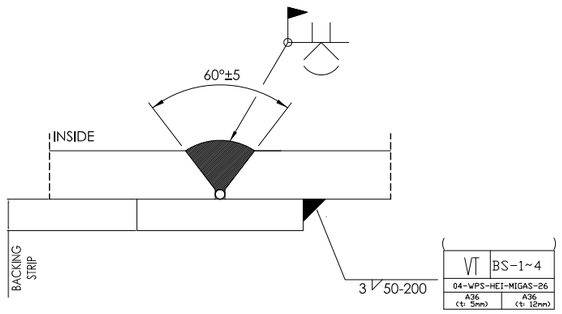
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

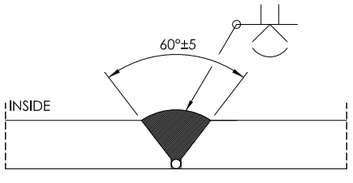
   # NOZZLE ATTACHMENT WELDING OF DUCTING



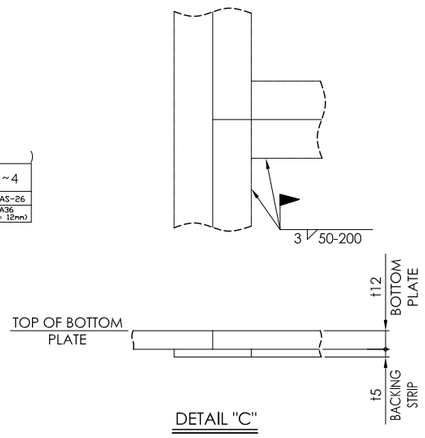
BOTTOM PLATE ARRANGEMENT



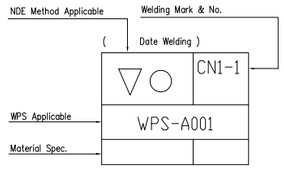
DETAIL "A"



DETAIL "B"



DETAIL "C"



NDE METHOD SYMBOL

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

MATERIAL SPECIFICATION	
BOTTOM PLATE	A36
BACKING STRIPE	A36

LEGEND :

WPS NO : 008/HEI/WPS/MIGAS/21 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP BOTTOM ADSORPTION TANK 1

Sheet No./Total sheets	2/10
Size of memory	

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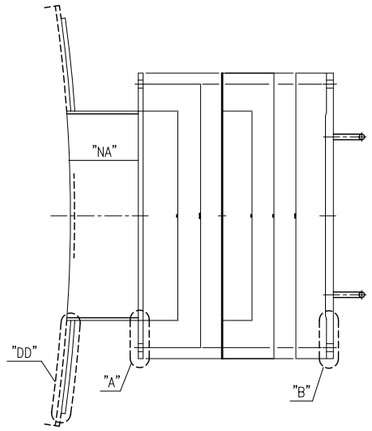
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-203

NDE Map No.
E2502-NDE-PBY-002

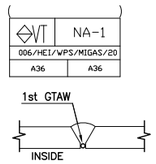
REV. 0

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



DETAIL OF NOZZLE (MH1) 24"



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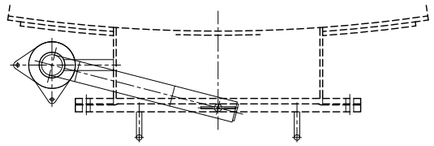
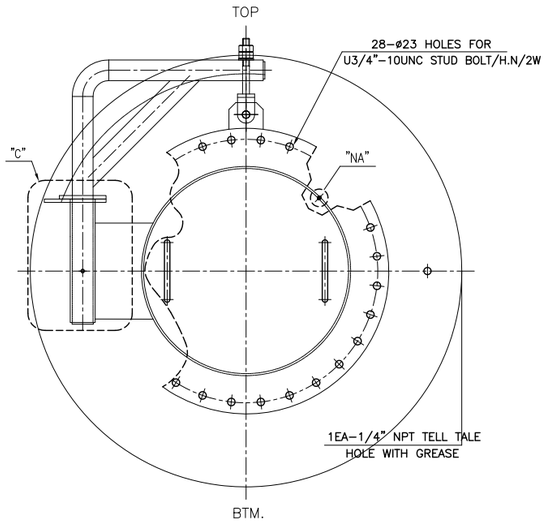
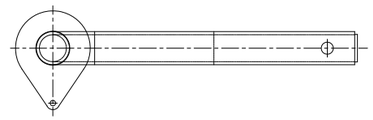
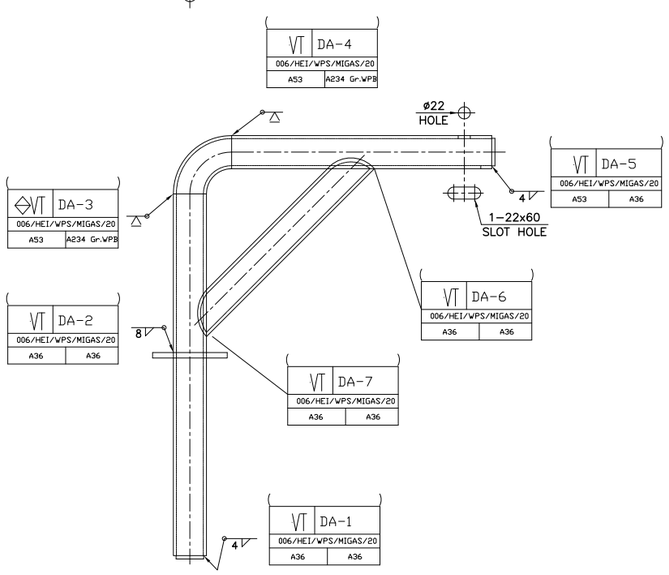


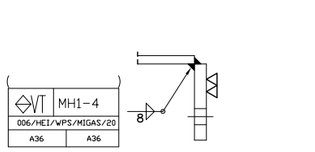


DAVIT ASSEMBLY
(DAVIT ORIENT. SEE ASS'Y DWG)

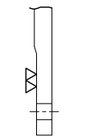




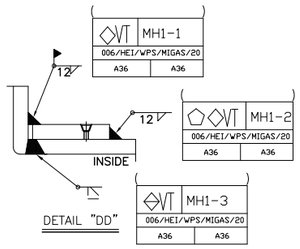
DAVIT DETAIL



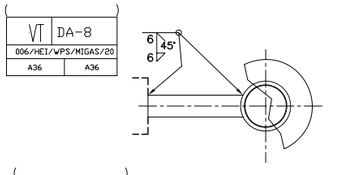
DETAIL "A"

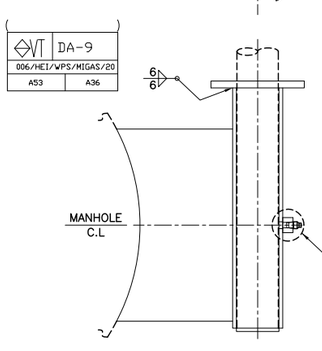


DETAIL "B"

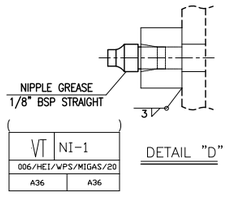


DETAIL "DD"

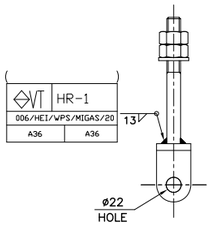


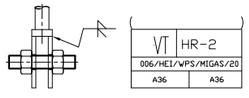


DETAIL "C"

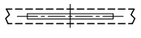


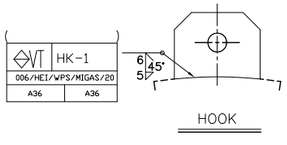
DETAIL "D"



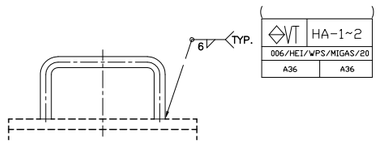


HANGER DETAIL

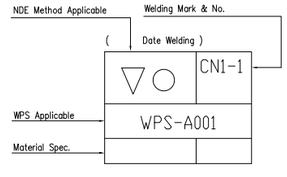




HOOK



HANDLE DETAIL



NDE METHOD SYMBOL

- UT SPOT
- PT 10%
- PT 100%
- PNEUMATIC TEST

VT VISUAL 100%

MATERIAL SPECIFICATION	
HOOK	A36
PIPE DAVIT	A53 Gr.B
HANDLE	A36
NOZZLE NECK	A36
PLATE FLANGE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP MANHOLE ADSORPTION TANK 1

Sheet No./Total sheets	3/9
Size of memory	

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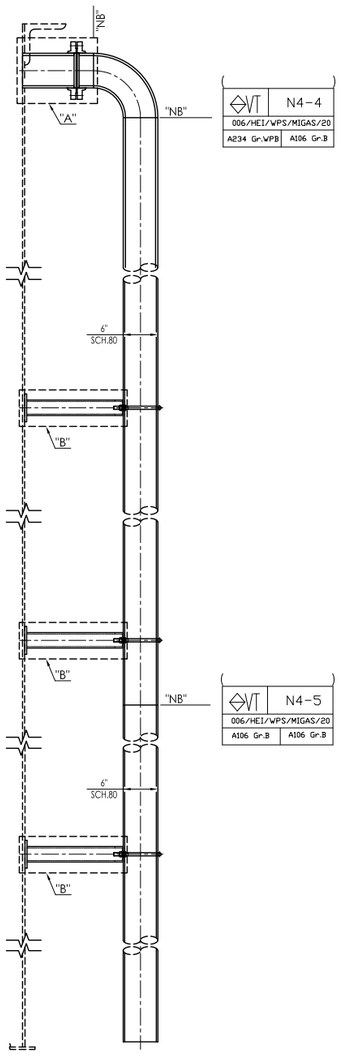
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-204

NDE Map No.
E2502-NDE-PBY-002

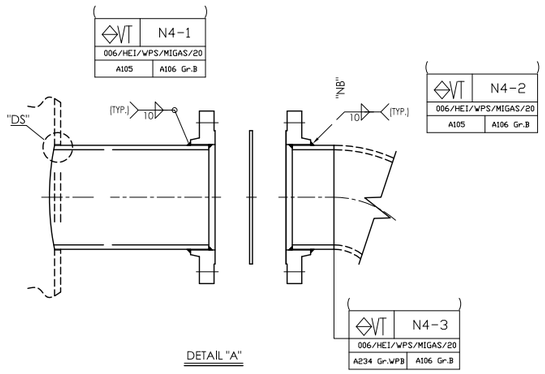
REV.
0

GENERAL NOTES :

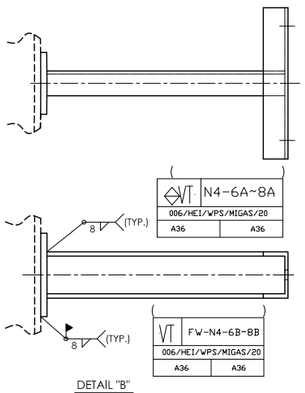
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



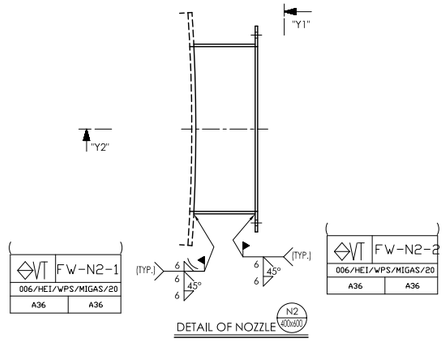
DETAIL OF NOZZLE N4 6"



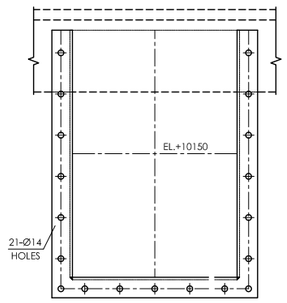
DETAIL "A"



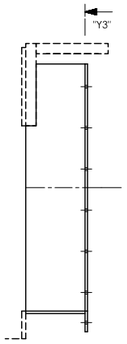
DETAIL "B"



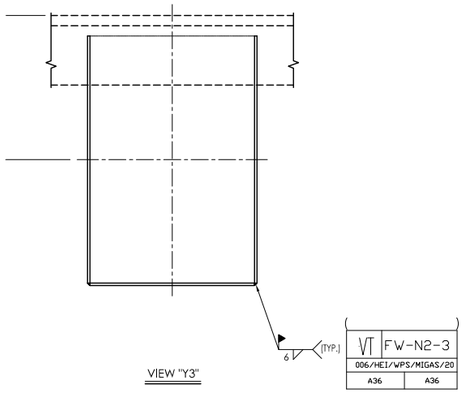
DETAIL OF NOZZLE N2 300x60



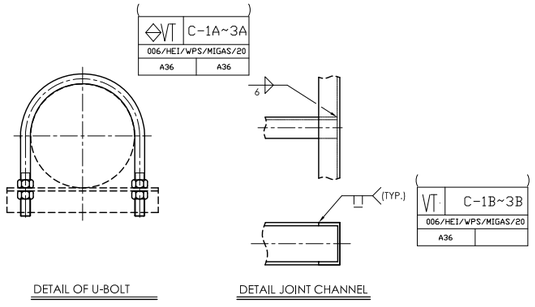
VIEW "Y1"



VIEW "Y2"

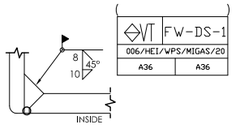


VIEW "Y3"



DETAIL OF U-BOLT

DETAIL JOINT CHANNEL



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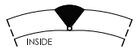
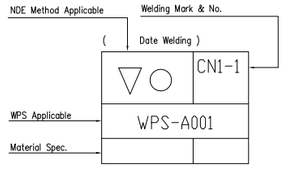


DETAIL "NB"



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 1-3 ADSORPTION TANK 1

Sheet No./Total sheets	4/9
Size of memory	

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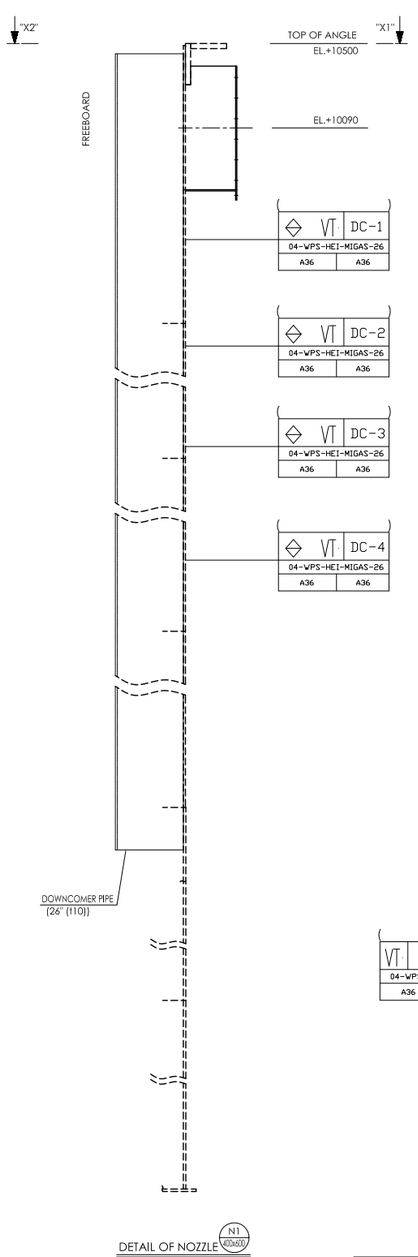
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-205

NDE Map No.
E2502-NDE-PBY-002

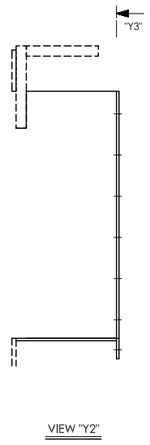
REV. 0

GENERAL NOTES :

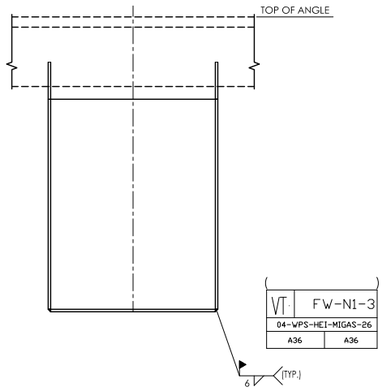
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



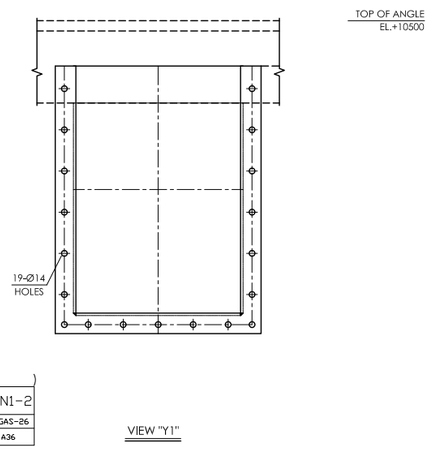
DETAIL OF NOZZLE N1 400x600



VIEW "Y2"

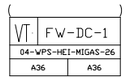


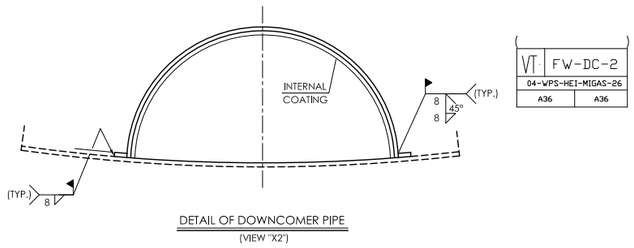
VIEW "Y3"



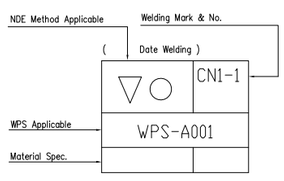
VIEW "X1"

VIEW "Y1"





DETAIL OF DOWNCOMER PIPE
(VIEW "X2")



NDE METHOD SYMBOL

▽ UT SPOT

◈ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

WPS NO : 004-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 2-3 ADSORPTION TANK 1

Sheet No./Total sheets	5/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-206

NDE Map No.
E2502-NDE-PBY-002

REV.
0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

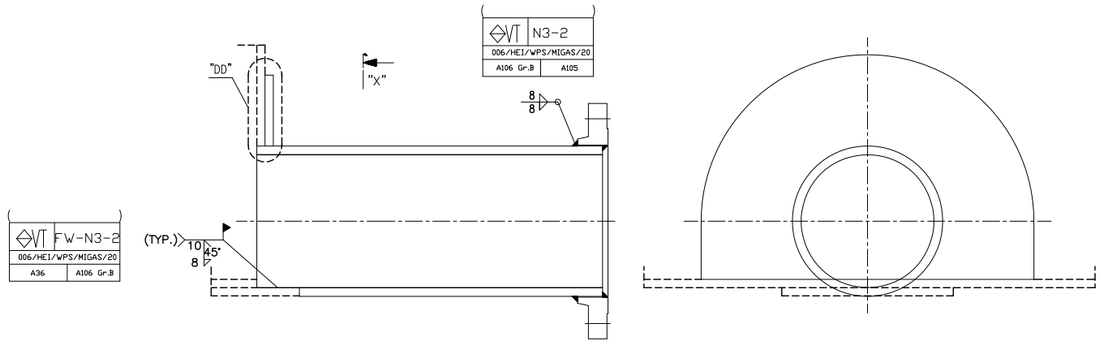
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

3. LIQUID PENETRANT

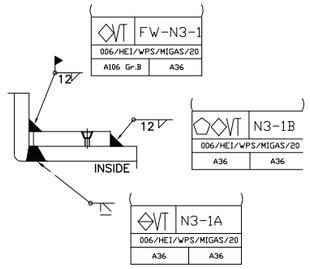
   # LIFTING LUG AND REMOVING OF JIG

   # NOZZLE ATTACHMENT WELDING OF DUCTING

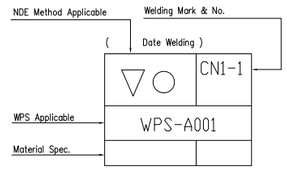


DETAIL OF NOZZLE N3 8"

DETAIL OF REINF. PAD



DETAIL "DD"



NDE METHOD SYMBOL

- ▽ UT SPOT
- ◇ PT 10%
- ◆ PT 100%
- ⬠ PNEUMATIC TEST

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 3-3 ADSORPTION TANK 1

Sheet No./Total sheets	6/9
Size of memory	

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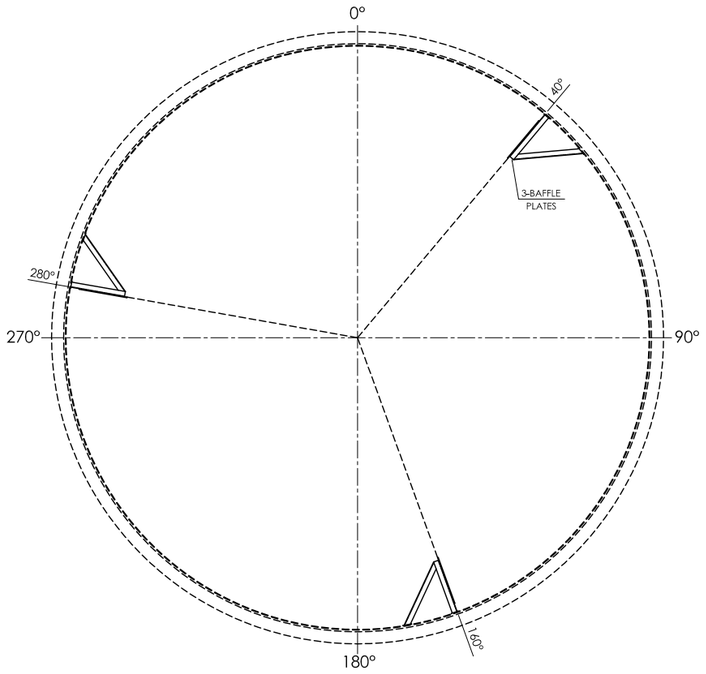
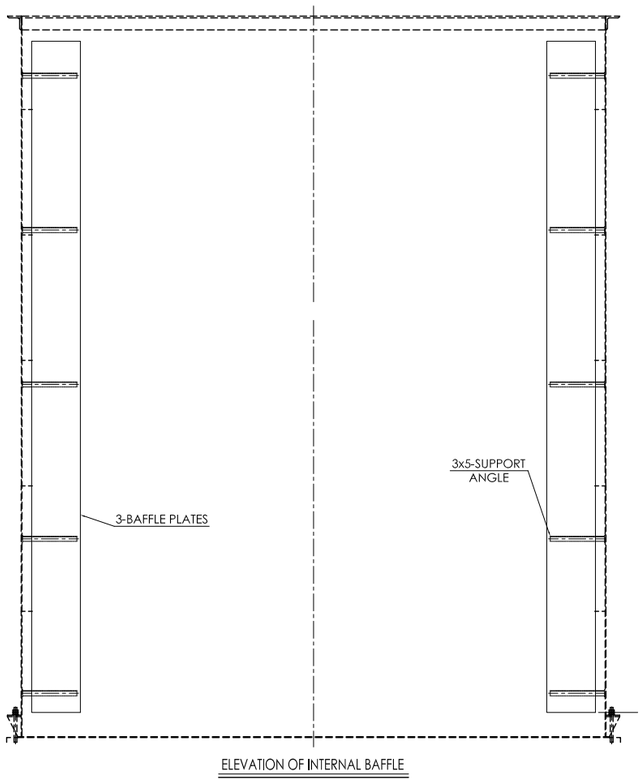
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-207

NDE Map No.
E2502-NDE-PBY-002

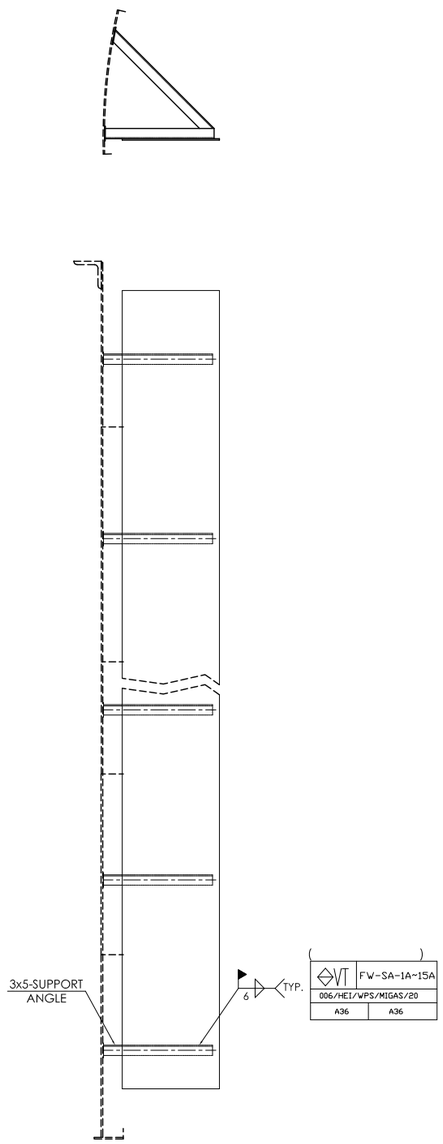
REV. 0



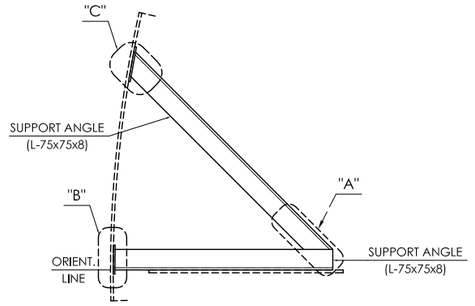
ORIENTATION OF INTERNAL BAFFLE

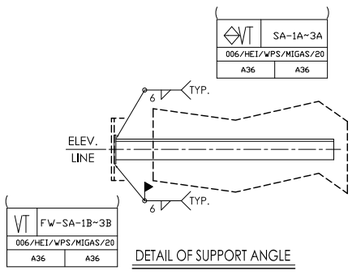


ELEVATION OF INTERNAL BAFFLE

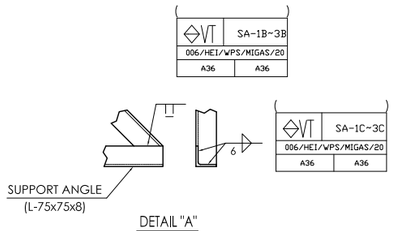


DETAIL OF INTERNAL BAFFLE





DETAIL OF SUPPORT ANGLE



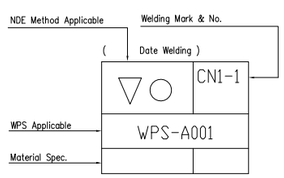
DETAIL "A"

DETAIL "B"

DETAIL "C"

GENERAL NOTES :

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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
INTERNAL BAFFLE	A36
SUPPORT ANGLE	A36
SUPPORT PAD	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name

NDE MAP INTERNAL BAFFLE ADSORPTION TANK 1

Sheet No./Total sheets	7/9
Size of memory	

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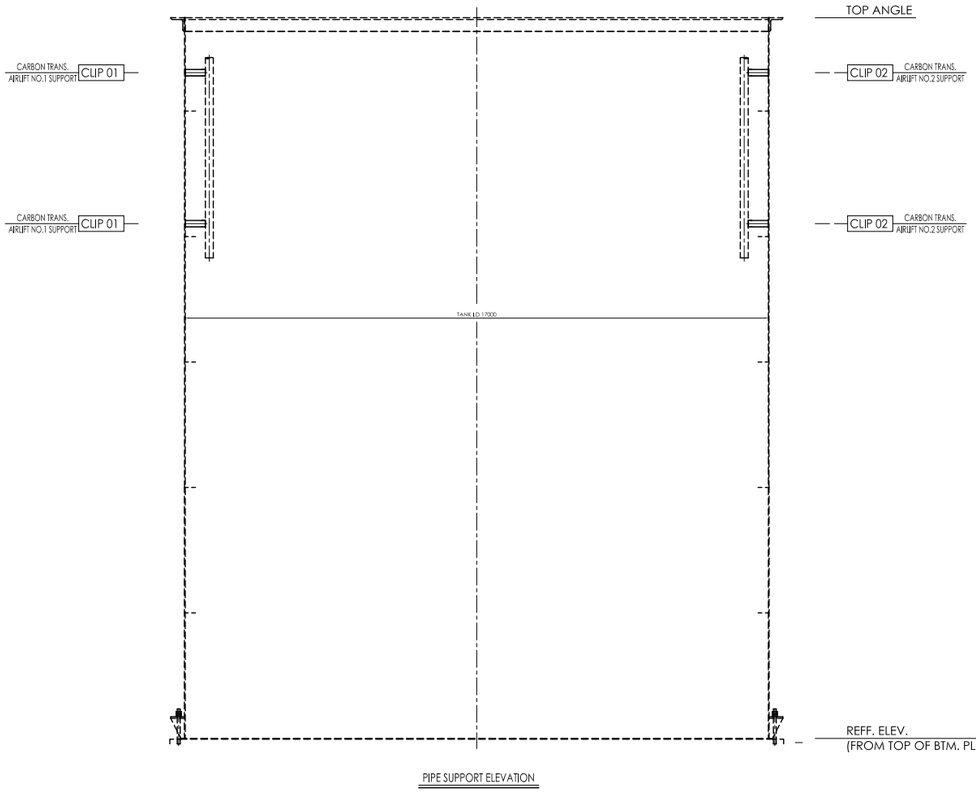
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-208

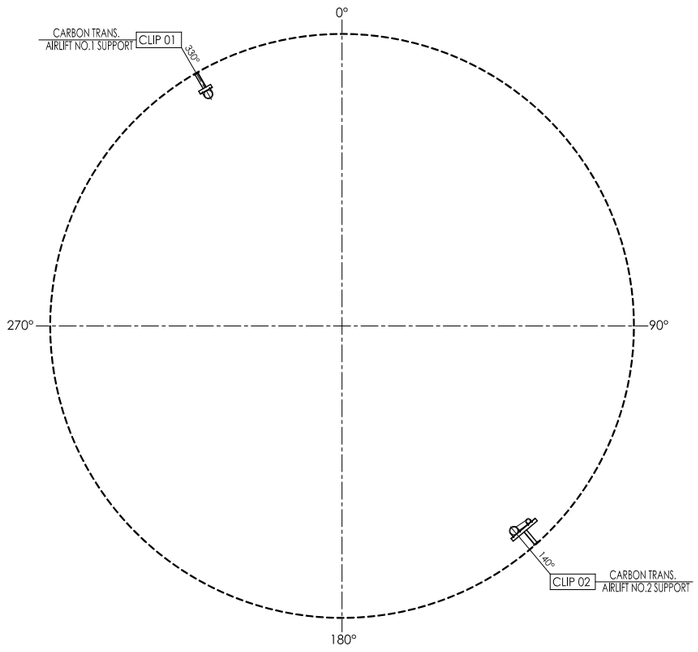
NDE Map No.	REV.
E2502-NDE-PBY-002	0

GENERAL NOTES :

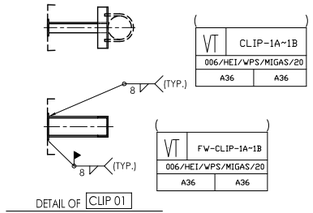
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



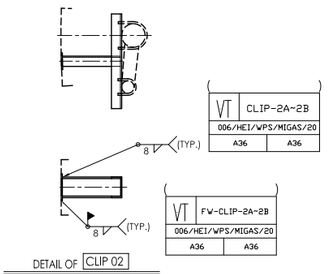
PIPE SUPPORT ELEVATION



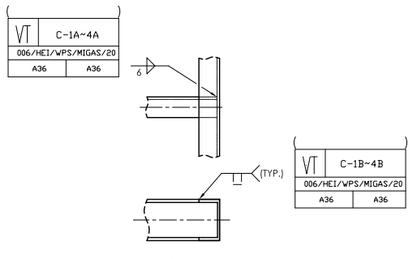
PIPE SUPPORT PLAN



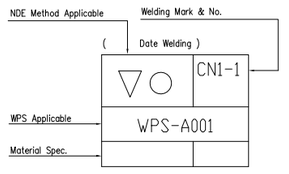
DETAIL OF CLIP 01
(CARBON TRANS. AIRLIFT NO.1 SUPPORT)



DETAIL OF CLIP 02
(CARBON TRANS. AIRLIFT NO.2 SUPPORT)



DETAIL JOINT CHANNEL



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :
SUPPORT CHANNEL	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1
REINF. PAD	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

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

CHANGE BY CAD SYSTEM ONLY

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP INTERNAL SUPPORT
ADSORPTION TANK 1

Sheet No./Total sheets	8/10
Size of memory	

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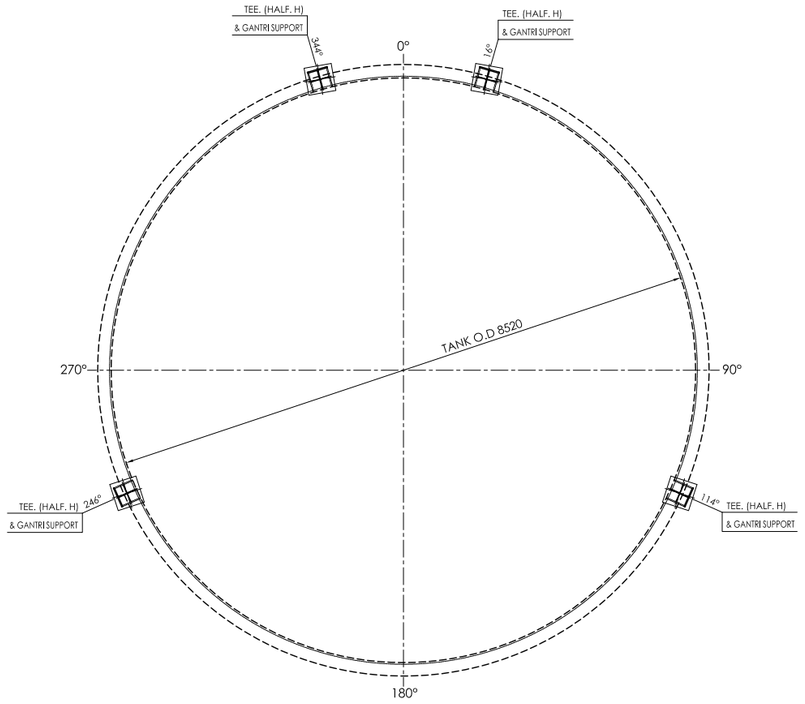
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-209

NDE Map No.
E2502-NDE-PBY-002

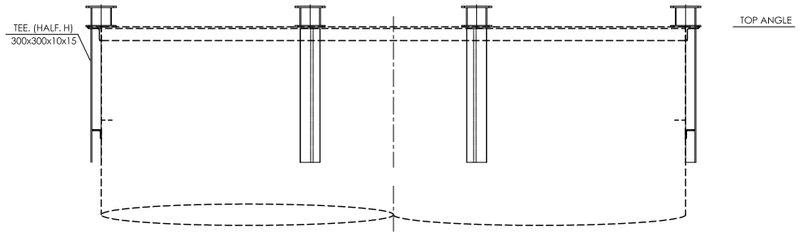
REV.
0

GENERAL NOTES :

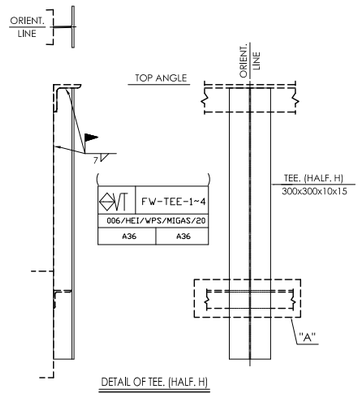
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



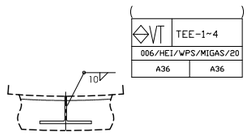
EXTERNAL SUPPORT ORIENTATION

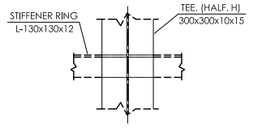


EXTERNAL SUPPORT ELEVATION

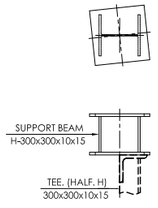


DETAIL OF TEE. (HALF. H)

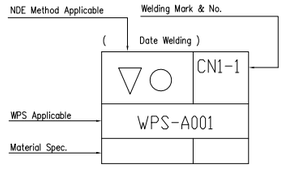




DETAIL "A"



DETAIL OF GANTRI SUPPORT



NDE METHOD SYMBOL

▽ UT SPOT
◇ PT 10%
VT VISUAL 100%

MATERIAL SPECIFICATION	
TEE HALF	A36
SUPPORT BEAM	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name

NDE MAP EXTERNAL SUPPORT
ADSORPTION TANK 1

Sheet No./Total sheets	9/10
Size of memory	

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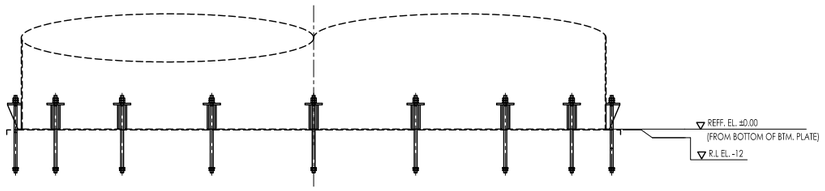
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-210

NDE Map No. : E2502-NDE-PBY-002

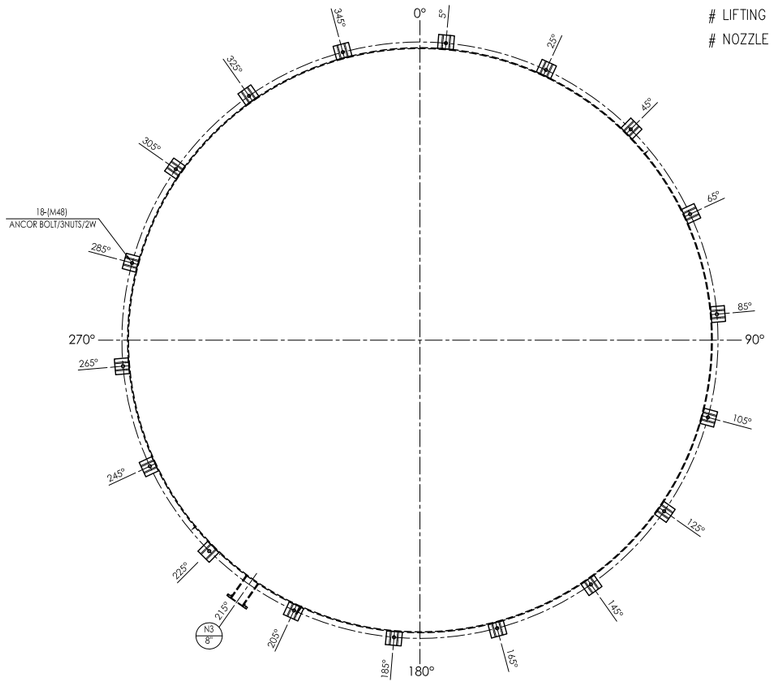
REV. : 0

GENERAL NOTES :

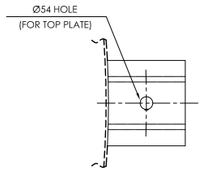
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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

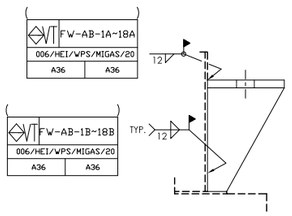


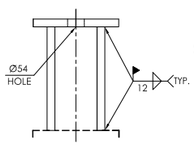
ANCHOR BOLT ELEVATION

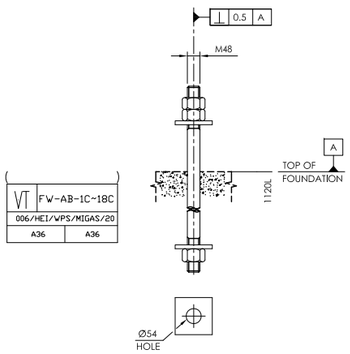


ANCHOR BOLT ORIENTATION
(PLAN VIEW)



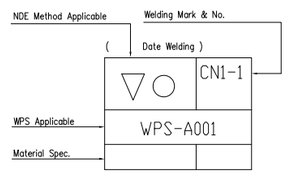






DETAIL OF ANCHOR BOLT CHAIR

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



NDE METHOD SYMBOL

▽ UT SPOT
◇ PT 10%
VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :
TOP PLATE	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1
GUSSET PLATE	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP ANCHOR BOLT ADSORPTION TANK 1

NDE Map No.
E2502-NDE-PBY-002

REV.
0

Sheet No./Total sheets	10/10
Size of memory	

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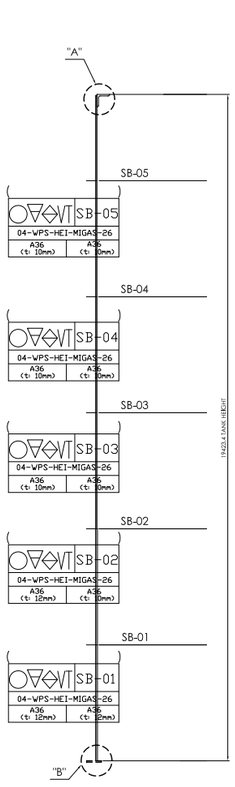
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-211

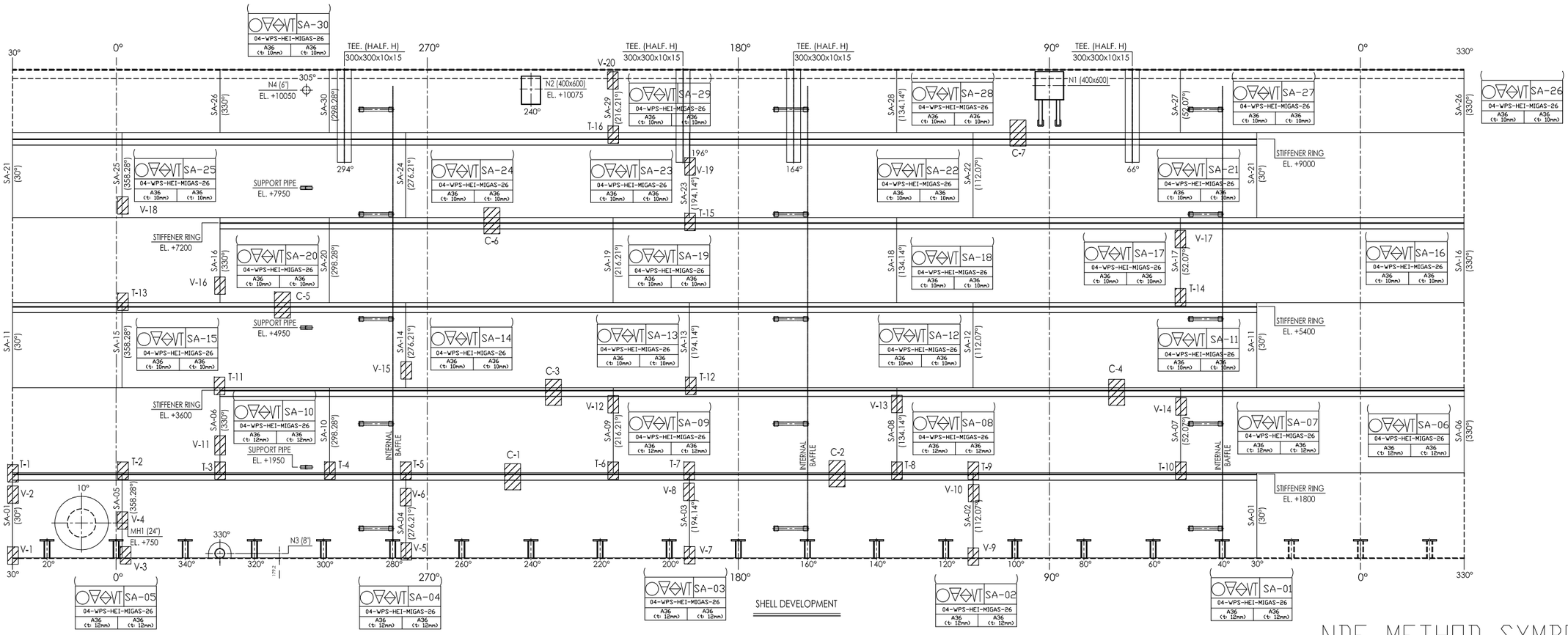
7. NDE MAP NO. : E2502-NDE-PBY-003

GENERAL NOTES :

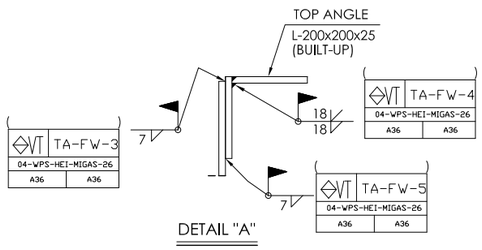
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   |# NOZZLE ATTACHMENT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



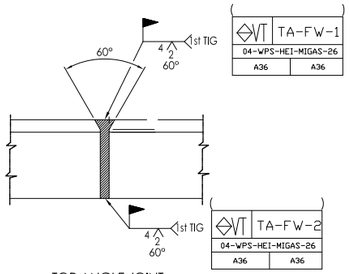
SHELL HORIZONTAL JOINT



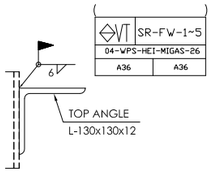
SHELL DEVELOPMENT



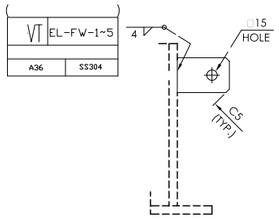
DETAIL "A"



TOP ANGLE JOINT

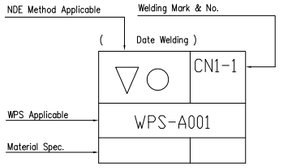


DETAIL OF STIFFENER RING



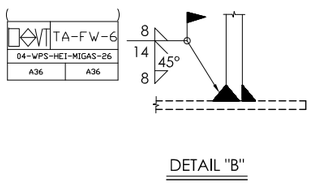
EARTHNG LUG

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



NDE METHOD SYMBOL

- VACUUM BOX
- RT 10%
- UT SPOT LAMINATION CHECK FOR SHELL
- PT 10%
- VT VISUAL 100%



DETAIL "B"

MATERIAL SPECIFICATION	
SHELL	A36
TOP ANGLE	A36
STIFFENER RING	A36

LEGEND :

WPS NO : 04-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP SHELL ADSORPTION TANK 2

NDE Map No.
E2502-NDE-PBY-001

REV. 0

Sheet No./Total sheets	1/9
Size of memory	

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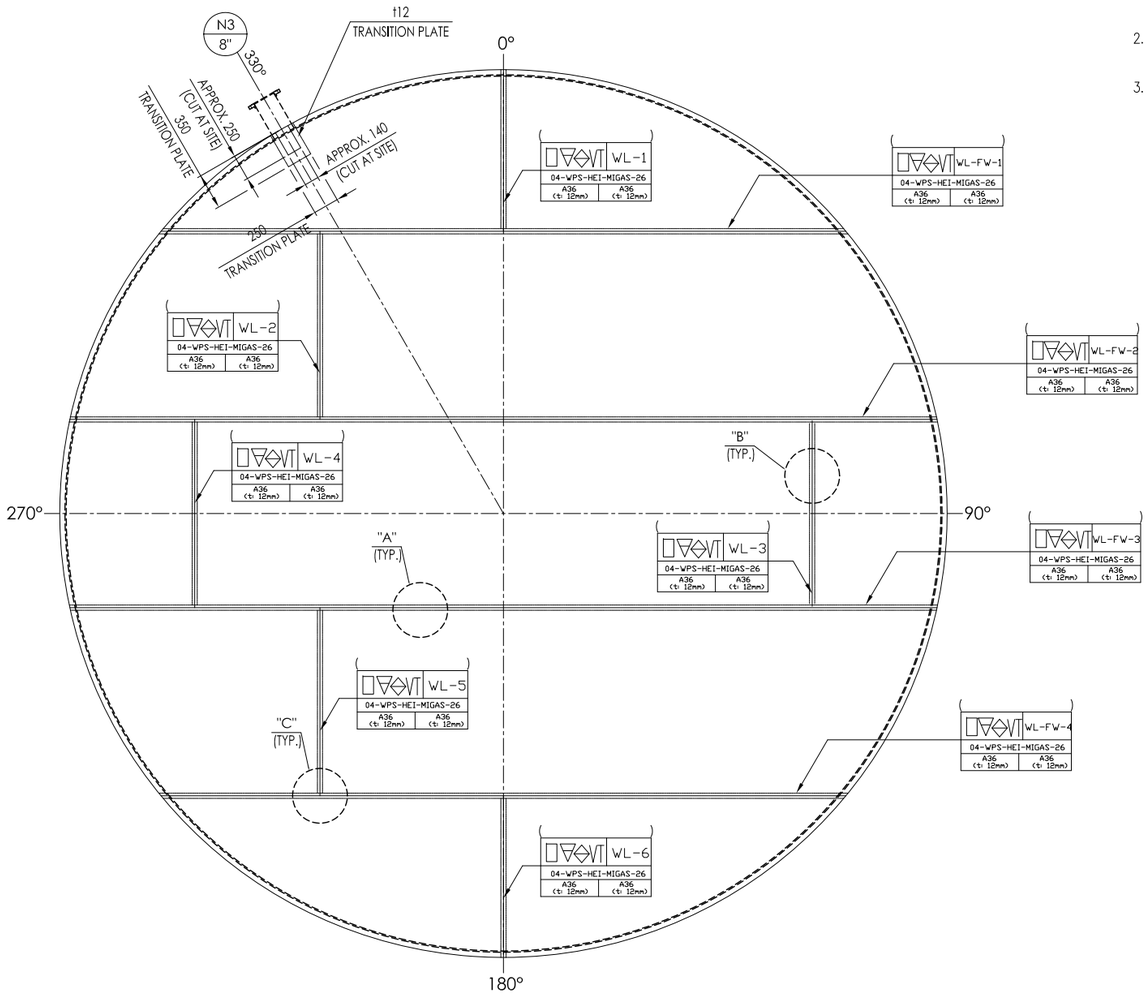
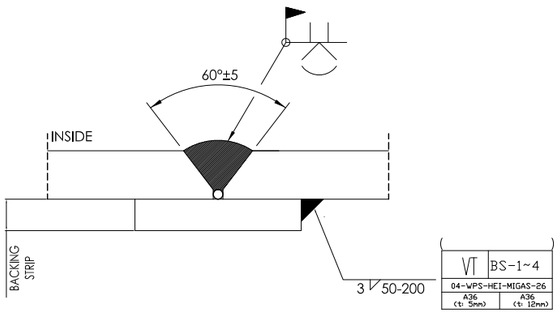
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 2
REFER DWG NO.	: E2502-000-DWG-302

GENERAL NOTES :

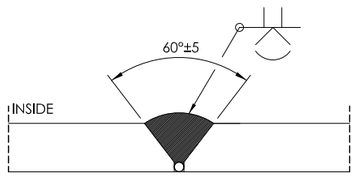
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



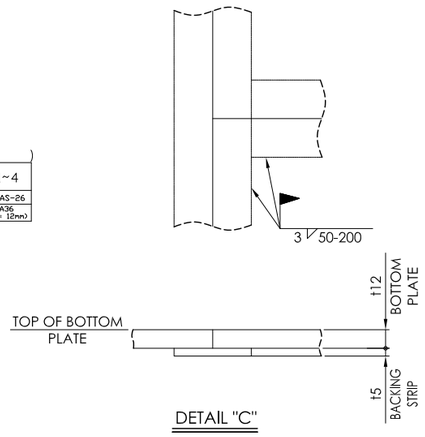
BOTTOM PLATE ARRANGEMENT



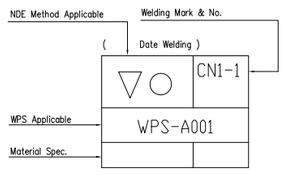
DETAIL "A"



DETAIL "B"



DETAIL "C"



NDE METHOD SYMBOL

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

MATERIAL SPECIFICATION		LEGEND :
BOTTOM PLATE	A36	WPS NO : 04-WPS-HEI-MIGAS-26 SMAW P1 to P1
BACKING STRIPE	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP BOTTOM ADSORPTION TANK 2

Sheet No./Total sheets	2/9
Size of memory	

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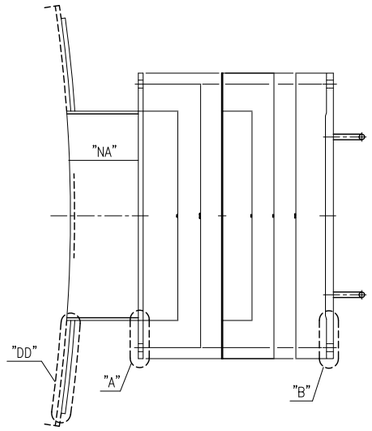
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 2
REFER DWG NO.	: E2502-000-DWG-303

NDE Map No. E2502-NDE-PBY-003

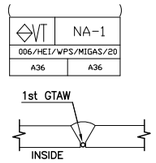
REV. 0

GENERAL NOTES :

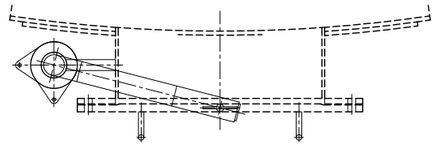
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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

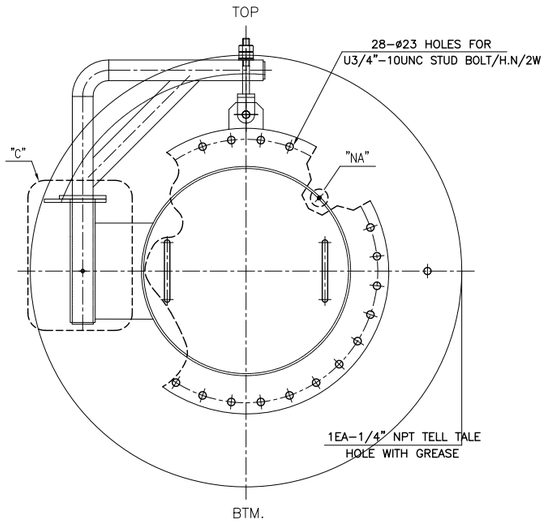


DETAIL OF NOZZLE (MH1) 24"

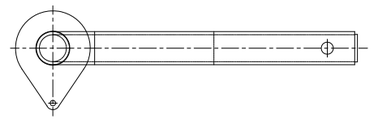


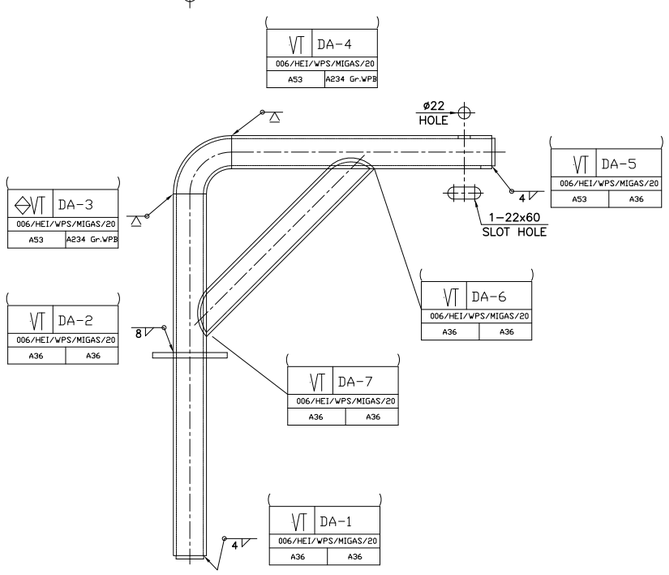
DETAIL "NA"



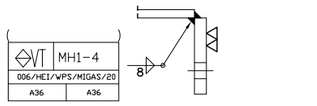


DAVIT ASSEMBLY
(DAVIT ORIENT. SEE ASS'Y DWG)

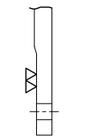




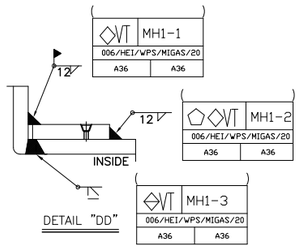
DAVIT DETAIL



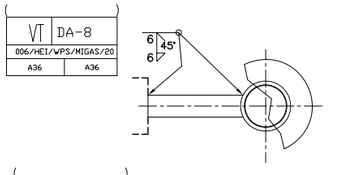
DETAIL "A"



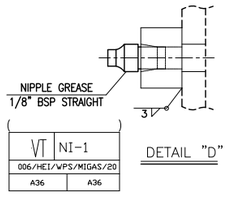
DETAIL "B"



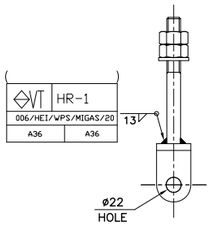
DETAIL "DD"

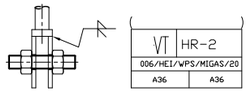


DETAIL "C"

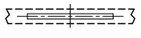


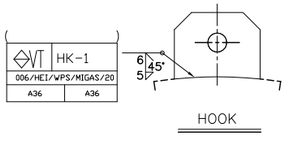
DETAIL "D"



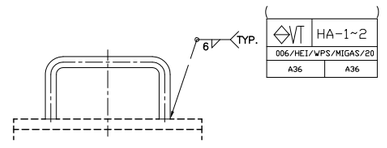


HANGER DETAIL



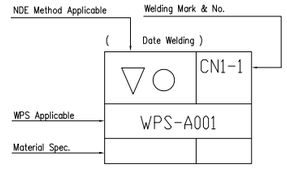


HOOK



HANDLE DETAIL

NDE METHOD SYMBOL



- UT SPOT
- PT 10%
- PT 100%
- PNEUMATIC TEST

VT VISUAL 100%

MATERIAL SPECIFICATION	
HOOK	A36
PIPE DAVIT	A53 Gr.B
HANDLE	A36
NOZZLE NECK	A36
PLATE FLANGE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP MANHOLE ADSORPTION TANK 2

Sheet No./Total sheets	3/9
Size of memory	

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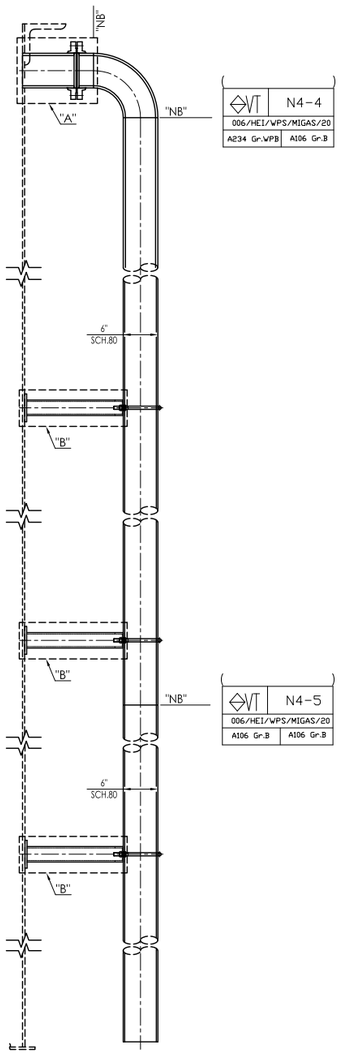
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 2
REFER DWG NO.	: E2502-000-DWG-304

NDE Map No.
E2502-NDE-PBY-003

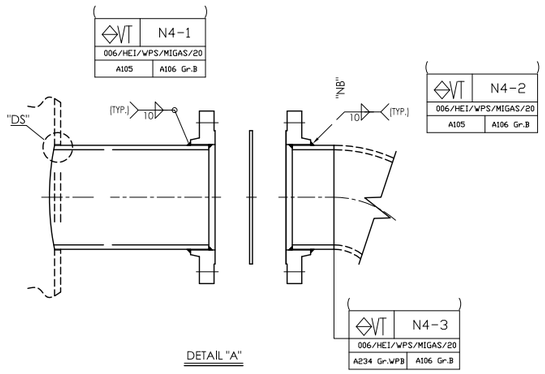
REV.
0

GENERAL NOTES :

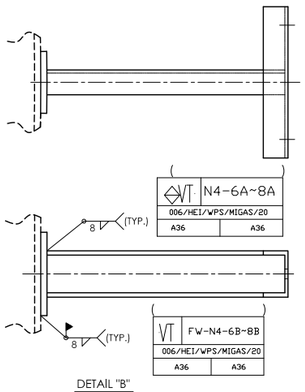
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



DETAIL OF NOZZLE N4 6"



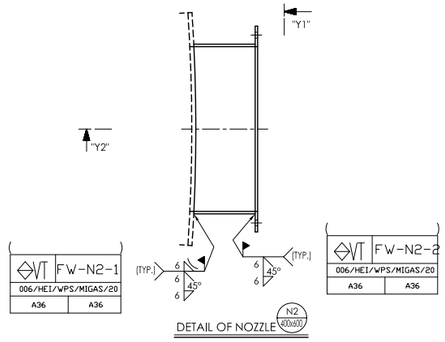
DETAIL "A"



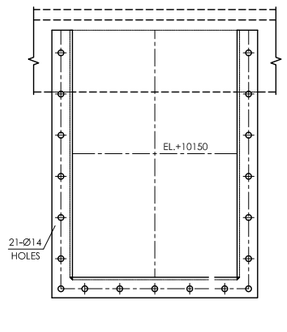
DETAIL "B"

DETAIL "DS"

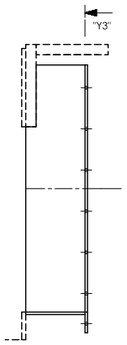
DETAIL "NB"



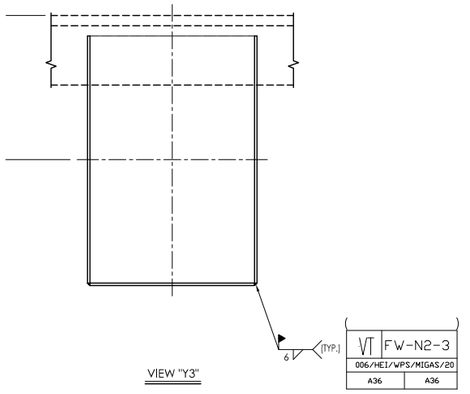
DETAIL OF NOZZLE N2 300x60



VIEW "Y1"



VIEW "Y2"



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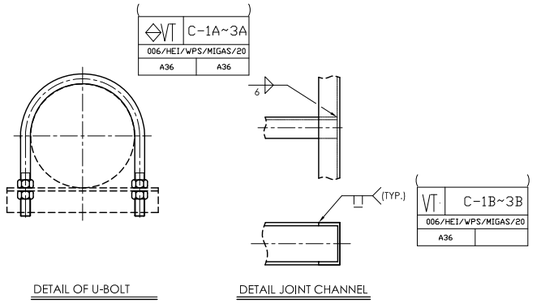
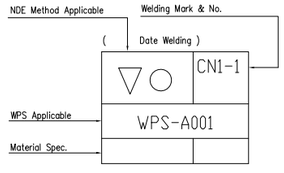


DETAIL OF U-BOLT

DETAIL JOINT CHANNEL



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 1-3 ADSORPTION TANK 2

Sheet No./Total sheets	4/9
Size of memory	

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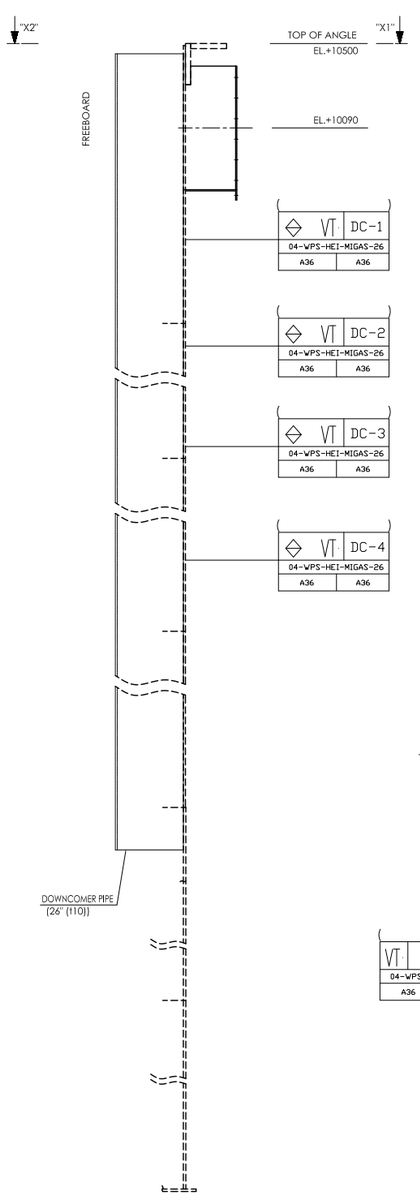
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 2
REFER DWG NO.	: E2502-000-DWG-305

NDE Map No.
E2502-NDE-PBY-003

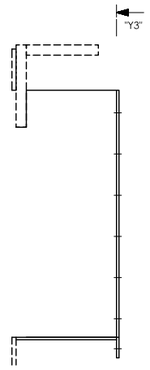
REV. 0

GENERAL NOTES :

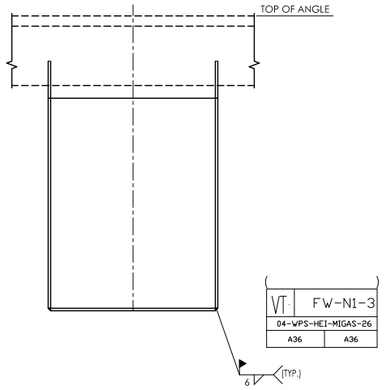
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



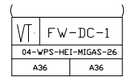
DETAIL OF NOZZLE N1 400x600

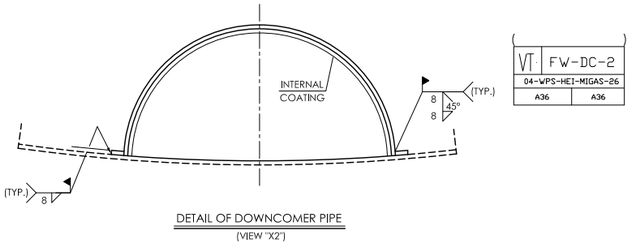


VIEW "Y2"

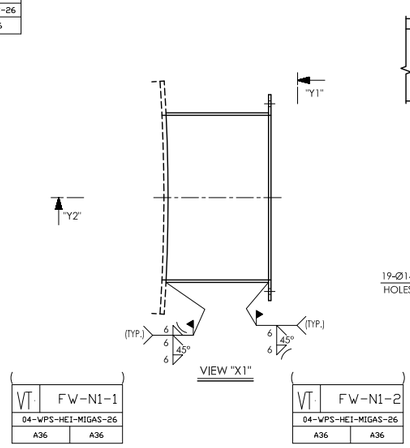


VIEW "Y3"

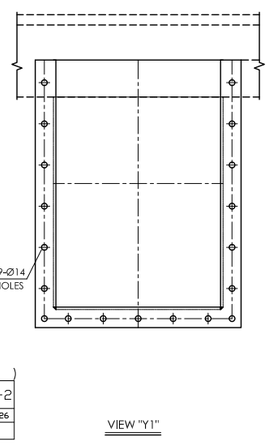




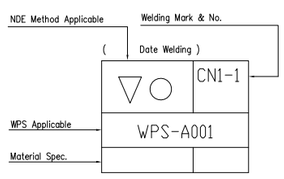
DETAIL OF DOWNCOMER PIPE
(VIEW "X2")



VIEW "X1"



VIEW "Y1"



NDE METHOD SYMBOL

▽ UT SPOT

◈ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

WPS NO : 004-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 2-3 ADSORPTION TANK 2

Sheet No./Total sheets	5/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 2
REFER DWG NO.	: E2502-000-DWG-306

NDE Map No.
E2502-NDE-PBY-003

REV.
0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

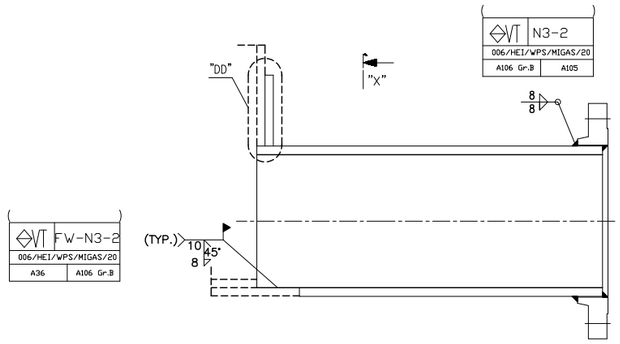
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

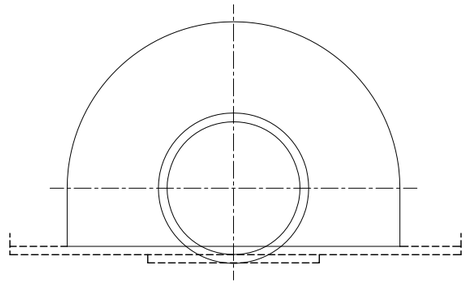
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

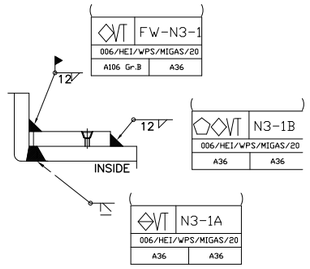
   # NOZZLE ATTACHMENT WELDING OF DUCTING



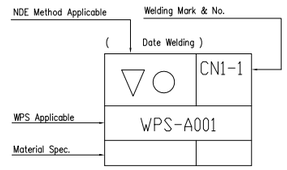
DETAIL OF NOZZLE N3 8"



DETAIL OF REINF. PAD



DETAIL "DD"



NDE METHOD SYMBOL

- UT SPOT
- PT 10%
- PT 100%
- PNEUMATIC TEST

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Sheet No./Total sheets : 6/9

Size of memory :

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 2
REFER DWG NO.	: E2502-000-DWG-307

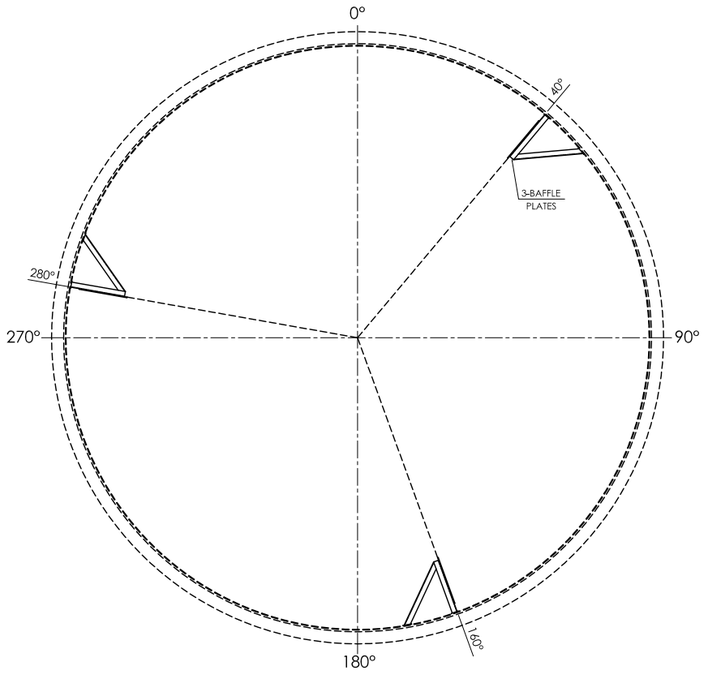
Name

NDE MAP NOZZLE 3-3 ADSORPTION TANK 2

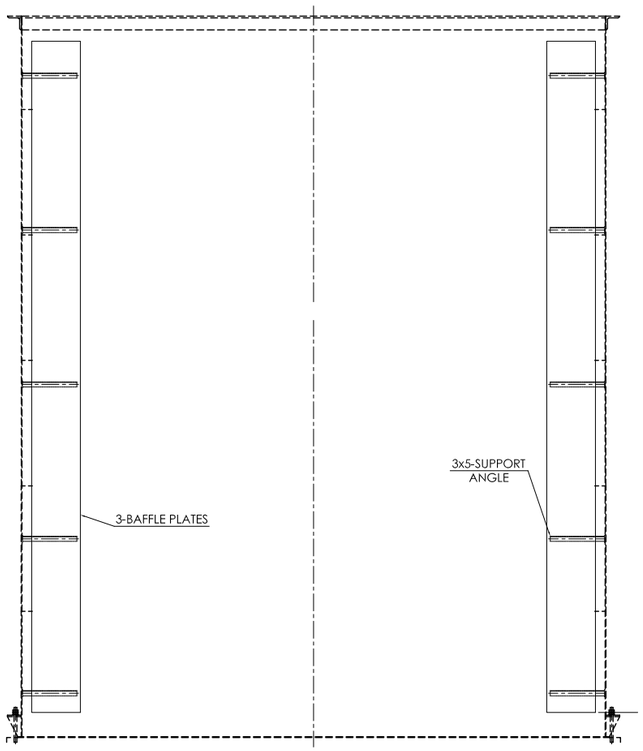
NDE Map No.

E2502-NDE-PBY-003

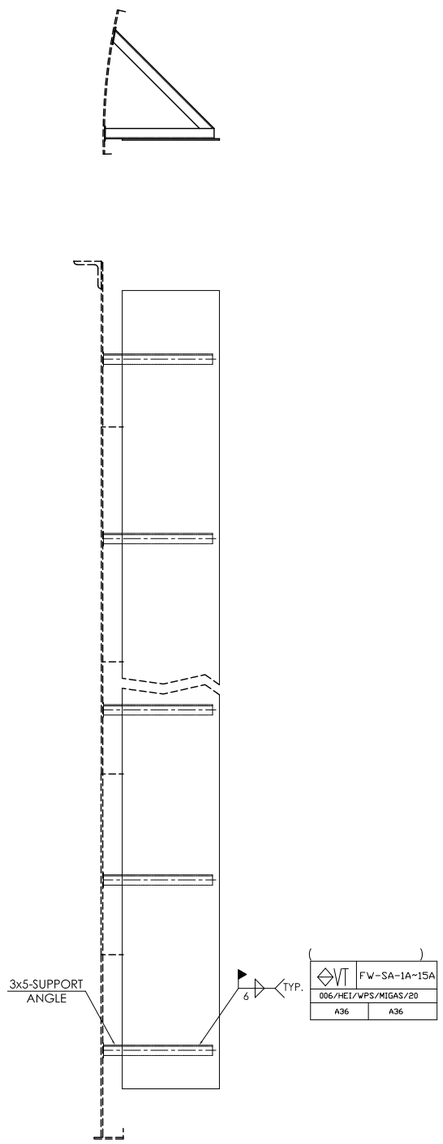
REV. 0



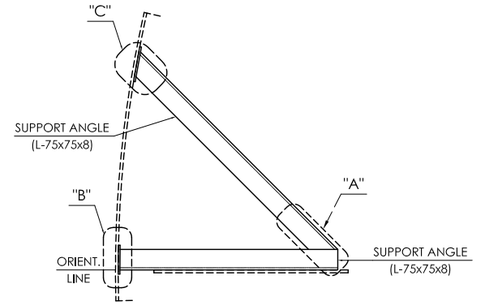
ORIENTATION OF INTERNAL BAFFLE

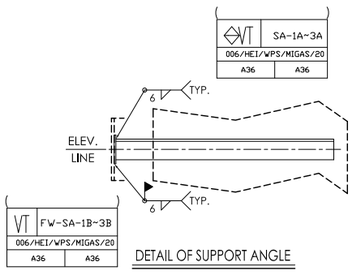


ELEVATION OF INTERNAL BAFFLE

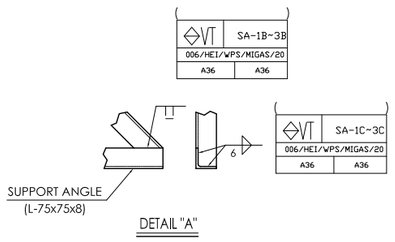


DETAIL OF INTERNAL BAFFLE





DETAIL OF SUPPORT ANGLE



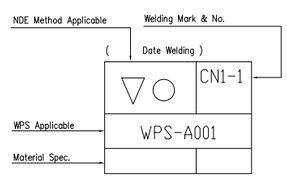
DETAIL "A"

DETAIL "B"

DETAIL "C"

GENERAL NOTES :

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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
INTERNAL BAFFLE	A36
SUPPORT ANGLE	A36
SUPPORT PAD	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name

NDE MAP INTERNAL BAFFLE ADSORPTION TANK 2

Sheet No./Total sheets	7/9
Size of memory	

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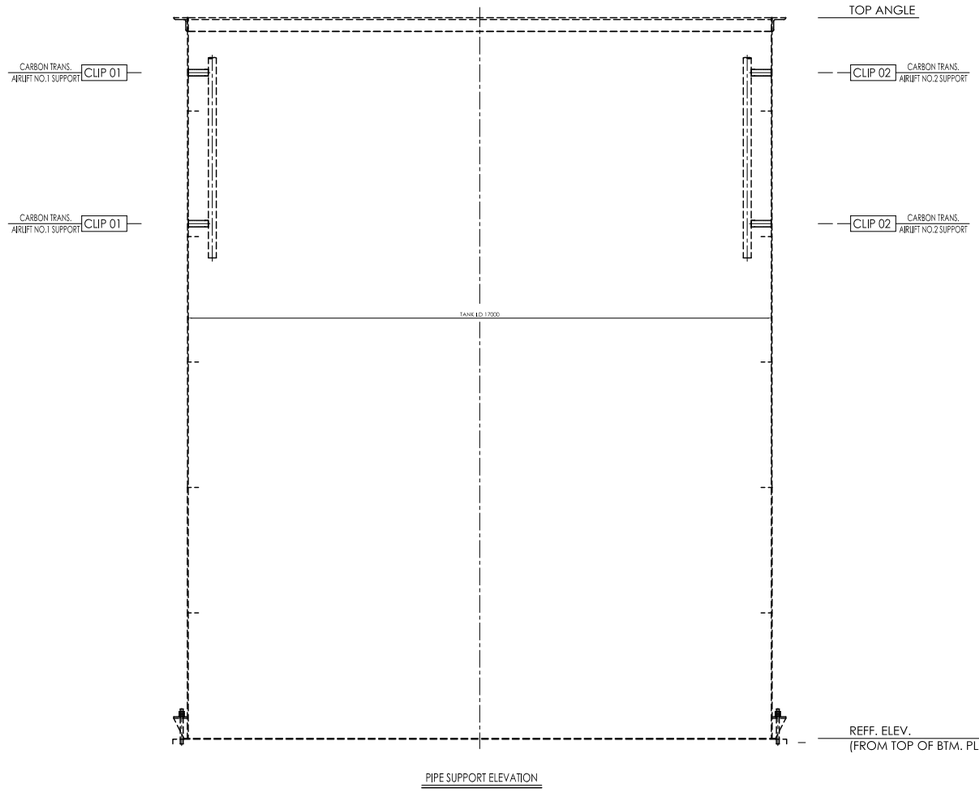
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 2
REFER DWG NO.	: E2502-000-DWG-308

NDE Map No. E2502-NDE-PBY-003

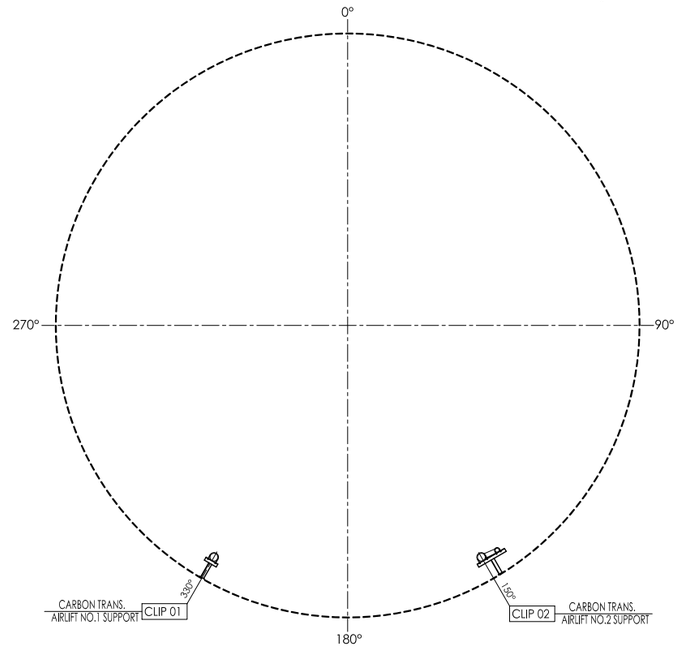
REV. 0

GENERAL NOTES :

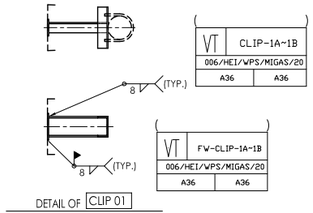
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



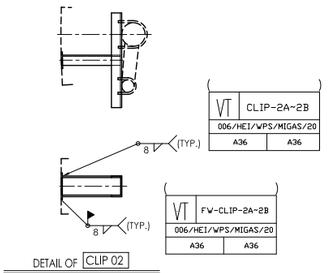
PIPE SUPPORT ELEVATION



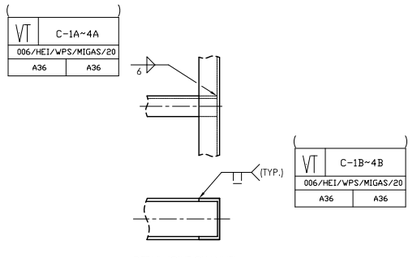
PIPE SUPPORT PLAN



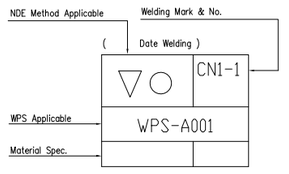
DETAIL OF CLIP 01
(CARBON TRANS. AIRLIFT NO.1 SUPPORT)



DETAIL OF CLIP 02
(CARBON TRANS. AIRLIFT NO.2 SUPPORT)



DETAIL JOINT CHANNEL



NDE METHOD SYMBOL

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

MATERIAL SPECIFICATION		LEGEND :
SUPPORT CHANNEL	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1
REINF. PAD	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP INTERNAL SUPPORT
ADSORPTION TANK 2

Sheet No./Total sheets	8/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 2
REFER DWG NO.	: E2502-000-DWG-309

NDE Map No.
E2502-NDE-PBY-003

REV. 0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

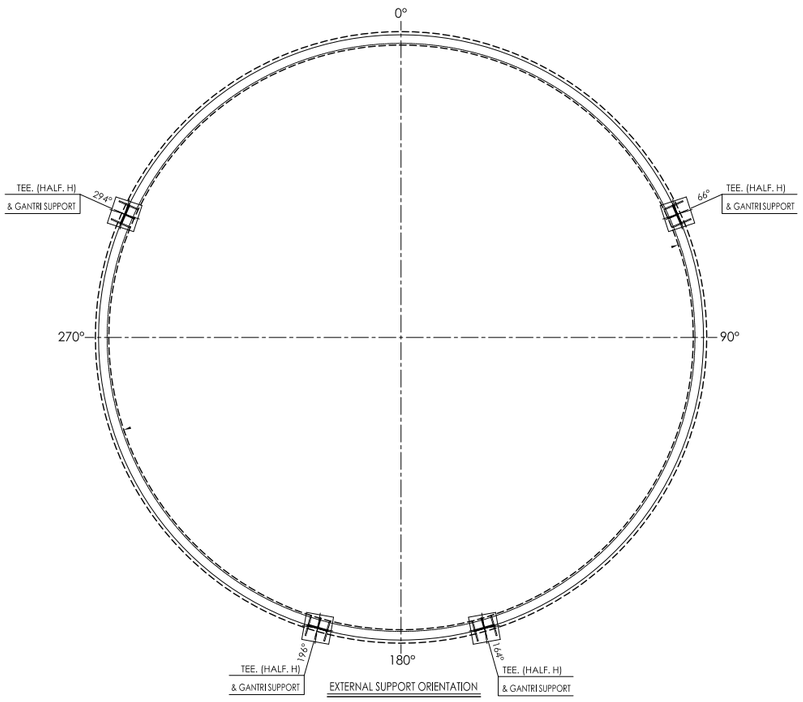
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

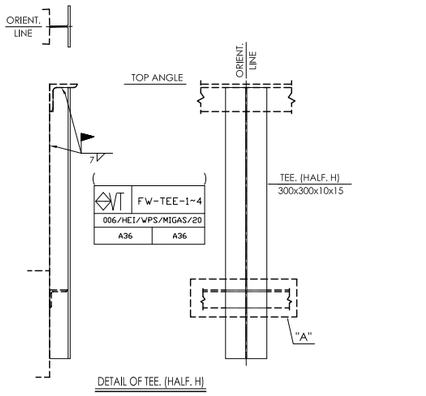
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

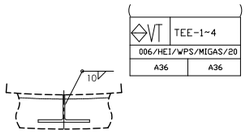
   # NOZZLE ATTACHMENT WELDING OF DUCTING

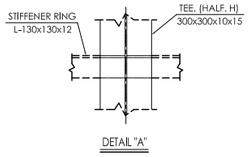


EXTERNAL SUPPORT ORIENTATION

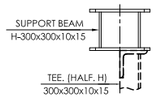


DETAIL OF TEE. (HALF. H)

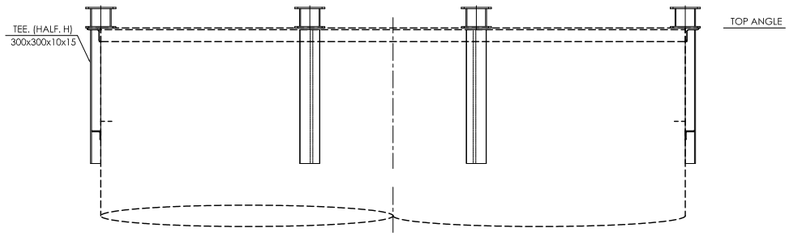




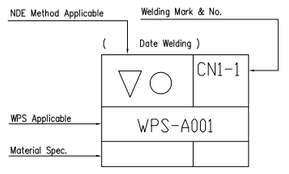
DETAIL "A"



DETAIL OF GANTRI SUPPORT



EXTERNAL SUPPORT ELEVATION



NDE METHOD SYMBOL

▽ UT SPOT

◈ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
TEE HALF	A36
SUPPORT BEAM	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name

NDE MAP EXTERNAL SUPPORT ADSORPTION TANK 2

Sheet No./Total sheets	8/9
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 2
REFER DWG NO.	: E2502-000-DWG-309

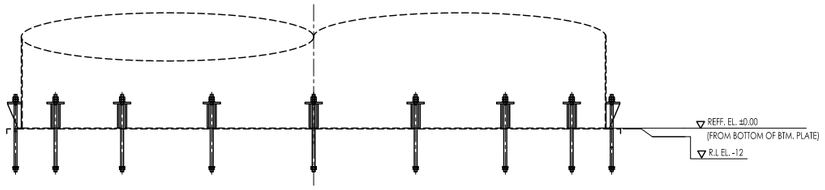
NDE Map No.

E2502-NDE-PBY-003

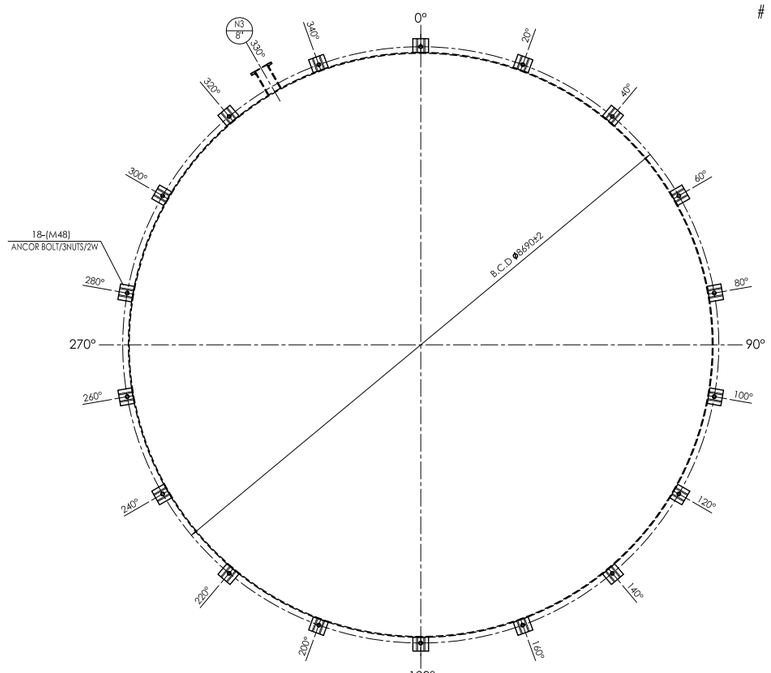
REV. 0

GENERAL NOTES :

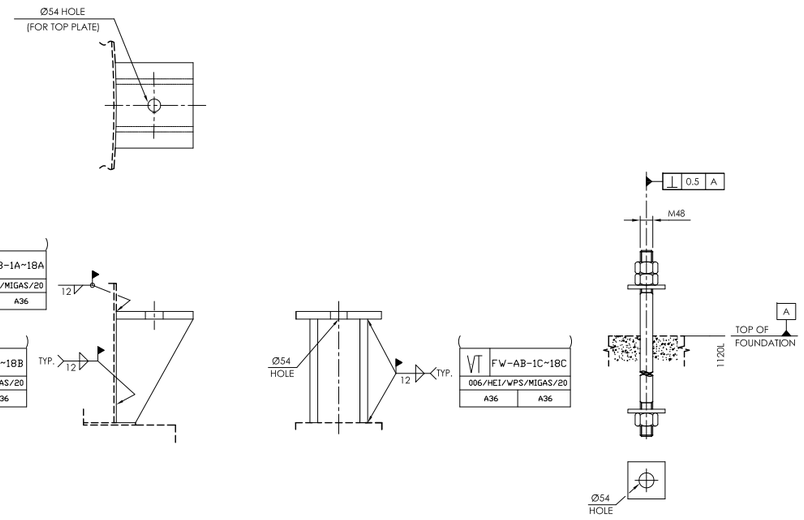
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



ANCHOR BOLT ELEVATION

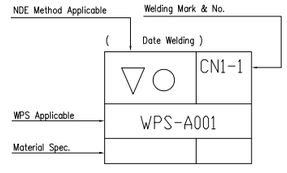


ANCHOR BOLT ORIENTATION
(PLAN VIEW)



DETAIL OF ANCHOR BOLT CHAIR

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



NDE METHOD SYMBOL

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

MATERIAL SPECIFICATION	
TOP PLATE	A36
GUSSET PLATE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Sheet No./Total sheets	9/9
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 2
REFER DWG NO.	: E2502-000-DWG-311

Name
NDE MAP ANCHOR BOLT ADSORPTION TANK 2

NDE Map No.
E2502-NDE-PBY-003

REV.
0

8. NDE MAP NO. : E2502-NDE-PBY-004

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

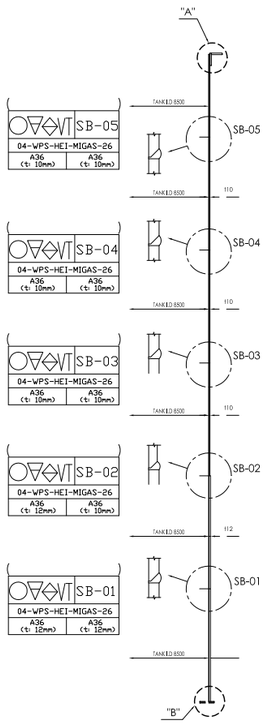
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

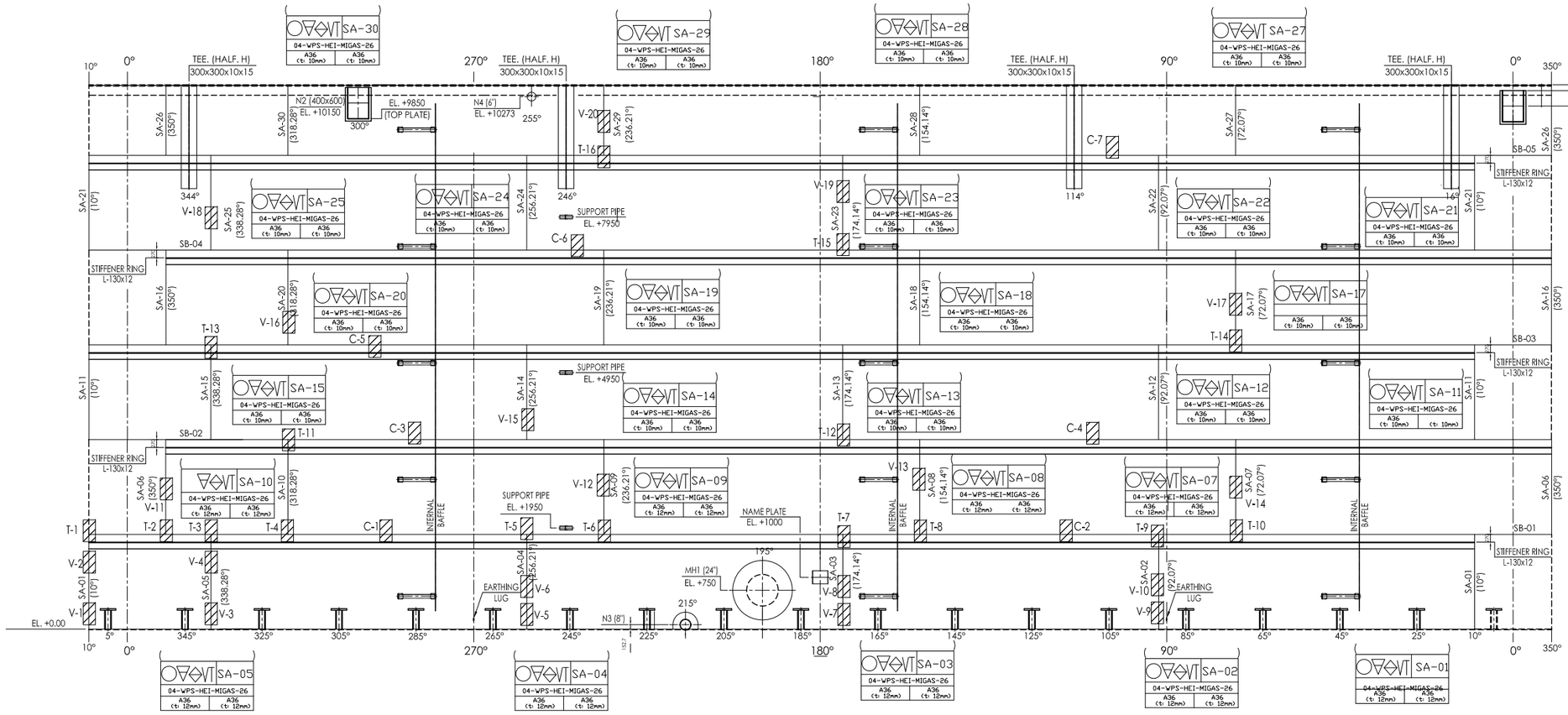
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

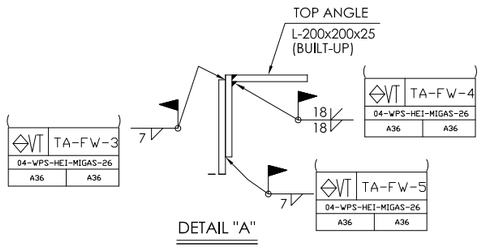
   |# NOZZLE ATTACHMENT WELDING OF DUCTING



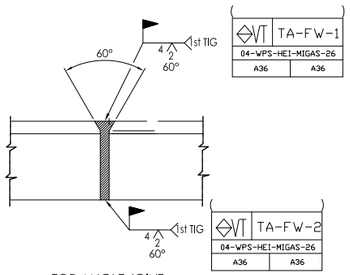
SHELL HORIZONTAL JOINT



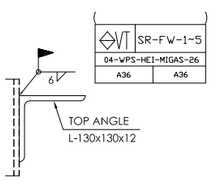
SHELL DEVELOPMENT



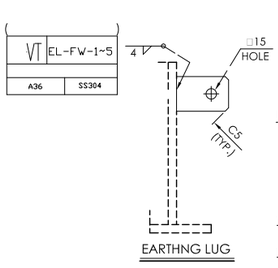
DETAIL "A"



TOP ANGLE JOINT

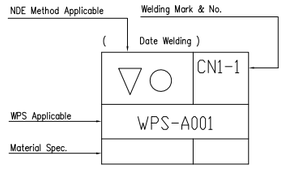


DETAIL OF STIFFENER RING



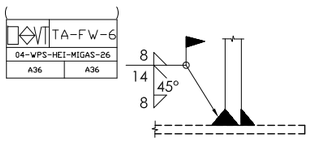
EARTHNG LUG

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



NDE METHOD SYMBOL

- □ VACUUM BOX
- ○ RT 10%
- ▽ UT SPOT LAMINATION CHECK FOR SHELL
- ◇ PT 10%
- VT VISUAL 100%



DETAIL "B"

MATERIAL SPECIFICATION	
SHELL	A36
TOP ANGLE	A36
STIFFENER RING	A36

LEGEND :

WPS NO : 008/HEI/WPS/MIGAS/21 SMAW P1 to P1
006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP SHELL ADSORPTION TANK 3

Sheet No./Total sheets	1/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 3
REFER DWG NO.	: E2502-000-DWG-402

NDE Map No.
E2502-NDE-PBY-004

REV.
0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

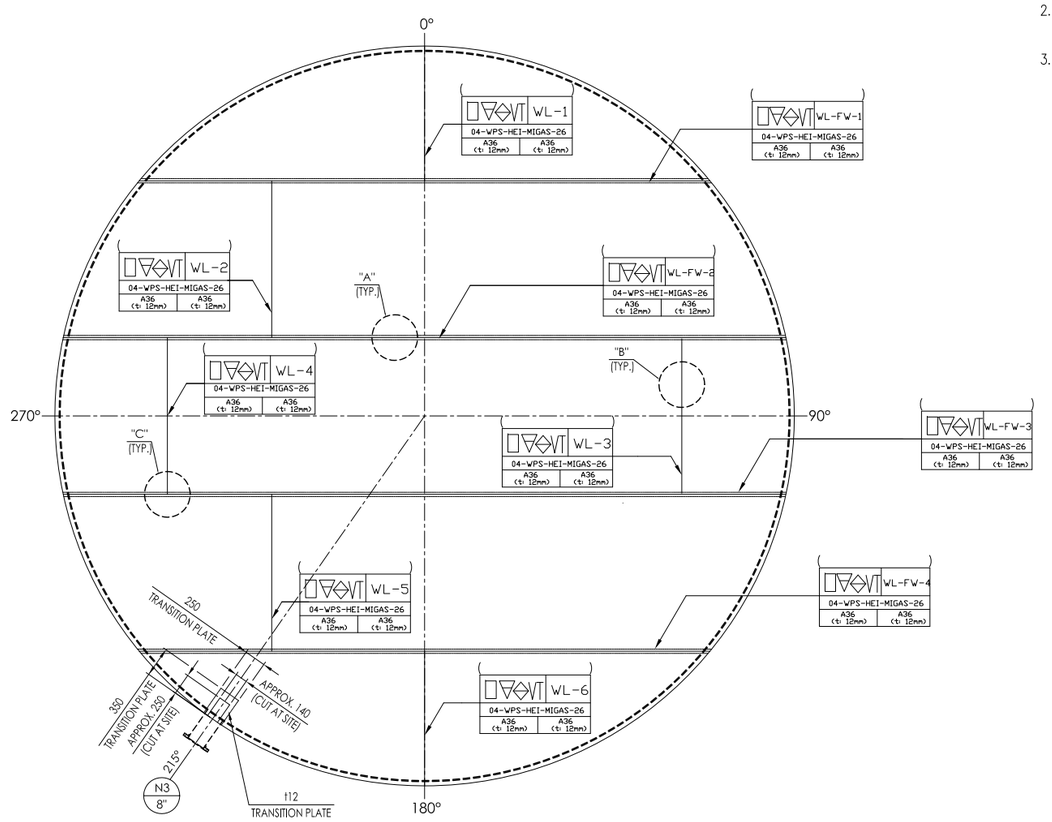
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

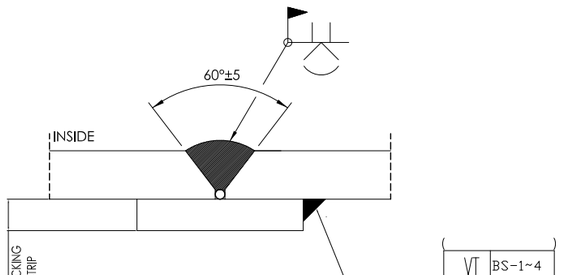
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

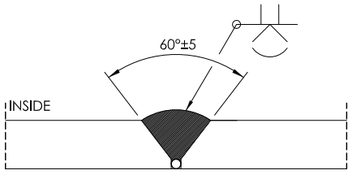
   # NOZZLE ATTACHMENT WELDING OF DUCTING



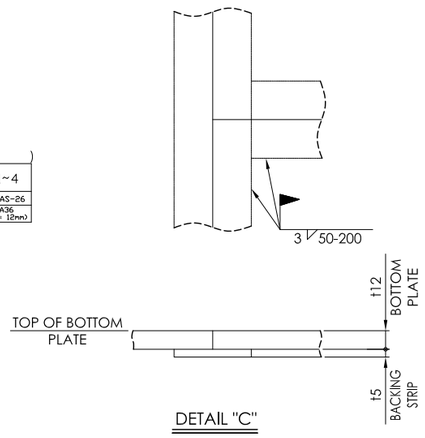
BOTTOM PLATE ARRANGEMENT



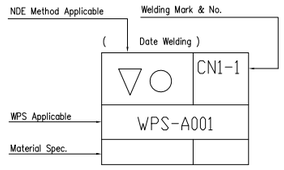
DETAIL "A"



DETAIL "B"



DETAIL "C"



NDE METHOD SYMBOL

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

MATERIAL SPECIFICATION	
BOTTOM PLATE	A36
BACKING STRIPE	A36

LEGEND :

WPS NO : 008/HEI/WPS/MIGAS/21 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP BOTTOM ADSORPTION TANK 3

Sheet No./Total sheets	2/10
Size of memory	

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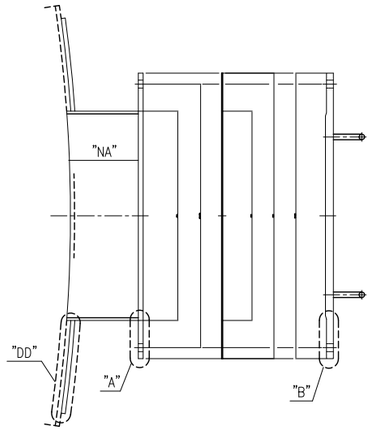
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 3
REFER DWG NO.	: E2502-000-DWG-403

NDE Map No.
E2502-NDE-PBY-004

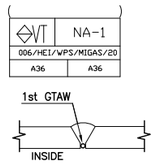
REV. 0

GENERAL NOTES :

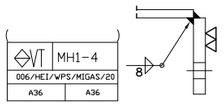
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



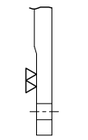
DETAIL OF NOZZLE (MH1) 24"



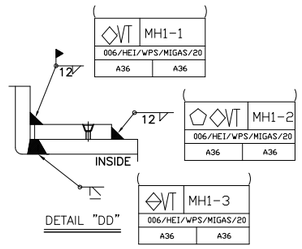
DETAIL "NA"



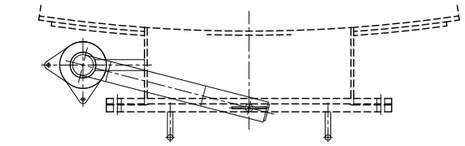
DETAIL "A"

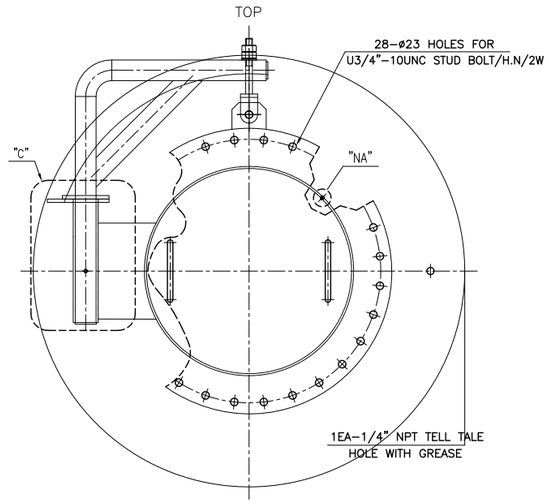


DETAIL "B"

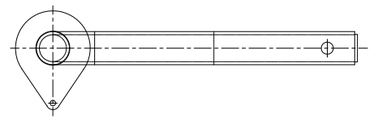


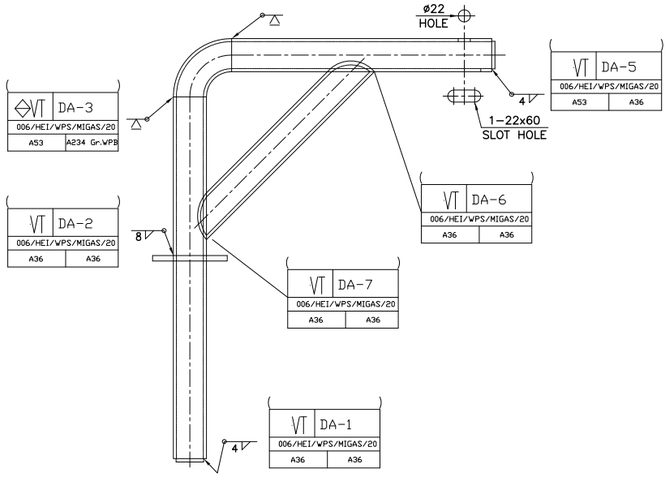
DETAIL "DD"



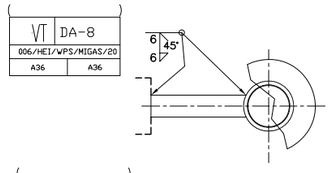


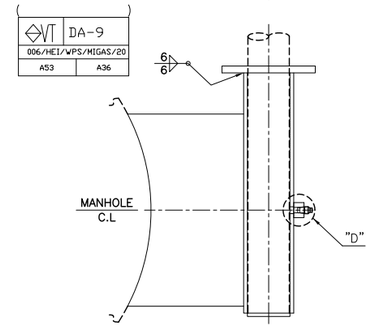
DAVIT ASSEMBLY
(DAVIT ORIENT. SEE ASS'Y DWG)



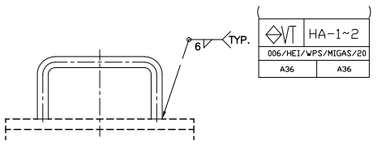


DAVIT DETAIL

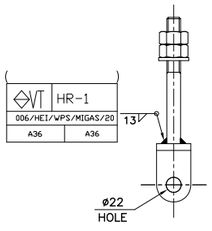




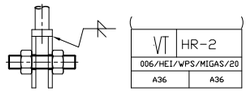
DETAIL "C"

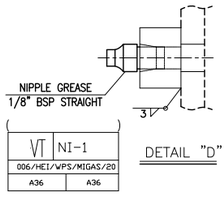


HANDLE DETAIL



HANGER DETAIL





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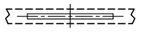
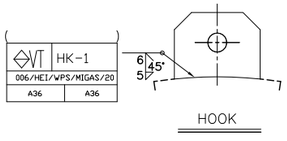


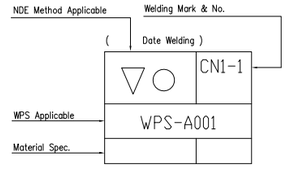


HOOK

NDE METHOD SYMBOL

- UT SPOT
- PT 10%
- PT 100%
- PNEUMATIC TEST

VT VISUAL 100%



MATERIAL SPECIFICATION	
HOOK	A36
PIPE DAVIT	A53 Gr.B
HANDLE	A36
NOZZLE NECK	A36
PLATE FLANGE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP MANHOLE ADSORPTION TANK 3

Sheet No./Total sheets	3/9
Size of memory	

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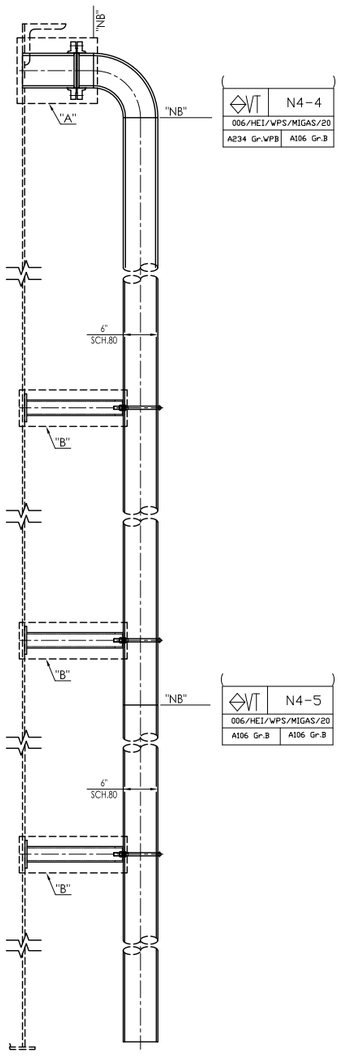
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 3
REFER DWG NO.	: E2502-000-DWG-404

NDE Map No.
E2502-NDE-PBY-004

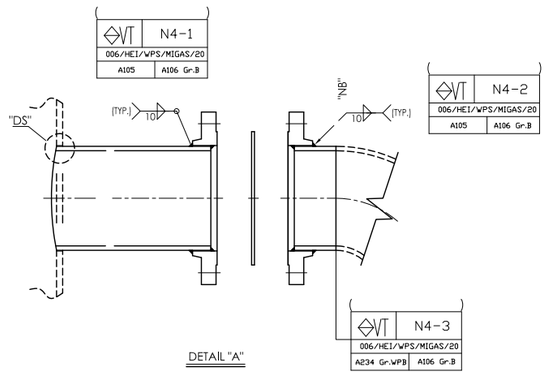
REV.
0

GENERAL NOTES :

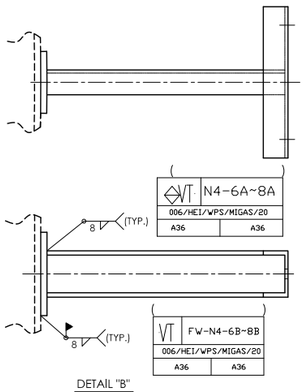
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



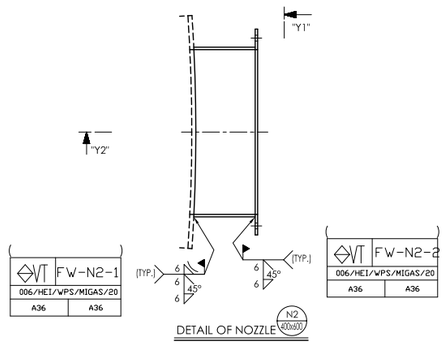
DETAIL OF NOZZLE N4 6"



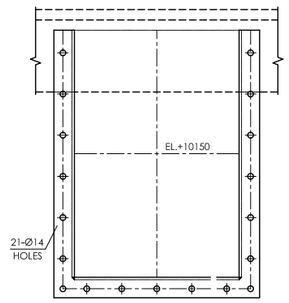
DETAIL "A"



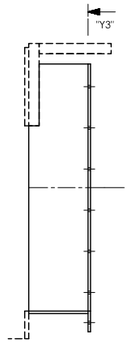
DETAIL "B"



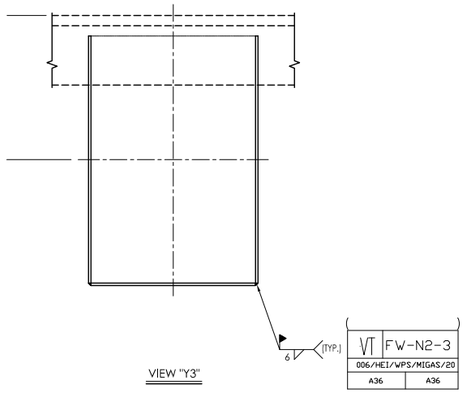
DETAIL OF NOZZLE



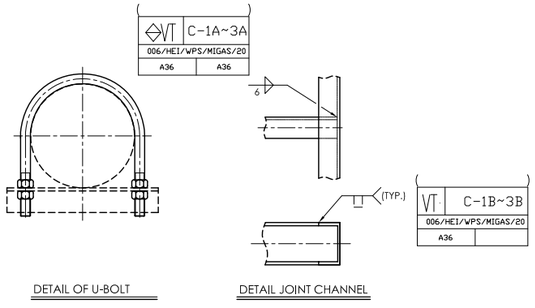
VIEW "Y1"



VIEW "Y2"

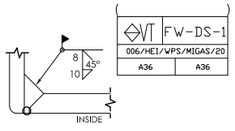


VIEW "Y3"

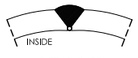


DETAIL OF U-BOLT

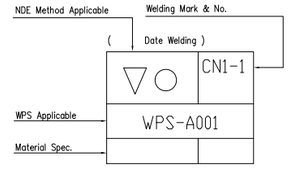
DETAIL JOINT CHANNEL



DETAIL "DS"



DETAIL "NB"



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 1-3 ADSORPTION TANK 3

Sheet No./Total sheets	4/9
Size of memory	

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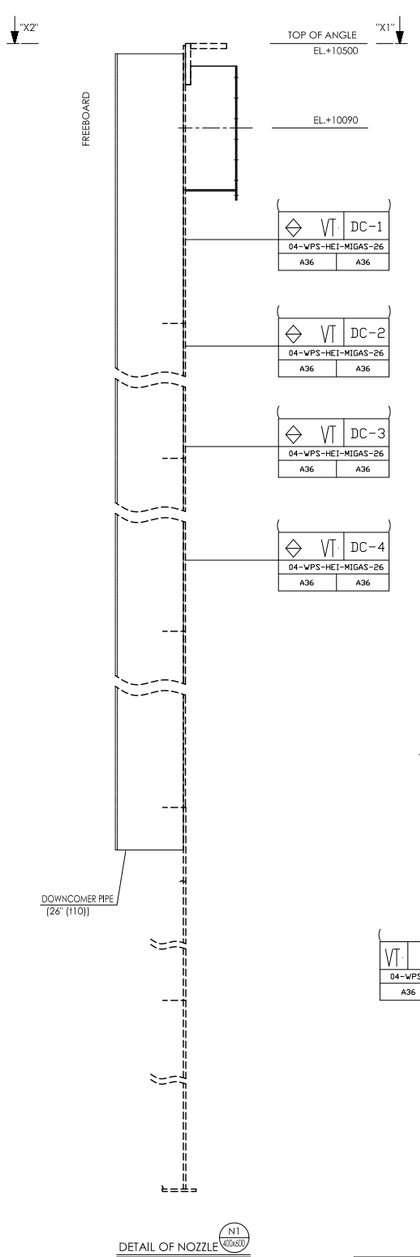
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 3
REFER DWG NO.	: E2502-000-DWG-405

NDE Map No.
E2502-NDE-PBY-004

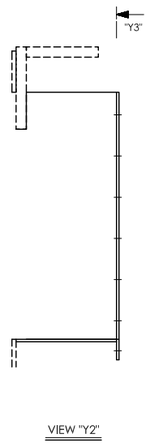
REV. 0

GENERAL NOTES :

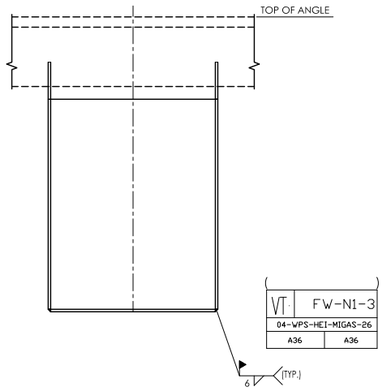
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



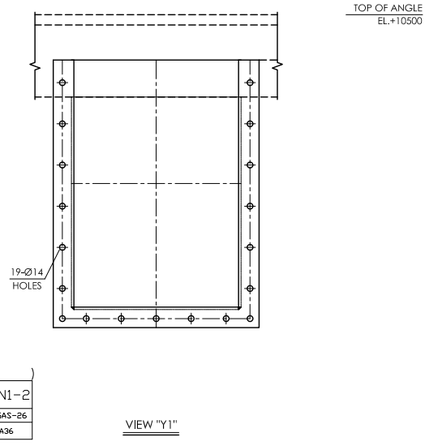
DETAIL OF NOZZLE N1 400x600



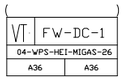
VIEW "Y2"

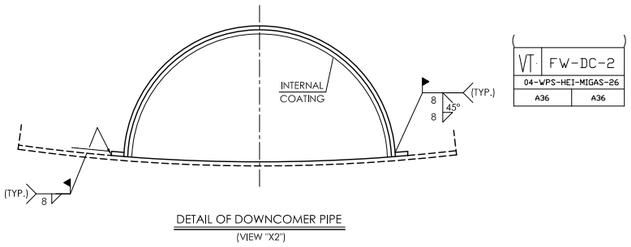


VIEW "Y3"

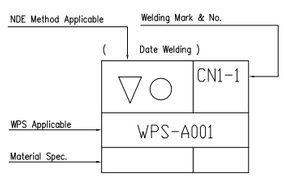


VIEW "Y1"





DETAIL OF DOWNCOMER PIPE
(VIEW "X2")



NDE METHOD SYMBOL

▽ UT SPOT

◈ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

WPS NO : 004-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 2-3 ADSORPTION TANK 3

Sheet No./Total sheets	5/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 3
REFER DWG NO.	: E2502-000-DWG-406

NDE Map No.
E2502-NDE-PBY-004

REV.
0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

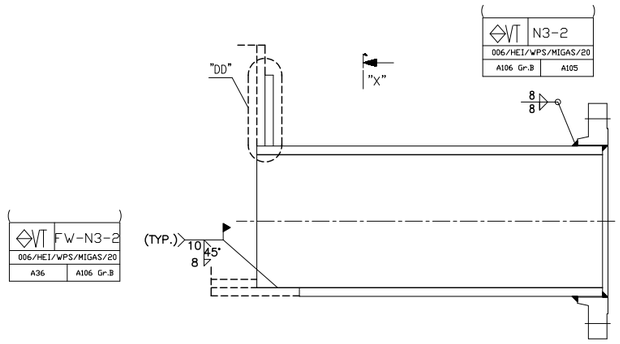
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

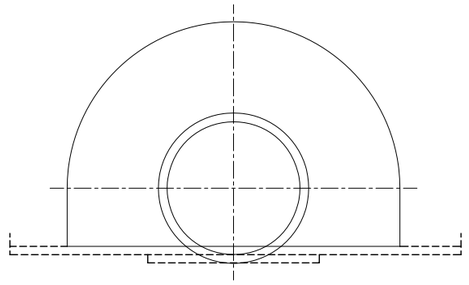
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

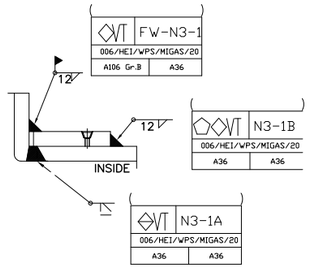
   # NOZZLE ATTACHMENT WELDING OF DUCTING



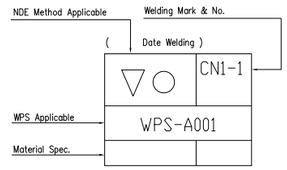
DETAIL OF NOZZLE N3 8"



DETAIL OF REINF. PAD



DETAIL "DD"



NDE METHOD SYMBOL

- ▽ UT SPOT
- ◇ PT 10%
- ◆ PT 100%
- ⬠ PNEUMATIC TEST

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 3-3 ADSORPTION TANK 3

Sheet No./Total sheets	6/9
Size of memory	

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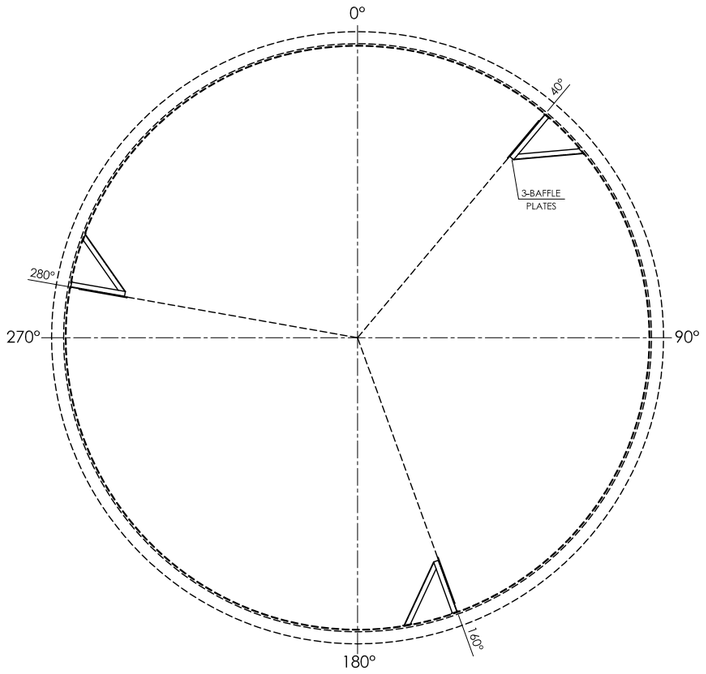
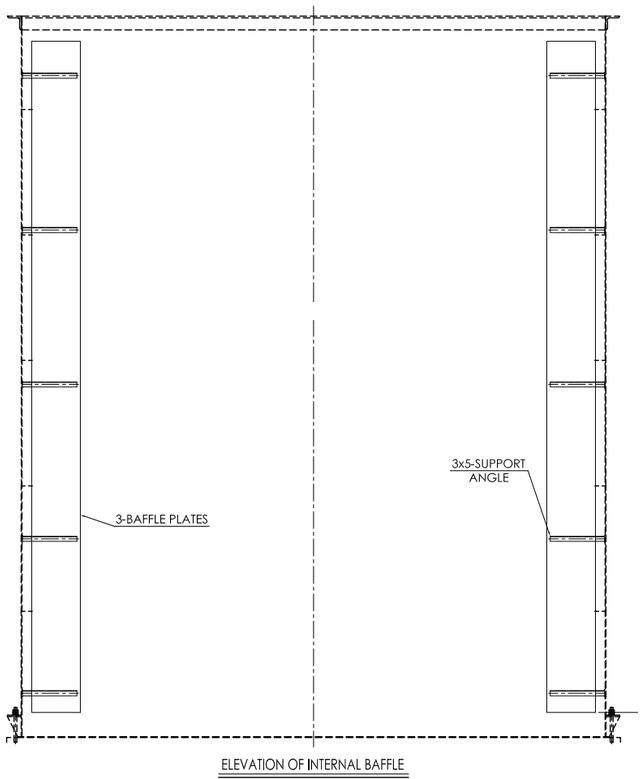
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 3
REFER DWG NO.	: E2502-000-DWG-407

NDE Map No.
E2502-NDE-PBY-004

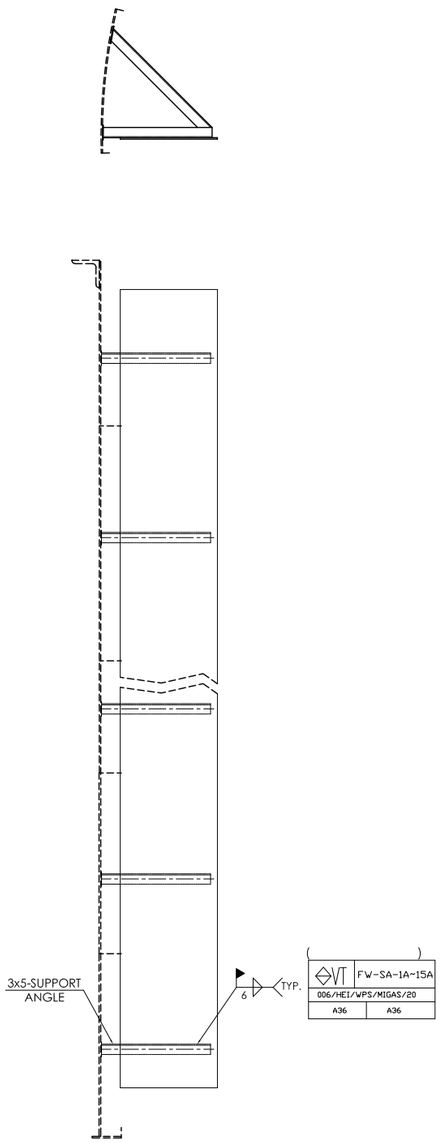
REV. 0



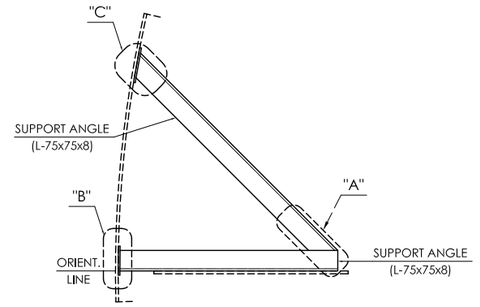
ORIENTATION OF INTERNAL BAFFLE

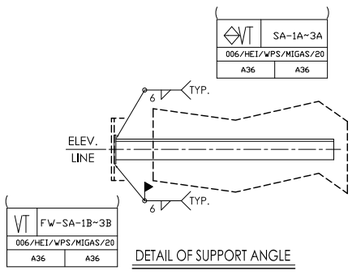


ELEVATION OF INTERNAL BAFFLE

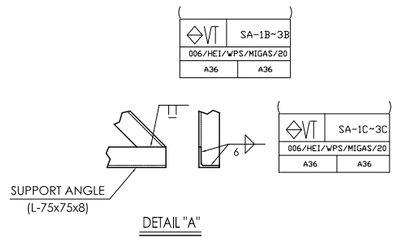


DETAIL OF INTERNAL BAFFLE





DETAIL OF SUPPORT ANGLE



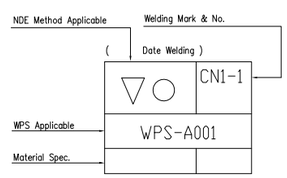
DETAIL "A"

DETAIL "B"

DETAIL "C"

GENERAL NOTES :

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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :
INTERNAL BAFFLE	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1
SUPPORT ANGLE	A36	
SUPPORT PAD	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Sheet No./Total sheets	7/9
Size of memory	

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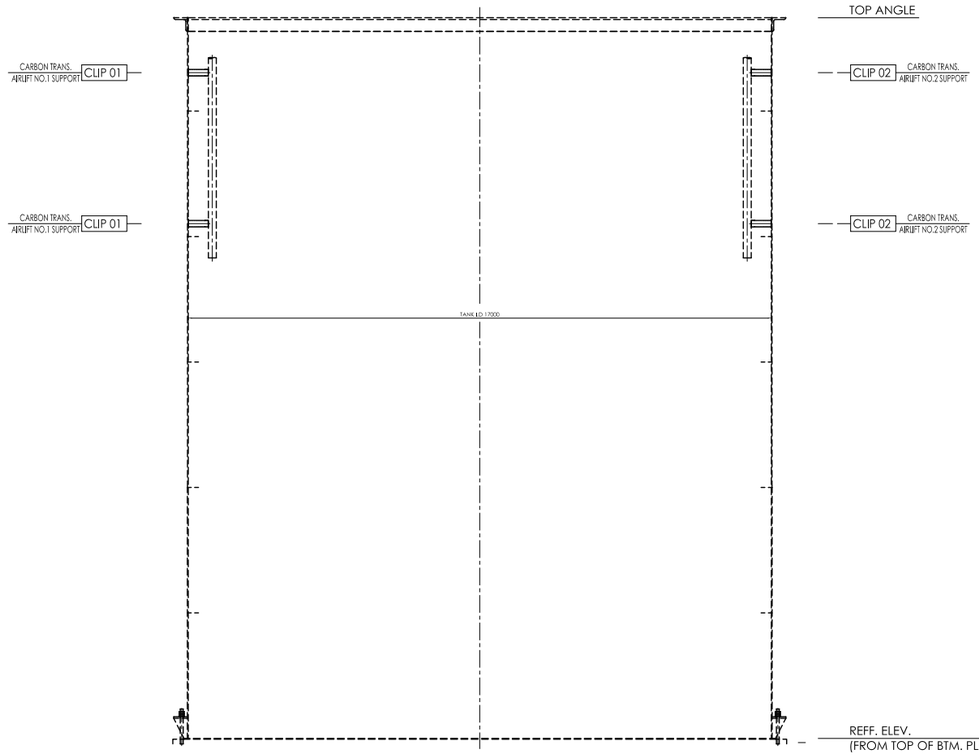
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 3
REFER DWG NO.	: E2502-000-DWG-408

Name
NDE MAP INTERNAL BAFFLE ADSORPTION TANK 3

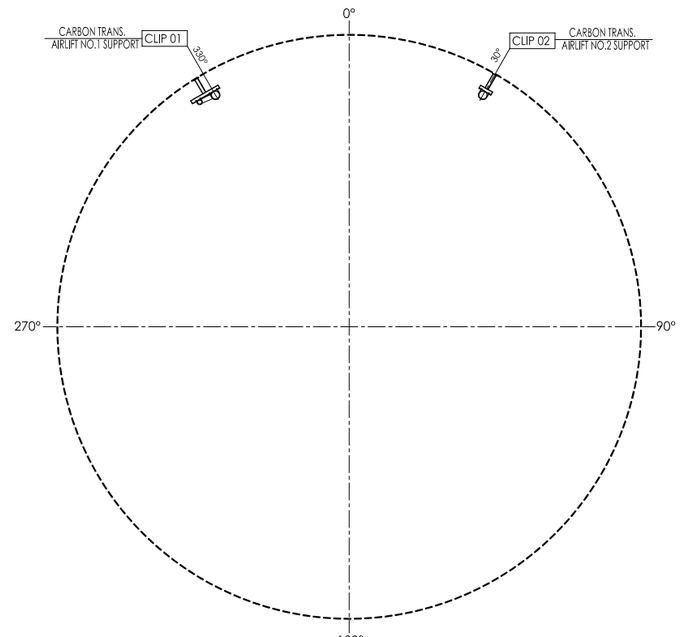
NDE Map No.	REV.
E2502-NDE-PBY-004	0

GENERAL NOTES :

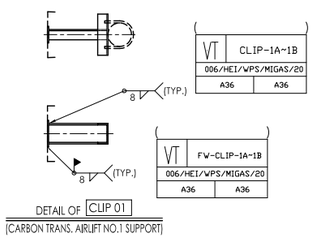
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



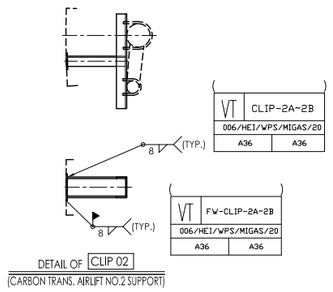
PIPE SUPPORT ELEVATION



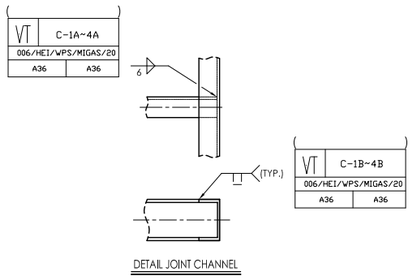
PIPE SUPPORT PLAN



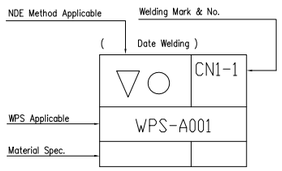
DETAIL OF CLIP 01
(CARBON TRANS. AIRLIFT NO.1 SUPPORT)



DETAIL OF CLIP 02
(CARBON TRANS. AIRLIFT NO.2 SUPPORT)



DETAIL JOINT CHANNEL



NDE METHOD SYMBOL

▽ UT SPOT

◈ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :
SUPPORT CHANNEL	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1
REINF. PAD	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP INTERNAL SUPPORT
ADSORPTION TANK 3

Sheet No./Total sheets	8/10
Size of memory	

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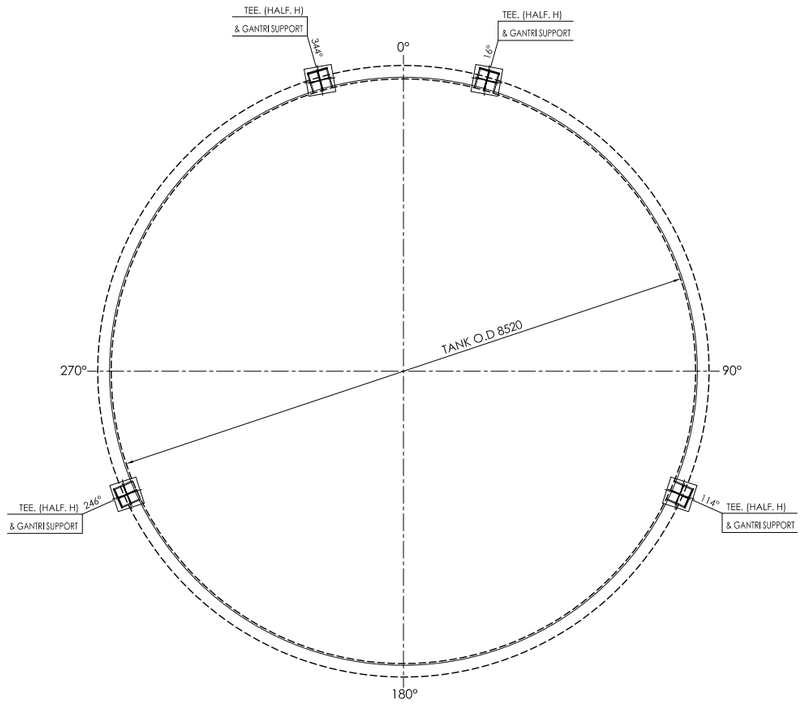
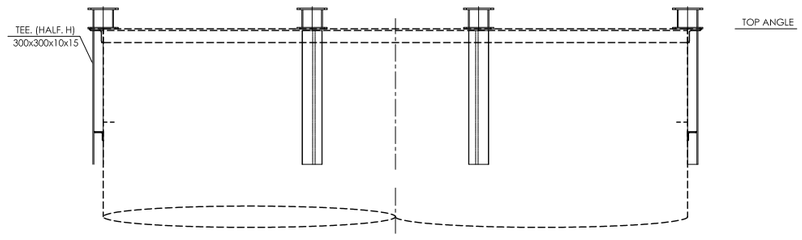
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 3
REFER DWG NO.	: E2502-000-DWG-409

NDE Map No.
E2502-NDE-PBY-004

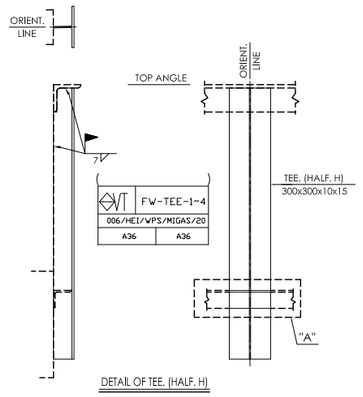
REV.
0



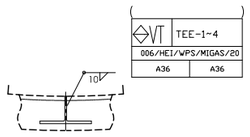
EXTERNAL SUPPORT ORIENTATION

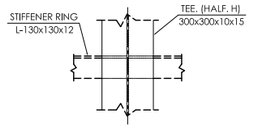


EXTERNAL SUPPORT ELEVATION

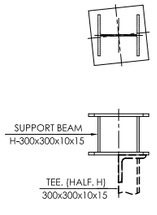


DETAIL OF TEE. (HALF. H)





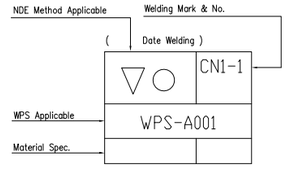
DETAIL "A"



DETAIL OF GANTRI SUPPORT

GENERAL NOTES :

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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
TEE HALF	A36
SUPPORT BEAM	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name

NDE MAP EXTERNAL SUPPORT
ADSORPTION TANK 3

Sheet No./Total sheets	9/10
Size of memory	

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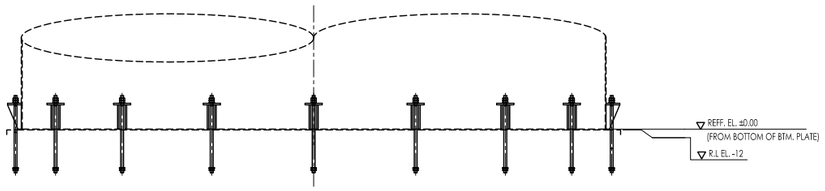
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-210

NDE Map No. : E2502-NDE-PBY-002

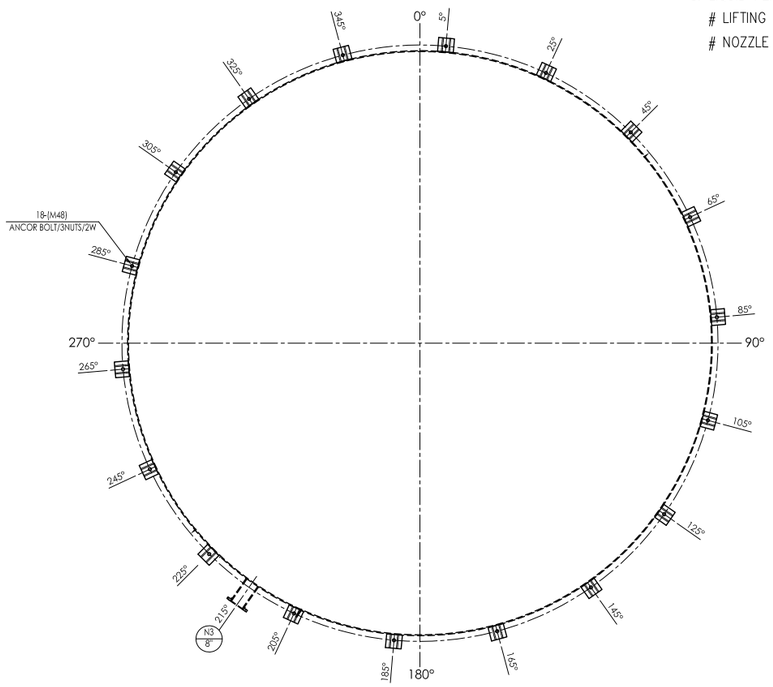
REV. : 0

GENERAL NOTES :

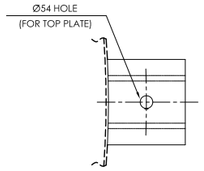
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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

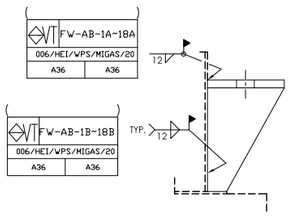


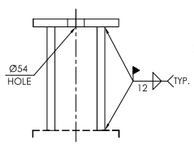
ANCHOR BOLT ELEVATION

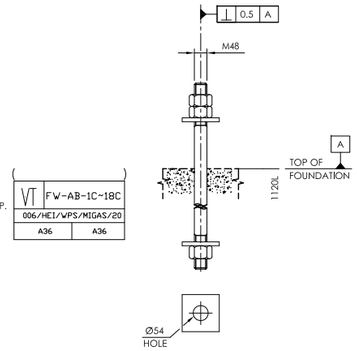


ANCHOR BOLT ORIENTATION
(PLAN VIEW)



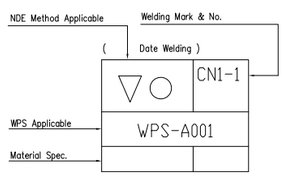






DETAIL OF ANCHOR BOLT CHAIR

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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
TOP PLATE	A36
GUSSET PLATE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Sheet No./Total sheets	10/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 3
REFER DWG NO.	: E2502-000-DWG-411

Name
NDE MAP ANCHOR BOLT ADSORPTION TANK 3

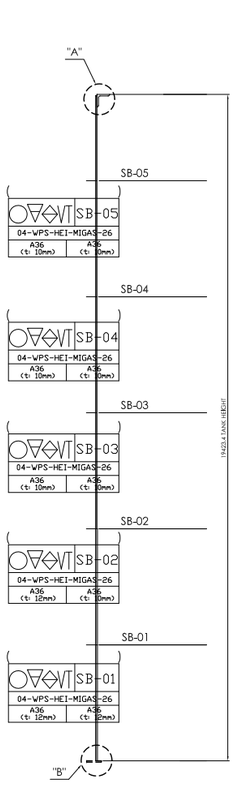
NDE Map No.
E2502-NDE-PBY-004

REV.
0

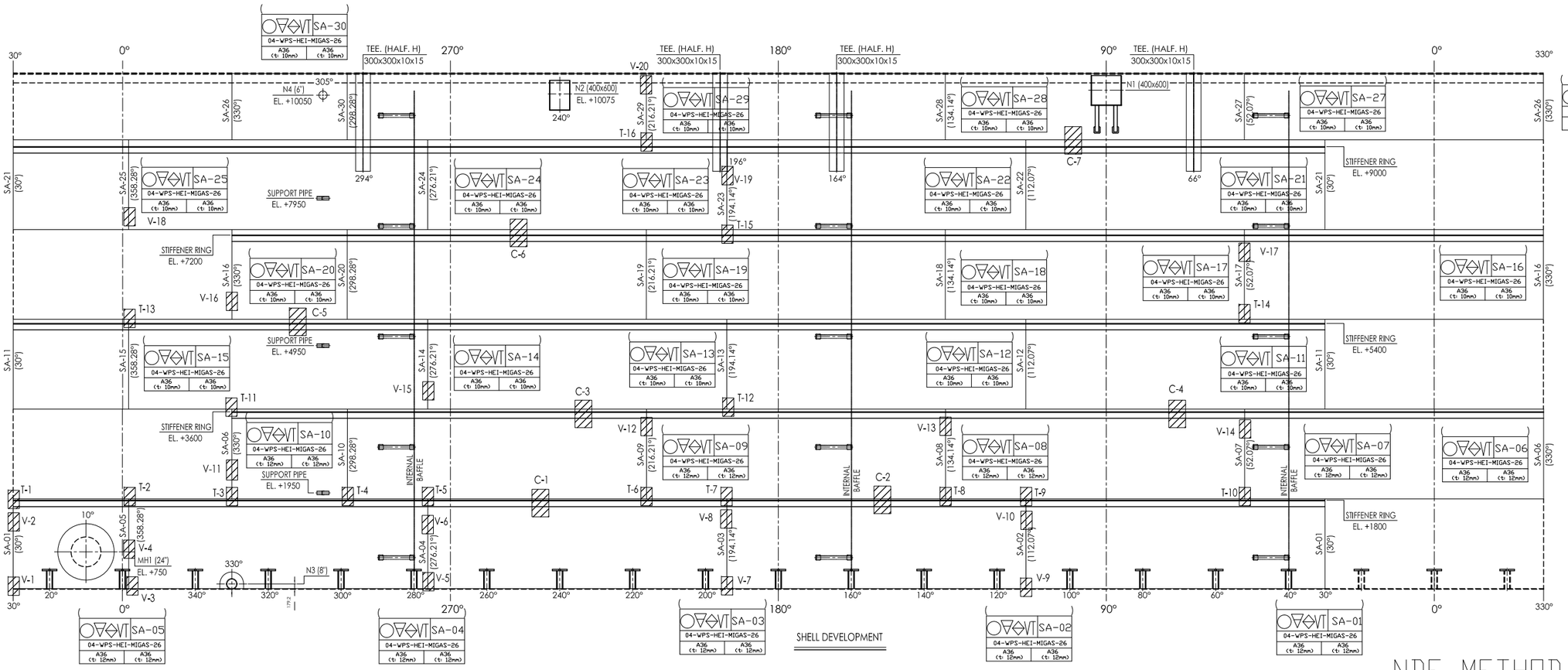
9. NDE MAP NO. : E2502-NDE-PBY-005

GENERAL NOTES :

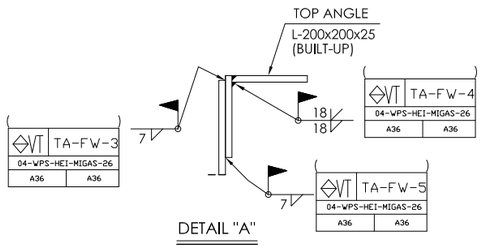
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   |# NOZZLE ATTACHMENT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



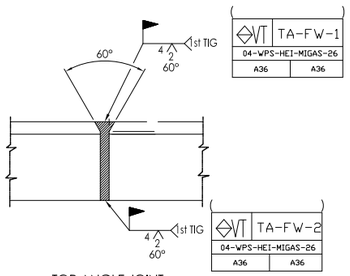
SHELL HORIZONTAL JOINT



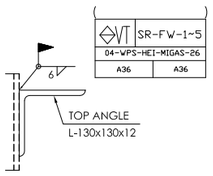
SHELL DEVELOPMENT



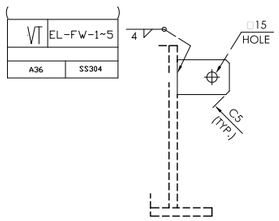
DETAIL "A"



TOP ANGLE JOINT

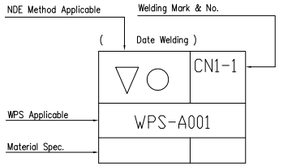


DETAIL OF STIFFENER RING



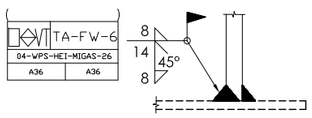
EARTHNG LUG

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



NDE METHOD SYMBOL

- VACUUM BOX
- RT 10%
- UT SPOT LAMINATION CHECK FOR SHELL
- PT 10%
- VT VISUAL 100%



DETAIL "B"

MATERIAL SPECIFICATION	
SHELL	A36
TOP ANGLE	A36
STIFFENER RING	A36

LEGEND :

WPS NO : 04-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP SHELL ADSORPTION TANK 4

Sheet No./Total sheets	1/9
Size of memory	

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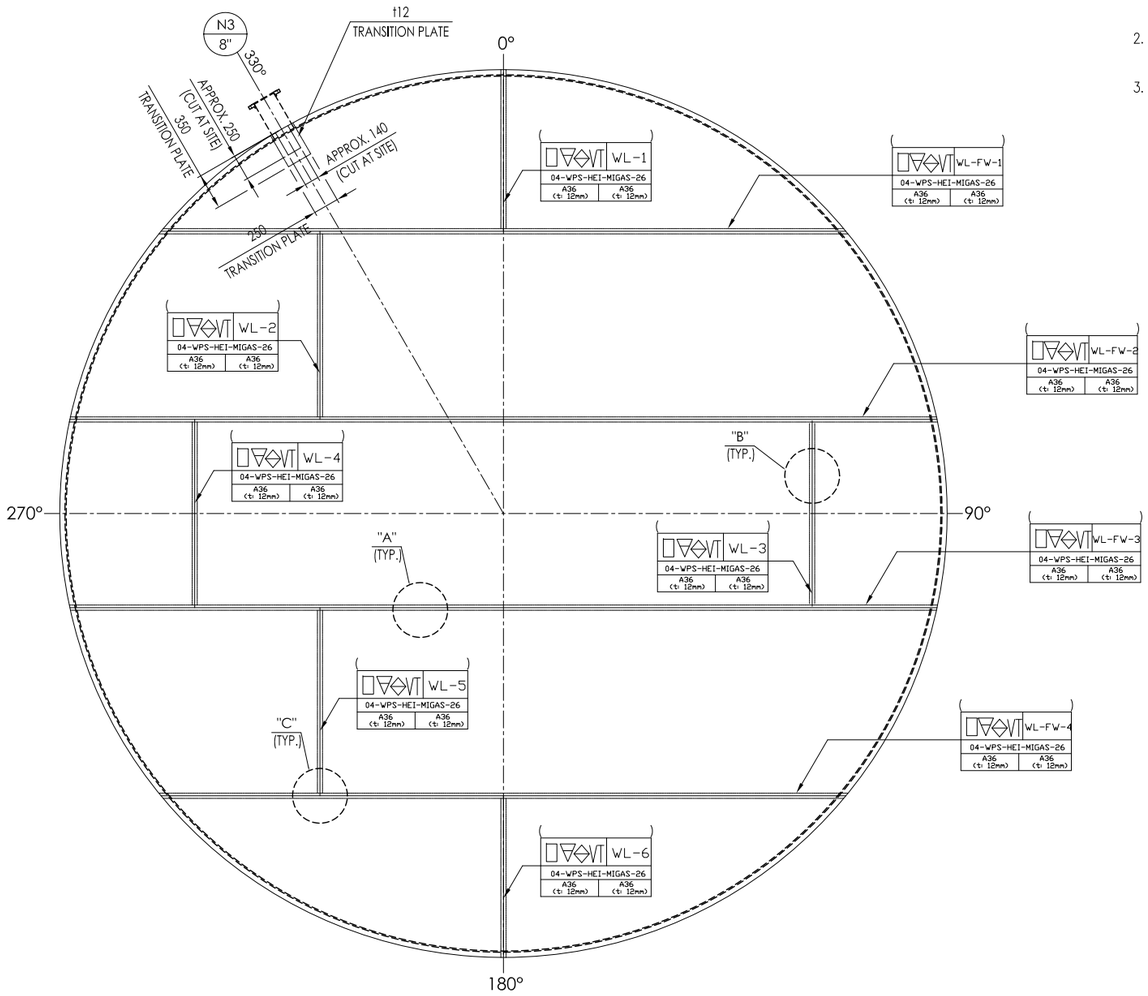
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 4
REFER DWG NO.	: E2502-000-DWG-502

NDE Map No.
E2502-NDE-PBY-001

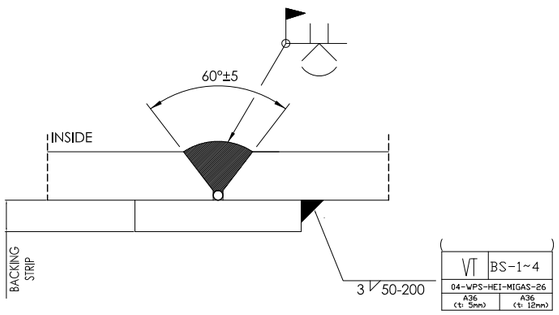
REV.
0

GENERAL NOTES :

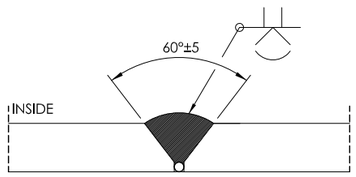
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



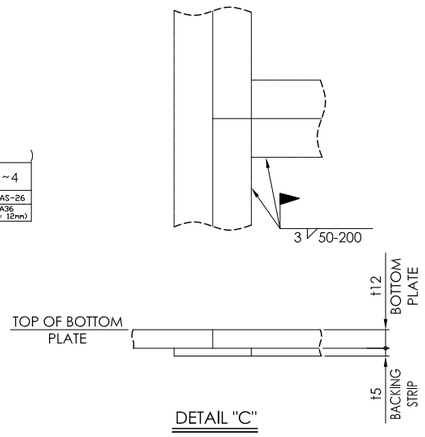
BOTTOM PLATE ARRANGEMENT



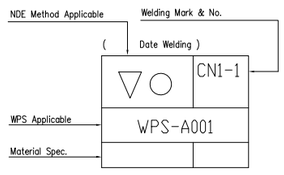
DETAIL "A"



DETAIL "B"



DETAIL "C"



NDE METHOD SYMBOL

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

MATERIAL SPECIFICATION	
BOTTOM PLATE	A36
BACKING STRIPE	A36

LEGEND :

WPS NO : 04-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP BOTTOM ADSORPTION TANK 4

Sheet No./Total sheets	2/9
Size of memory	

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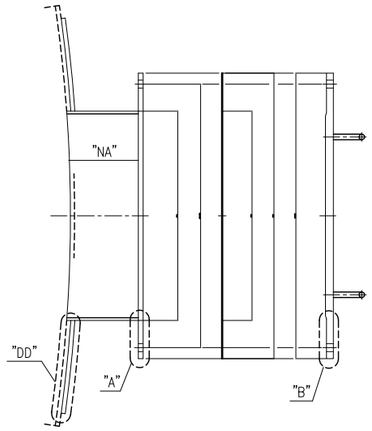
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 4
REFER DWG NO.	: E2502-000-DWG-503

NDE Map No.
E2502-NDE-PBY-005

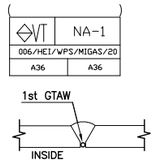
REV.
0

GENERAL NOTES :

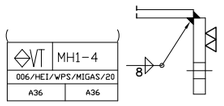
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



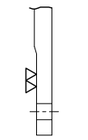
DETAIL OF NOZZLE (MH1) 24"



DETAIL "NA"



DETAIL "A"



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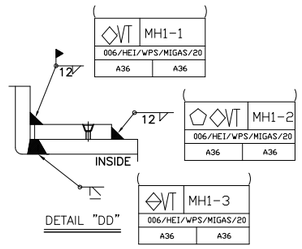
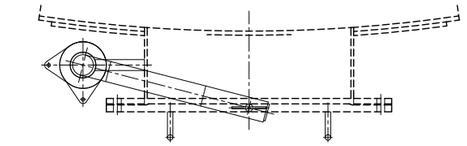
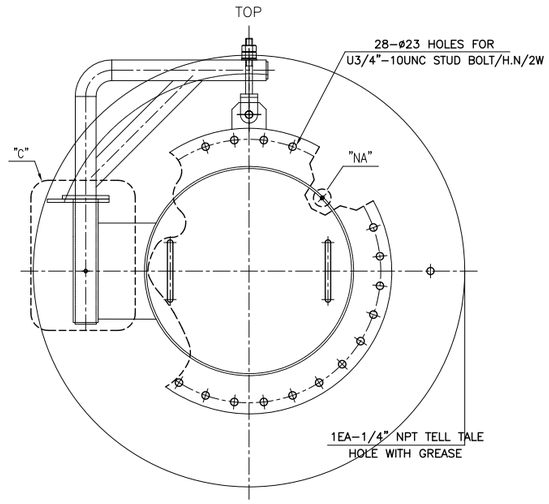
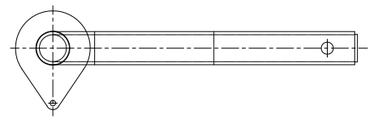


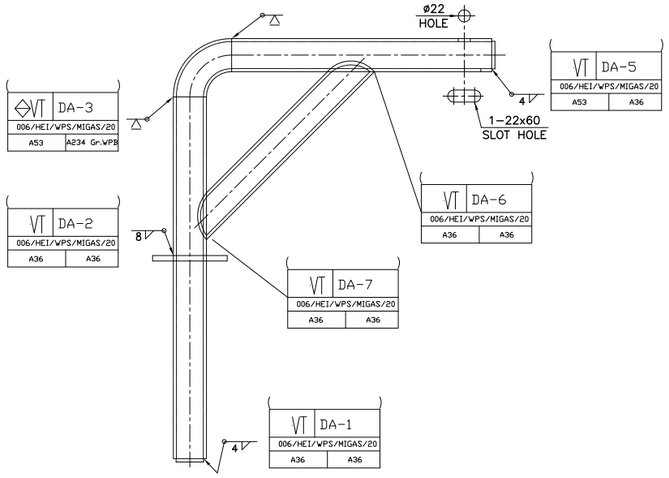
DETAIL "DD"



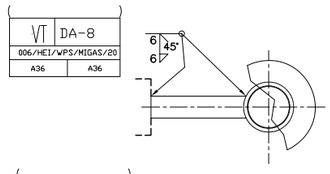


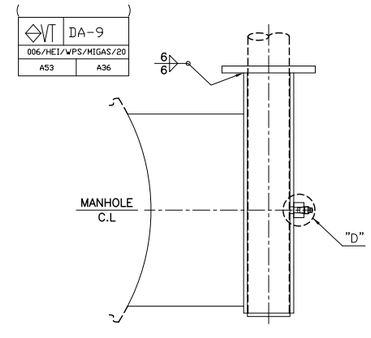
DAVIT ASSEMBLY
(DAVIT ORIENT. SEE ASS'Y DWG)



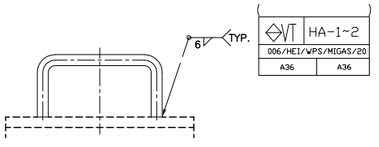


DAVIT DETAIL

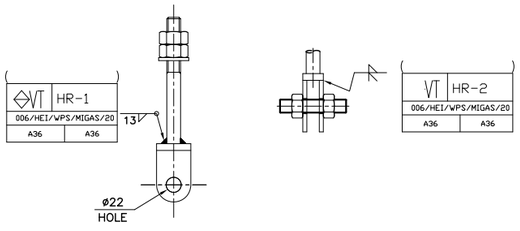




DETAIL "C"

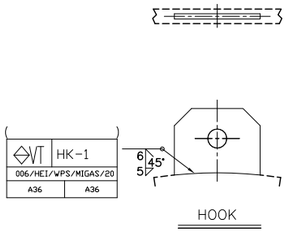


HANDLE DETAIL



DETAIL "D"

HANGER DETAIL

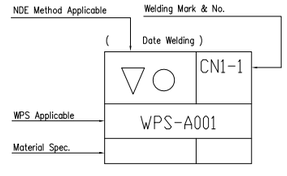


HOOK

NDE METHOD SYMBOL

- UT SPOT
- PT 10%
- PT 100%
- PNEUMATIC TEST

VT VISUAL 100%



MATERIAL SPECIFICATION	
HOOK	A36
PIPE DAVIT	A53 Gr.B
HANDLE	A36
NOZZLE NECK	A36
PLATE FLANGE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP MANHOLE ADSORPTION TANK 4

Sheet No./Total sheets	3/9
Size of memory	

PT. HANAZONO Engineering Indonesia
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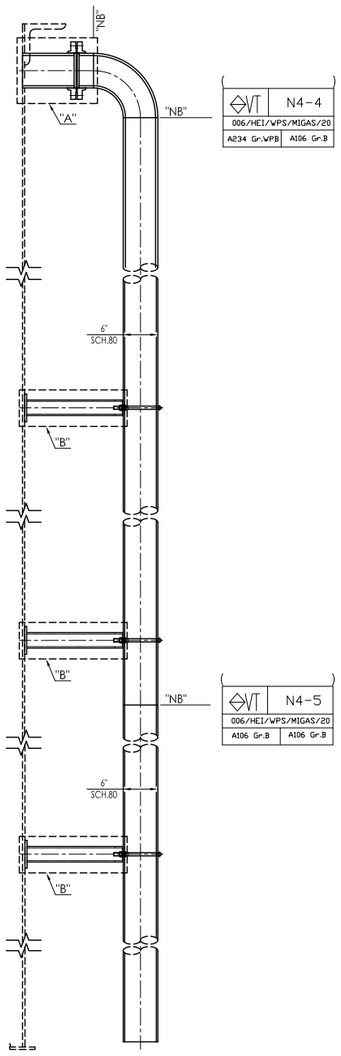
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 4
REFER DWG NO.	: E2502-000-DWG-504

NDE Map No.
E2502-NDE-PBY-005

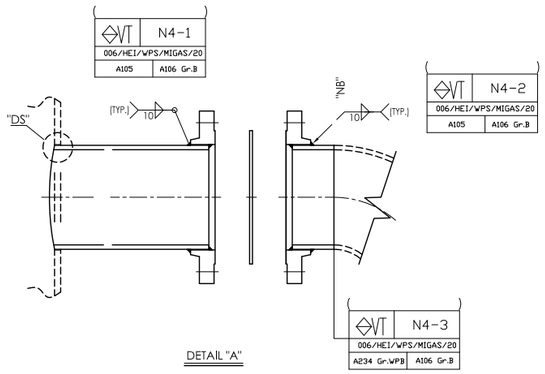
REV.
0

GENERAL NOTES :

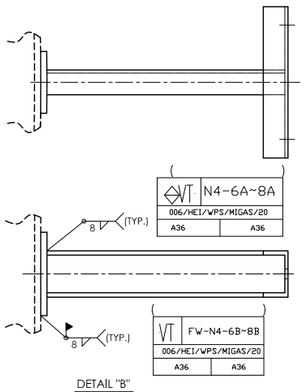
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



DETAIL OF NOZZLE N4 6"



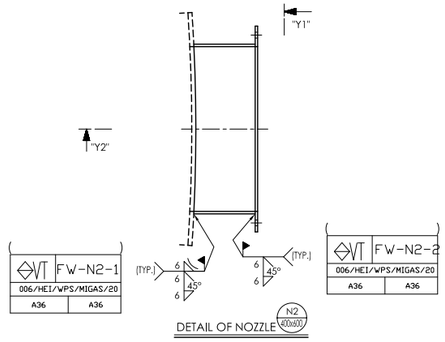
DETAIL "A"



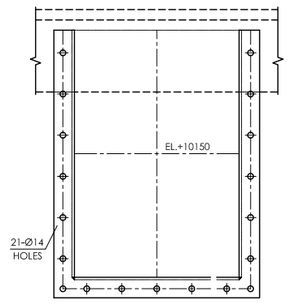
DETAIL "B"

DETAIL "DS"

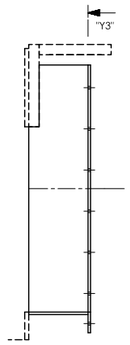
DETAIL "NB"



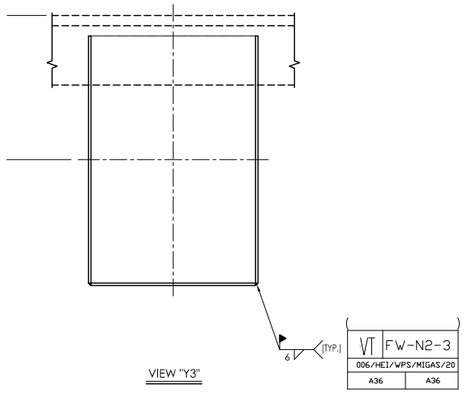
DETAIL OF NOZZLE N2 300x80



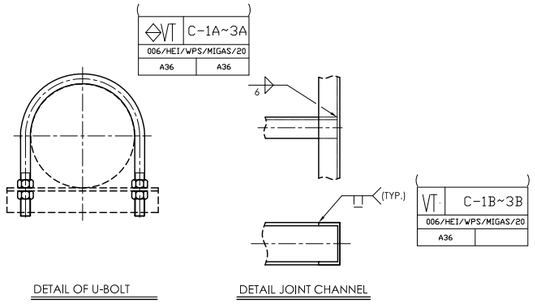
VIEW "Y1"



VIEW "Y2"

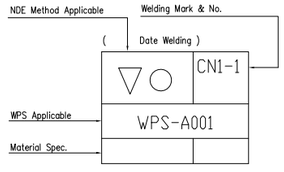


VIEW "Y3"



DETAIL OF U-BOLT

DETAIL JOINT CHANNEL



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 1-3 ADSORPTION TANK 4

Sheet No./Total sheets	4/9
Size of memory	

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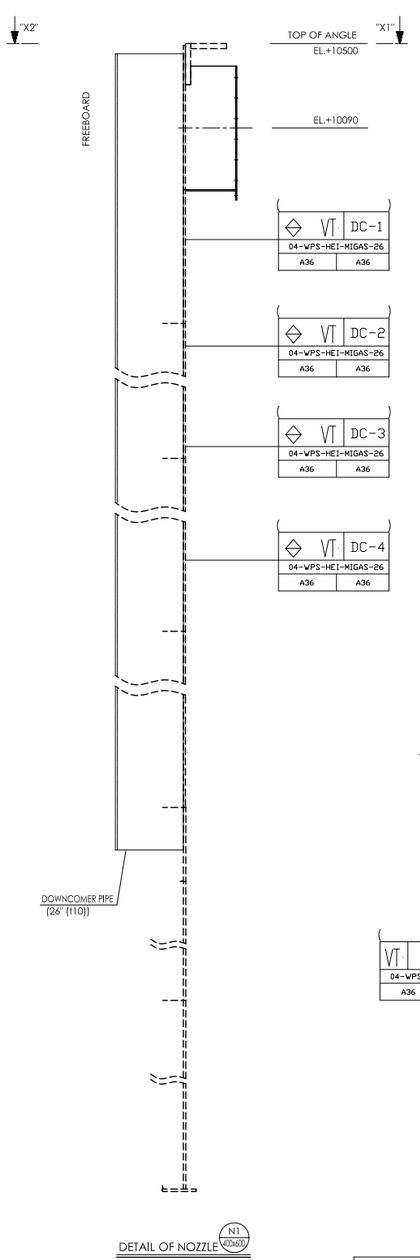
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 4
REFER DWG NO.	: E2502-000-DWG-505

NDE Map No.
E2502-NDE-PBY-005

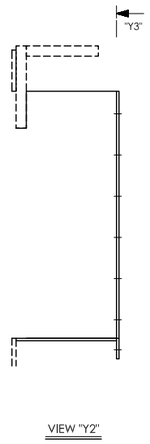
REV. 0

GENERAL NOTES :

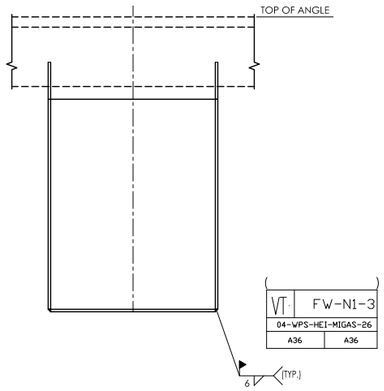
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



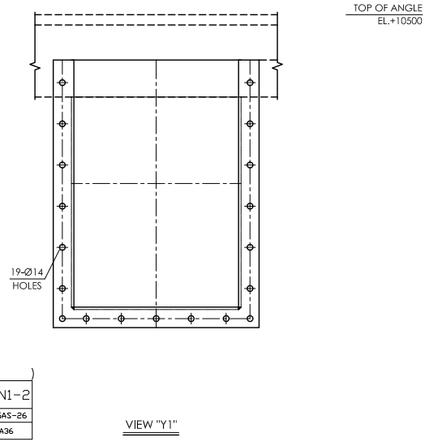
DETAIL OF NOZZLE N1 400x600



VIEW "Y2"



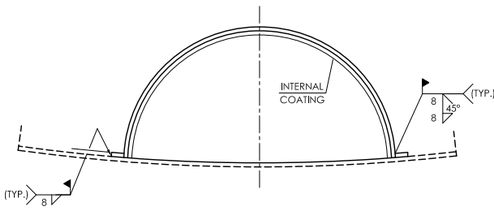
VIEW "Y3"



VIEW "X1"

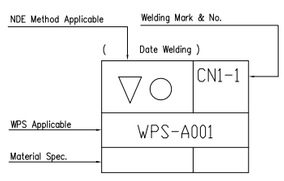
VIEW "Y1"

VT FW-DC-1
04-WPS-HEI-MIGAS-26
A36 A36



DETAIL OF DOWNCOMER PIPE
(VIEW "X2")

VT FW-DC-2
04-WPS-HEI-MIGAS-26
A36 A36



NDE METHOD SYMBOL

▽ UT SPOT

◈ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

WPS NO : 004-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 2-3 ADSORPTION TANK 4

Sheet No./Total sheets	5/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 4
REFER DWG NO.	: E2502-000-DWG-506

NDE Map No.
E2502-NDE-PBY-005

REV.
0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

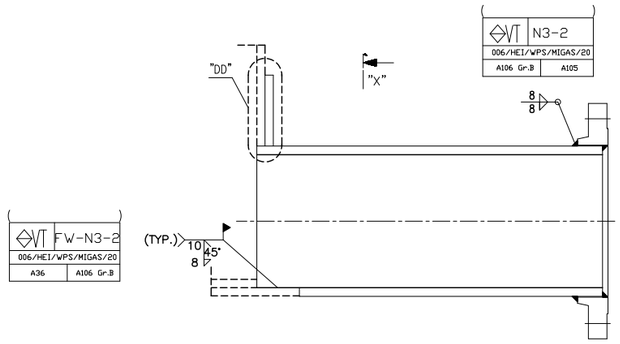
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

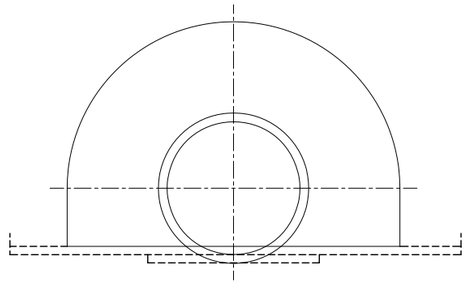
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

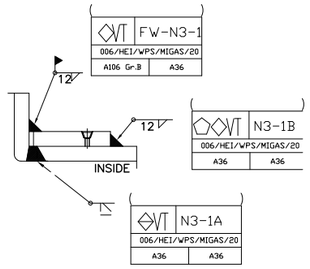
   # NOZZLE ATTACHMENT WELDING OF DUCTING



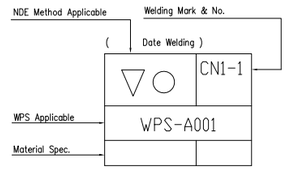
DETAIL OF NOZZLE N3 8"



DETAIL OF REINF. PAD



DETAIL "DD"



NDE METHOD SYMBOL

- ▽ UT SPOT
- ◇ PT 10%
- ◆ PT 100%
- ⬠ PNEUMATIC TEST

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 3-3 ADSORPTION TANK 4

Sheet No./Total sheets	6/9
Size of memory	

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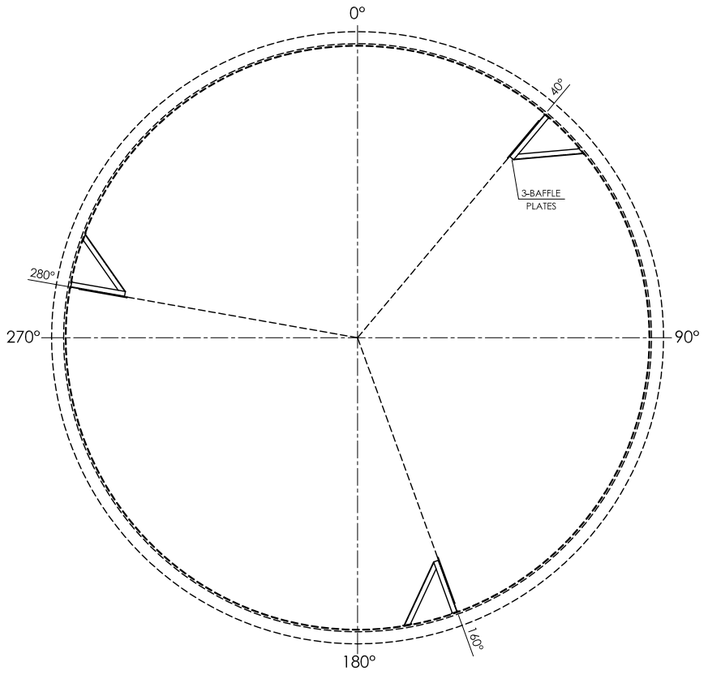
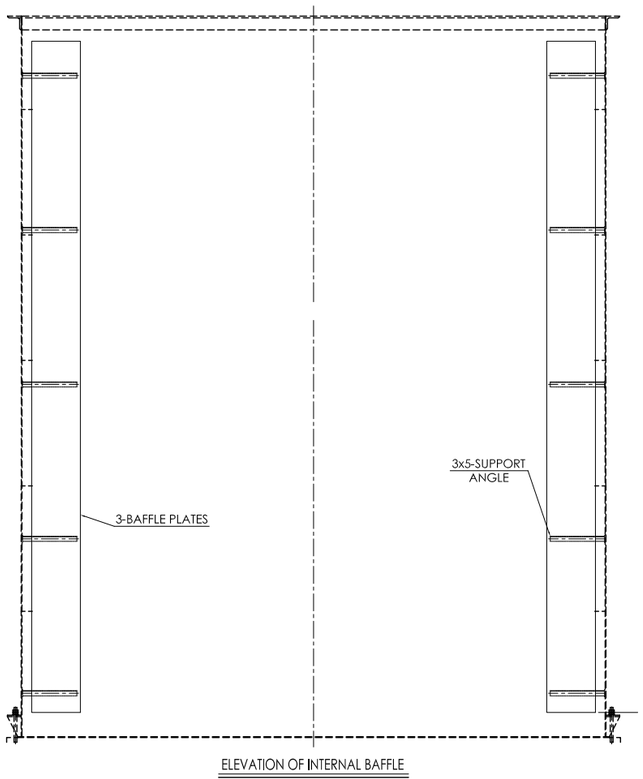
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 4
REFER DWG NO.	: E2502-000-DWG-507

NDE Map No.
E2502-NDE-PBY-005

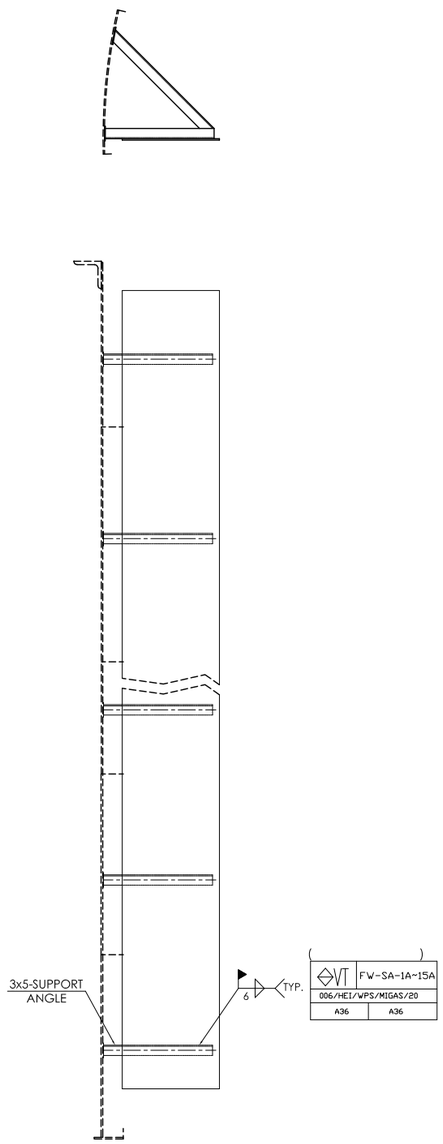
REV. 0



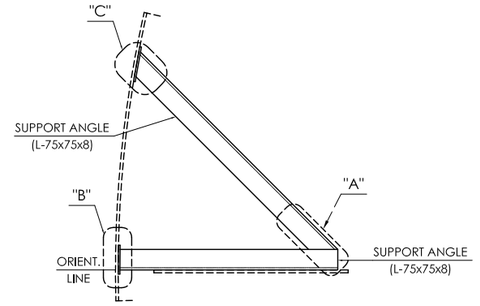
ORIENTATION OF INTERNAL BAFFLE

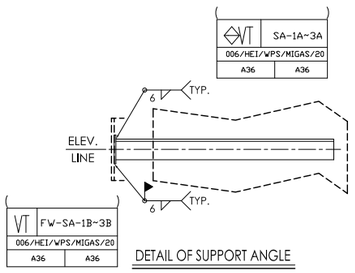


ELEVATION OF INTERNAL BAFFLE

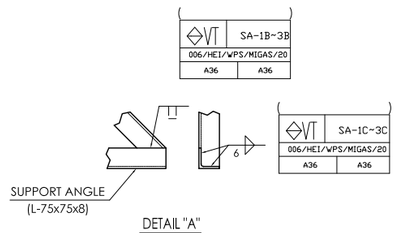


DETAIL OF INTERNAL BAFFLE





DETAIL OF SUPPORT ANGLE



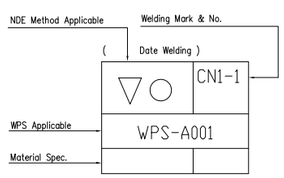
DETAIL "A"

DETAIL "B"

DETAIL "C"

GENERAL NOTES :

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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :
INTERNAL BAFFLE	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1
SUPPORT ANGLE	A36	
SUPPORT PAD	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Sheet No./Total sheets	7/9
Size of memory	

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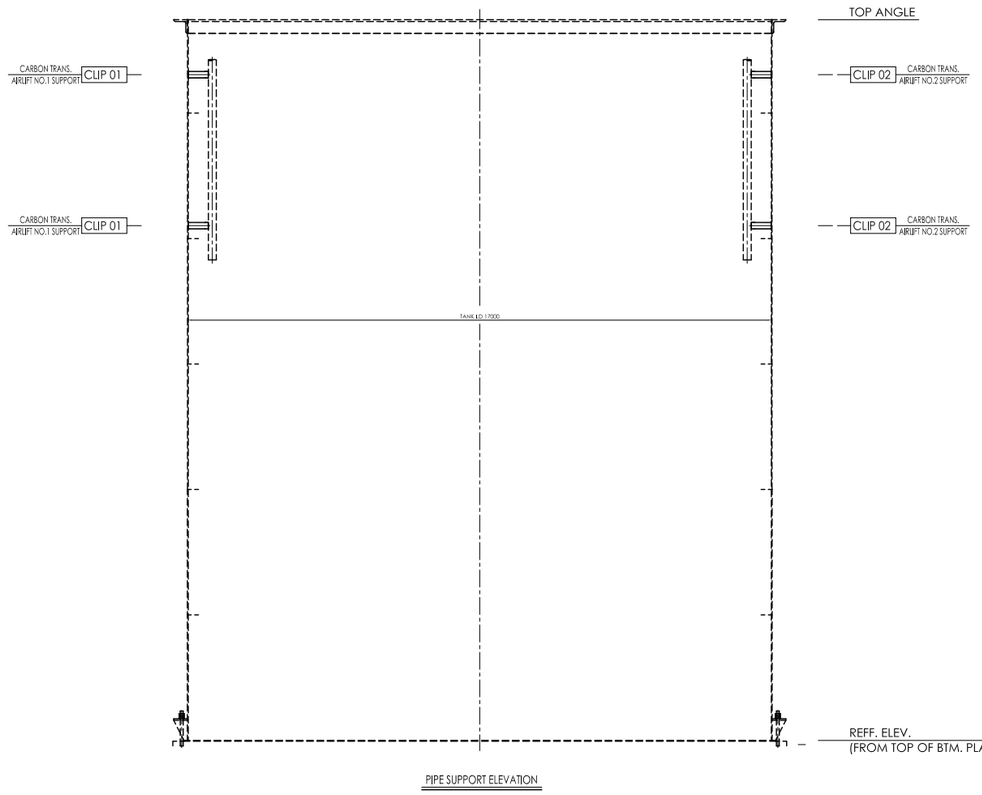
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 4
REFER DWG NO.	: E2502-000-DWG-508

Name
NDE MAP INTERNAL BAFFLE ADSORPTION TANK 4

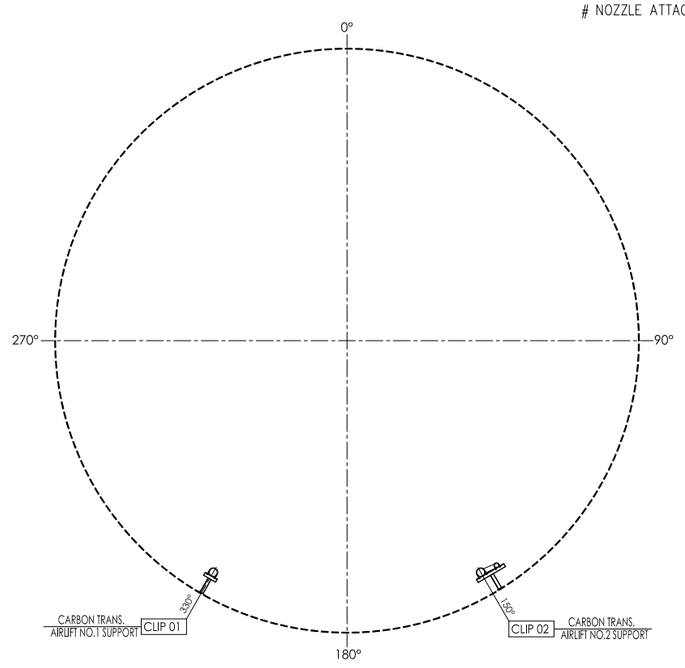
NDE Map No.	REV.
E2502-NDE-PBY-005	0

GENERAL NOTES :

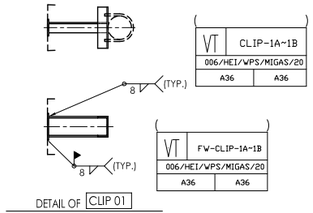
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



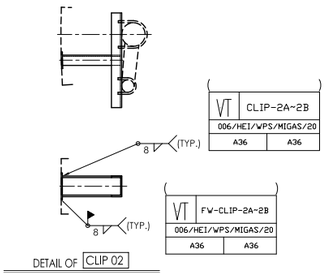
PIPE SUPPORT ELEVATION



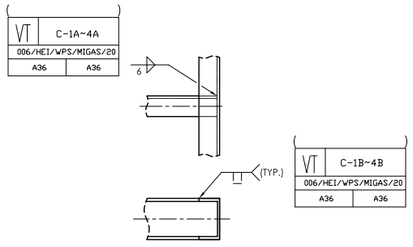
PIPE SUPPORT PLAN



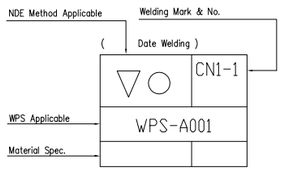
DETAIL OF CLIP 01
(CARBON TRANS. AIRLIFT NO.1 SUPPORT)



DETAIL OF CLIP 02
(CARBON TRANS. AIRLIFT NO.2 SUPPORT)



DETAIL JOINT CHANNEL



NDE METHOD SYMBOL

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

MATERIAL SPECIFICATION		LEGEND :
SUPPORT CHANNEL	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1
REINF. PAD	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP INTERNAL SUPPORT
ADSORPTION TANK 4

Sheet No./Total sheets	8/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 4
REFER DWG NO.	: E2502-000-DWG-509

NDE Map No.
E2502-NDE-PBY-005

REV.
0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

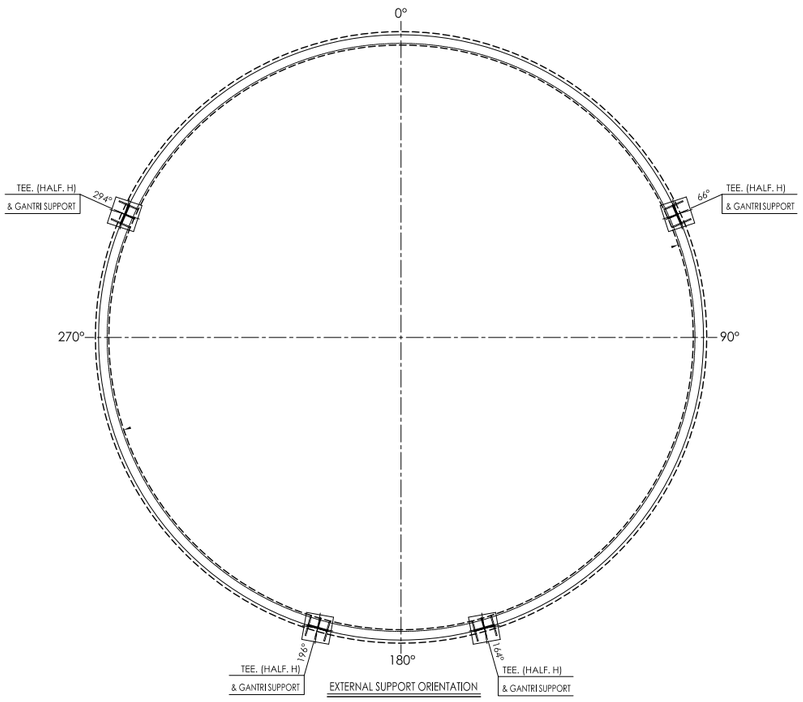
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

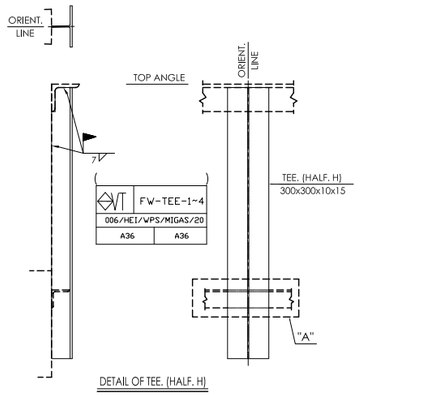
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.

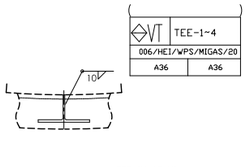
3. LIQUID PENETRANT

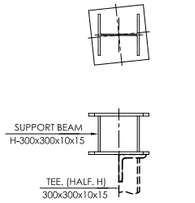
   # LIFTING LUG AND REMOVING OF JIG

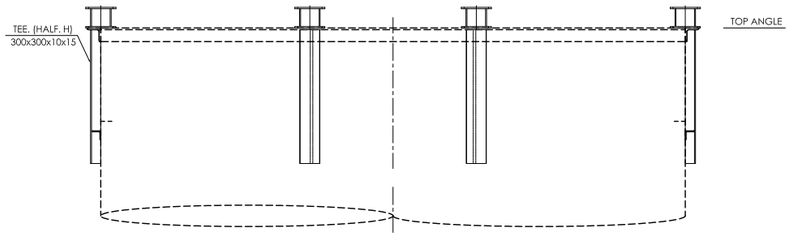
   # NOZZLE ATTACHMENT WELDING OF DUCTING

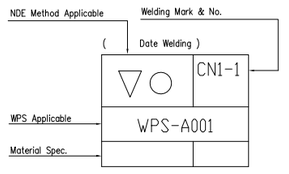












NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
TEE HALF	A36
SUPPORT BEAM	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name

NDE MAP EXTERNAL SUPPORT ADSORPTION TANK 4

Sheet No./Total sheets	8/9
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 4
REFER DWG NO.	: E2502-000-DWG-509

NDE Map No.

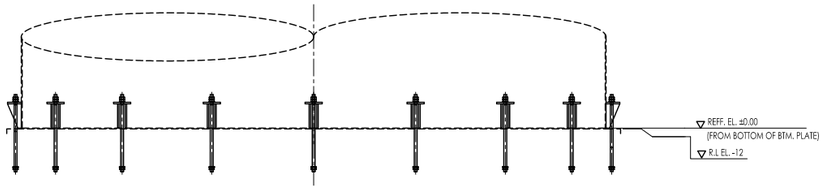
E2502-NDE-PBY-005

REV.

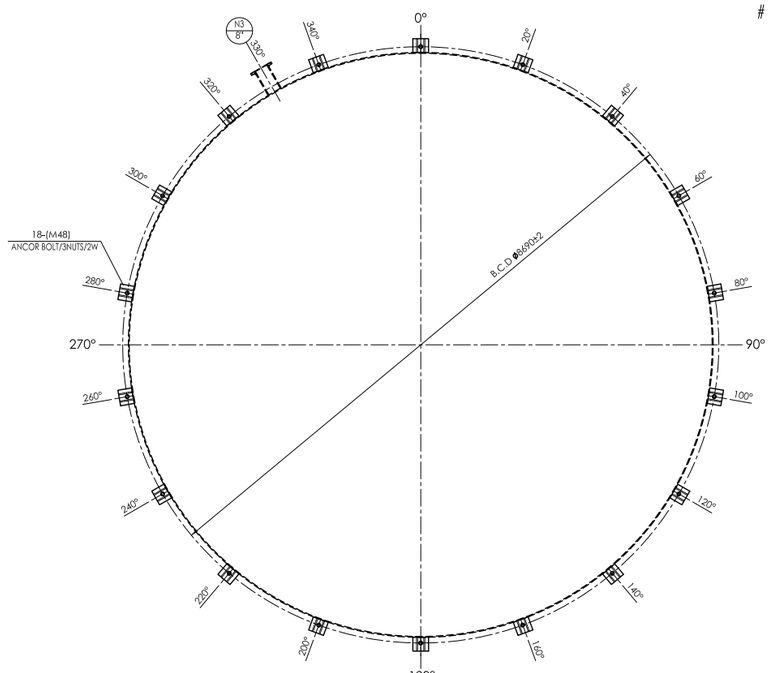
0

GENERAL NOTES :

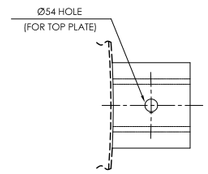
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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

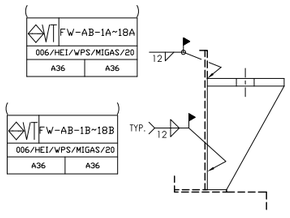


ANCHOR BOLT ELEVATION

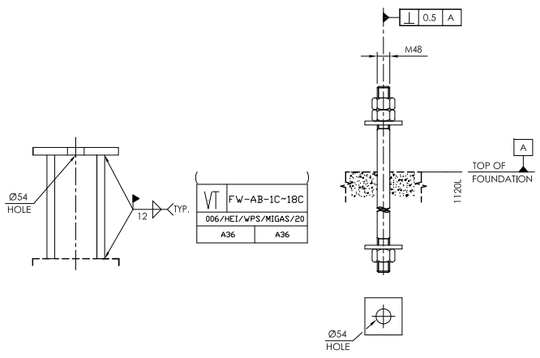


ANCHOR BOLT ORIENTATION
(PLAN VIEW)

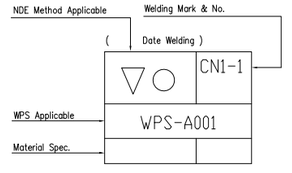




DETAIL OF ANCHOR BOLT CHAIR



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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
TOP PLATE	A36
GUSSET PLATE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP ANCHOR BOLT ADSORPTION TANK 4

Sheet No./Total sheets	9/9
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 4
REFER DWG NO.	: E2502-000-DWG-511

NDE Map No.
E2502-NDE-PBY-005

REV. 0

10. NDE MAP NO. : E2502-NDE-PBY-006

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

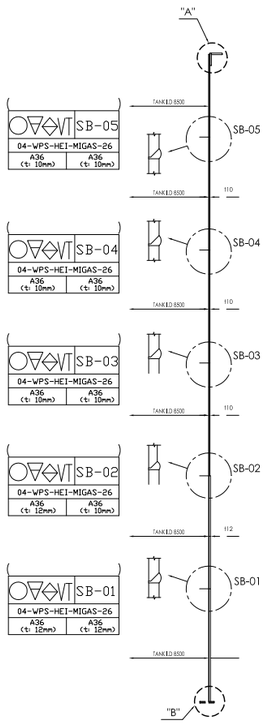
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

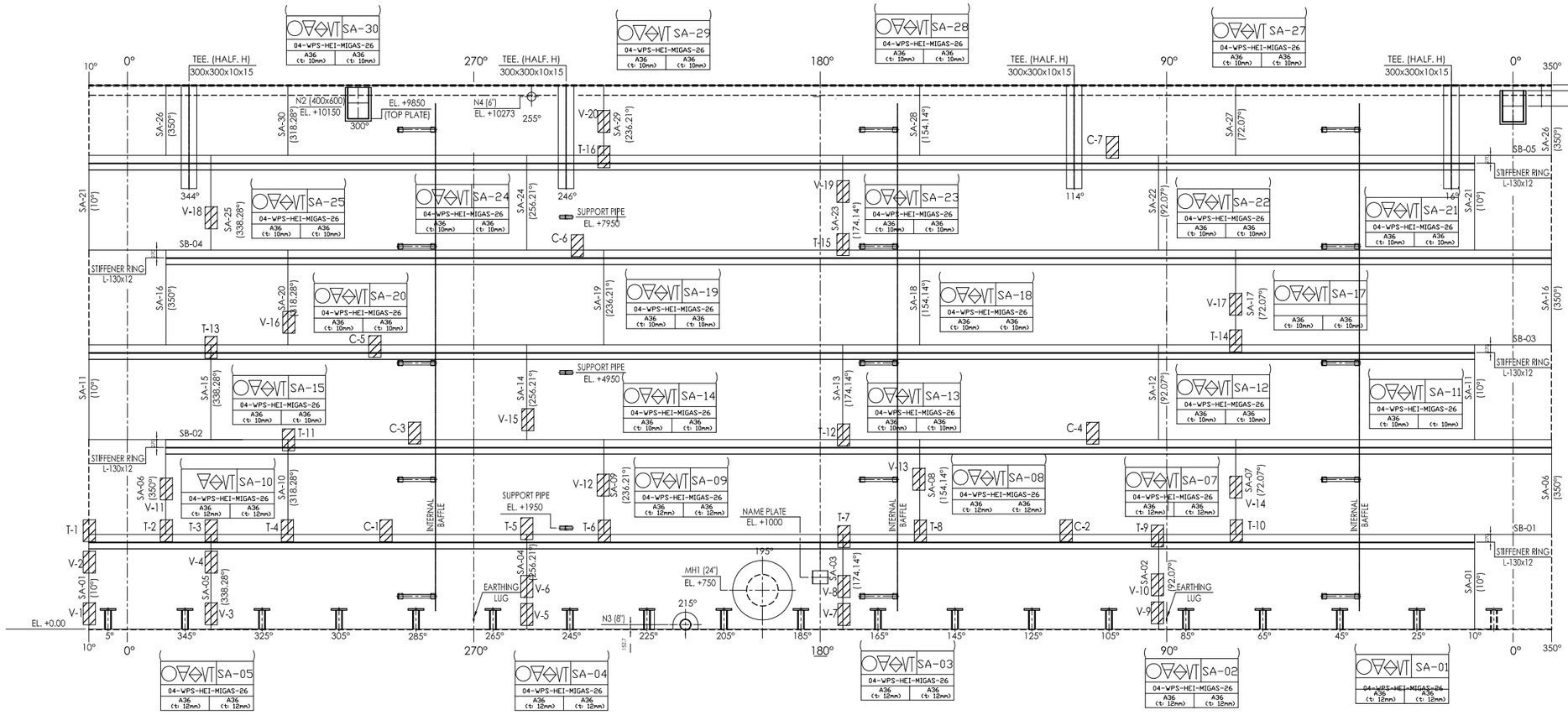
3. LIQUID PENETRANT

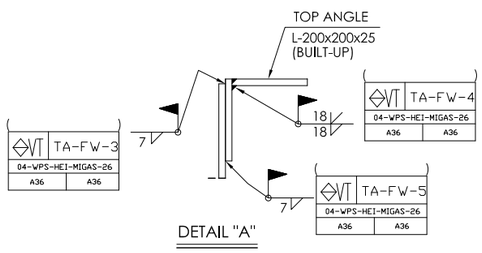
   # LIFTING LUG AND REMOVING OF JIG

   |# NOZZLE ATTACHMENT WELDING OF DUCTING

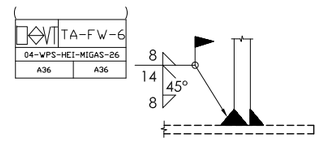


SHELL HORIZONTAL JOINT

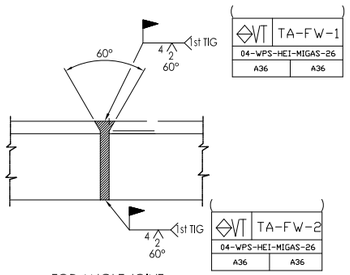




DETAIL "A"

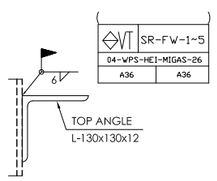


DETAIL "B"

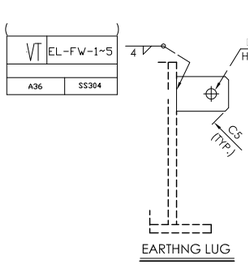


TOP ANGLE JOINT

SHELL DEVELOPMENT

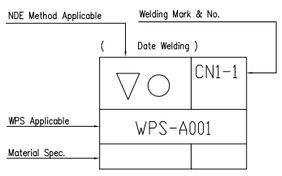


DETAIL OF STIFFENER RING



EARTHNG LUG

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



NDE METHOD SYMBOL

- □ VACUUM BOX
- ○ RT 10%
- ▽ UT SPOT LAMINATION CHECK FOR SHELL
- ◇ PT 10%
- VT VISUAL 100%

MATERIAL SPECIFICATION	
SHELL	A36
TOP ANGLE	A36
STIFFENER RING	A36

LEGEND :

WPS NO : 008/HEI/WPS/MIGAS/21 SMAW P1 to P1
006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP SHELL ADSORPTION TANK 5

NDE Map No.
E2502-NDE-PBY-006

REV. 0

Sheet No./Total sheets	1/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 5
REFER DWG NO.	: E2502-000-DWG-602

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

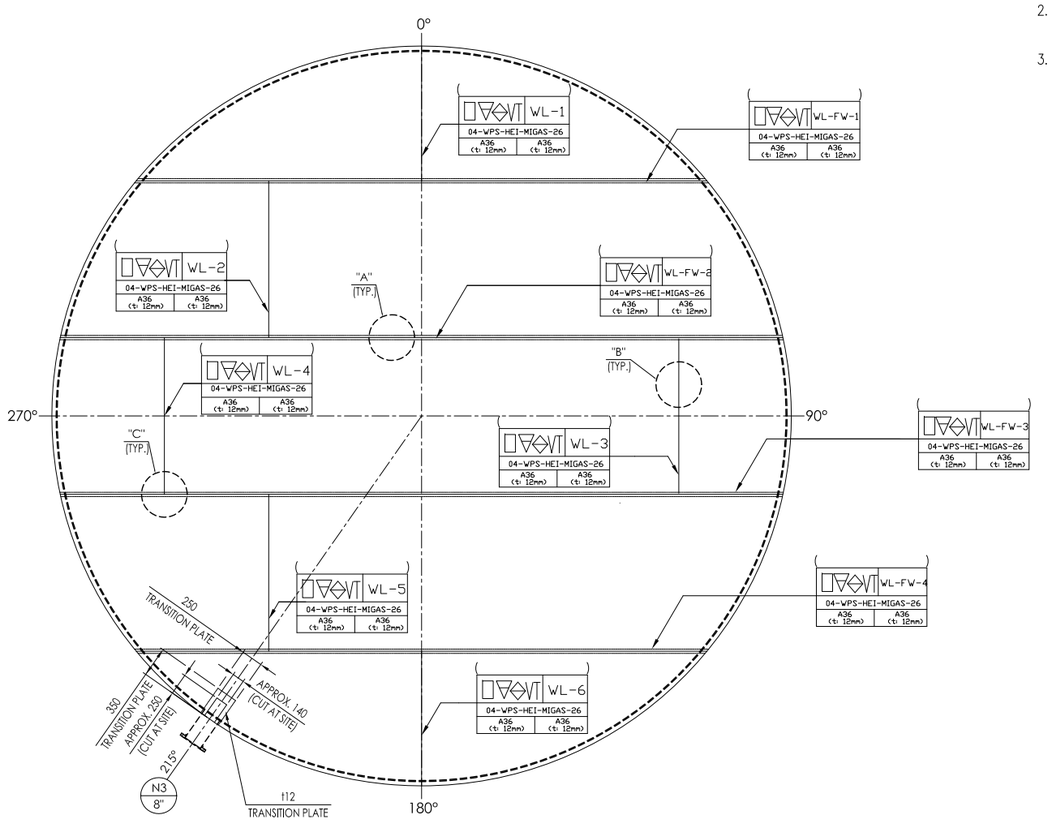
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

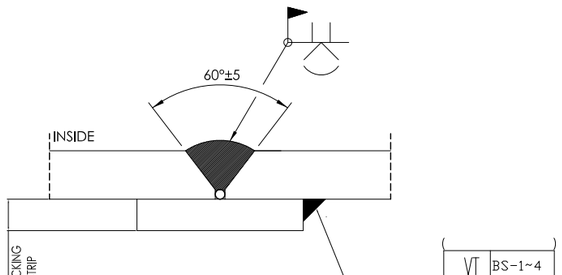
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

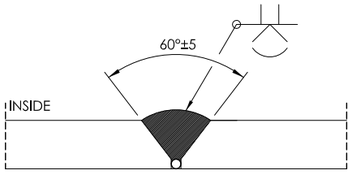
   # NOZZLE ATTACHMENT WELDING OF DUCTING



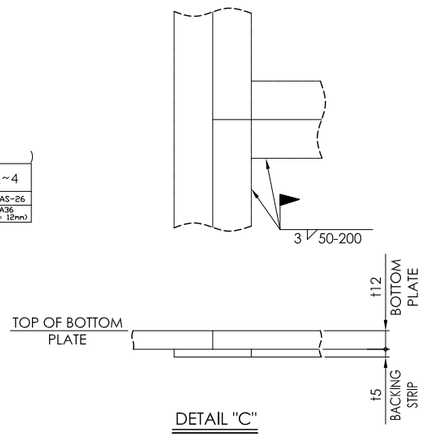
BOTTOM PLATE ARRANGEMENT



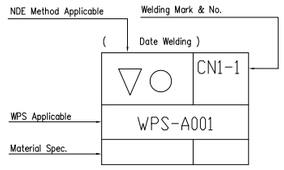
DETAIL "A"



DETAIL "B"



DETAIL "C"



NDE METHOD SYMBOL

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

MATERIAL SPECIFICATION	
BOTTOM PLATE	A36
BACKING STRIPE	A36

LEGEND :

WPS NO : 008/HEI/WPS/MIGAS/21 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP BOTTOM ADSORPTION TANK 5

Sheet No./Total sheets	2/10
Size of memory	

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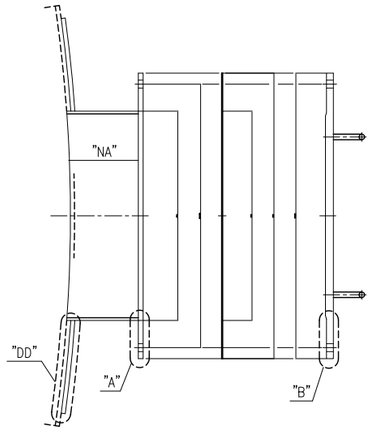
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 5
REFER DWG NO.	: E2502-000-DWG-603

NDE Map No.
E2502-NDE-PBY-006

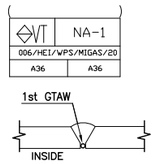
REV. 0

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



DETAIL OF NOZZLE (MH1) 24"



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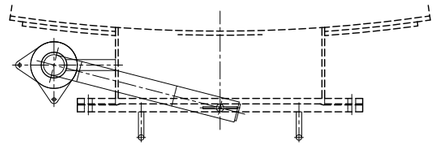
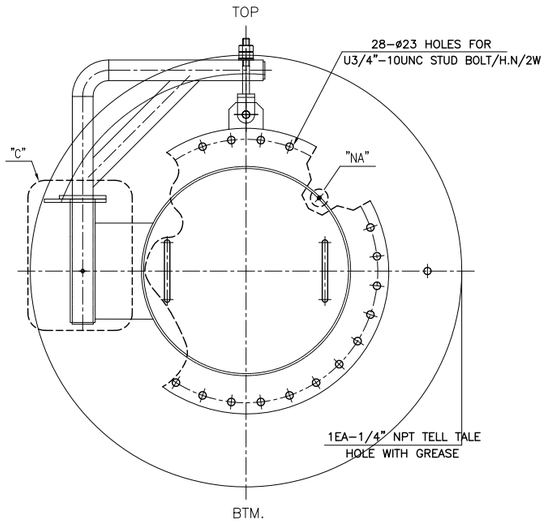
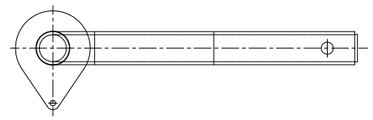
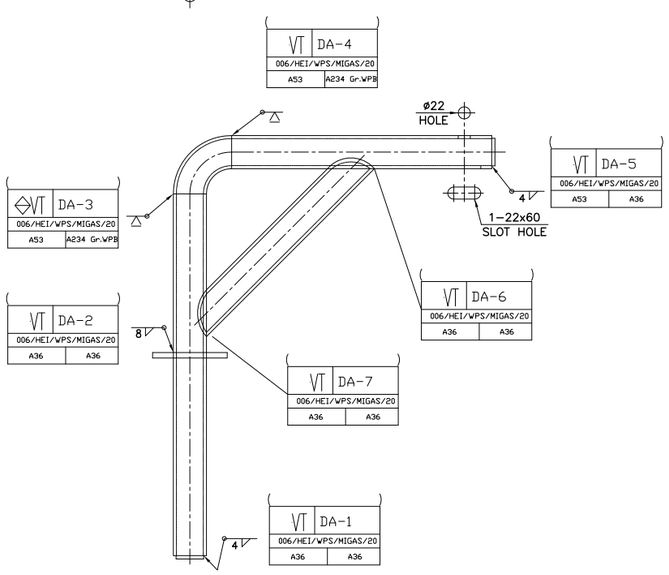


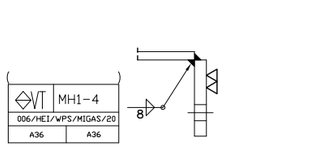


DAVIT ASSEMBLY
(DAVIT ORIENT. SEE ASS'Y DWG)

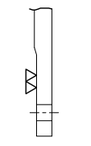




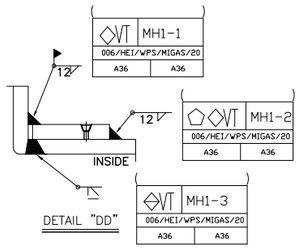
DAVIT DETAIL



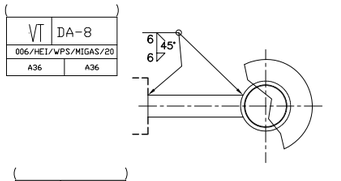
DETAIL "A"

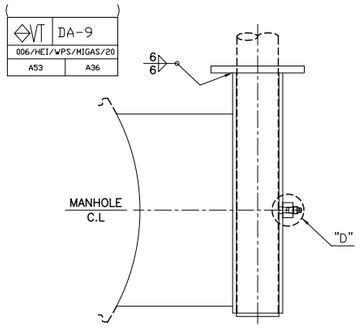


DETAIL "B"

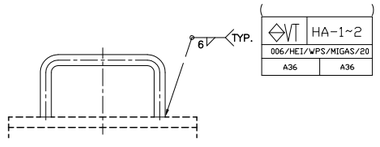


DETAIL "DD"

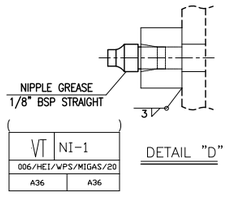




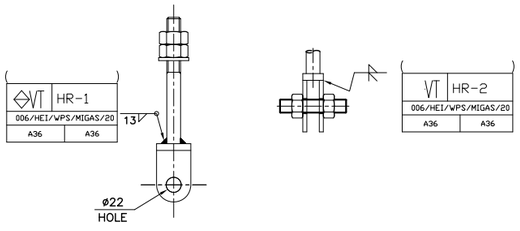
DETAIL "C"



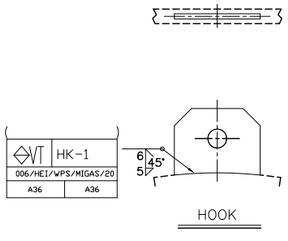
HANDLE DETAIL



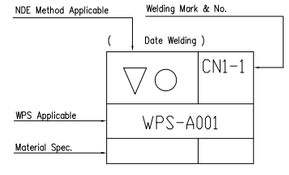
DETAIL "D"



HANGER DETAIL



HOOK



NDE METHOD SYMBOL

- UT SPOT
- PT 10%
- PT 100%
- PNEUMATIC TEST

VT VISUAL 100%

MATERIAL SPECIFICATION	
HOOK	A36
PIPE DAVIT	A53 Gr.B
HANDLE	A36
NOZZLE NECK	A36
PLATE FLANGE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP MANHOLE ADSORPTION TANK 5

Sheet No./Total sheets	3/9
Size of memory	

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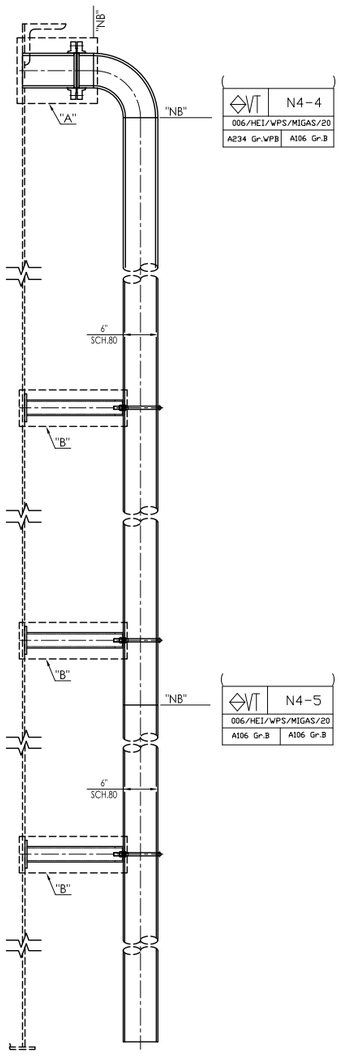
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 5
REFER DWG NO.	: E2502-000-DWG-604

NDE Map No.
E2502-NDE-PBY-006

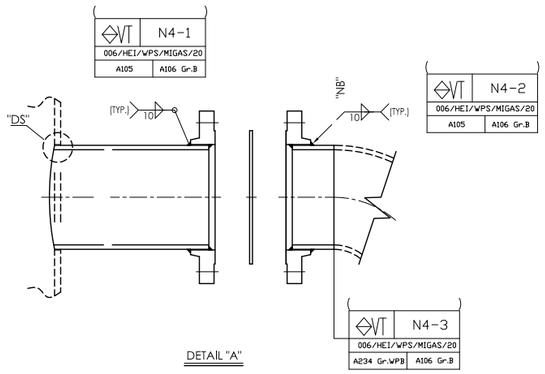
REV.
0

GENERAL NOTES :

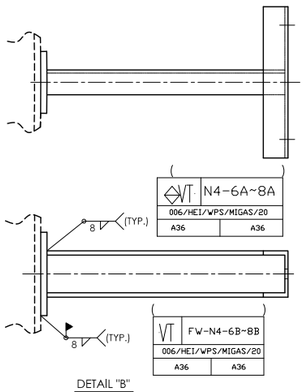
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



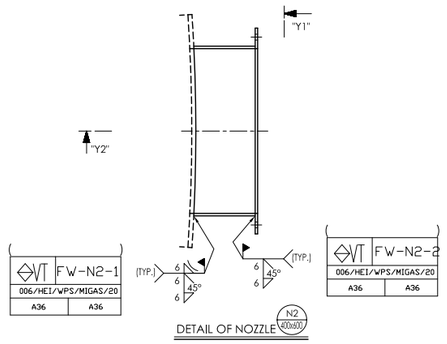
DETAIL OF NOZZLE N4 6"



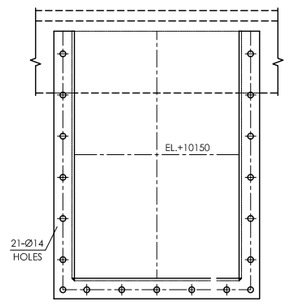
DETAIL "A"



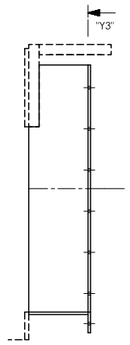
DETAIL "B"



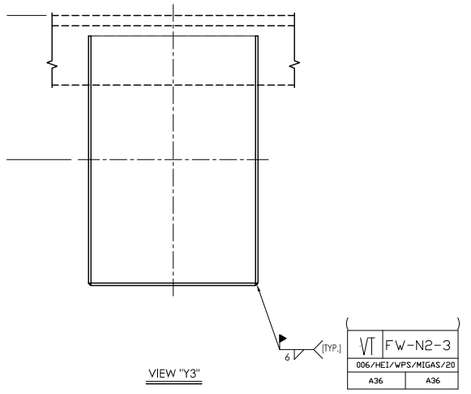
DETAIL OF NOZZLE N2 300x60



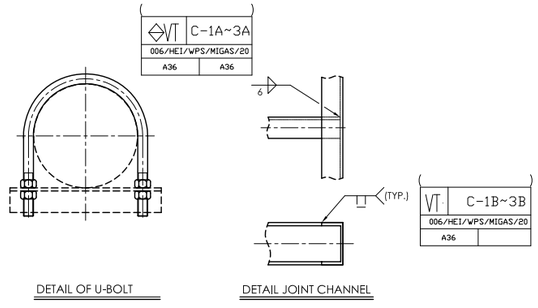
VIEW "Y1"



VIEW "Y2"

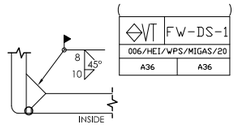


VIEW "Y3"

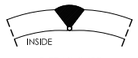


DETAIL OF U-BOLT

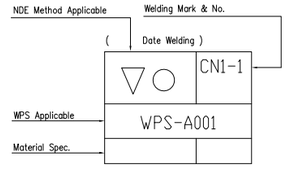
DETAIL JOINT CHANNEL



DETAIL "DS"



DETAIL "NB"



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 1-3 ADSORPTION TANK 5

Sheet No./Total sheets	4/9
Size of memory	

PT. HANAZONO Engineering Indonesia
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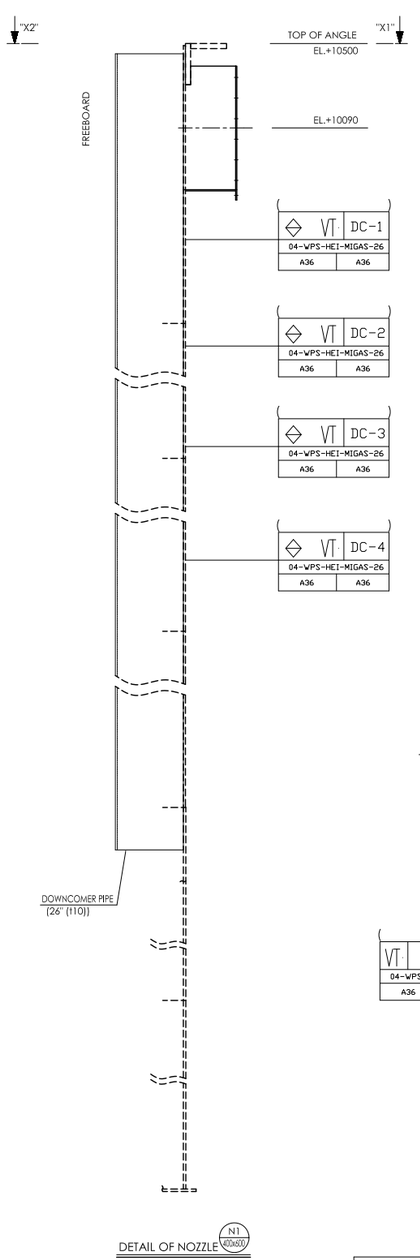
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 5
REFER DWG NO.	: E2502-000-DWG-605

NDE Map No.
E2502-NDE-PBY-006

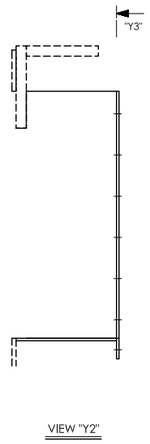
REV. 0

GENERAL NOTES :

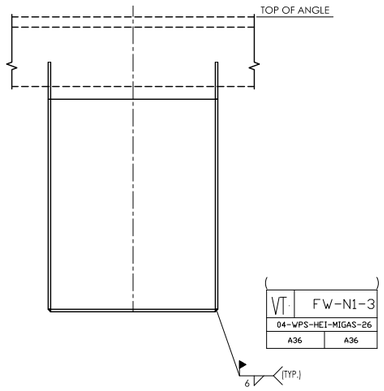
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



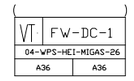
DETAIL OF NOZZLE N1 400x600

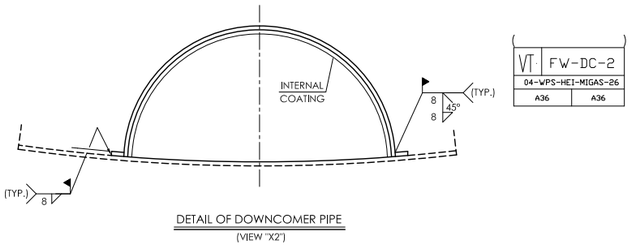


VIEW "Y2"

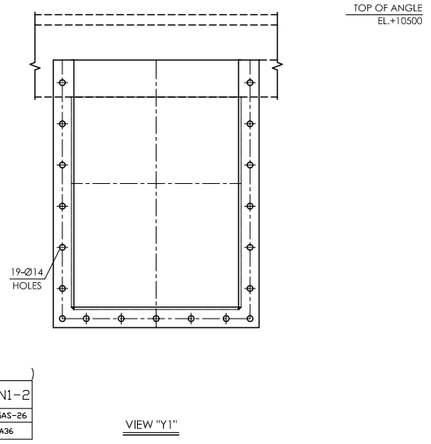


VIEW "Y3"



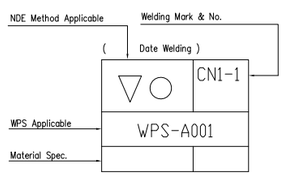


DETAIL OF DOWNCOMER PIPE
(VIEW "X2")



VIEW "X1"

VIEW "Y1"



NDE METHOD SYMBOL

▽ UT SPOT

◈ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

WPS NO : 004-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 2-3 ADSORPTION TANK 5

Sheet No./Total sheets	5/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 5
REFER DWG NO.	: E2502-000-DWG-606

NDE Map No.
E2502-NDE-PBY-006

REV.
0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

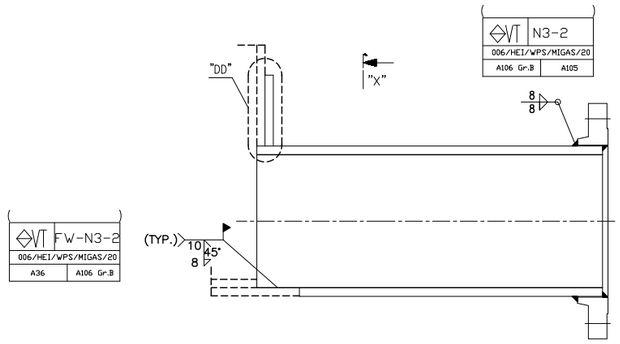
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

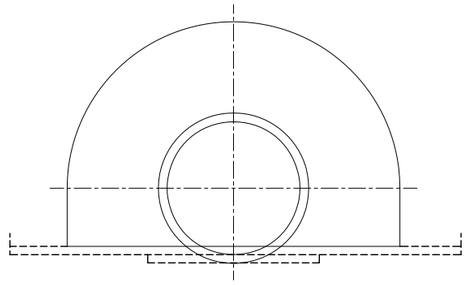
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

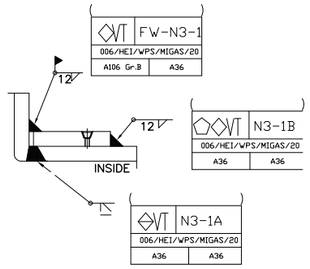
   # NOZZLE ATTACHMENT WELDING OF DUCTING



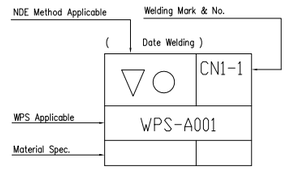
DETAIL OF NOZZLE N3 8"



DETAIL OF REINF. PAD



DETAIL "DD"



NDE METHOD SYMBOL

- UT SPOT
- PT 10%
- PT 100%
- PNEUMATIC TEST

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 3-3 ADSORPTION TANK 5

Sheet No./Total sheets	6/9
Size of memory	

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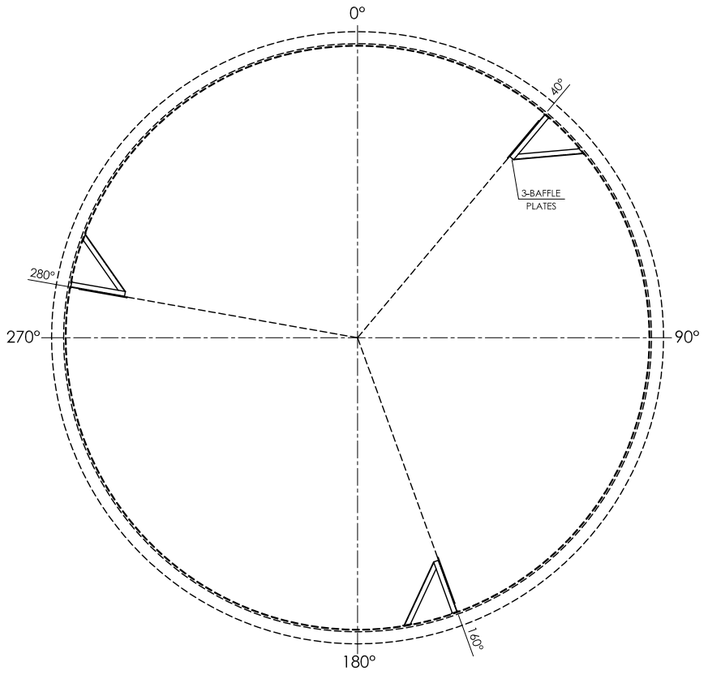
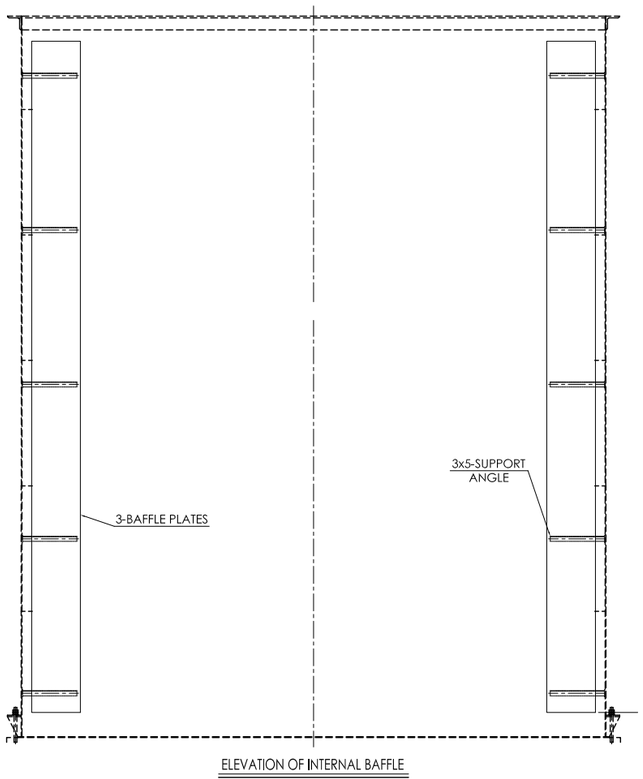
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 5
REFER DWG NO.	: E2502-000-DWG-607

NDE Map No.
E2502-NDE-PBY-006

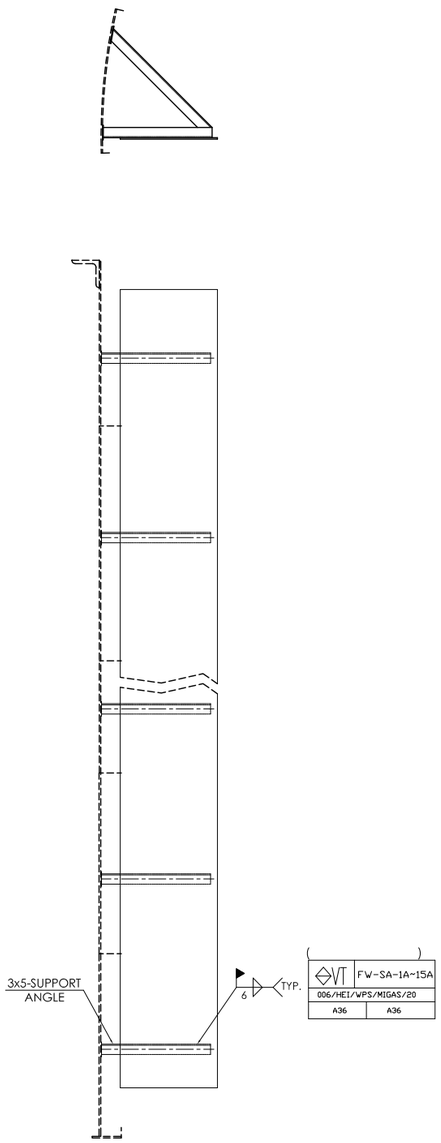
REV. 0



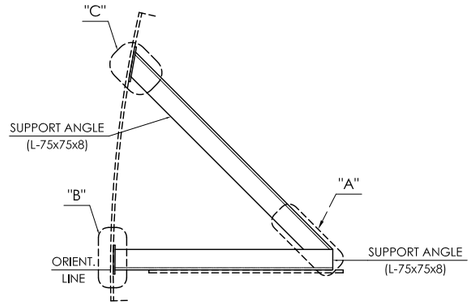
ORIENTATION OF INTERNAL BAFFLE

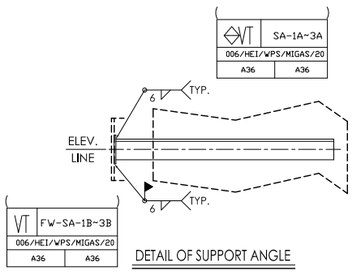


ELEVATION OF INTERNAL BAFFLE

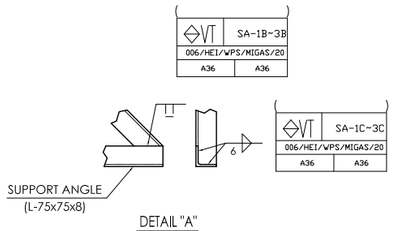


DETAIL OF INTERNAL BAFFLE





DETAIL OF SUPPORT ANGLE



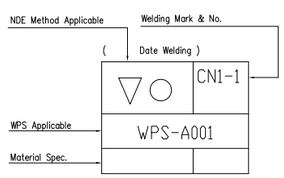
DETAIL "A"

DETAIL "B"

DETAIL "C"

GENERAL NOTES :

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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
INTERNAL BAFFLE	A36
SUPPORT ANGLE	A36
SUPPORT PAD	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name

NDE MAP INTERNAL BAFFLE ADSORPTION TANK 5

Sheet No./Total sheets	7/9
Size of memory	

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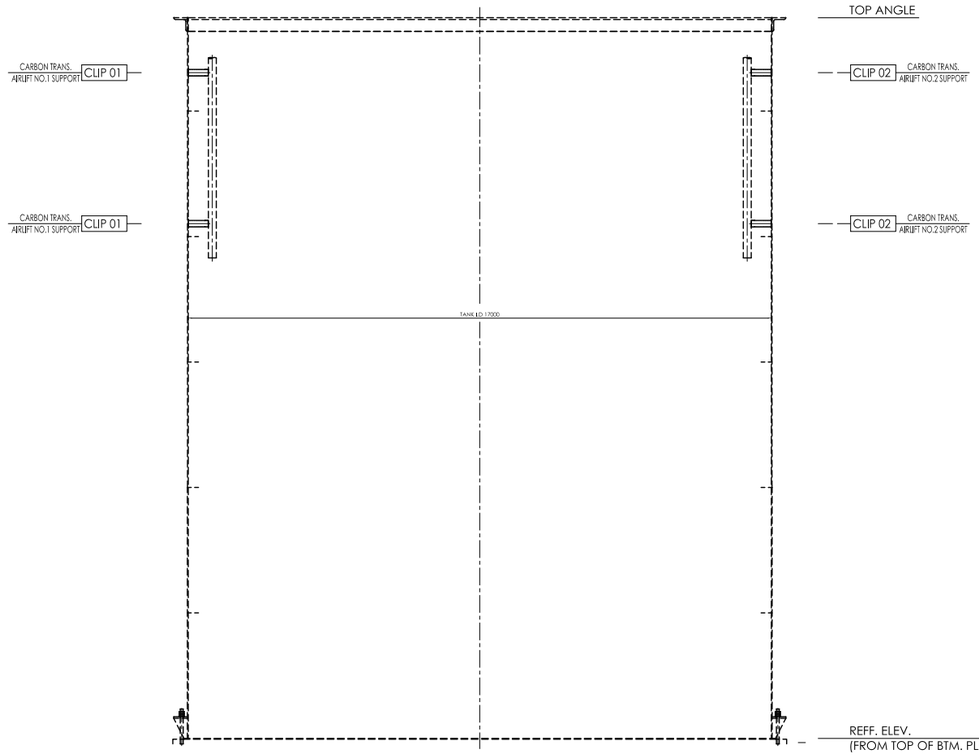
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 5
REFER DWG NO.	: E2502-000-DWG-608

NDE Map No. E2502-NDE-PBY-006

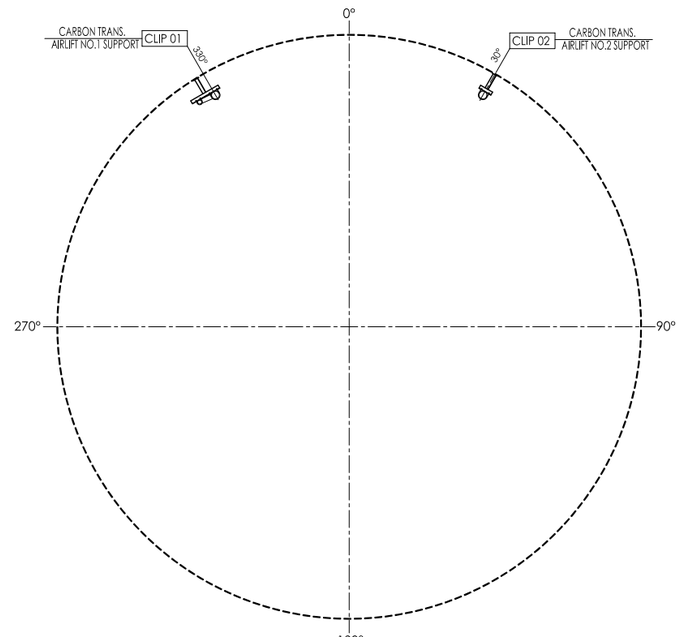
REV. 0

GENERAL NOTES :

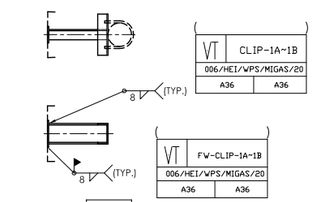
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



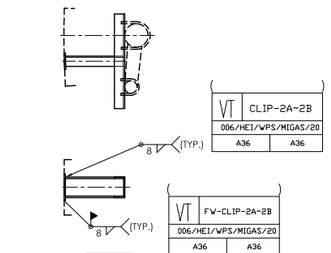
PIPE SUPPORT ELEVATION



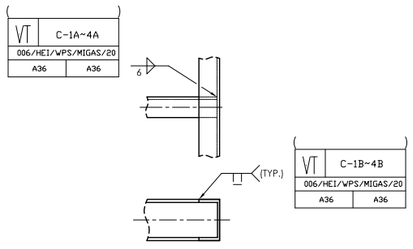
PIPE SUPPORT PLAN



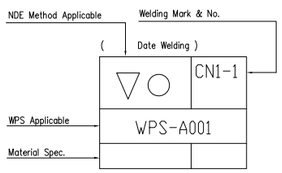
DETAIL OF CLIP 01
(CARBON TRANS. AIRLIFT NO.1 SUPPORT)



DETAIL OF CLIP 02
(CARBON TRANS. AIRLIFT NO.2 SUPPORT)



DETAIL JOINT CHANNEL



NDE METHOD SYMBOL

▽ UT SPOT

◈ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :
SUPPORT CHANNEL	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1
REINF. PAD	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP INTERNAL SUPPORT
ADSORPTION TANK 5

Sheet No./Total sheets	8/10
Size of memory	

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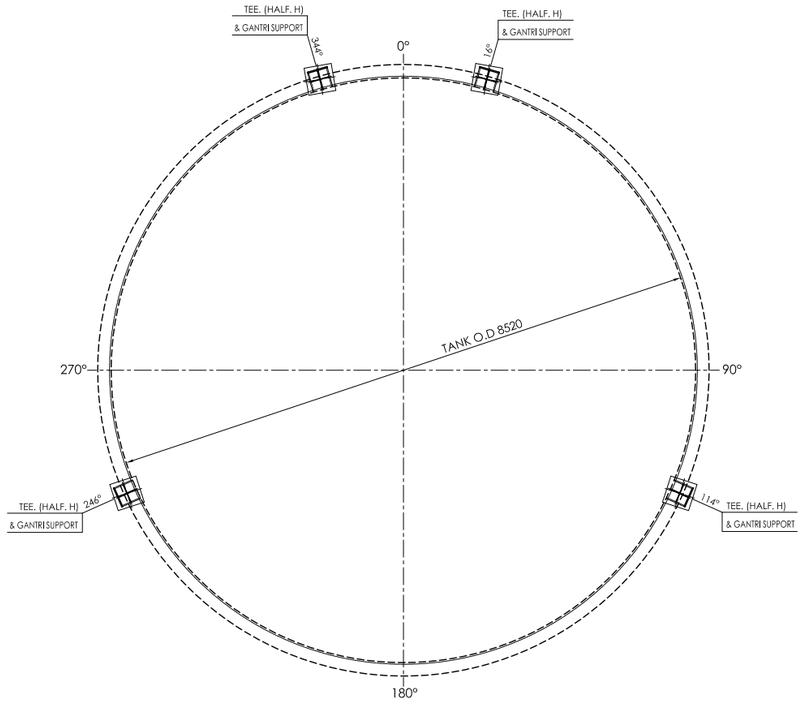
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 5
REFER DWG NO.	: E2502-000-DWG-609

NDE Map No.
E2502-NDE-PBY-006

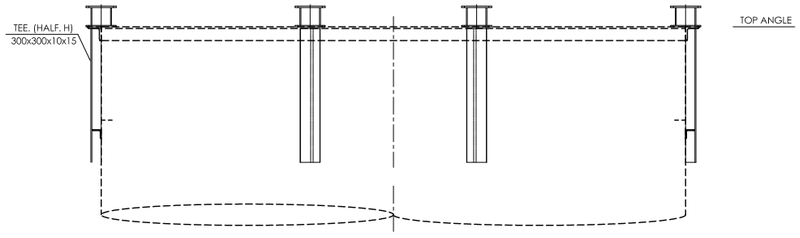
REV.
0

GENERAL NOTES :

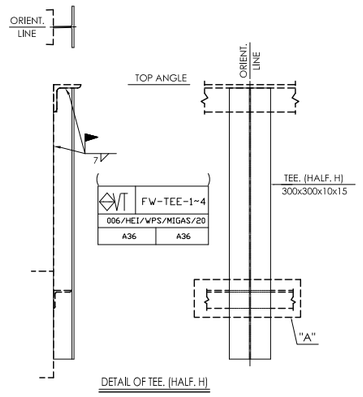
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



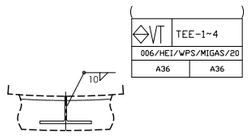
EXTERNAL SUPPORT ORIENTATION

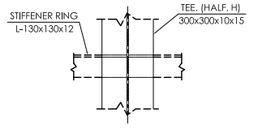


EXTERNAL SUPPORT ELEVATION

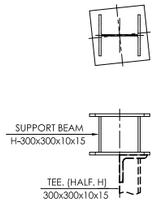


DETAIL OF TEE. (HALF. H)

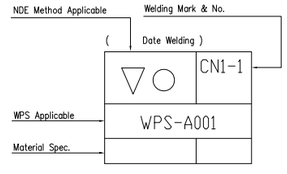




DETAIL "A"



DETAIL OF GANTRI SUPPORT



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
TEE HALF	A36
SUPPORT BEAM	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name

NDE MAP EXTERNAL SUPPORT
ADSORPTION TANK 5

Sheet No./Total sheets	9/10
Size of memory	

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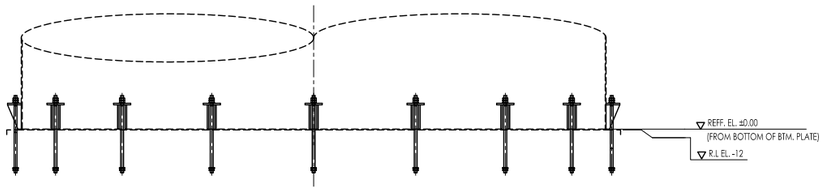
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 1
REFER DWG NO.	: E2502-000-DWG-210

NDE Map No. E2502-NDE-PBY-002

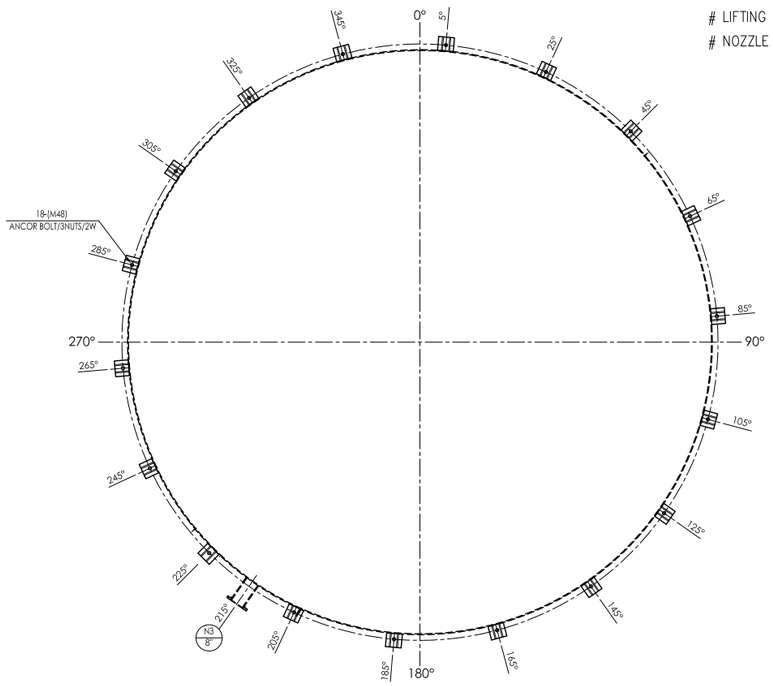
REV. 0

GENERAL NOTES :

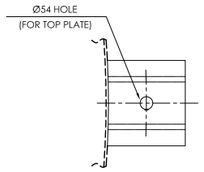
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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

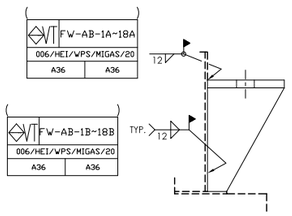


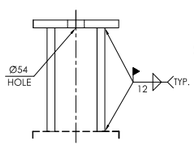
ANCHOR BOLT ELEVATION

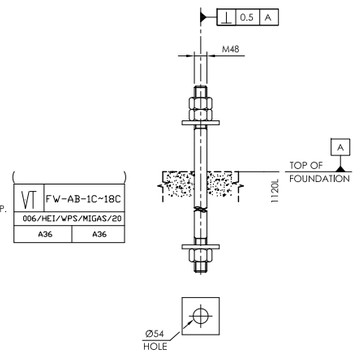


ANCHOR BOLT ORIENTATION
(PLAN VIEW)



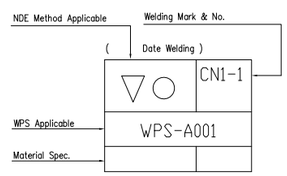






DETAIL OF ANCHOR BOLT CHAIR

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



NDE METHOD SYMBOL

▽ UT SPOT
◇ PT 10%
VT VISUAL 100%

MATERIAL SPECIFICATION	
TOP PLATE	A36
GUSSET PLATE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP ANCHOR BOLT ADSORPTION TANK 5

Sheet No./Total sheets	10/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 5
REFER DWG NO.	: E2502-000-DWG-611

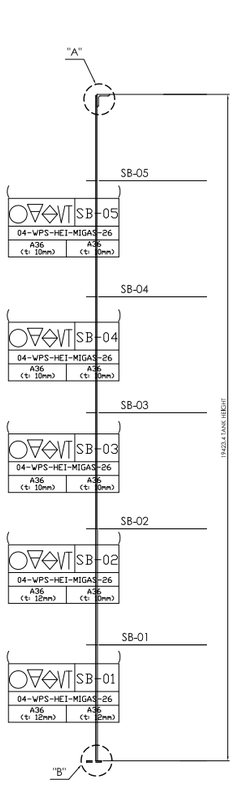
NDE Map No.
E2502-NDE-PBY-006

REV.
0

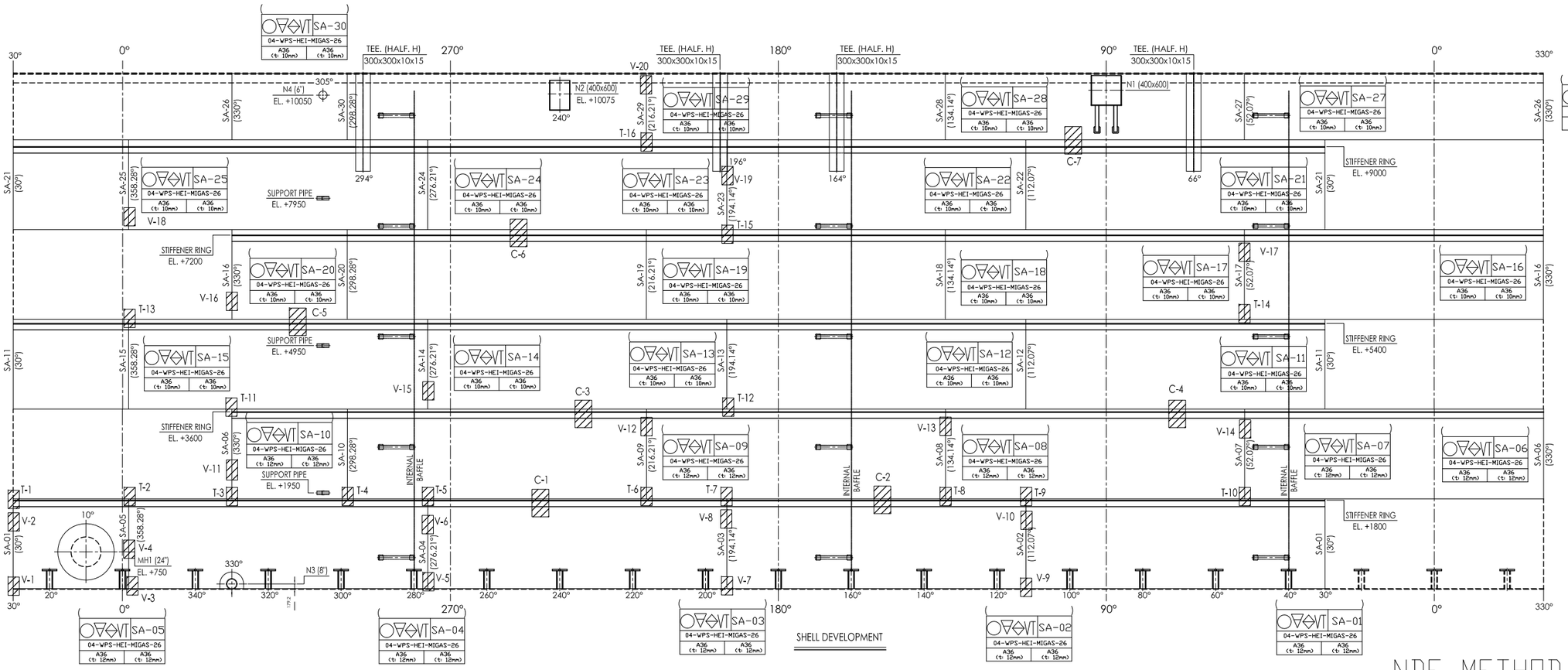
11. NDE MAP NO. : E2502-NDE-PBY-007

GENERAL NOTES :

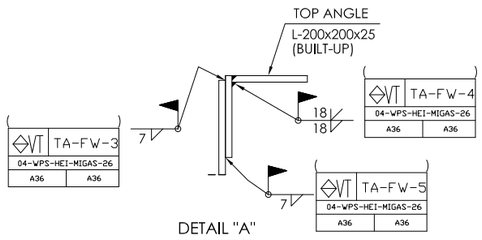
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   |# NOZZLE ATTACHMENT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



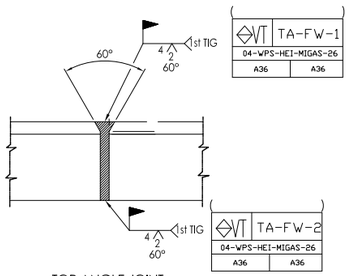
SHELL HORIZONTAL JOINT



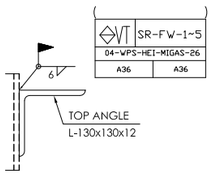
SHELL DEVELOPMENT



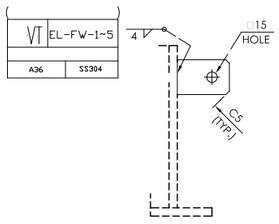
DETAIL "A"



TOP ANGLE JOINT

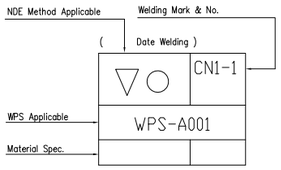


DETAIL OF STIFFENER RING



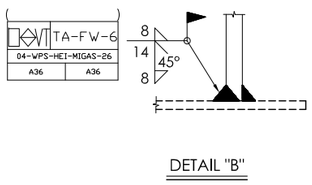
EARTHNG LUG

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



NDE METHOD SYMBOL

- VACUUM BOX
- RT 10%
- UT SPOT LAMINATION CHECK FOR SHELL
- PT 10%
- VT VISUAL 100%



DETAIL "B"

MATERIAL SPECIFICATION	
SHELL	A36
TOP ANGLE	A36
STIFFENER RING	A36

LEGEND :

WPS NO : 04-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP SHELL ADSORPTION TANK 6

Sheet No./Total sheets	1/9
Size of memory	

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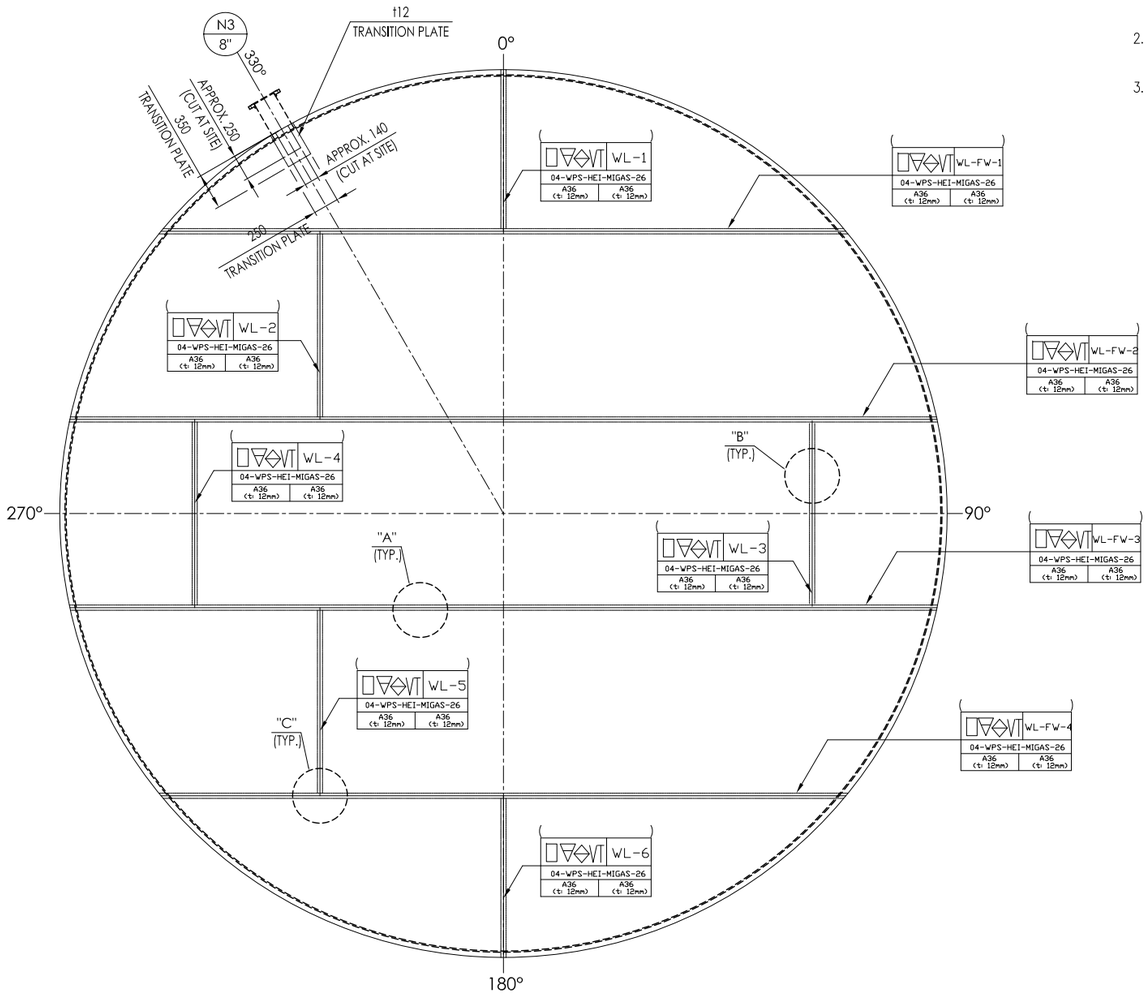
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 6
REFER DWG NO.	: E2502-000-DWG-702

NDE Map No.
E2502-NDE-PBY-001

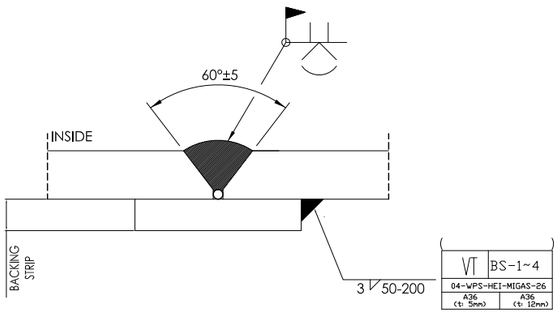
REV.
0

GENERAL NOTES :

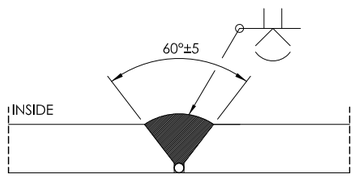
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



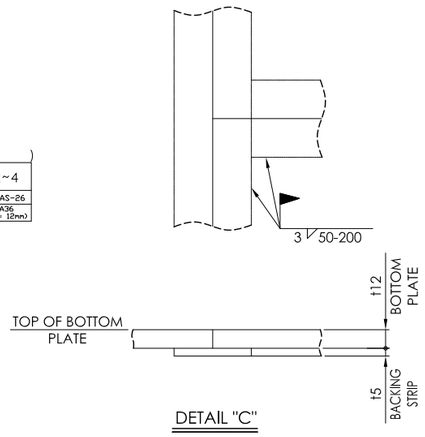
BOTTOM PLATE ARRANGEMENT



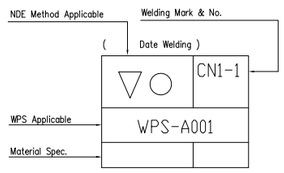
DETAIL "A"



DETAIL "B"



DETAIL "C"



NDE METHOD SYMBOL

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

MATERIAL SPECIFICATION	
BOTTOM PLATE	A36
BACKING STRIPE	A36

LEGEND :

WPS NO : 04-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP BOTTOM ADSORPTION TANK 6

Sheet No./Total sheets	2/9
Size of memory	
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 6
REFER DWG NO.	: E2502-000-DWG-703

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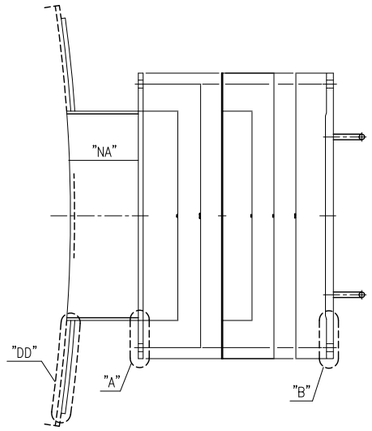
NDE Map No. E2502-NDE-PBY-007

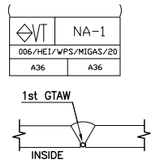
REV. 0

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



DETAIL OF NOZZLE (MH1) 24"



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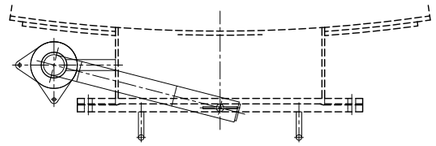
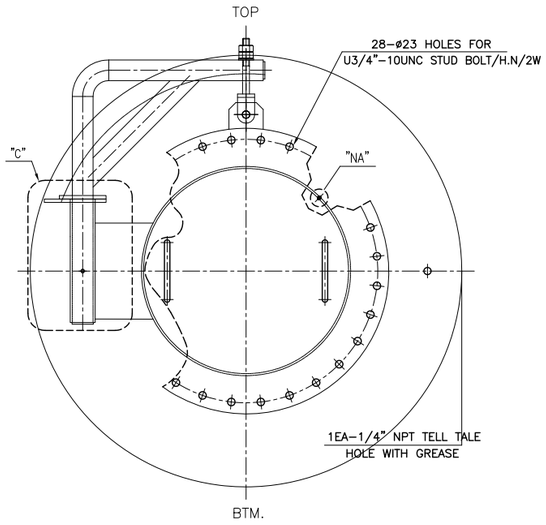
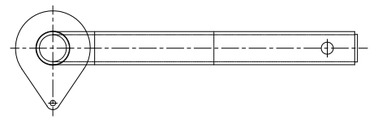
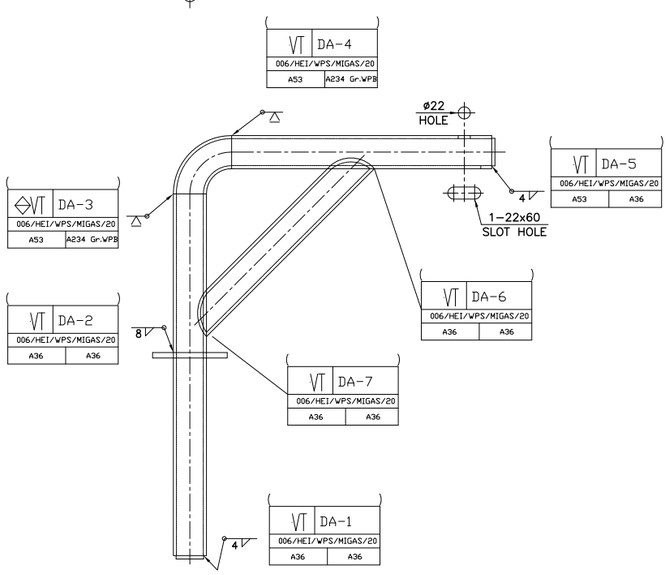


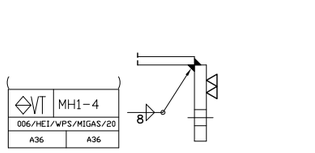


DAVIT ASSEMBLY
(DAVIT ORIENT. SEE ASS'Y DWG)

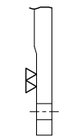




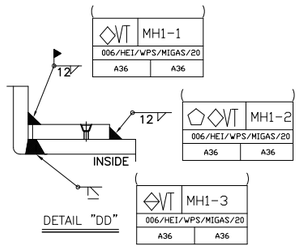
DAVIT DETAIL



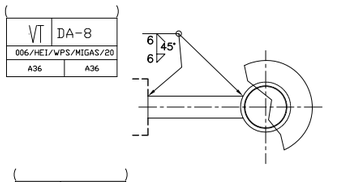
DETAIL "A"

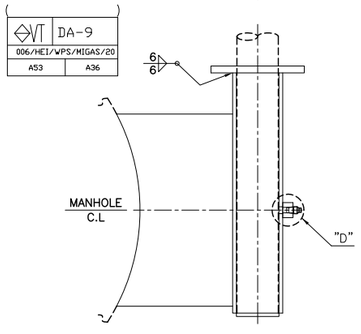


DETAIL "B"

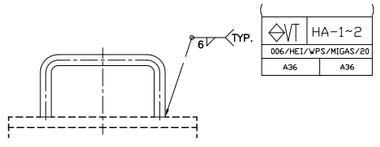


DETAIL "DD"

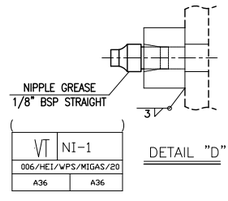




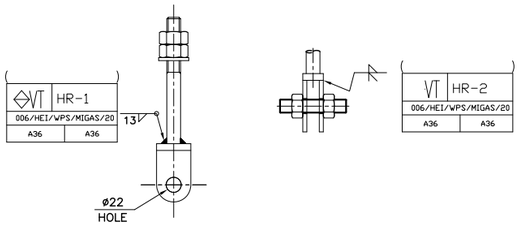
DETAIL "C"



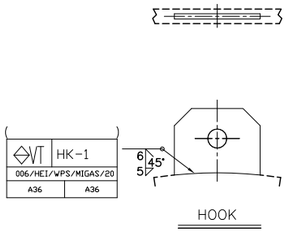
HANDLE DETAIL



DETAIL "D"



HANGER DETAIL

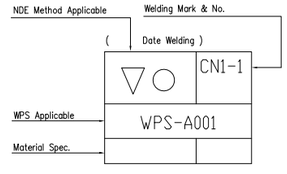


HOOK

NDE METHOD SYMBOL

- UT SPOT
- PT 10%
- PT 100%
- PNEUMATIC TEST

VT VISUAL 100%



MATERIAL SPECIFICATION	
HOOK	A36
PIPE DAVIT	A53 Gr.B
HANDLE	A36
NOZZLE NECK	A36
PLATE FLANGE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP MANHOLE ADSORPTION TANK 6

Sheet No./Total sheets	3/9
Size of memory	

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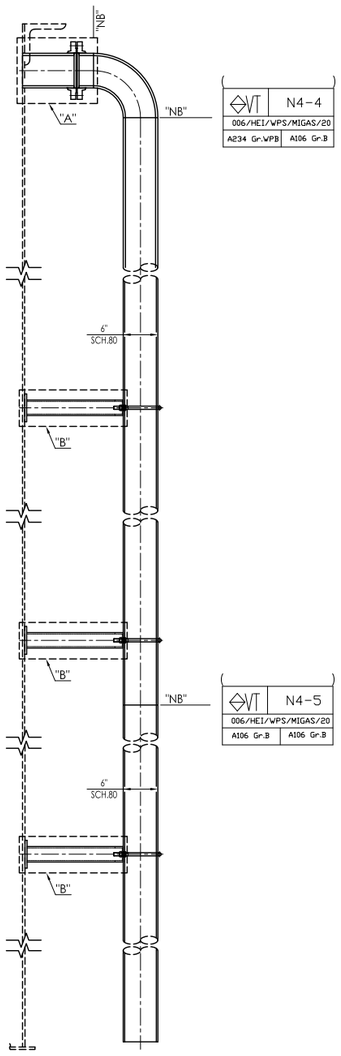
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 6
REFER DWG NO.	: E2502-000-DWG-704

NDE Map No.
E2502-NDE-PBY-007

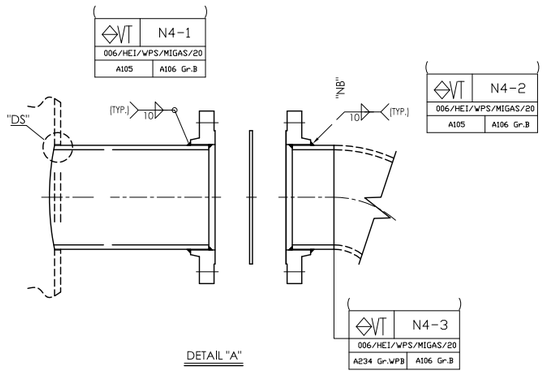
REV.
0

GENERAL NOTES :

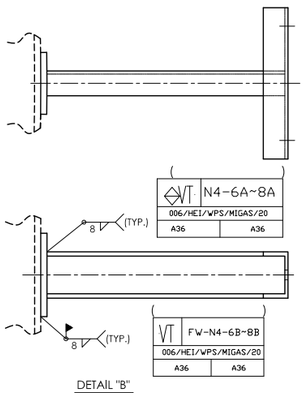
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



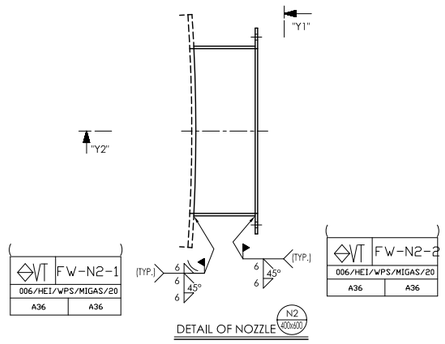
DETAIL OF NOZZLE N4 6"



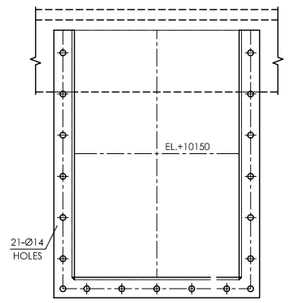
DETAIL "A"



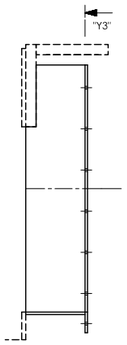
DETAIL "B"



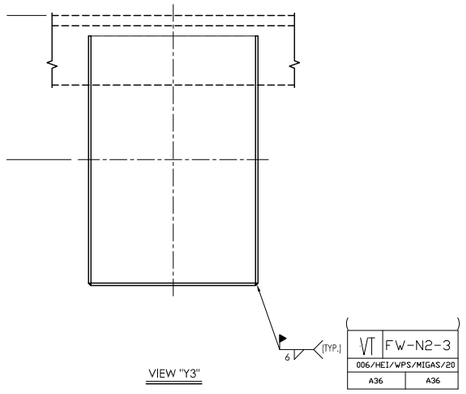
DETAIL OF NOZZLE N2 300x60



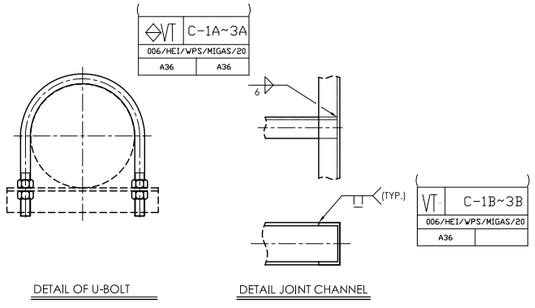
VIEW "Y1"



VIEW "Y2"

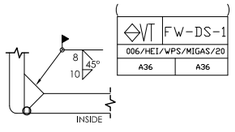


VIEW "Y3"

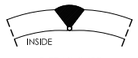


DETAIL OF U-BOLT

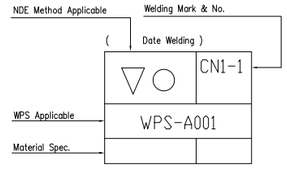
DETAIL JOINT CHANNEL



DETAIL "DS"



DETAIL "NB"



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 1-3 ADSORPTION TANK 6

Sheet No./Total sheets	4/9
Size of memory	

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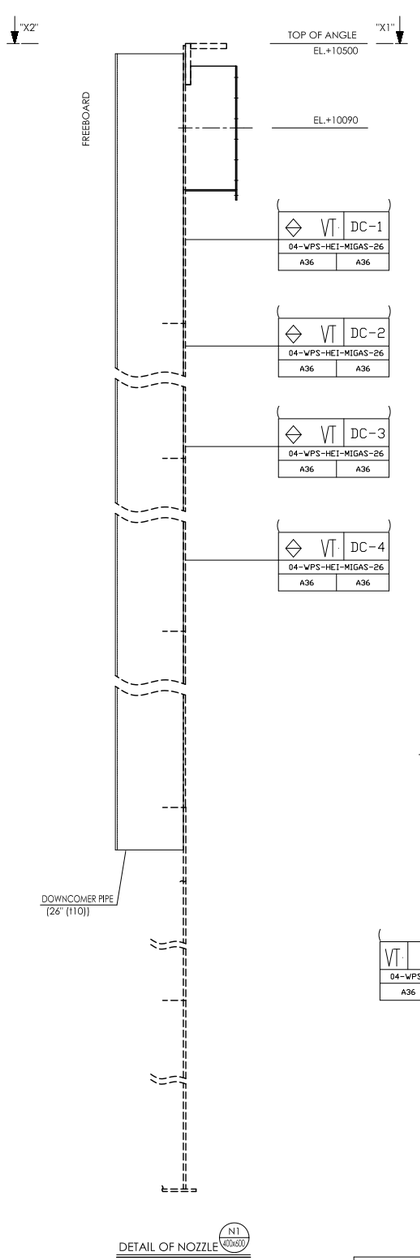
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 6
REFER DWG NO.	: E2502-000-DWG-705

NDE Map No.
E2502-NDE-PBY-007

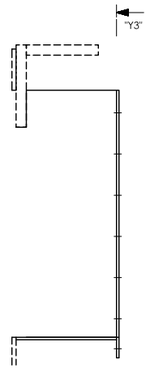
REV. 0

GENERAL NOTES :

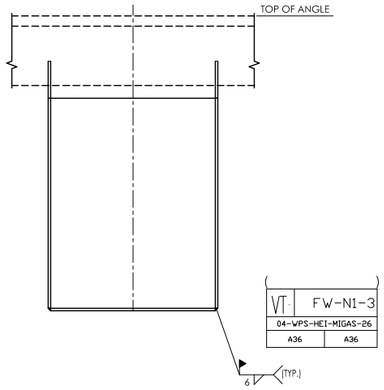
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



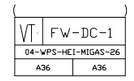
DETAIL OF NOZZLE N1 400x600

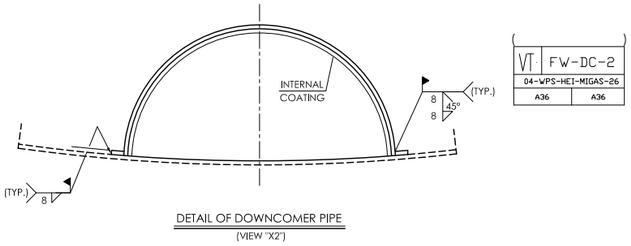


VIEW "Y2"

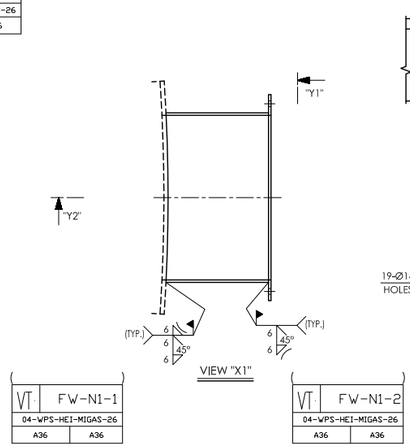


VIEW "Y3"



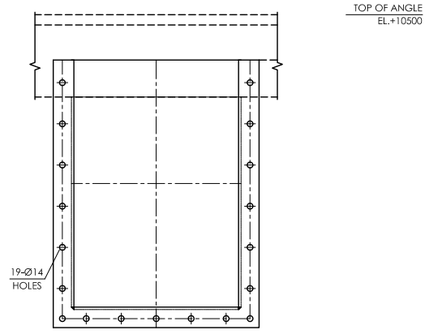


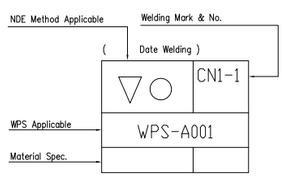
DETAIL OF DOWNCOMER PIPE
(VIEW "X2")



VIEW "X1"

VIEW "Y1"





NDE METHOD SYMBOL

▽ UT SPOT

◈ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36
CHANNEL	A36

LEGEND :

WPS NO : 004-WPS-HEI-MIGAS-26 SMAW P1 to P1

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 2-3 ADSORPTION TANK 6

NDE Map No.
E2502-NDE-PBY-007

REV.
0

Sheet No./Total sheets	5/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 6
REFER DWG NO.	: E2502-000-DWG-706

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

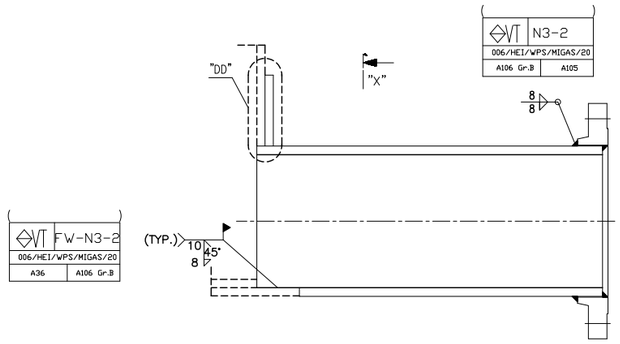
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

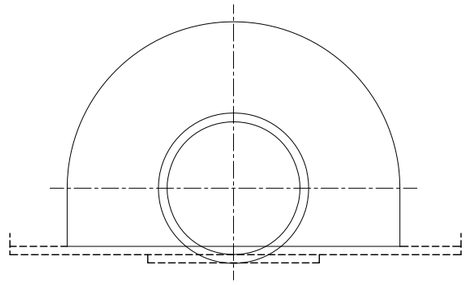
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

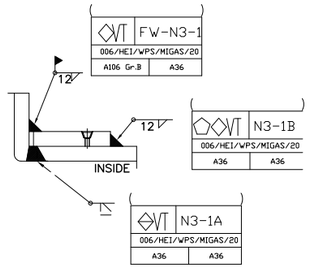
   # NOZZLE ATTACHMENT WELDING OF DUCTING



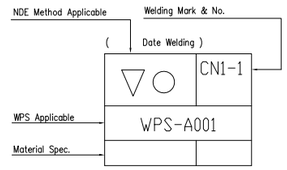
DETAIL OF NOZZLE N3 8"



DETAIL OF REINF. PAD



DETAIL "DD"



NDE METHOD SYMBOL

- ▽ UT SPOT
- ◇ PT 10%
- ◆ PT 100%
- ⬠ PNEUMATIC TEST

VT VISUAL 100%

MATERIAL SPECIFICATION	
FLANGE	A105
NOZZLE NECK	A106 Gr.B
REINF. PAD	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP NOZZLE 3-3 ADSORPTION TANK 6

Sheet No./Total sheets	6/9
Size of memory	

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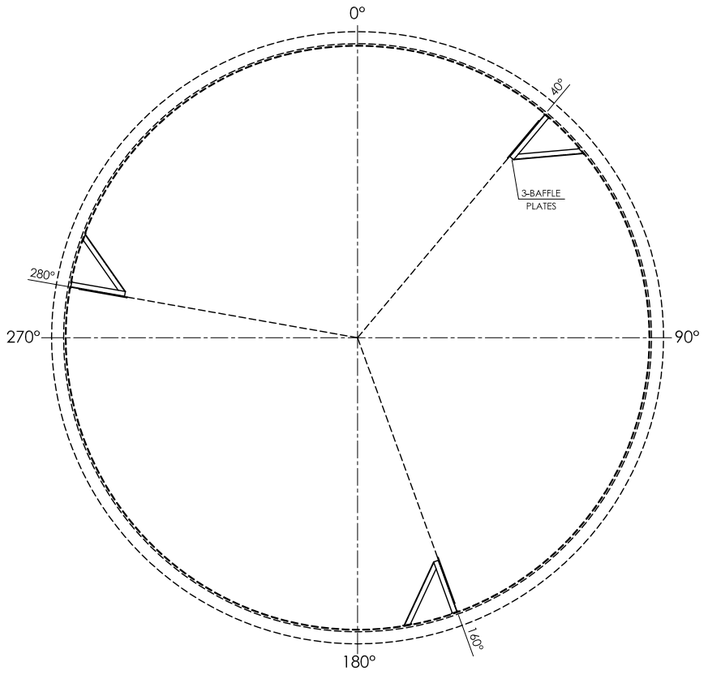
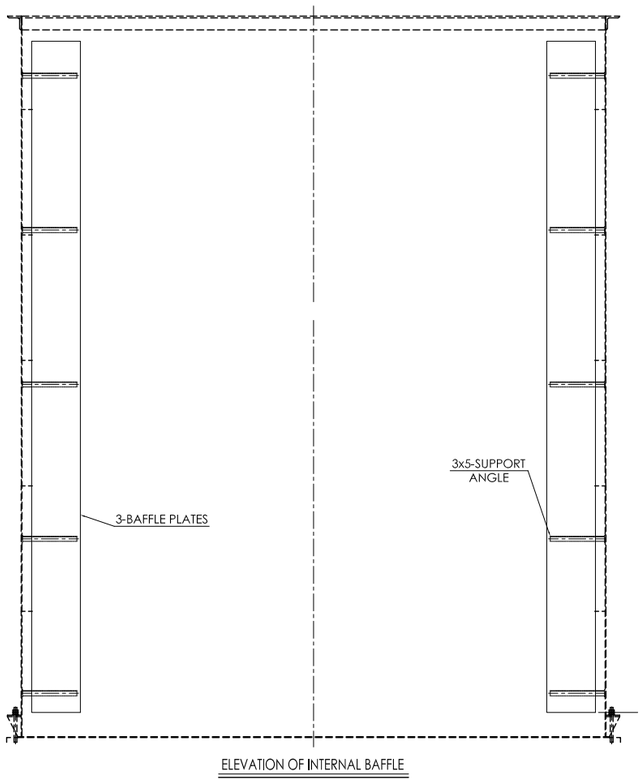
JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 6
REFER DWG NO.	: E2502-000-DWG-707

NDE Map No.
E2502-NDE-PBY-007

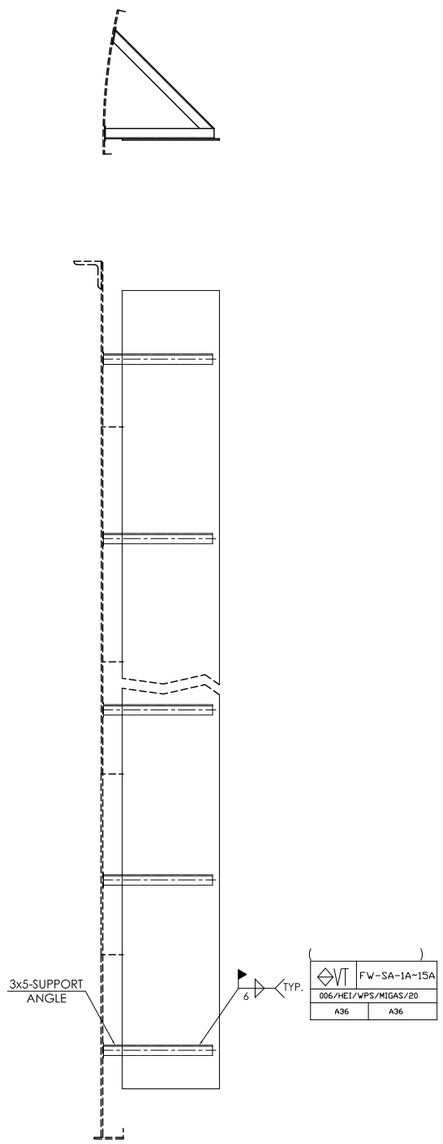
REV. 0



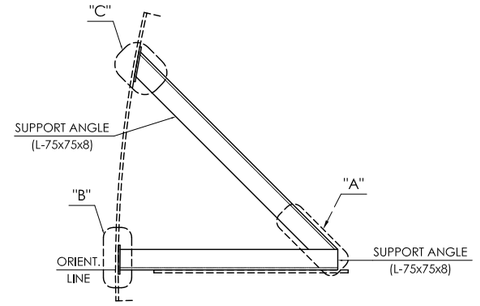
ORIENTATION OF INTERNAL BAFFLE

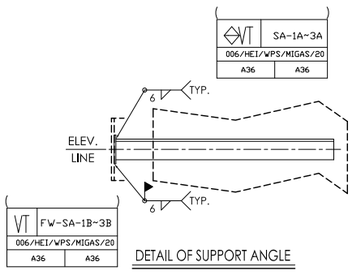


ELEVATION OF INTERNAL BAFFLE

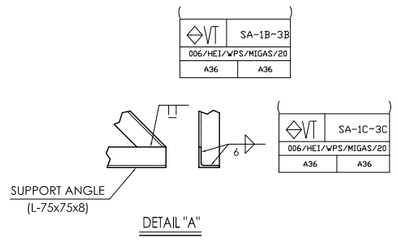


DETAIL OF INTERNAL BAFFLE





DETAIL OF SUPPORT ANGLE



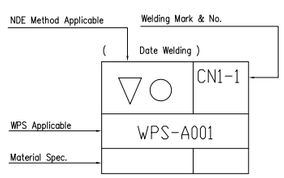
DETAIL "A"

DETAIL "B"

DETAIL "C"

GENERAL NOTES :

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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :
INTERNAL BAFFLE	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1
SUPPORT ANGLE	A36	
SUPPORT PAD	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP INTERNAL BAFFLE ADSORPTION TANK 6

Sheet No./Total sheets	7/9
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 6
REFER DWG NO.	: E2502-000-DWG-708

NDE Map No. E2502-NDE-PBY-007

REV. 0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

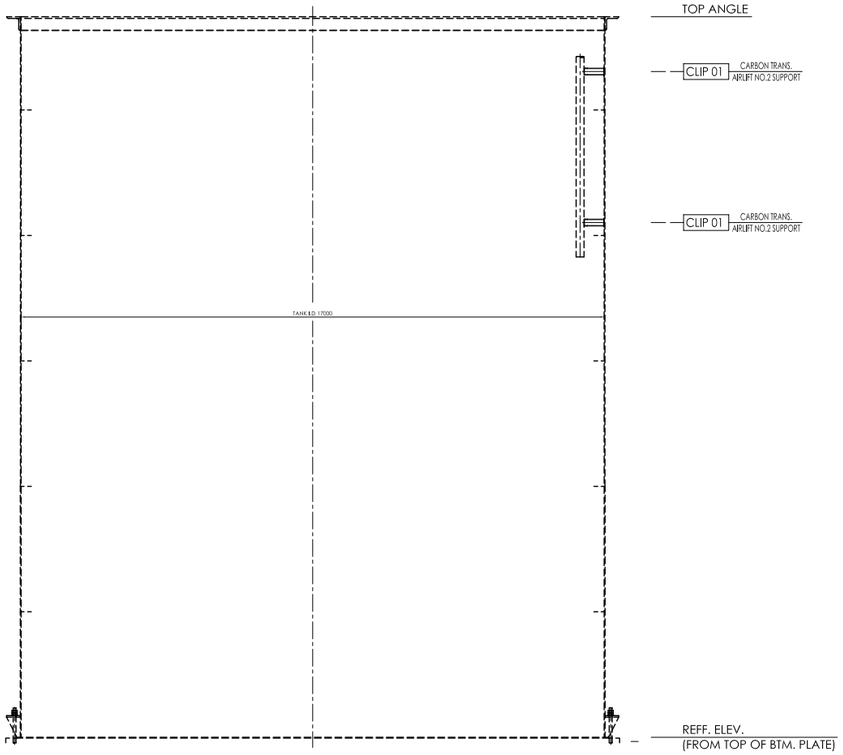
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

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

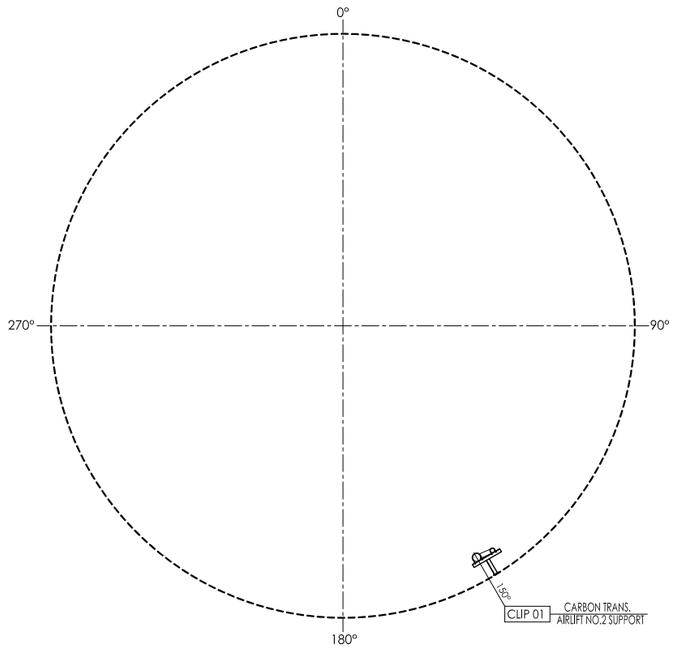
3. LIQUID PENETRANT

   # LIFTING LUG AND REMOVING OF JIG

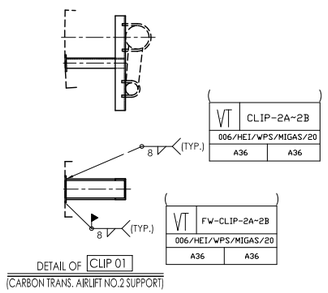
   # NOZZLE ATTACHMENT WELDING OF DUCTING



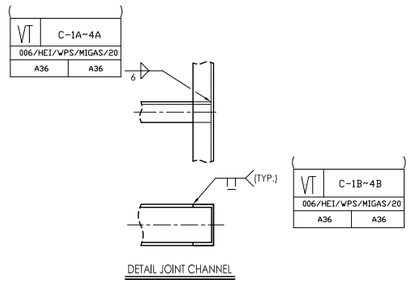
PIPE SUPPORT ELEVATION



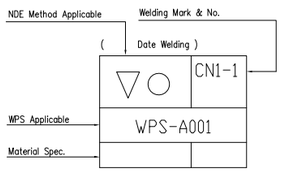
PIPE SUPPORT PLAN



DETAIL OF CLIP 01 (CARBON TRANS. AIRLIFT NO.2 SUPPORT)



DETAIL JOINT CHANNEL



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION		LEGEND :
SUPPORT CHANNEL	A36	WPS NO : 006/HEI/WPS/MIGAS/20 GTAW & SMAW P1 to P1
REINF. PAD	A36	

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name: NDE MAP INTERNAL SUPPORT ADSORPTION TANK 6

Sheet No./Total sheets	8/10
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 6
REFER DWG NO.	: E2502-000-DWG-709

NDE Map No. E2502-NDE-PBY-007

REV. 0

GENERAL NOTES :

1. BOLT HOLE ORIENTATION

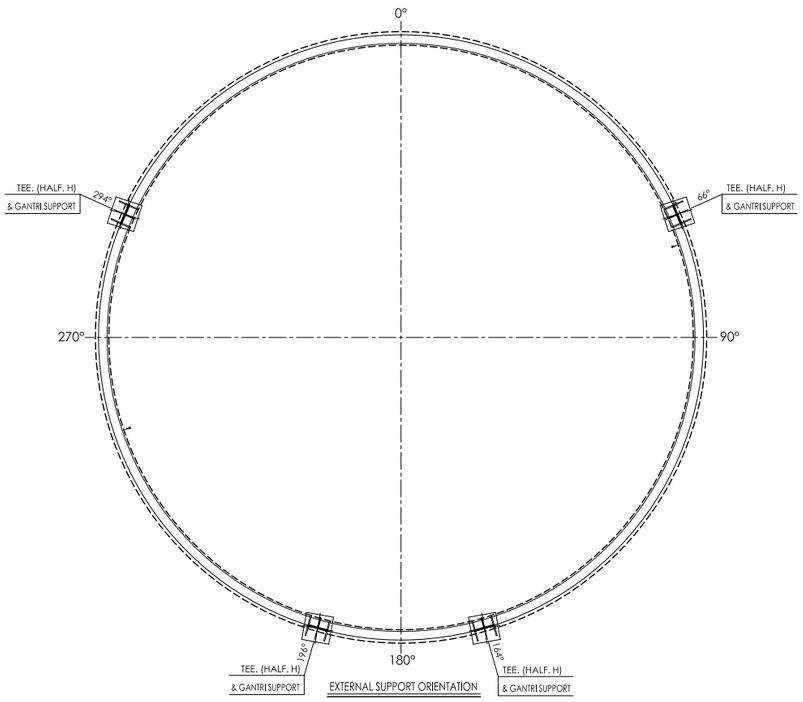
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).

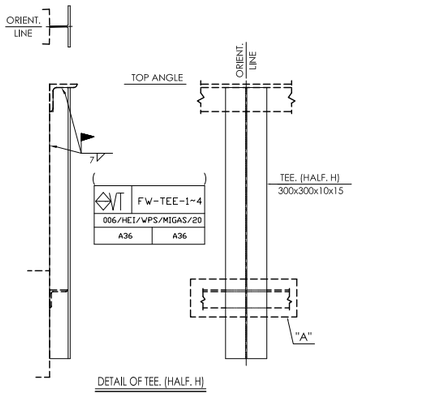
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.

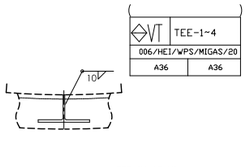
3. LIQUID PENETRANT

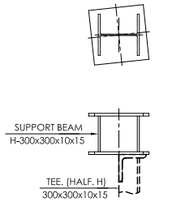
   # LIFTING LUG AND REMOVING OF JIG

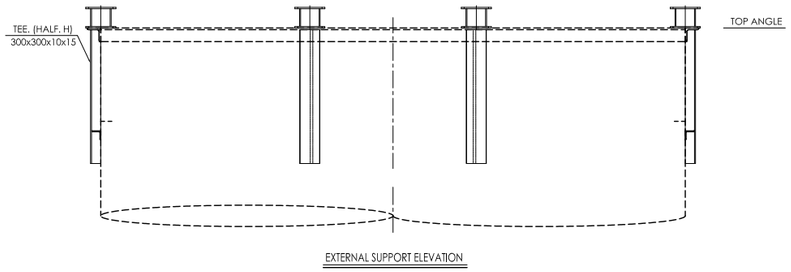
   # NOZZLE ATTACHMENT WELDING OF DUCTING

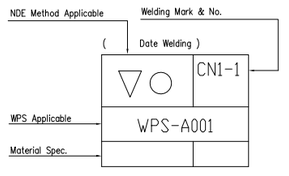












NDE METHOD SYMBOL

▽ UT SPOT

◈ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
TEE HALF	A36
SUPPORT BEAM	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name

NDE MAP EXTERNAL SUPPORT ADSORPTION TANK 6

Sheet No./Total sheets	8/9
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 6
REFER DWG NO.	: E2502-000-DWG-709

NDE Map No.

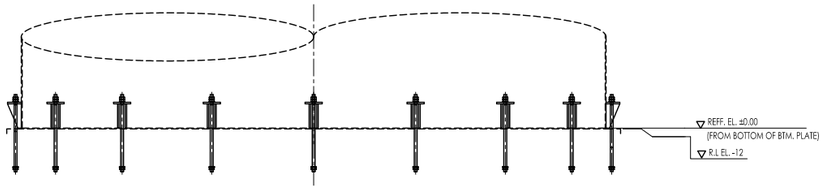
E2502-NDE-PBY-007

REV.

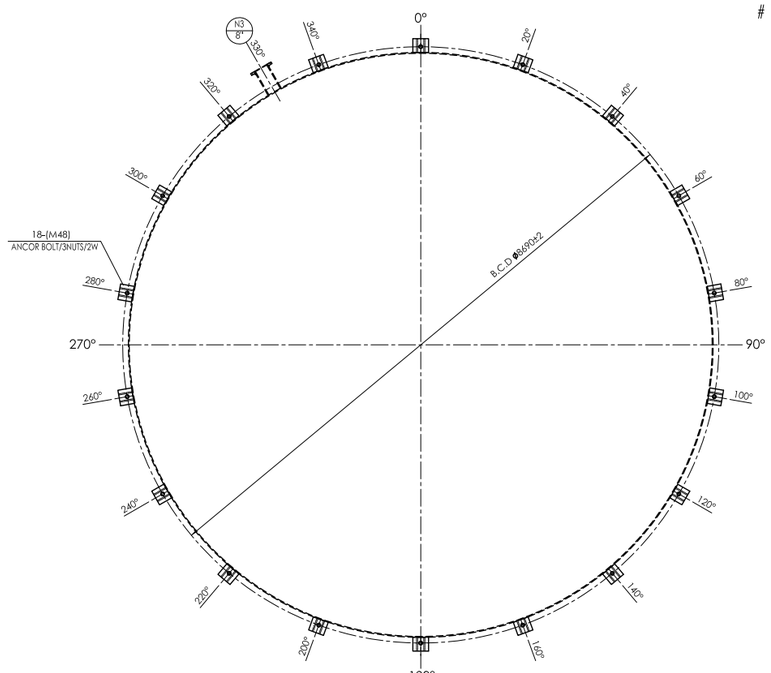
0

GENERAL NOTES :

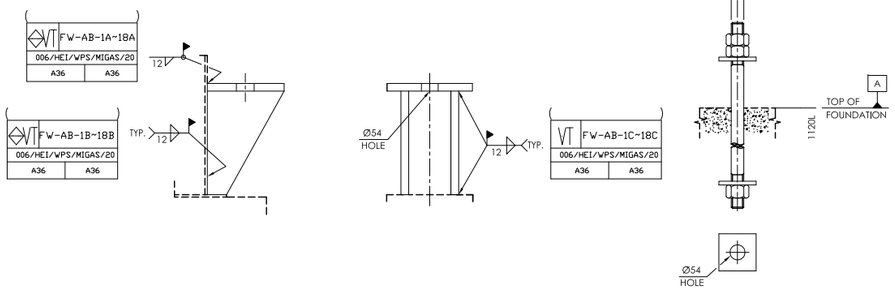
1. BOLT HOLE ORIENTATION
   BOLT HOLE ORIENTATION IN NOZZLE FLANGE SHALL BE STRADDLE THE PRINCIPAL CENTER LINE OF THE DUCTING (AXIS 0° & 90°).
2. WELD SHALL BE NEAT IN APPEARANCE, FREE ON SLAG UNDERCUTS AND OTHER DEFECTS.
3. LIQUID PENETRANT
   # LIFTING LUG AND REMOVING OF JIG
   # NOZZLE ATTACHMENT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



ANCHOR BOLT ELEVATION

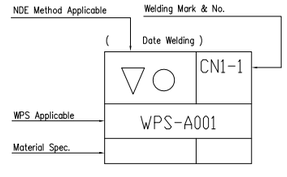


ANCHOR BOLT ORIENTATION
(PLAN VIEW)



DETAIL OF ANCHOR BOLT CHAIR

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



NDE METHOD SYMBOL

▽ UT SPOT

◇ PT 10%

VT VISUAL 100%

MATERIAL SPECIFICATION	
TOP PLATE	A36
GUSSET PLATE	A36

LEGEND :

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

File name :

REV	DATE	APPR		1	2
0	29/09/25				

CHANGE BY CAD SYSTEM ONLY

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

	DATE	SIGN
DRAFT		BENRIDHO
CHECK		RUSNANDI
APPR		

Scale : NTS

Name
NDE MAP ANCHOR BOLT ADSORPTION TANK 6

Sheet No./Total sheets	9/9
Size of memory	

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JOB NO.	: E2502
DESIGN FOR PRODUCT	: POBOYA 2000 TPD EXPANSION
TAG NO./LINE NO.	: ADSORPTION TANK 6
REFER DWG NO.	: E2502-000-DWG-711

NDE Map No.
E2502-NDE-PBY-007

REV. 0