

Certificate No : 2023-PTR-EC-STD-004

Date : July 21st, 2023



CERTIFICATE OF ACCOMPLISHMENT

This is to certify that

NAUFAL MORALIS JAKARIA, S.T

ID NUMBER : EC-STD-004

has completed 32 hours & finished the Final Project of our E-course

STORAGE TANK DESIGN AS PER API 650

MANUAL CALCULATION

Trainer : TITO FEBRIANTO, S.T - Senior Mechanical Static Engineer

Held by **PETROS OIL GAS TRAINING** covering the subjects as listed on the back page



Certificate Validation

A handwritten signature in black ink, appearing to read "Heru Prasadja, ST", located in the bottom right corner.

Heru Prasadja, ST
Director

STORAGE TANK DESIGN AS PER API 650

MANUAL CALCULATION

1. WELDED TANKS INTRODUCTION

- API 650 scope
- Standard Reference and Tools
- Scope of Design

2. MATERIAL SELECTION

- Standard References for Material
- Plates
- Sheets
- Structural Shapes
- Piping, Forgings, Flanges
- Bolting
- Welding Electrodes
- Impact Test Requirements

3. WELDING AND LOAD DESIGN

- Vertical Shell plate joint (figure 5.1)
- Horizontal Shell plate joint (Figure 5.2)
- Roof joint (Figure 5.3a)
- Bottom plate joint (Figure 5.3a,b,c)
- Load consideration
- Allowable stress
- Study case

4. SHELL PLATE DESIGN (1 FOOT METHOD)

- References
- Minimum shell thickness
- Allowable stress
- Calculation thickness by 1Foot Method
- Study Case 1Foot Method

5. BOTTOM PLATE DESIGN

- Minimum information data
- General information
- Annular plate thickness calculation
- Annular plate width calculation
- Study Case

6. WIND GIRDER DESIGN

- References
- Stiffening ring type
- Top wind girder
- Intermediate wind girder
- Study case

7. ROOF DESIGN

- Type of Roof
- Roof Comparison
- Roof consideration

8. SHELL OPENING AND MANWAY DESIGN

- References
- Opening type
- Cover plate and bolting flange
- Manway neck
- Manhole diameter and bolt circle diameter
- Reinforcement
- Bolt and Gasket
- Study case

9. NOZZLES AND FITTINGS DESIGN

- References
- Opening type
- Reinforcement
- Bolt and Gasket
- Shell nozzle
- Flush type cleanout fitting
- Flush type shell connection
- Study case

10. SHELL DESIGN (VARIABLE DESIGN POINT METHOD)

- References
- Calculation thickness by Variable Design Point Method
- First Course (t1) Calculation
- Second Course (t2) Calculation
- Upper Course (tx) Calculation
- Study Case

11. STORAGE TANK WITH SMALL INTERNAL PRESSURE

- References
- Scope of Design
- Permissible Details of Compression Rings
- Maximum Design Pressure
- Test Pressure Procedure
- Design of Roof Plates
- Study Case

FINAL PROJECT