



Design & Maintenance Of Aboveground Atmospheric Storage Tanks (API 650)



Introduction:

Aboveground atmospheric storage tanks store a diverse variety of liquids used in the hydrocarbon processing industry at refineries, chemical plants, and marketing terminals. They are also part of the support facilities in other industries, such as fuel storage tanks at power plants. These tanks have gained importance and visibility in recent years due to failures that have resulted in hydrocarbon spills and environmental impact. Following these incidents, there has been a marked increase in government regulation and industry attention to tanks. Therefore, establishing a course for evaluating the structural integrity of aboveground atmospheric storage tanks has become an important priority.

A tank maintenance and integrity evaluation course can only be effective if it also considers tank design requirements. Recognizing the primary features of these tanks and understanding how they are designed provide the information needed to better understand their maintenance requirements. The first part of this course focuses on atmospheric storage tank design requirements in accordance with API 650. Once the basics of storage tank design have been established, the course will turn to maintenance requirements in accordance with API 653. The course includes slides of actual installations, sample problems, and classroom exercises to illustrate specific points and give the candidates the

opportunity to practice application of the topics discussed. It is recommended that the candidates bring copies of API 650 and API 653 to the course. The candidates are asked to bring a hand-held calculator to the course.

Who Should Attend?

Individuals who have engineering, inspection, maintenance, and management responsibility related to aboveground atmospheric storage tanks that store hydrocarbon liquids, individuals who have engineering, inspection, maintenance and management responsibility related to aboveground atmospheric storage tanks that store hydrocarbon liquids

Course Objectives:

By the end of this course delegates will be able to:

- Gain an understanding of the design and maintenance requirements of aboveground atmospheric storage tanks in accordance with API-650 and API-653 respectively

Course Outline:

Part I - API-650

Storage Tank Types and Features

- Tank Types and Functions
- Primary Components
- Appurtenances
- Design Specifications

Material Selection

- Material Property Considerations
- Acceptable Material Specification

Mechanical Design Requirements

- Mechanical Design Parameters
- Shell Thickness Determination
- Wind Girder Requirements
- Nozzle Design Details
- Roof Requirements
- Bottom Requirements
- Designing Tanks for Small Internal Pressures
- Optional Design Basis for Small Tanks
- Elevated Temperature Storage Tanks
- Austenitic Stainless Steel Storage Tanks

Fabrication Details

- Types of Welded Joints
- Welding Methodology
- Weld Detail Requirements

Inspection and Testing Requirements

- Types of Weld Defects
- Inspection Methods
- Inspection Requirements
- Dimensional/Tolerances
- Testing

Vents and Fire Protection Systems

- Vents for Fixed Roof Tanks
- Vents for Floating Roof Tanks
- Fire Protection Systems

Supplementary Information

- API Recommended Practice 651

- API Recommended Practice 652

Part II - API-653

Introduction

- Scope of API-653
- Definitions
- Starting an API-653 Compliance Program
- Cost of an API-653 Compliance Program

Tank Inspection

- Objectives
- Prioritization
- Inspection Frequencies
- Record Keeping
- Inspector Qualification

Tank Component Evaluation

- Shell
- Bottom
- Nozzles
- Roof
- Foundation
- Shell and Bottom Settlement

Leak Detection Methods

Tank Repair and Alteration

- General Considerations
- Material Considerations
- General Requirements for Repair and Alteration

- Removal, Repair and Replacement of Shell Plate Material
- Repair, Addition, Replacement and Alteration of Shell Penetrations
- Repair of Tank Bottoms
- Tank Roof Repair

Dismantling and Reconstruction

- Dismantling Methods
- Reconstruction
- Dimensional Tolerances