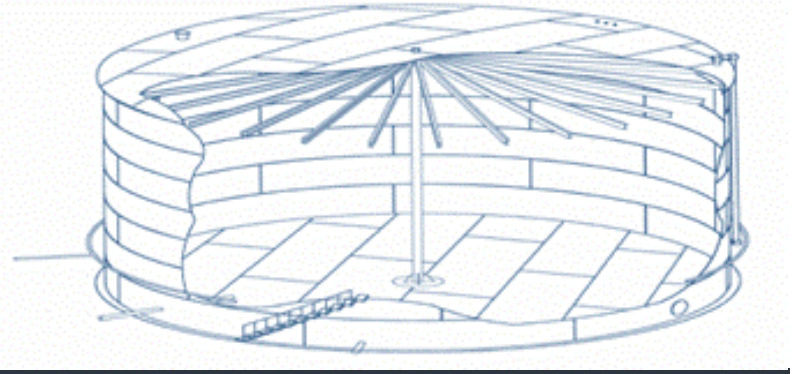
API 653 : Tank Inspection Code



API 653: TANK INSPECTION CODE: Inspection, Repair, Alteration, & Reconstruction of Steel Aboveground Storage Tanks Used in the Petrochemical Industry (API Exam Preparation Training)

Who Should Attend

The course is intended for Inspection Engineers who are seeking API-653 certification. Other engineers, managers or technical staffs who are dealing with Steel Aboveground Storage Tanks used in the Petrochemical Industry will also benefit

Course Duration/Credits

Five days (40 hours as per API regulations)/4.0 CEUs

Training Methodology

This interactive training course includes the following training methodologies as a percentage of total tuition hours:-

50% Lectures
30% Workshops, Group Work & Practical Exercises
20% Videos & Software

Course Certificate

Worldwide Tank Services certificate will be issued to all attendees completing minimum of 75% of the total tuition hours of the course.

Course Accreditation

(1) This API exam preparation training course complies with the **API** (**American Petroleum Institute**) regulations and is designed to prepare participants for API 653 exam that qualifies successful participants to the "**API 653 Tank Inspection Certification"**.

Course Objectives

In order to meet the needs of today's fast changing inspection industry, Worldwide Tank Services has developed the "Tank Inspection Course with API 653 Exam Prep.".

The course textbook includes notes and summaries on the tank inspection standards referenced in the API 653 Body of Knowledge. This comprehensive 40 hour course consists of five 8-hour teaching days. It is designed to accomplish a two-fold training agenda:

(1) To train those individuals who are interested in obtaining the API 653 Tank Inspection Certification.
(2) Train those who require a working knowledge of the intricacies encountered in the working environment.

Additionally, quizzes are given at the end of each section; homework is handed out at the end of each class day, which consists of **25** questions per day and is reviewed at the beginning of the following day, and a "practice" exam is administered at the end of the course.

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API 653 Tank Inspection Code

Required Codes and Standards:

Listed below are the effective editions of the publications required for the **September 23, 2009** API 653, Aboveground Storage Tank Inspector Examination.

- **API Recommended Practice 571,** *Damage Mechanisms Affecting Fixed Equipment in the Refining Industry, First Edition, December 2003*. IHS Product code **API CERT 653_571** (includes only the portions specified below)

  ATTENTION: Only the following mechanisms to be included:

  4.2.7 - Brittle Fracture
  4.2.16 – Mechanical Fatigue
  4.3.2 – Atmospheric Corrosion
  4.3.3 – Corrosion under insulation (CUI)
  4.3.8 – Microbiologically Induced Corrosion (MIC)
  4.3.9 – Soil Corrosion
  4.3.10 – Caustic Corrosion
  4.5.1 – Chloride Stress Corrosion Cracking (C1-SCC)
  4.5.3 – Caustic Stress Corrosion Cracking (Caustic Embrittlement)
  5.1.1.11 – Sulfuric Acid Corrosion

- **API Recommended Practice 575**, *Inspection of Atmospheric and Low-Pressure Storage Tanks*, **Second Edition, May, 2005**. IHS Product Code **API CERT 575**
- **API Recommended Practice 577,** *Welding Inspection and Metallurgy,* First Edition, October 2004. IHS Product Code **API CERT 577**
- **API Standard 650**, *Welded Steel Tanks for Oil Storage,* Tenth Edition, November 1998, including Addendum 1 (March 2000), Addendum 2 (Nov. 2001), and Addendum 3 (Sept. 2003) and Addendum 4 (December 2005). IHS Product Code **API CERT 650**
- **API Recommended Practice 651**, *Cathodic Protection of Aboveground Petroleum Storage Tanks*, **Third Edition, January 2007**. IHS Product Code **API CERT 651**
- **API Recommended Practice 652**, *Lining of Aboveground Petroleum Storage Tank Bottoms*, Third Edition, October 2005. IHS Product Code **API CERT 652**
- **API Standard 653**, *Tank Inspection, Repair, Alteration, and Reconstruction*, Third Edition, December 2001; including Addendum 1 (September 2003) and Addendum 2 (November 2005). IHS Product Code **API CERT 653**
- **American Society of Mechanical Engineers (ASME)**, *Boiler and Pressure Vessel Code*, **2007 edition**.
  i. ASME Section V, *Nondestructive Examination, Articles 1, 2, 6, 7 and **23** **(Section SE-797 only).***
  ii. Section IX, *Welding and Brazing Qualifications (Section QW only)*

IHS Product Code for the ASME package **API CERT 653 ASME**. Package includes **only** the above excerpts necessary for the exam.

API and ASME publications may be ordered through IHS Documents at 303-397-7956 or 800-854-7179. Product codes are listed above. Orders may also be faxed to 303-397-2740. More information is available at http://www.ihs.com. API members are eligible for a 30% discount on all API documents; exam candidates are eligible for a 20% discount on all API documents. When calling to order, please identify yourself as an exam candidate and/or API member. **Prices quoted will reflect the applicable discounts.** No discounts will be made for ASME document

Note: **API and ASME publications are copyrighted material. Photocopies of API and ASME publications are not permitted. CD-ROM versions of the API documents are issued quarterly by Information Handling Services and are allowed. Be sure to check your CD-ROM against the editions noted on this sheet.**

API 653 Tank Inspection Code

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

DAY 1

0730 – 0800 Registration & Coffee
0800 – 0815 Welcome
0815 – 0830 PRE-TEST
0830 – 0900 Introduction
0900 – 0930 Students Take Initial Math Quiz
0930 – 1000 Review Math Quiz Answers
1000 – 1015 Break
1015 – 1045 Overview of Course Outline
1045 – 1230 Review of API 653 Body of Knowledge
1230 – 1330 Lunch
1330 – 1445
API 653 - Section 1 – Scope:
Introduction, Compliance with This Standard, Jurisdiction, Safe Working Practices

API 653 - Section 2 – Referenced Publications
API 653 - Section 3 – Definitions

1445 – 1500 Break
1500 – 1620
API 653 - Section 4 - Suitability
For Service:
General, Tank Roof Evaluation, Tank Shell Evaluation, Tank Bottom Evaluation, Tank Foundation Evaluation

1620 – 1720
API 653 - Section 5 - Brittle Fracture Considerations:
General, Basic Considerations, Assessment Procedure

1720 – 1730 Distribute Homework
1730 End of Day One

DAY 2

0730 – 0830 Review Homework Answers
0830 – 1000

API 653 - Section 6 – Inspection
General, Inspection Frequency Considerations, Inspections from the Outside of the Tank, Internal Inspection, Alternative to Internal Inspection to Determine Bottom Thickness, Preparatory Work for Internal Inspection, Inspection Checklists, Records, Reports, Non-Destructive Testing

API 653 - Section 7 - Materials
General, New Materials, Original Materials for Reconstructed Tanks, Welding Consumables

API 653 - Section 8
Design Considerations for Reconstructed Tanks
General, New Weld Joints, Existing Weld Joints, Shell Design, Shell Penetrations, Wind Girders and Shell Stability, Roofs, Seismic Design

1000 – 1015 Break
1015 – 1230

API 653 - Section 9 - Tank Repair And Alteration
General, Removal and Replacement of Shell Plate Material, Shell Repairs Using Lap-Welded Patch Plates, Repair of Defects in Shell Plate Material, Alteration of Tank Shells to Change Shell Height, Repair of Defective Welds, Repair of Shell Penetrations, Addition or Replacement of Shell Penetrations, Alteration of Existing Shell Penetrations, Repair of Tank Bottoms, Repair of Fixed Roofs, Floating Roofs, Repair or Replacement of Floating Room Perimeter Seals, Hot Taps

API 653 - Section 10 - Dismantling And Reconstruction
General, Cleaning and Gas Freeing, Dismantling Methods, Reconstructions, Dimensional Tolerances

API 653 - Section 11 - Welding
Welding Qualifications, Identification and Records

API 653 Tank Inspection Code

DAY 2 Cont.

API 653 - Section 12

Examination And Testing
Nondestructive Examination, Radiographs, Hydrostatic Testing, Leak Tests, Measured Settlement During Hydrostatic Testing
API 653 - Section 13

Marking And Recordkeeping
Nameplates, Recordkeeping, Certification

API 653 – Appendices A – G

1230 – 1330 Lunch
1330 – 1400 Administer API 653 Section Quiz
1400 – 1500

API 650 - Section 1 - Scope
General, Limitations, Compliance, Referenced Publications

API 650 - Section 2 - Materials
General, Plates, Welding Electrodes

1500 – 1515 Break
1515 – 1735
API 650 - Section 3 - Design
Joints, Bottom Plates, Annular Bottom Plates, Shell Design, Shell Openings, Shell Attachments and Tank Appurtenances, Roofs, Wind Load on Tanks (Overturning Stability)

API 650 - Section 4 - Fabrication
API 650 - Section 5 - Erection

General, Details of Welding, Inspection, Testing and Repairs, Repairs to Welds, Dimensional Tolerances

1735 – 1745 Distribute Homework
1745 End of Day Two

DAY 3

0730 – 0800 Review Homework Answers
0800 – 0945 API 650 - Section 6 - Methods of Inspecting Joints
Radiographic Method, Magnetic Particle Examination, Ultrasonic Examination, Liquid Penetrant Examination, Visual Examination API 650 - Section 7 - Welding Procedure & Welder Qualifications
Definitions, Qualification of Welders

API 650 - Section 8 - Marking
Nameplates, Division of Responsibility, Certification

0945 – 1000 Break
1000 – 1130 API 650 - Appendices B - S
1130 – 1200 Administer API 650 Section Quiz
1200 – 1230 Slide Show – “Don’t Let This Happen To Your Tank”
1230 – 1330 Lunch
1330 – 1445 Complete Slide Show -“Don’t Let This Happen To Your Tank”
API RP 575 Section 1 – Scope
API RP 575 Section 3 - Selected Nondestructive Examination (NDE) Methods
Ultrasonic-Thickness Measurement, Magnetic Floor Testing

API RP 575 - Section 4 - Types of Storage Tanks
General, Storage Tanks with Linings and/or Cathodic Protection, Storage Tanks with Leak Detection Systems, Low-Pressure Storage Tanks

1445 – 1500 Break

API 653 Tank Inspection Code

DAY 4

0730 – 0800 Review Homework Answers
0800 – 1000

API RP 577 - Section 1 - Scope
API RP 577 - Section 3 - Definitions
API RP 577 - Section 4 – Welding Inspection Tasks Prior To, During and Upon Completion of Welding Operations; Non-conformances and Defects; NDE Examiner Certification; Safety Precautions

API RP 577 - Section 5 – Welding Processes Shielded Metal Arc Welding (SMAW), Gas Tungsten Arc Welding (GTAW), Gas Metal Arc Welding (GMAW), Flux Cored Arc Welding (FCAW), Submerged Arc Welding (SAW), Stud Arc Welding (SW)

1000 – 1015 Break
1015 – 1230

API RP 577 - Section 11 – Refinery and Petrochemical Plant Welding Issues
API RP 577 – Appendix A – Terminology and Symbols
Weld Joint Types, Weld Symbols, Weld Joint Nomenclature, Electrode Identification
ASME Section V - Nondestructive Test Methods Ultrasonic Thickness Testing, Liquid Penetrant Testing, Magnetic Particle Testing, Radiographic Film Interpretation

1230 – 1330 Lunch
1330 – 1530 ASME Section IX - WPS and PQR Requirements
Review Procedure Exercise

1530 – 1545 Break
1545 – 1715 ASME Section IX - Welder Certification

1715 – 1720 Distribute Homework
1720 End of Day Four

DAY 5

0730 – 0800 Review Homework Answers

0800 – 1000 Question and Answer Session

1000 – 1015 Break

1015 – 1230 API 653 Sample Exam

1230 – 1330 Lunch

1330 – 1530

Continue API 653 Sample Exam
Review API 653 Exam Answers

1530 – 1545 Break

1545 – 1600 Presentation of Certificates

1600 End of Course