

## **API-Source Inspection & Quality Assurance of Fixed Equipment**



**Trainer: Diwakar Joshi**

**"Source Inspection" is a relatively new discipline declared open by API throughout the world in 2014**

### **Course History:**

API, for in service inspection, has provided quite a few qualifications for many years now. API 510 – Pressure Vessel Inspector, API 653 – Above Ground Storage Tank Inspector, API 570 –Piping Inspector are a few examples.

These exams are very good in their own place, and there is respect for these qualifications in Oil and Gas industry. In all these years, there was a realization that there is no such qualification program for new equipment inspection, except ASME's AI programs meant for inspectors of AIA.

To fulfil this need, API has now started **Source Inspector** program, and the first certificate examination was conducted in March 2014. This qualification covers the inputs required for inspectors who are responsible for Examining fabricated and

manufactured equipment and materials at the supplier facility, and, confirming that the supplier's quality management system is being utilized effectively.

**There is no specific minimum experience requirement for this examination.**

### **Scope/Purpose of SI Training:**

This training objective covers the process of providing quality surveillance of materials, equipment and fabrications being supplied for use in the oil, petrochemical and gas Industry, including upstream, midstream and downstream segments. This guide may be used as the basis for providing a systematic approach to risk-based source inspection in order to provide confidence that materials and equipment being purchased meet the minimum requirements as specified in the project documents and contractual agreements. The activities outlined in this study course do not intend to replace the manufacturer's / fabricator's own quality system, but rather are meant to guide source inspectors acting on behalf of purchasers to determine whether manufactures/fabricators own quality systems have functioned appropriately, such that the purchased equipment and materials will meet contractual agreements.

Scope of Source Inspection and Quality Surveillance of Fixed Equipment is to provide quality surveillance of materials, equipment and fabrications being supplied for use in the fertilizer, oil, petrochemical and gas Industry. This study guide focuses primarily on pressure containing and structural equipment (fixed equipment) including: vessels, columns/towers, heat exchangers, piping, valves, pressure relief devices, tubulars, and associated structural fabrications.

### **Course Objectives:**

This training program is developed to impart necessary inputs to the participants for preparing themselves for the source inspector examination of API.

The course consists of theoretical inputs on codes like ASME, API, ASNT, AWS and SSPC documents, and practical aspects are covered by discussion on various case studies. The uniqueness of the program is emphasizing on the 'why' part of the code rather than the 'what' part. When the participants understand the 'why' part of the code, they start following the code practices unconsciously, and that is the real success of inspection.

In addition to this the participant needs to give meaning to customer specifications. One has to understand that when the code is silent, the customer is speaking. We should be able to catch customer's additional requirements and give justice to the customer specification. This is usually never taught in a training class.

In addition to the theoretical inputs, there will be quizzes, case studies and discussions throughout the course, to ensure in depth penetration of the subject.

### **At the end of this course the participant shall be able to:**

- Appreciate the design base of pressure vessels, tanks, piping, valves, flanges and PRDs, and structural code requirements.
- Know the material requirements and the raw material acceptance criteria
- Know the manufacturing processes, their limitations and the pain areas
- Know the inspection processes including the NDE, and personnel qualification
- Know the Welding processes, procedures and welders' qualification

- Have an idea of in service inspection, and how it is connected with new and cold vessel inspection
- Know material verification program
- Know surface finish and coating inspection
- Know the welding and inspection
- Have knowledge and skill to interpret customer specification

### **Methodology:**

Hand outs would be provided and teaching would be interactive through power point slides presentation with numerous case studies.

This training course emphasizes on Theory and Practical activities – participants will be divided into small activity groups to hold case-discussions, practical skill stations and required class demonstrations.

- Participants will be provided with individual and team exercises
- Course handouts and MS Power Point presentations
- Group discussions.
- Global case studies.

Training material, practical exercise, case studies will be provided to each participant in the form of printed manuals and copy on flash drive

### **Percentage of Course Delivery**

- a) 50% class presentation
- b) 15% group and individual exercise / Quiz
- c) 10% case study with an open room for client's site/open cases.
- d) 5% mass media : movie/videos
- e) 20% **Home Work and Mock-up Exams.**

### **Course Assessment/Mock-up Exams:**

- Pre-training assessment test; multiple choice questions.
- Mock-up exams as per API exam pattern.

### **Who should attend?**

The course is suitable to all persons related to Inspection. It is applicable to upstream, midstream and downstream segments. It is also recommended for Third Party Inspectors, Inspection Engineers/Surveyors, Design persons, Purchase persons, Supervisors, NDT Coordinators and Project Engineers.

### **Course contents:**

- How to prepare an overall Source Inspection Plan for an entire project and an Inspection and Test Plan (ITP) for each equipment item
- How to conduct an equipment risk assessment in order to determine the level of source inspection activities that will be required.
- Guidance on the criteria to use for selecting source inspectors to match their skills and training with different types of equipment with different risk levels

- Guidance on scheduling and conducting significant source inspection events like the preinspection (fabrication kick-off) meeting, the S/V quality coordination meeting, final acceptance testing, etc.
- Guidance on SI safety and professional conduct at S/V shops
- How to review welding procedures and welder qualification documents
- How to review inspection/examination records of the S/V

**Course Outline:**

<b>DAY1</b>	<b>DAY2</b>	<b>DAY3</b>
<p><b>Session1</b> Welcome&amp;Introduction BenchmarkTest BasicMetallurgy&amp;materials</p> <p><b>Session2</b>  ASMESectionIIPartA ASMESectionIIPartB,C,D</p> <p><b>Session3</b> Inspectionofpressurevessels– API572Sec3&amp;4</p> <p><b>Session4</b> ASMESectionVIII Div.1UG– Generalrequirements</p>	<p><b>Session1</b> ASMESectionVIII Div.1(UWandUCS)– Weldingrequirements&amp;MaterialRequirements.</p> <p><b>Session2</b> WeldingandInspection– API577</p> <p><b>Session3</b> WeldingInspection(CWIHandbook)</p> <p><b>Session4</b> B16.5-Flanges</p>	<p><b>Session1</b> ASMESectionIX–WPS&amp;PQR</p> <p><b>Session2</b> ASMESectionIX– WelderPerformanceQualification</p> <p><b>Session3</b> ASMESectionV– SurfaceTechniques</p> <p><b>Session4</b> ASMESectionV– VolumetricTechniques</p>
<b>DAY4</b>		<b>DAY5</b>
<p><b>Session1</b> <i>AWSD1.1–Design&amp;WeldingRequirements</i></p> <p><b>Session2</b> • <i>AWSD1.1– Inspection&amp;TestingRequirements</i></p> <p><b>Session3</b> • <i>ProcessPiping–Design&amp;Materials -B31.3</i></p> <p><b>Session4</b> <i>ProcessPiping–Inspection&amp;Testing -B31.3</i></p>		<p><b>Session1</b> Surfacecoatingandpreparations–(SSPC-PA2)</p> <p><b>Session2</b> API598-Valves</p> <p><b>Session3</b> DealingwithCustomerSpecifications&amp;Casestudies</p> <p><b>Session4</b> Mock-upexam&amp;Discussion</p>

## TRAINER's BRIEF CV

**Joshi Diwakar Damodar:**

**Has conducted following API Courses (more than 100 programs) for Qatar Petroleum, Aramco, Bapco, Reliance, IOCL and other refineries and also in Insight Quality Services in Pune and Chennai:**

1) API-Source Inspector (Fixed Equipment)- (i) IGF, Dubai, (ii) M/s Stork, Trinidad & Tobago (iii) IQS

2) API 510 - (i) Qatar Petroleum, (ii) Bapco, (iii) IOCL, (iv) Reliance, (v) IQS

3) API 570 - (i) Qatar Petroleum, (ii) Bapco, (iii) IOCL, (iv) Reliance, (v) IQS

4) API 653 - (i) Qatar Petroleum, (ii) Bapco, (iii) IOCL, (iv) Reliance, (v) Aramco (vi) IQS

5) API 580 - (i) Qatar Petroleum, (ii) IQS

6) API 571- (i) IQS, (ii) IGF

7) API 577- (i) IQS, (ii) IGF

8) API 1169 - (i) Planned for IGF

### EDUCATIONAL QUALIFICATION:

EXAM	EXAMINING BODY	CLASS
PRE. PROF. ENGG.	SHIVAJI UNIVERSITY , INDIA	1 <sup>st</sup> Class
B. E. MECHANICAL	SHIVAJI UNIVERSITY , INDIA	1 <sup>st</sup> Class

### ADDITIONAL / INDUSTRIAL QUALIFICATION (TRAINING & EDUCATION)

TRAINING	INSTITUTE	YEAR	REMARKS
API Source Inspector (SI)	API	2014	Passed the exam Valid up to 2017
API - Tank Entry Supervisor (TES)	API	2014	Passed the exam Valid up to 2017

API 510 Pressure Vessel Inspector	API	2005	Passed the exam Valid up to 2017
API 936 Refractory Practitioner	API	2010	Passed the exam Valid up to 2016
API 577 Inspector	API	2009	Passed the exam Valid up to 2015
API 580 Inspector	API	2009	Passed the exam Valid up to 2018
API 571 Inspector	API	2009	Passed the exam Valid up to 2018
API 570 Authorized Piping Inspector	API	2005	Passed the exam Valid up to 2017
API 653 Above ground Storage Tank	API	2005	Passed the exam Valid up to 2017
ASNT Level III (Basic + RT+ UT + MT+ PT +ET+ LT+VT)	ASNT, USA, Bombay, Madras, Hyderabad	Started in 1990	Passed the Exam (Basic + RT+ UT + MT+ PT +ET+ LT+VT). Valid upto 2018
ACCP Professional Level III	ASNT		LT + MT + RT+ UT + VT
RWTUV Level III (RT + PT + MT + UT)	RWTUV	2005	Passed the Exam (PT + MT + UT) Valid up to 2018
American Welding Society – Senior Certified Welding Inspector	American Welding Society	1994 – CWI 2006 - SCWI	Passed the Exam for SCWI Valid upto 2015
ISO 9000 Lead Assessor Training and Exam	BATALA, , UK (Bombay , India )	1992	Passed the exam for Lead Assessor registered Provisional Assessor at IRCA London in 1997
Training in Membrane cell project	By UHDE west Germany (at Pune)	1991	On job training
QA / QC aspect in Titanium Fabrication	Titanium Fabricators Ltd. Sheffield, UK	1989	Completed Training & Exam
Radiographic Interpretation	WRI Abington, Cambridge, UK	1989	Completed Training & Exam
<b>Workshops conducted</b>			
NDE Examiners Workshop	ISNT – Pune (India)	1999	Completed
NDE Examiners Workshop	ISNT – Pune (India)	2013	Completed

