



# AL156: Fundamentals of AAS (Atomic Absorption Spectrometry)





## Training Description:

Atomic Absorption Spectrometry (AAS) is a spectro-analytical procedure for the quantitative determination of chemical elements using the absorption of optical radiation (light) by free atoms in the gaseous state. It is a technique for measuring quantities of chemical elements present in environmental samples by measuring the absorbed radiation by the chemical element of interest. This is done by reading the spectra produced when the sample is excited by radiation. The atoms absorb ultraviolet or visible light and make transitions to higher energy levels. Atomic absorption methods measure the amount of energy in the form of photons of light that are absorbed by the sample.

Meanwhile, an inductively coupled plasma (ICP) or transformer coupled plasma (TCP) is a type of plasma source in which the energy is supplied by electric currents which are produced by electromagnetic induction, that is, by time-varying magnetic fields. Electromagnetic induction creates energy in the source by causing ions to circulate. Movement of the ions generates energy in the form of heat.

This intensive course is designed to provide participants with a detailed and up-to-date overview of metal testing using AAS and ICP instruments. It covers the types of samples tested by AAS and ICP; the sampling errors, representative sampling, sample contamination and sample preservation; the sample accountability, sample standard handling and sample preparation; and the validation of measurement by its accuracy and precision.

During this interactive course, participants will be able to learn the factors affecting accuracy and precision of result analysis; the parts and component of AAS and ICP and the function of each; the operating principle; the daily and periodic calibration of AAS and ICP; the measurements measured by AAS and ICP; the use of standard method for testing various chemical constituents of the samples; the application of minor maintenance needed to be carried out; and the method configuration and development.

## Training Objective:

**By the end of the training, participants will be able to:**

- ✓ Apply and gain a good working knowledge on metal testing using AAS and ICP instruments
- ✓ Identify the types of samples tested by AAS and ICP as well as sampling errors, representative sampling, sample contamination and sample preservation
- ✓ Carryout sample accountability, sample standard handling and sample preparation
- ✓ Validate measurement by its accuracy and precision and recognize the factors affecting accuracy and precision of result analysis
- ✓ Describe the parts and component of AAS and ICP and identify the function of each
- ✓ Employ operating principle and conduct daily and periodic calibration of AAS and ICP
- ✓ Identify the measurements measured by AAS and ICP
- ✓ Use the standard method for testing various chemical constituents of the samples
- ✓ Apply minor maintenance needed to be carried out
- ✓ Employ method configuration and development





## Training Designed for:

This course provides an overview of all significant aspects and considerations of metal testing using AAS (atomic absorption spectrometry) and ICP (inductively coupled plasma) instruments for laboratory employees.

## Training Program:

### DAY ONE:

- ❖ PRE-TEST
- ❖ Introduction
- ❖ **Samples**
  - Types of Samples Tested by AAS & ICP
  - Sampling Errors
  - Representative Sampling
  - Sample Contamination & Sample Preservation
  - Sample Accountability
  - Sample Standard Handling
  - Samples Preparation for the following Specific tests: IP 501 Fuel Oil Metals, Arsenic, Selenium & Tellurium of Sulfur Product Metals Analysis of E-Catalyst (V, Ni, Sb & Mo)
- ❖ **Measurement Validation**
  - Accuracy & Its Meaning
  - Factor Affecting Accuracy of Result Analysis
  - Precision & Its Meaning
  - Factor Affecting Precision of Result Analysis

### DAY TWO:

- ❖ **Atomic Absorption Spectrometry (AAS) & Inductively Coupled Plasma (ICP)**
  - Description of Parts Component of AAS & ICP
  - Function of each Component
  - Operating Principle of AAS & ICP
  - AAS & ICP Daily & Periodic Calibration

### DAY THREE:

- ❖ **Atomic Absorption Spectrometry (AAS) & Inductively Coupled Plasma (ICP) *continued***
  - Measurements Measured by AAS & ICP
  - Using Standard Method for Testing Various Chemical Constituents of the Samples
  - Minor Maintenance Needed to be Carried out
  - Method Configuration & Development using the Instrument Software

### DAY FOUR:

- ❖ **Practical Sessions**
  - Atomic Absorption Spectrometer
  - Inductively Coupled Plasma Instrument

### DAY FIVE:

- ❖ **Practical Sessions**
  - Reagents & Solutions Equipped to be Used for both AAS & ICP Available at the Client's Laboratory which are Usually Provided by the Instruments Manufacturers





- Recommended Methods are those Standard Methods Used for Testing the Mentions Metals. The Standard Method Book should be Available at the Client's Lab
- ❖ Course Conclusion
- ❖ POST-TEST and EVALUATION

### Training Requirement:

"Hand's on practical sessions, equipment and software will be applied during the course if required and as per the client's request".

Please note that the above topics can be amended as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

### Training Methodology:

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

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Software & General Discussions
- Pre and Post Test

### Training Certificate(s):

Internationally recognized certificate(s) will be issued to each participant who completed the course.

### Training Fees:

**As per the course location** - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01<sup>st</sup> of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

### Training Timings:

#### Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:30	Recess (Prayer Break & Lunch)
13:30 - 15:00	Last Session

**For training registrations or in-house enquiries, please contact:**

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Training & Career Development Department

