

**COURSE OVERVIEW FE0761**  
**Acoustic Emission Testing Level I Training & Certification**  
**(ASNT, SNT-TC-1A)**

**Course Title**

Acoustic Emission Testing Level I Training & Certification (ASNT's SNT-TC-1A)

**Course Date/Venue**

October 06-10, 2024/ Boardroom, Warwick Hotel Doha, Doha, Qatar

**Course Reference**

FE0761

**Course Duration/Credits**

Five days (40 hours)/4.0 CEUs/40 PDHs

**Course Description**



***This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art equipment.***



This course will provide participants the theory lectures and practical training with a preliminary understanding of Acoustic Emission (AE) as per the ASNT Recommended Practice No. SNT-TC-1A for Personnel Qualification and Certification in Nondestructive Testing.



This course is designed to provide participants with a detailed and up-to-date overview of acoustic emission testing. It covers the principles, characteristics and sources of acoustic emission; the wave propagation, Kaiser & Felicity effects and Felicity ratio; the AE wave using sensors, instrumentation and signal processing; the cables, signal conditioning, signal detection and source location techniques; the acoustic emission test systems and accessory techniques; and the acoustic emission test techniques, equipment calibration, setting up for test and loading procedures.

During this interactive course, participants will learn the data display, noise sources and pre-test identification techniques; the precautions against noise, data interpretation, evaluation and reports; the codes, standards and procedures covering guide-type standards, standardized/codified acoustic emission test procedures and



user-developed test procedures; and the proper applications of acoustic emission testing for laboratory studies (material characterization) and structural applications.

Sample Questions for general examinations will be presented in the question booklet C that was obtained from ASNT headquarters. Participants will further demonstrate familiarity with and ability to operate the necessary equipment for AE, record and analyse the resultant information to the degree required as well as test flawed specimen and component and analyse the results of NDT as part of the practical training.

At the completion of the course, participants will be appearing for a Level I exam. Each candidate will be a 'Certified ASNT NDT Level I in Acoustic Emission Testing' upon successfully passing the examination with a minimum passing composite grade of at least 80 percent (%).

### **Course Objectives**

Upon the successful completion of this course, each participant will be able to:-

- Get certified as a “*Certified ASNT-NDT Level I in Acoustic Emission Testing*”
- Discuss the principles of acoustic emission testing covering its characteristics and sources
- Explain wave propagation, Kaiser & Felicity effects and Felicity ratio
- Sense the AE wave using sensors and illustrate instrumentation and signal processing
- Identify cables and apply signal conditioning, signal detection and source location techniques
- Recognize acoustic emission test systems and apply accessory techniques
- Carryout acoustic emission test techniques, equipment calibration, setting up for test and loading procedures
- Review data display and employ noise sources and pre-test identification techniques
- Perform precautions against noise, data interpretation, evaluation and reports
- Apply codes, standards and procedures covering guide-type standards, standardized/codified acoustic emission test procedures and user-developed test procedures
- Carryout proper applications of acoustic emission testing for laboratory studies (material characterization) and structural applications

### **Exclusive Smart Training Kit - H-STK®**



*Participants of this course will receive the exclusive “Haward Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials conveniently saved in a **Tablet PC***

**Who Should Attend**

This course provides an overview of all significant aspects and considerations of acoustic emission testing in accordance with the ASNT international standard for all engineers and other technical staff working in the field of welding technology and quality assurance of welded joints using acoustic emission testing and in order to investigate material with such technique.

**Exam Eligibility & Structure**

Exam Candidates shall have the following minimum pre-requisites:-

Initial Training & Experience Levels			
Level	Training Hours	Minimum Hours in AE Method	Total Hours in NDT
I	40	210	400

**Examinations Category & Criteria**

**Vision Examinations**

- Near-Vision Acuity
  - This examination will ensure natural or corrected near-distance acuity in at least one eye such that the applicant is capable of reading a minimum of Jaeger Number 2 or equivalent type and size letter at the distance designated on the chart but not less than 12 inches (30.5 cm) or a standard Jaeger test chart. The ability to perceive an Ortho-Rater minimum of 8 or similar test pattern is also acceptable. This examination shall be administered annually.
- Color Contrast Differentiation
  - This examination will demonstrate the capability of distinguishing and differentiating contrast among colors or shades of gray used in the method as determined by the company. This shall be conducted upon initial certification and at five-year intervals thereafter

**General (Written)**

- This examination will address the basic principles of the applicable method
- The NDT Level III will provide appropriate questions covering the applicable method to the degree required by the company's written practice
- The minimum number of examination questions that will be given is 40

**Specific (Written)**

- This examination will address the equipment, operating procedures and NDT techniques that the individual may encounter during specific assignments to the degree required by the company's written practice
- The specific examination will also cover the specifications or codes and acceptance criteria used in the company's NDT procedures
- The minimum number of examination questions that will be given is 20



### Practical

- The candidate shall demonstrate familiarity with and ability to operate the necessary NDT equipment, record and analyse the resultant information to the degree required
- At least one flawed specimen or component shall be tested and the results of the NDT analysed by the candidate
- The description of the specimen, the NDT procedure including check points and the results of the examination shall be documented
- Proficiency shall be demonstrated in performing the NDT technique on one or more specimens or machine problems approved by the NDT Level III and in evaluating the results to the degree of responsibility as described in the company's written practice. At least ten (10) different checkpoints requiring an understanding of test variables and the employer's procedural requirements will be included. The candidate shall detect all discontinuities and conditions specified by the NDT Level III

*Note: While it is normal to score the practical on a percentile basis, practical examinations will contain check points that failure to successfully complete will result in failure of the examination*

### Additional Criteria

All written examinations will be closed-book except that necessary data such as graphs, tables, specifications, procedures, codes, etc., may be provided during the examination. All questions are approved by the responsible NDT Level III.

### Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

### Course Fee

**US\$ 6,500** per Delegate. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

### Qualification Certificate(s)

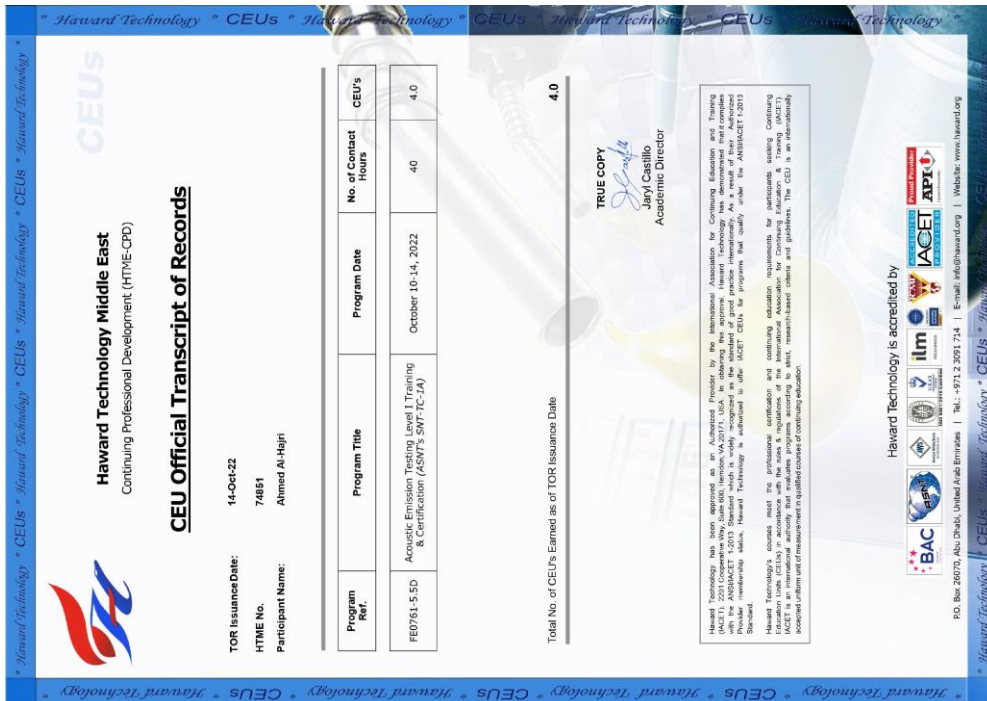
- (1) Internationally recognized Qualification Certificates will be issued to participants who have successfully completed the course and passed the exam at the end of the course. Successful candidate will be certified as a "Certified ASNT-NDT Level I in Acoustic Emission Testing". Certificates are valid for 5 years.

**Sample of Certificates**

The following are samples of the certificates that will be awarded to course participants:-




- (2) Official Transcript of Records will be provided to the successful delegates with the equivalent number of ANSI/IACET accredited Continuing Education Units (CEUs) earned during the course.



### Certificate Accreditations

Certificates are accredited by the following international accreditation organizations:-

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The American Society for Nondestructive Testing (ASNT)


Haward Technology's instructors are certified by **The American Society for Nondestructive Testing (ASNT)** and are authorized to conduct ASNT's certification programs for specific NDT methods in accordance with ASNT-TC-1A (2016). ASNT is the world's largest technical society for nondestructive testing (NDT) that provides a forum for exchange of NDT technical information, NDT educational materials and programs, and standards and services for the qualification and certification of NDT personnel.

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The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units (CEUs)** in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **4.0 CEUs** (Continuing Education Units) or **40 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

### Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



**Mr. Luis Lopez** is a **Senior Inspection Engineer** with extensive experience within the **Oil & Gas, Petrochemical** and **Refinery** industries. His expertise widely covers in the areas of **Thermography, Thermal Infrared Testing, Radiographic Film Interpretation, Visual Testing, Phased Array Ultrasonic Testing, Ultrasonic Testing, Magnetic Particle Testing, Liquid Penetrant Testing, Non-destructive Testing, NDT Methods & Applications, Electromagnetic Testing, Hydrostatic Leak Testing, Eddy Current Testing, Valve Inspection & Testing, Codes & Standards Interpretation, Corrosion Engineering, Corrosion & Metallurgy, Welding & Corrosion Engineering, Welding Metrology, International Welding Codes, Practical Welding Technology, Plastic Pipe Welding, Welding Inspection, Welding Defects Analysis, Welding Joints & Coating Inspection, Post Weld Heat Treatment, Hardness Testing, Welding Electrodes Monitoring & Control, Pipe Testing, Piping System, Steel Structures, Metals Casting, Crane Functional Testing & Load Testing, Hydrotesting, Pressure Testing Procedure, Pressure Equipment Calibration, Stream Inspection, Corrosion Evaluation, Casting Products Inspection and Raw Materials Inspection.** He is currently the **Senior NDT Instructor** of **SETE** wherein he is deeply involved in thermography, NDT qualification and certification of personnel.

During his career life, Mr. Lopez gained his practical and field experience through his various significant positions and dedication as the **Technical Manager, NDT Instructor, NDT Manager & Instructor, NDT Inspector, NDT Offshore Inspector & Quality Control, Phased Array Ultrasonic Technician** and **Radiographic Testing Technician** for various international companies such as the JP Inspections, Nova Inspection, NSD Services, Cotemar, UNISPEC Inspection and Ruiver.

Mr. Lopez holds a **Diploma in Professional Mechanical & Electrical Technician**. Further, he is a **Certified Instructor/Trainer, a Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management (ILM)**, a **Certified ASNT-NDT Level III Inspector** in Infrared & Thermal Testing (**IR**), Liquid Penetrant Testing (**PT**), Magnetic Particle Testing (**MT**), Ultrasonic Testing (**UT**), Visual Testing (**VT**), Radiography Testing (**RT**), Leak Testing (**LT**), Electromagnetic Testing (**ET**), **Certified Welding Inspection & Metallurgy Professional (API 577)** and a **Certified AWS-CWI Welding Inspector**. He has further delivered numerous trainings, courses, workshops, seminars and conferences internationally.

### Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.



### 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 & Introduction
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>Principles of Acoustic Emission Testing</b> Characteristics of Acoustic Emission • Sources of Acoustic Emission • Wave Propagation - Introduction
0930 – 0945	Break
0945 – 1200	<b>Principles of Acoustic Emission Testing (cont'd)</b> Repeated Loadings: Kaiser & Felicity Effects & Felicity Ratio • Terminology (refer to AE Glossary, ASTM E 1316)
1200 – 1300	Lunch
1300 – 1500	<b>Sensing the AE Wave</b> Sensors
1500 – 1515	Break
1515 – 1650	<b>Sensing the AE Wave (cont'd)</b> Sensor Attachment
1650 – 1700	<b>Recap</b>
1700	End of Day One

#### **Day 2**

0730 – 0930	<b>Instrumentation &amp; Signal Processing</b> Cables • Signal Conditioning
0930 – 0945	Break
0945 – 1200	<b>Instrumentation &amp; Signal Processing (cont'd)</b> Signal Detection • Signal Processing
1200 – 1300	Lunch
1300 – 1500	<b>Instrumentation &amp; Signal Processing (cont'd)</b> Source Location Techniques • Acoustic Emission Test Systems
1500 – 1515	Break
1515 – 1650	<b>Instrumentation &amp; Signal Processing (cont'd)</b> Accessory Techniques
1650 – 1700	<b>Recap</b>
1700	End of Day Two

#### **Day 3**

0730 – 0930	<b>Acoustic Emission Test Techniques</b> Equipment Calibration & Setup for Test • Loading Procedures
0930 – 0945	Break
0945 – 1200	<b>Acoustic Emission Test Techniques (cont'd)</b> Data Display • Noise Sources & Pre-test Identification Techniques
1200 – 1300	Lunch
1300 – 1500	<b>Acoustic Emission Test Techniques (cont'd)</b> Precautions against Noise • Data Interpretation & Evaluation: Introduction
1500 – 1515	Break



1515 – 1650	<b>Acoustic Emission Test Techniques (cont'd)</b> Reports
1650 – 1700	<b>Recap</b>
1700	End of Day Three

**Day 4**

0730 – 0930	<b>Codes, Standards &amp; Procedures</b> Guide-type Standards (Glossaries, Calibration, Etc.) • Standardized/Codified Acoustic Emission Test Procedures
0930 – 0945	Break
0945 – 1200	<b>Codes, Standards &amp; Procedures (cont'd)</b> User-Developed Test Procedures
1200 – 1300	Lunch
1300 – 1500	<b>Applications of Acoustic Emission Testing (Course should Include at least 3 Categories from 4.1 &amp; at least 4 Categories from 4.2)</b> <b>4.1 Laboratory Studies (Material Characterization)</b> Crack Growth & Fracture Mechanics • Environmentally Assisted Cracking • Dislocation Movement (Metals) • Clarifying Deformation Mechanisms (Composites) • Phase Transformation & Phase Stability • Creep
1500 – 1515	Break
1515 – 1650	<b>Applications of Acoustic Emission Testing (Course should Include at least 3 Categories from 4.1 &amp; at least 4 Categories from 4.2)</b> <b>4.1 Laboratory Studies (Material Characterization) (cont'd)</b> Residual Stress • Corrosion • Fatigue • Rupture • Ductile/Brittle Transition • Other Material Characterization Applications
1650 – 1700	<b>Recap</b>
1700	End of Day Four

**Day 5**

0730 – 0930	<b>Applications of Acoustic Emission Testing (Course should Include at least 3 Categories from 4.1 &amp; at least 4 Categories from 4.2)</b> <b>4.2 Structural Applications</b> Pressure Vessels (Metal) • Storage Tanks (Metal) • Pressure Vessels/Storage Tanks (Composite) • Piping & Pipelines • Bucket Trucks • Aircraft • Bridges
0930 – 0945	Break
0945 – 1115	<b>Applications of Acoustic Emission Testing (Course should Include at least 3 Categories from 4.1 &amp; at least 4 Categories from 4.2)</b> <b>4.2 Structural Applications</b> Mines • Dams, Earthen Lopes • Pumps, Valves, Etc. • Rotating Plant • In-process Weld Monitoring • Leak Detection & Monitoring • Other Structural Applications
1115 – 1200	<b>Theoretical Examination</b>
1200 – 1300	Lunch
1300 – 1515	<b>Theoretical Examination (cont'd)</b>
1515 – 1530	Break
1530 – 1630	<b>Practical Examination</b>
1630 – 1645	<b>Course Conclusion</b>
1645 – 1700	Presentation of Course Certificates
1700	End of Course

**Practical Sessions**

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will carry out NDT inspection using our “Acoustic Emission Testing (AE) Equipment” and our specifically designed flawed specimen test components.



**Ultrasonic Testing (UT) Equipment**



**Ultrasonic Testing Package USM 36**



**Course Coordinator**

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