

**COURSE OVERVIEW FE0772-10D**  
**Phased Array Ultrasonic Testing Level II Training & Certification**  
**(ASNT, SNT-TC-1A)**

**Course Title**

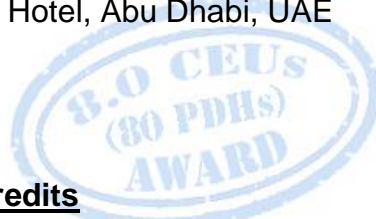
Phased Array Ultrasonic Testing Level II Training & Certification (ASNT, SNT-TC-1A)

**Course Date/Venue**

Session 1: August 25-September 05, 2024/  
 Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE  
 Session 2: November 18-29, 2024/Fujairah Meeting Room, Grand Millennium Al Wahda Hotel, Abu Dhabi, UAE

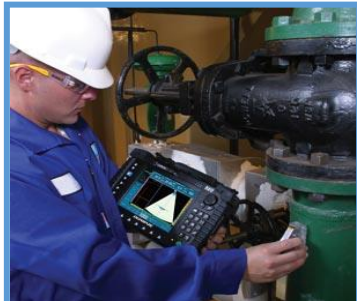


**Course Reference**  
 FE0772-10D



**Course Duration/Credits**  
 Ten days (80 hours)/8.0CEUs/80 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 simulators.***



This course will provide participants the theory lectures and practical training with a preliminary understanding of Phase Array Ultrasonic Testing as per the ANSI/ASNT CP-105-2016 Standard for qualification of nondestructive testing personnel and as per the ASNT Recommended Practice No. SNT-TC-1A 2016 for Personnel Qualification and Certification in Nondestructive Testing.



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 Phased Array Ultrasonic Testing, 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 II exam. Each candidate will be a 'Certified ASNT NDT Level II in Phased Array Testing' upon successfully passing the examination with a minimum passing composite grade of at least 80 percent (%) which will be administered and graded by Haward Technology through its Certified ASNT Level-III instructors.

### Course Objectives

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

- Get certified as a “*Certified ASNT Level II in Phased Array Ultrasonic Testing*”
- Discuss the terminologies of phase array, including its history and the levels of certification responsibilities
- Explain the basic principles of phase array, ultrasonic wave theory that include longitudinal and shear wave as well as phase array concepts and theory
- Identify the computer-based systems equipment, focal law generation, probes, wedges and scanners
- Carryout testing techniques thru linear, sectorial and electronic scans
- Employ proper calibration covering active element and probe checks, wedge delay, velocity, exit point verifications, refractions angle verifications, sensitivity, DAC, TCG, TVG and ACG variables and parameters
- Identify the effects of curvature and focusing the effects
- Apply data collection using single probes, multiple probes and multiple groups or multiplexing single/multiples probes
- Recognize non-encoded scans, encoded scans, zone discrimination, scan plans, exam coverages and probe offsets and indexing
- Carryout various procedures for specific applications, data presentations, data evaluation and reporting

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



Participants of this course will receive the exclusive “Howard Smart Training Kit” (H-STK®). The H-STK® consists of a comprehensive set of technical content which includes **electronic version** of the course materials, sample video clips of the instructor’s actual lectures & practical sessions during the course conveniently saved in a **Tablet PC**.

### Who Should Attend

This course provides an overview of all significant aspects and considerations of ultrasonic 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 ultrasonic testing and in order to investigate material with such technique.

### Course Prerequisite Criteria

Initial Training & Experience Levels			
Level	Training Hours	Minimum Hours in Method	Total Hours in NDT
Ultrasonic Level II	80	160	N/A

## 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 applicable NDT method. This shall be conducted upon initial certification and at five-year intervals thereafter.

### 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 employer's written practice
- The specific examination will also cover the specifications or codes and acceptance criteria used in the employer's NDT procedures
- The minimum number of examination questions that will be given is 30

### 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 Ultrasonic Testing 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 employer'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.

**Course 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 Level II in Phased Array Ultrasonic Testing”. Qualification Certificate is valid for 5 years.

**Qualification Certificate(s)**

The following qualification certificate is a sample of the qualification certificates that will be issued to successful candidates:




(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

Haward Technology is 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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USA International Association for Continuing Education and Training (IACET)

Haward Technology is an Authorized Training Provider by the International Association for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, Virginia 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 Association 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 **8.0 CEUs** (Continuing Education Units) or **80 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.

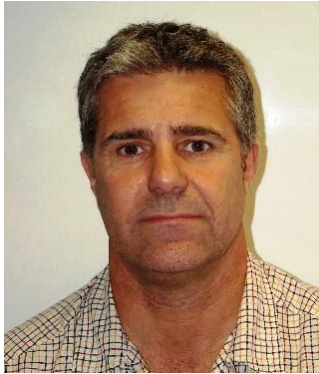
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British Accreditation Council (BAC)

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. Mark Peacock**, is a **Senior Inspection Engineer** with almost **40 years** of experience within the **Oil, Gas, Refinery** and **Petrochemical** industries. His wide expertise extensively covers in the areas of Ultrasonic Testing (**UT**), Radiographic Testing (**RT**), Magnetic Particle Testing (**MT**), Liquid Penetrant Testing (**PT**), Time of Flight Diffraction (**ToFD**), Phased Array Ultrasonic Testing (**PAUT**), **Eddy Current, Rope Access, Boilers Operation & Maintenance, Welding Technology, Welding Fabrication, Welding Inspection, Welding Safety, Gas Pipelines, Pressure Equipment, Crane Inspection,**

**Welding Processes & Related Defects, Material Science & Bonding, Non-Destructive Testing (NDT), Asset Integrity Management (AIM), Advanced Integrity Management for Corrosion & Inspection, Pressure Vessel Design, Piping Design, Construction & Mechanical Integrity, Radiation Protection, Destructive Testing for Metals & Welding, Fabrication Works, Bearing Types & Applications, Valves Applications & Inspection, Pump Inspection, Gear Design, Shaft Alignment, Pressure Vessels Inspections, Rotating & Static Equipment, Gas Processing Plant, Gas Platform Inspection & Repair and Hydro Testing.** He is currently the **NDT Technical Manager Inspector** of Devonport Royal Dockyard wherein he is responsible for the procedure, technique writing, review, welding inspection, eddy current, ultrasonic manual & automated (TOFD and Phased Array) and NDT Inspection.

During Mr. Peacock's career life, he acquired his practical and technical expertise and held key positions as the **Quality Assurance Director, Technical Director, Senior Specialist NDT Inspector, NDT Inspector, Welding Inspector, Crane Inspector** and **Senior NDT Technician** for various companies such as the IRISNDT, Genesis Energy, CET Medway Ltd., QATS Ltd Rochester, Structural and Weld Testing Ltd and Gravesend.

Mr. Peacock is a **Certified Instructor/Trainer**, a **Certified ASNT-NDT Level III Inspector** in Ultrasonic Testing (**UT**), Liquid Penetrant Testing (**PT**), Magnetic Particle Testing (**MT**) and Radiography Testing (**RT**); a **Certified Level II Inspector** in Eddy Current Testing (**ET**); a **Certified PCN-BINDT III** in Ultrasonic Testing (**UT**) and **Dye Penetrant**; a **Certified PCN-BINDT Level II** in Time of Flight Diffraction (**ToFD**); a **Certified CSWIP Level I Rope Access**; a **Certified CSWIP Welding Inspector**; a **Certified CSWIP Level II Phased Array Ultrasonic Testing (PAUT)** and a member of the British Institute of Non-Destructive Testing (**BINDT**) and American Society for Nondestructive Testing (**ASNT**). Further, he has delivered numerous trainings, courses, workshops, seminars and conferences internationally.

### Course Fee

**US\$ 12,000** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

### 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	<i>Registration &amp; Coffee</i>
0800 – 0815	<i>Welcome &amp; Introduction</i>
0815 – 0830	<b>PRE-TEST</b>
0830 – 0930	<b>Introduction</b> <i>Terminology of PA (Phased Array) • History of PA - Medical Sound Etc. • Responsibilities of Levels of Certification</i>
0930 – 0945	<i>Break</i>
0945 – 1200	<b>Basic Principles of PA</b> <i>Review of Ultrasonic Wave Theory: Longitudinal &amp; Shear Wave</i>
1200 – 1300	<i>Lunch Break</i>
1300 – 1500	<b>Basic Principles of PA (cont'd)</b> <i>Review of Ultrasonic Wave Theory: Longitudinal &amp; Shear Wave</i>
1500 – 1515	<i>Break</i>
1515 – 1650	<b>Basic Principles of PA (cont'd)</b> <i>Introduction to PA Concepts &amp; Theory</i>
1650 – 1700	<b>Recap</b>
1700	<i>End of Day One</i>

#### **Day 2**

0730 – 0930	<b>Equipment</b> <i>Computer-Based Systems (Processors, Control Panel Including Input &amp; Output Sockets, Block Diagram Showing Basic Internal Circuit Modules) • Computer-Based Systems (Multi-Element/Multi-Channel Configurations, Portable Battery Operated Versus Full Computer-Based Systems)</i>
0930 – 0945	<i>Break</i>
0945 – 1200	<b>Equipment (cont'd)</b> <i>Focal Law Generation (Onboard Focal Law Generator) • Focal Law Generation (External Focal Law Generator)</i>
1200 – 1300	<i>Lunch Break</i>
1300 – 1500	<b>Equipment (cont'd)</b> <i>Probes (Composite Materials, Pitch, Gap, &amp; Size, Passive Planes, Active Planes) • Probes (Arrays: 1D, 2D, Polar, Annular, Special Shape, etc, Beam &amp; Wave Forming, Grating Lobes)</i>
1500 – 1515	<i>Break</i>
1515 – 1650	<b>Equipment (cont'd)</b> <i>Wedges (Types of Wedge Designs) • Scanners (Mechanized, Manual)</i>
1650 – 1700	<b>Recap</b>
1700	<i>End of Day Two</i>



**Day 3**

0730 – 0930	<b>Testing Techniques</b> Linear Scans
0930 – 0945	Break
0945 – 1200	<b>Testing Techniques (cont'd)</b> Sectorial Scans
1200 – 1300	Lunch Break
1300 – 1500	<b>Testing Techniques (cont'd)</b> Electronic Scans
1500 – 1515	Break
1515 – 1650	<b>Testing Techniques (cont'd)</b> Electronic Scans
1650 – 1700	<b>Recap</b>
1700	End of Day Three

**Day 4**

0730 – 0930	<b>Calibration</b> Active Element & Probe Checks
0930 – 0945	Break
0945 – 1200	<b>Calibration (cont'd)</b> Wedge Delay
1200 – 1300	Lunch Break
1300 – 1500	<b>Calibration (cont'd)</b> Velocity • Exit Point Verifications
1500 – 1515	Break
1515 – 1650	<b>Calibration (cont'd)</b> Refraction Angle Verifications
1650 – 1700	<b>Recap</b>
1700	End of Day Four

**Day 5**

0730 – 0930	<b>Calibration (cont'd)</b> Sensitivity
0930 – 0945	Break
0945 – 1200	<b>Calibration (cont'd)</b> DAC, TCG, TVG & ACG Variables & Parameters
1200 – 1300	Lunch
1300 – 1500	<b>Calibration (cont'd)</b> Effects of Curvature • Focusing Effects
1500 – 1515	Break
1515 – 1645	<b>Calibration (cont'd)</b> Beam Steering • Acquisition Gates
1645 – 1700	<b>Recap</b>
1700	End of Day Five







**Day 6**

0730 – 0930	<b>Data Collection</b> Single Probes • Multiple Probes • Multiple Groups or Multiplexing Single/Multiple Probes
0930 – 0945	Break
0945 – 1200	<b>Data Collection (cont'd)</b> Non-Encoded Scans (Time-Based Data Storage) • Encoded Scans (Line Scans, Raster Scans) • Zone Discrimination
1200 – 1300	Lunch Break
1300 – 1500	<b>Data Collection (cont'd)</b> Scan Plans & Exam Coverages (Sectorial, Linear, Electronic Raster Scans)
1500 – 1515	Break
1515 – 1650	<b>Data Collection (cont'd)</b> Probe Offsets & Indexing
1650 – 1700	<b>Recap</b>
1700	End of Day Six

**Day 7**

0730 – 0930	<b>Procedures</b> Specific Applications (Material Evaluations, Components Evaluation, Weld Inspections)
0930 – 0945	Break
0945 – 1200	<b>Procedures (cont'd)</b> Data Presentations (Standard, Other)
1200 – 1300	Lunch Break
1300 – 1500	<b>Procedures (cont'd)</b> Data Evaluation (Codes/Standards/Specifications)
1500 – 1515	Break
1515 – 1650	<b>Procedures (cont'd)</b> Data Evaluation (Flaw Characterization)
1650 – 1700	<b>Recap</b>
1700	End of Day Seven

**Day 8**

0730 – 0930	<b>Procedures (cont'd)</b> Data Evaluation (Flaw Dimensioning, Geometry, Software Tools)
0930 – 0945	Break
0945 – 1200	<b>Procedures (cont'd)</b> Data Evaluation (Evaluation Gates)
1200 – 1300	Lunch Break
1300 – 1500	<b>Procedures (cont'd)</b> Reporting (Imaging Outputs)
1500 – 1515	Break
1515 – 1650	<b>Procedures (cont'd)</b> Reporting (Onboard Reporting Tools, Plotting, ACAD, Etc.)
1650 – 1700	<b>Recap</b>
1700	End of Day Eight





**Day 9**

0730 – 0800	<b>Specific Theory Examination (30 minutes)</b>
0800 - 0900	<b>Specific Practical Examination (60 minutes)</b> (A) Assembly, & Functional Check of the MEPAUT Equipment, Including Probe/s & Encoder. Probe 'Element Check', to be Saved as 'Data File' & 'HTML Report'
0900 – 0915	Break
0915 – 1115	<b>Specific Practical Examination (2 hours per Sample) : Sample 1</b> (B) Production of Complete Data File from Three Samples Selected by the Examiner, Including Set Up & Preparation of the Specimen & Visual Examination, Scan Plans, Carrying Out Tests, Post Test Procedures, Collecting & Storing Test Data. The Candidate Shall Demonstrate Beam Steering, Encoding Parameters, Focusing & DAC/TCG Production &, In Addition, Demonstrate Completeness of Data. Weld Preparation Should Include Double-V & Single-V Configurations, With Varying Wall Thicknesses.
1115 - 1215	<b>Lunch</b>
1215 - 1415	<b>Specific Practical Examination (2 hours per Sample) : Sample 2</b> (B) Production of Complete Data File from Three Samples Selected by the Examiner, Including Set Up & Preparation of the Specimen & Visual Examination, Scan Plans, Carrying Out Tests, Post Test Procedures, Collecting & Storing Test Data. The Candidate Shall Demonstrate Beam Steering, Encoding Parameters, Focusing & DAC/TCG Production &, In Addition, Demonstrate Completeness of Data. Weld Preparation Should Include Double-V & Single-V Configurations, With Varying Wall Thicknesses.
1430 - 1630	<b>Specific Practical Examination (2 hours per Sample) : Sample 3</b> (B) Production of Complete Data File from Three Samples Selected by the Examiner, Including Set Up & Preparation of the Specimen & Visual Examination, Scan Plans, Carrying Out Tests, Post Test Procedures, Collecting & Storing Test Data. The Candidate Shall Demonstrate Beam Steering, Encoding Parameters, Focusing & DAC/TCG Production &, In Addition, Demonstrate Completeness of Data. Weld Preparation Should Include Double-V & Single-V Configurations, With Varying Wall Thicknesses.
1650 – 1700	<b>Recap</b>
1700	End of Day Nine

**Day 10**

0730 – 0930	<b>Specific Practical Examination (2 hours per Data File) : Data File 1</b> (C) Examination & Assessment & Analysis of the Three Date Files from the Above Samples, Using Appropriate Viewing Software. Candidates Shall Complete a Test Report with the Results in a Prescribed Format Which Indicates Defect Location & Size. The Report Shall Also Include Discontinuity Characterization (Size & Position of Defects in Relation to a Known Datum/s) & Evaluation, Echo Dynamic Characterization. The Report Shall Include Detection of Mandatory Discontinuities.
0930 – 0945	Break



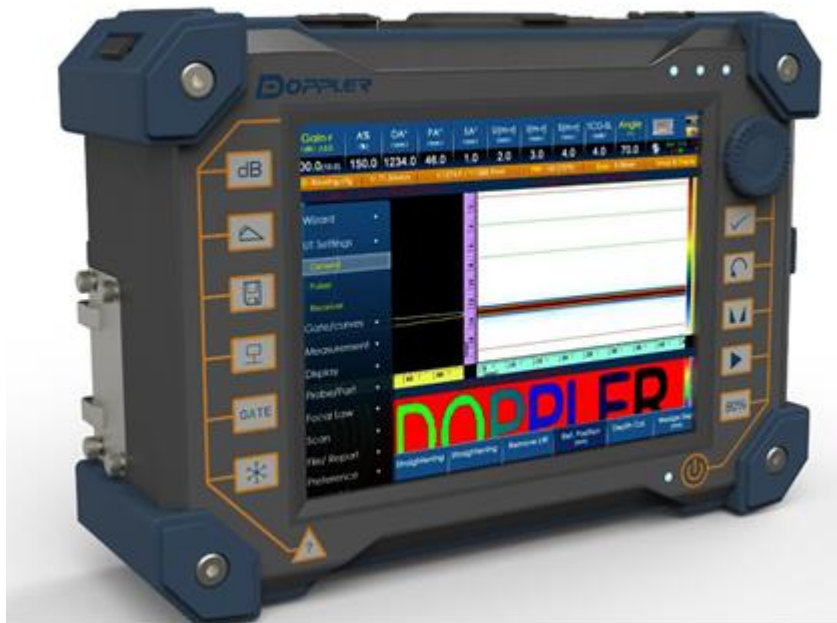


0945 - 1145	<b>Specific Practical Examination (2 hours per Data File) : Data File 2</b> (C) Examination & Assessment & Analysis of the Three Date Files from the Above Samples, Using Appropriate Viewing Software. Candidates Shall Complete a Test Report with the Results in a Prescribed Format Which Indicates Defect Location & Size. The Report Shall Also Include Discontinuity Characterization (Size & Position of Defects in Relation to a Known Datum/s) & Evaluation, Echo Dynamic Characterization. The Report Shall Include Detection of Mandatory Discontinuities.
1145 - 1215	Lunch
1215 - 1415	<b>Specific Practical Examination (2 hours per Data File) : Data File 3</b> (C) Examination & Assessment & Analysis of the Three Date Files from the Above Samples, Using Appropriate Viewing Software. Candidates Shall Complete a Test Report with the Results in a Prescribed Format Which Indicates Defect Location & Size. The Report Shall Also Include Discontinuity Characterization (Size & Position of Defects in Relation to a Known Datum/s) & Evaluation, Echo Dynamic Characterization. The Report Shall Include Detection of Mandatory Discontinuities.
1415 - 1430	Break
1430 -1630	<b>Specific Practical Examination (2 hours)</b> (D) Develop an NDT Instruction Suitable for a Level 1 Operator for One of the Sample Given for Paragraph (B) Above to a Provided Code or Specification. The Instruction Shall Detail the Methods of Scanning, File Structure, Collecting & Storing Data & The Necessary Calculations to Achieve this. The Instruction Shall Include Scope, Status, Authorization, Personnel, Apparatus & Settings, Product & Test Area, Test Conditions, Preparation for Testing, Application of Test Instructions, Recording & Classifying Results & Report the Results.
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 be provided with an opportunity to carryout various testing using the “Doppler Flexcan 16/64”, “IIW Type 2 Calibration Block”, “ASME Basic Calibration Block”, “Couple of Weld Samples”, “Single ‘V’ Plate to Plate Advanced UT Flawed Specimens 15 mm”, “6 inches Pipe to Pipe Ultrasonic Test Flawed Specimens” and “Ultrasonic Couplant Powder”.



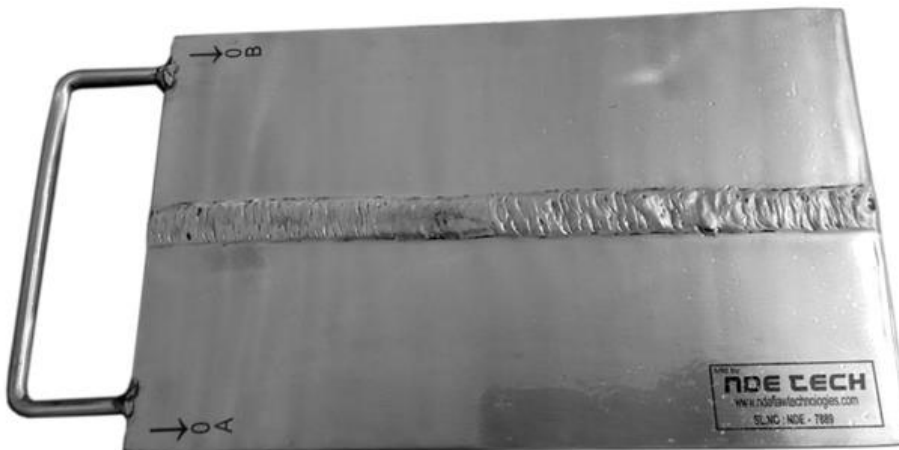
**DOPPLER FLEXCAN 16/64**



**IIW Type 2 Calibration Block**



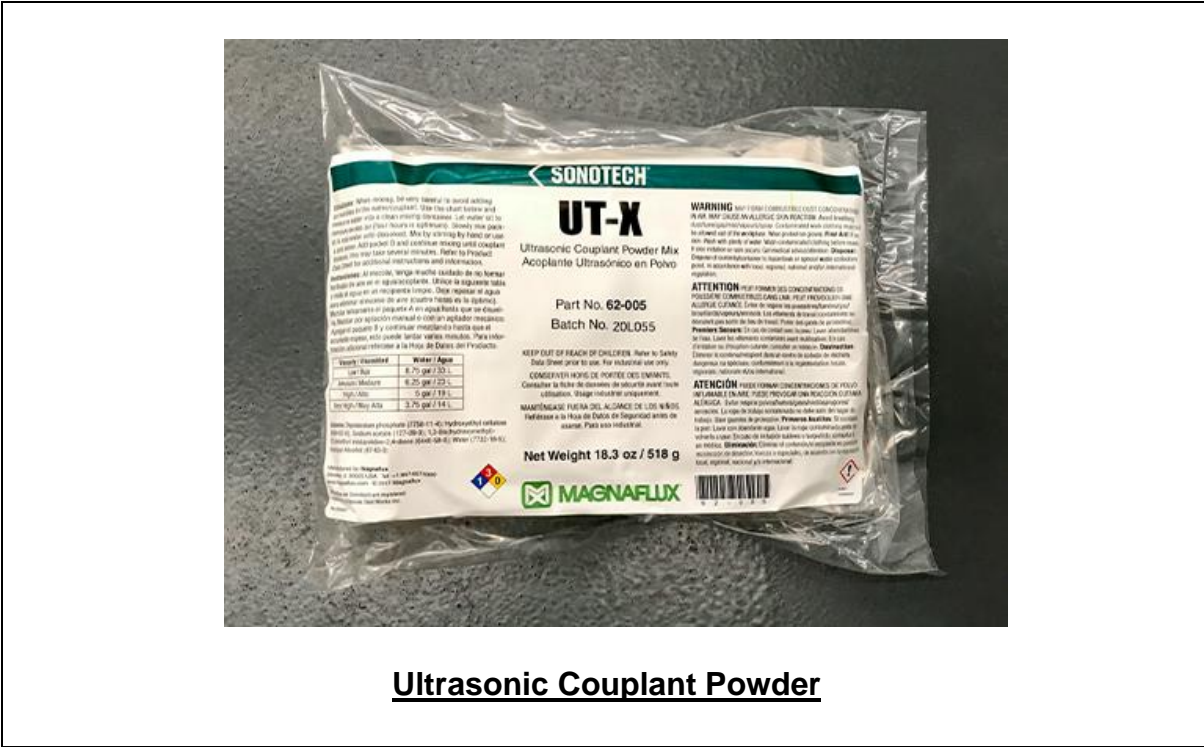
**ASME Basic Calibration Block**



**Single 'V' Plate to Plate Advanced UT Flawed Specimens 15 mm**



**6 inches Pipe to Pipe Ultrasonic Test Flawed Specimens**



**Ultrasonic Couplant Powder**

**Course Coordinator**  
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