COURSE OVERVIEW FE0126
Industrial Operations & Inspection Essentials

Course Title
Industrial Operations & Inspection Essentials

Course Reference
FE0126

Course Duration/Credits
Five days/3.0 CEUs/30 PDHs

Course Date/Venue

Session(s)	Course Date	Venue
1	May 18-22, 2025	Olivine Meeting Room, Fairmont Nile City, Cairo, Egypt
2	August 10-14, 2025	Tamra Meeting Room, Al Bandar Rotana Creek, Dubai, UAE
3	December 07-11, 2025	Safir Meeting Room, Divan Istanbul, Taksim, Turkey

Course Description

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

This course is designed to provide participants with a detailed and up-to-date overview of Industrial Operations and Inspection Essentials. It covers the industrial systems and facilities, types of industrial operations, key facility components, facility layout and access control zones and inspector's role in facility management; the roles and coordination between departments, worksite communication and reporting standards; the health, safety and environment (HSE) fundamentals, permit to work, risk assessment, LOTO, fire safety, H_2S; and the confined space entry.

Further, the course will also discuss the technical drawings and P&IDs, codes, standards and specifications; the quality assurance (QA) essentials, non-destructive testing (NDT) basics, inspection checklists and documentation; the mechanical inspection, electrical inspection, industrial security inspection, transport inspection and gardening and landscaping inspection; the roles of foremen and inspectors in team leadership, task delegation and performance tracking; and the situational leadership techniques.

During this interactive course, participants will learn the causes of site conflict and resolution models and dealing with difficult behavior and escalation; the emotional intelligence on site, ethics of authority and neutrality; the professionalism and confidentiality, integrity in reporting and documentation and dealing with unethical practices; and the verbal and written communication, technical documentation and reports, digital tools and reporting systems.

Course Objectives

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

- Apply and gain an in-depth knowledge on industrial operations and inspection essentials
- Discuss the industrial systems and facilities including types of industrial operations, key facility components, facility layout and access control zones and inspector's role in facility management
- Identify the roles and coordination between departments including worksite communication and reporting standards
- Discuss health, safety and environment (HSE) fundamentals and apply permit to work, risk assessment, LOTO, fire safety, H_2S and confined space entry
- Read technical drawings and P&IDs including codes, standards and specifications
- Carryout quality assurance (QA) essentials, non-destructive testing (NDT) basics, inspection checklists and documentation
- Apply mechanical inspection, electrical inspection, industrial security inspection, transport inspection and gardening and landscaping inspection
- Identify the roles of foremen and inspectors in team leadership and apply task delegation, performance tracking and situational leadership techniques
- Recognize the causes of site conflict and resolution models, deal with difficult behavior and escalation and apply emotional intelligence on site, ethics of authority and neutrality
- Implement professionalism and confidentiality, integrity in reporting and documentation and dealing with unethical practices
- Apply verbal and written communication, technical documentation and reports as well as digital tools and reporting systems

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 industrial operations and inspection essentials for operations managers and supervisors, maintenance teams, quality assurance/control personnel, safety officers and inspectors, engineers (mechanical, electrical, civil, etc.), project managers and site managers, regulatory and compliance personnel, technicians and field operators and other technical staff.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- 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.

- 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 **3.0 CEUs** (Continuing Education Units) or **30 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.

Accommodation

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

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. Steve Magalios, CEng, PGDip (on-going), MSc, BSc, is a **Senior Welding & Pipeline Engineer** with almost **30 years** of extensive **On-shore/Offshore** experience in the **Oil & Gas**, **Construction**, **Refinery** and **Petrochemical** industries. His expertise widely covers in the areas of **Welding Technology**, **Welding & Fabrication**, **Welding Inspection**, **Pipeline** Operation & Maintenance, **Pipeline** Design & Construction, **Pipeline** Repair Methods, **Pipeline** Engineering, Pipeline Integrity Management System (**PIMS**), **Pipeline** Pigging, Piping & Pipe Support Systems, **Piping** Systems & Process Equipment, **Piping** System Repair & Maintenance, **Piping** Integrity Management, Computer Aided Design (**CAD**), **Building & Road** Design Skills, **Civil Engineering Design**, **Structural Reliability** Engineering, **Road** Construction & Maintenance, **Concrete Structures & Building Rehabilitation**, **Reinforced Concrete Structures Protection**, **Geosynthetics & Ground Improvement Methods**, **Blueprint** Reading & Interpretation, **Blue Print** Documentation, Mechanical **Drawings**, **P&ID**, **Flow Diagram** Symbols and **Land Surveying** & Property Evaluation. He is also well-versed in Lean & Sour Gas, Condensate, **Compressors**, **Pumps**, Flare Knockout Drum, Block **Valve** Stations, New Slug Catcher, Natural **Gas Pipeline** & Network, Scraper Traps, Burn Pits, Risk Assessment, HSE Plan & Procedures, Quality Plan & Procedures, Safety & Compliance Management, Permit-to-Work Issuer, ASME, API, ANSI, ASTM, BS, NACE, ARAMCO & KOC Standards, MS Office tools, **AutoCAD**, **STAAD-PRO**, GIS, ArcInfo, ArcView, Autodesk Map and various programming languages such as FORTRAN, BASIC and AUTOLISP. Currently, he is the **Chartered Professional Surveyor Engineer & Urban-Regional Planner** wherein he is deeply involved in providing exact data, measurements and determining properly boundaries. He is also responsible in preparing and maintaining sketches, maps, reports and legal description of surveys.

During his career, Mr. Magalios has gained his expertise and thorough practical experience through challenging positions such as a **Project Site Construction Manager**, **Construction Site Manager**, **Project Manager**, **Deputy PMS Manager**, **Head of the Public Project Inspection Field Team**, **Technical Consultant**, **Senior Consultant**, **Consultant/Lecturer**, **Construction Team Leader**, **Lead Pipeline Engineer**, **Project Construction Lead Supervising Engineer**, **Lead Site Engineer**, **Senior Site Engineer, Welding Engineer, Lead Engineer**, **Senior Site Engineer**, **R.O.W. Coordinator**, **Site Representative**, **Supervision Head** and **Contractor** for international Companies such as the Penspen International Limited, Eptista Servicios de Ingeneria S.I., J/V ILF Pantec TH. Papaioannou & Co. – Emenergy Engineering, J/V Karaylannis S.A. – Intracom Constructions S.A., Ergaz Ltd., Alkyonis 7, Palaeo Faliro, Piraeus, Elpet Valkaniki S.A., Asprofos S.A., J/V Depa S.A. just to name a few.

Mr. Magalios is a **Registered Chartered Engineer** and has **Master** and **Bachelor** degrees in **Surveying Engineering** from the **University of New Brunswick**, **Canada** and the **National Technical University of Athens**, **Greece**, respectively. Further, he is currently enrolled for **Post-graduate** in **Quality Assurance** from the **Hellenic Open University**, **Greece**. He has further obtained a Level 4B Certificates in Project Management from the National & Kapodistrian University of Athens, Greece and Environmental Auditing from the Environmental Auditors Registration Association (EARA). Moreover, he is a **Certified Instructor/Trainer**, a **Chartered Engineer** of Technical Chamber of Greece and has delivered numerous trainings, workshops, seminars, courses and conferences internationally.

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

Cairo	**US$ 5,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Dubai	**US$ 5,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.
Istanbul	**US$ 6,000** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop 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	***PRE-TEST***
0830 – 0930	***Introduction to Industrial Systems & Facilities*** *Types of Industrial Operations (Manufacturing, Processing, Utilities) • Key Facility Components: Process, Utility, Administrative Zones• Facility Layout & Access Control Zones • Inspector's Role in Facility Management*
s0930 – 0945	*Break*
0945 – 1030	***Roles & Coordination Between Departments*** *Responsibilities of Inspection Disciplines • Coordination with Operations, Maintenance & HSE • Multi-Disciplinary Communication Protocols • Escalation & Reporting Procedures*
1030 – 1130	***Worksite Communication & Reporting Standards*** *Communication Hierarchy & Reporting Chains • Work Order & Permit Coordination • Toolbox Talks & Site Meetings • Digital Tools for Inspection Reporting*
1130 – 1215	***Health, Safety & Environment (HSE) Fundamentals*** *Industrial Hazards & Risk Types • HSE Policies & Safe Work Practices • Personal Protective Equipment (PPE) Types & Use • Safety Observation & Hazard Reporting*
1215 – 1230	*Break*

1230 – 1330	***Permit to Work, Risk Assessment & LOTO*** *PTW System Types & Workflow • Risk Assessment Techniques (JSA, HIRA) • Lockout/Tagout: Procedures & Scenarios • Documentation & Verification Protocols*
1330 – 1420	***Fire Safety, H2S & Confined Space Entry*** *Fire Triangle & Prevention Measures • Firefighting Equipment: Types & Use • H2S Hazard Zones & Detection • Confined Space Classification & Rescue Plans*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day One*

Day 2

0730 – 0830	***Technical Drawings & P&IDs*** *Reading General Arrangement Drawings • Piping & Instrumentation Diagrams (P&ID) Basics • Symbols, Legends & Layout Interpretation • Common Drawing Errors & Inspection Tips*
0830 – 0930	***Codes, Standards & Specifications*** *Overview of ISO, ASME, API, IEC, BS Standards • Material & Construction Specifications • Design versus As-Built Documentation • Tolerances, Deviations & Compliance*
0930 – 0945	*Break*
0945 – 1100	***Quality Assurance (QA) Essentials*** *QA versus QC: Roles & Responsibilities • Importance of QA in Inspections • Understanding ITPs & Quality Plans • Calibration & Equipment Traceability*
1100 – 1215	***Non-Destructive Testing (NDT) Basics*** *Visual Inspection Techniques & Tools • Ultrasonic Testing (UT) Procedures • Radiographic Testing (RT) Interpretation • Magnetic Particle & Dye Penetrant Testing*
1215 – 1230	*Break*
1230 – 1330	***Inspection Checklists & Documentation*** *Standard Checklist Formats by Discipline • Field Data Recording Procedures • Inspection Punch Listing & Close-Out • Compliance with Document Control Procedures*
1330 – 1420	***Practical Walkthrough – Reading & Reviewing*** *Hands-On Drawing Review Session • Sample QA Documentation Practice • NDT Report Interpretation Exercise • Reviewing Non-Conformance Reports*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Two*

Day 3

0730 – 0830	***Mechanical Inspection Focus*** *Rotating versus Static Equipment Overview • Alignment, Torqueing & Fastening Checks • Vibration & Oil Analysis Basics • Installation & Maintenance Observations*
0830 – 0930	***Electrical Inspection Focus*** *Cable Pulling, Routing & Terminations • Earthing System Inspection • IR Testing & Insulation Checks • Electrical Safety Audits*

0930 – 0945	*Break*
0945 – 1100	***Industrial Security Inspection Focus*** *Surveillance Systems & Perimeter Checks • Access Control Verification • Incident Reporting & Coordination • Crisis & Emergency Response Drills*
1100 – 1215	***Transport Inspection Focus*** *Daily Vehicle Inspection Routines • Engine, Brake & Fluid Checks • Safety & Compliance Documentation • Transport Log Verification*
1215 – 1230	*Break*
1230 – 1330	***Gardening & Landscaping Inspection Focus*** *Industrial Landscaping Standards • Irrigation System Inspection • Pest Control & Vegetation Management • Environmental Sustainability Indicators*
1330 – 1420	***QA/QC, Quantity Surveyor & Coordination Workshop*** *QA/QC: Test Packs, Hydrotest Witnessing • Quantity Surveying: BOQ Checks, Site Measurement • Field Coordination Scenarios • Collaborative Inspection Planning*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Three*

Day 4

0730 – 0830	***Leadership & Supervision in the Field*** *Roles of Foremen & Inspectors in Team Leadership • Task Delegation & Performance Tracking • Situational Leadership Techniques • Maintaining Team Morale*
0830 – 0930	***Conflict Resolution & Site Behavior*** *Causes of Site Conflict & Resolution Models • Dealing with Difficult Behavior & Escalation • Emotional Intelligence on Site• Ethics of Authority & Neutrality*
0930 – 0945	*Break*
0945 – 1100	***Ethics in Industrial Inspection*** *Professionalism & Confidentiality • Integrity in Reporting & Documentation • Dealing with Unethical Practices • Role of Third-Party Inspectors*
1100 – 1215	***Communication: Verbal & Written*** *Toolbox Talk Delivery Skills • Effective Speaking & Listening • Technical Writing Principles • Communicating Non-Conformance*
1215 – 1230	*Break*
1230 – 1420	***Technical Documentation & Reports*** *Daily Logbooks & Inspection Reports • Work Completion Reports & Redlines • Observation & Deviation Logs • Structured Email & Memo Writing*
1420 – 1430	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1430	*Lunch & End of Day Four*

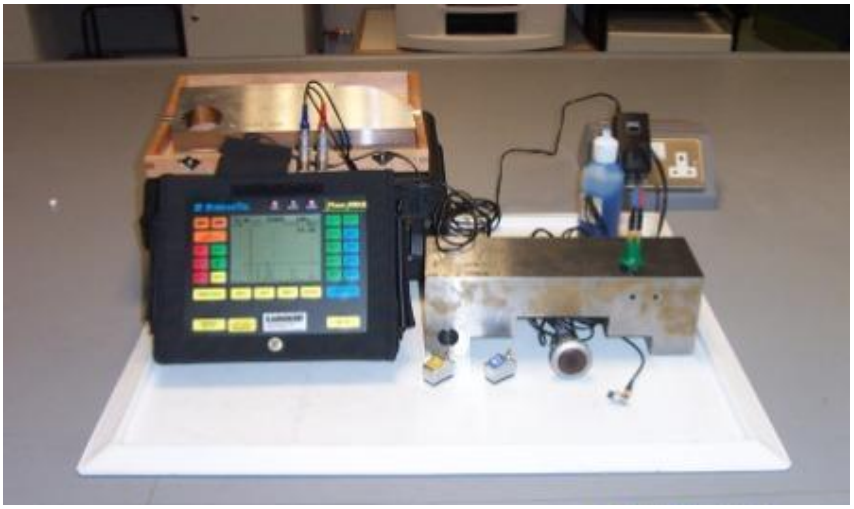
Day 5

0730 – 0930	***Digital Tools & Reporting Systems*** *Mobile Inspection Apps & Software • Document Management Systems • Online Permit Systems (PTW) • Cloud-Based Inspection Records*
0930 – 0945	*Break*
0945 – 1100	***Case Studies – Cross Functional Issues*** *Multi-Discipline Construction Issues • Role-Specific Failure Points • Non-Conformance Investigation • Risk Communication & Mitigation*
1100 – 1230	***Simulated Inspections*** *Field Inspection Walkthrough Scenarios • Use of Checklists & Tools • Real-Time Findings Documentation • Team Feedback & Rectification Plan*
1230 – 1245	*Break*
1245 – 1345	***Role-Play: Coordinatipon & Issue Resolution*** *QA/QC versus Quantity Surveyor Alignment • Security versus Maintenance Response • Documentation Handover Simulation • Incident Report Role-Play*
1345 – 1400	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1400 – 1415	***POST-TEST***
1415 – 1430	*Presentation of Course Certificates*
1430	*Lunch & End of Course*

Practical Sessions

Practical sessions which client shall provide will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout NDT inspection using the "Magnetic Particle Testing (MT) Equipment", "Ultrasonic Testing (UT) Equipment", "Liquid Penetrant Testing (PT) Equipment", "Radiographic Testing (RT) Equipment" and our specifically designed flawed specimen test components and "AutoCAD" software.

Magnetic Particle Testing (MT) Equipment



Ultrasonic Testing (UT) Equipment

Ultrasonic Testing Package USM 36

Liquid Penetrant Testing (PT) Equipment

Applications

The Model 880 devices are used for industrial applications of gamma radiography, mainly with Iridium-192, to inspect materials and structures in the density range of approximately 2.71 g/cm^3 through 8.53 g/cm^3. The Model 880 devices also accommodate low energy isotopes to permit radiography of materials and structures of thin sections of steel and low-density alloys. The Model 880 exposure devices are also designed for use with low activity sources with high photon energies that are used for mass absorption (gamma scanning) studies of high-density materials up to 18.7 g/cm^3.

Standard Source Assembly

Metallic Iridium-192 discs and pellets are doubly encapsulated in welded stainless steel or titanium capsules. The sealed sources are designed and tested to achieve an ISO/ANSI minimum classification of 97C64515 and to comply with the IAEA and USDOT requirements for 'Special Form' radioactive material. The ISO/ANSI classification 97C64515 stated in this manual refers to the complete source capsule which is attached to the source assembly. This classification also applies to the Se-75, Co-60 and Cs-137 versions of the source assemblies.

The sealed source is swaged to one end of a source holder consisting of a short flexible steel cable which has a female half of a connector at the other end, used for coupling to a control cable connector. The female connector also incorporates a stainless steel stop-ball swaged onto it (older versions of this source wire had the stop-ball as a separate component from the female connector). The purpose of the stop-ball is to provide mechanical positioning of the source assembly within the exposure device's shielding and to provide a means of securing the source assembly in the exposure device's locking mechanism.

Model 880 Delta authorized contents

Isotope	Assembly Model Number	Gamma Energy Range	Half Life	Approximate Steel Working Thickness	Device/Source Maximum Capacity
Ytterbium-169	*	8-308 keV	32 days	2-20 mm	108 Ci 4.00 TBq
Selenium-75	A424-25W A424-25**	66-401 keV	120 days	3-29 mm	150 Ci 5.55 TBq
Iridium-192	A424-9 A424-23**	206-612 keV	74 days	12-63 mm	150 Ci 5.55 TBq
Cobalt-60	A424-19	1.17-1.33 MeV	5.27 years	50-150 mm	65 mCi 2.40 GBq
Cesium-137	A424-30	663 keV	30 years	12-63 mm	380 mCi 14.0 GBq

Model 880 Sigma authorized contents

Isotope	Assembly Model Number	Gamma Energy Range	Half Life	Approximate Steel Working Thickness	Device/Source Maximum Capacity
Ytterbium-169	*	8-308 keV	32 days	2-20 mm	108 Ci 4.00 TBq
Selenium-75	A424-25W A424-25**	66-401 keV	120 days	3-29 mm	150 Ci 5.55 TBq
Iridium-192	A424-9 A424-23**	206-612 keV	74 days	12-63 mm	130 Ci 4.81 TBq
Cobalt-60	A424-19	1.17-1.33 MeV	5.27 years	50-150 mm	25 mCi 925 MBq
Cesium-137	A424-30	663 keV	30 years	12-63 mm	380 mCi 14.0 GBq

Dummy RT Projector

Model 880 Elite authorized contents

Isotope	Assembly Model Number	Gamma Energy Range	Half Life	Approximate Steel Working Thickness	Device/Source Maximum Capacity
Ytterbium-169	*	8-308 keV	32 days	2-20 mm	108 Ci 4.00 TBq
Selenium-75	A424-25W A424-25**	66-401 keV	120 days	3-29 mm	150 Ci 5.55 TBq
Iridium-192	A424-9 A424-23**	206-612 keV	74 days	12-63 mm	50 Ci 1.85 TBq
Cobalt-60	A424-19	1.17-1.33 MeV	5.27 years	50-150 mm	25 mCi 925 MBq
Cesium-137	A424-30	663 keV	30 years	12-63 mm	380 mCi 14.0 GBq

Model 880 Omega authorized contents

Isotope	Assembly Model Number	Gamma Energy Range	Half Life	Approximate Steel Working Thickness	Device/Source Maximum Capacity
Ytterbium-169	*	8-308 keV	32 days	2-20 mm	108 Ci 4.00 TBq
Selenium-75	A424-25W A424-25**	66-401 keV	120 days	3-29 mm	80 Ci 2.96 TBq
Iridium-192	A424-9 A424-23**	206-612 keV	74 days	12-63 mm	15 Ci 0.55 TBq

* Source assemblies with A1 quantities available for use in international jurisdictions.
** Approved for international transport, except in Canada.

Model 880 Atlas authorized contents

Isotope	Assembly Model Number	Gamma Energy Range	Half Life	Approximate Steel Working Thickness	Device/Source Maximum Capacity
Ytterbium-169	*	8-308 keV	32 days	2-20 mm	108 Ci 4.00 TBq
Selenium-75	A424-25W A424-25**	66-401 keV	120 days	3-29 mm	81 Ci 3.0 TBq
Iridium-192	A424-9 A424-23**	206-612 keV	74 days	12-63 mm	27 Ci 1.0 TBq

* Source assemblies with A1 quantities available for use in international jurisdictions.
** Approved for international transport, except in Canada.

The tungsten shielded Model 880 Atlas was evaluated as a USDOT Type A transport container. The Model 880 Atlas is NOT approved as a Type B transport package. Labeling for the Model 880 Atlas reflects Type A information for the package instead of the Type B information labeling on all other Model 880 exposure devices.

Source output

Isotope	At 1 m per Ci (37 GBq)		At 1 ft per Ci (37 GBq)	
Ytterbium-169	0.125 R/hr	1.25 mSv/hr	1.3 R/hr	13.0 mSv/hr
Selenium-75	0.203 R/hr	2.03 mSv/hr	2.2 R/hr	22.0 mSv/hr
Iridium-192	0.48 R/hr	4.80 mSv/hr	5.2 R/hr	52.0 mSv/hr
Cobalt-60	1.30 R/hr	13.0 mSv/hr	14.0 R/hr	140 mSv/hr
Cesium-137	0.32 R/hr	3.20 mSv/hr	3.4 R/hr	34.0 mSv/hr

Selected attenuation data

Material	Approximate Material Density (g/cm^3)	Approximate Half Value Thickness Inches (mm)				
		Ytterbium-169	Selenium-75	Iridium-192	Cobalt-60	Cesium-137
Concrete	2.35	1.140 (29.0)	1.180 (30.0)	1.700 (43.2)	2.400 (61.0)	3.00 (76.2)
Aluminum	2.65	-	1.100 (27.0)	-	-	-
Steel	7.80	0.170 (4.3)	0.315 (8.0)	0.512 (13.0)	0.827 (21.0)	0.900 (22.9)
Lead	11.34	0.032 (0.8)	0.039 (1.0)	0.200 (5.1)	0.500 (12.7)	0.250 (6.4)
Tungsten	17.80	-	0.032 (0.8)	0.130 (3.3)	0.310 (7.9)	0.225 (5.7)
DU	18.70	-	-	0.050 (1.3)	0.270 (6.8)	0.125 (3.2)

LED FILM VIEWER

Technical Specifications:

- Light Source – LED (White)
- Viewing density range – Up to 1.0 up to 4.5. D.
- Power source – AC, 230V 50/60Hz
- Max Luminance – 84,600 Cd/m2
- Film viewer body –Powder Coated Aluminium Body.
- Weight – 3.6 Kg
- Operating temperature: (-)10 C to (+) 60C .
- Cooling – High speed fans.
- Variable Light intensity control.
- Foot –switch control and cover on viewing screen.

Common features for all Film Viewers

- All film viewers are High Intensity type for viewing Industrial X-ray Films.
- A step-less control is provided for controlling Light Intensity.
- All film viewers are provided with Cooling fan, Heat absorbing glasses etc.
- A foot control switch helps in easy on-off operation.
- A built-in table lamp helps in making notes in dark.

Digit X Densitometer

"The densitometer of choice for the NDT industry"

The Digit-X NDTdensitometer is designed to meet the need for a robust and dependable instrument to measure any film directly from a viewer. Weighing just 175g and powered by battery, the device is portable and extremely practical across different settings.

Digit-X is a favourite amongst professionals in the Non-Destructive Testing (NDT) sector used for applications in Oil & Gas, Construction, Engineering, Fabrication, Inspection and other services.

British-manufactured combining ease of use with high accuracy and repeatability.

The *Digit-X* NDT densitometer is manufactured by Xograph, which has nearly fifty years' experience in designing and building reliable quality instruments. The *Digit-X*NDT densitometer provides immediate, precise and repeatable results.

Sturdy and robust design

With its sturdy and robust design, minimal drift and no warm up time *Digit-X* provides fast dependable readings. The fine fibre-optic probe allows small areas of film to be measured accurately with readings being displayed on the large clear LCD panel to 2 decimal places. Featuring 0.00 to 4.00 Optical Density.

Ready to use; backed by a 'no fuss' warranty

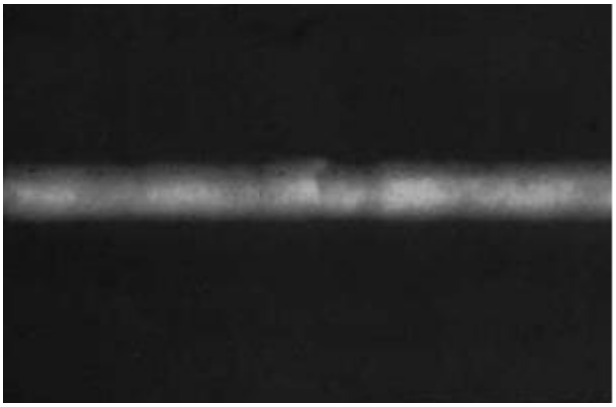
Digit-X comes complete with its own battery in a handy sturdy portable carry case, ready to use straight away.Backed by Xograph's established 'no fuss' one year warranty makes the *Digit-X* NDTdensitometer the best-value choice for reading film on a viewer.

***Digit-X* NDT Densitometer Specifications**

- Density Range 0.00 to 4.00 D
- Fibre Optic Aperture: 3mm
- Resolution: 0.01OD
- Accuracy: 0.05OD
- Repeatability: 0.02OD
- Drift: 0.0005/min
- Power Supply: 9v PP3 Battery
- Battery Life: Alkaline 2500 Hrs
- Size: 210x60x40mm
- Weight: 175kg

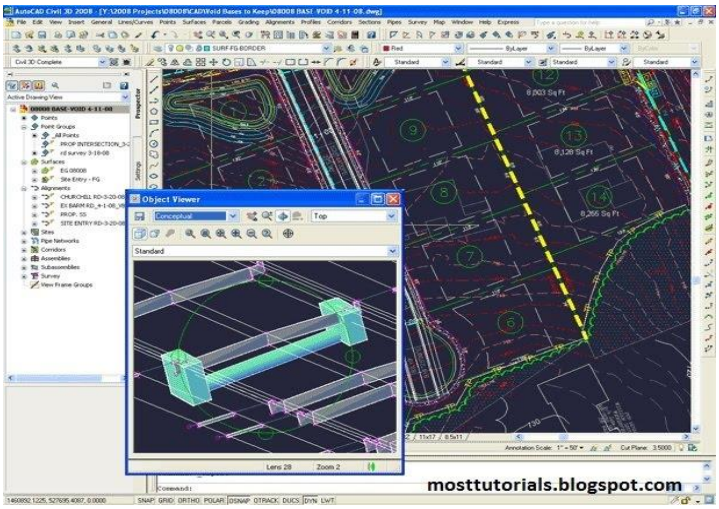
Standard Radiographs/Local Radiographs

Standard Film Strip



Sample Exposed RT Films

Flawed Specimen Test Components



AutoCAD

Course Coordinator
Mari Nakintu, Tel: +971 2 30 91 714, Email: mari1@haward.org