COURSE OVERVIEW FE0985
Thermal Infrared Testing ASNT Level-I Training & Certification (ASNT, SNT-TC-1A)

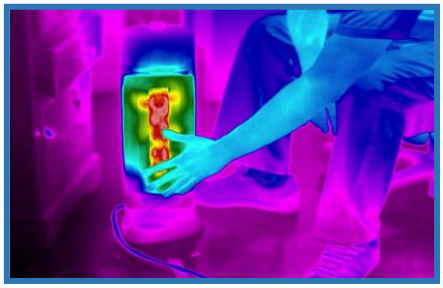
Course Title
Thermal Infrared Testing ASNT Level-I Training & Certification (ASNT, SNT-TC-1A)

Course Date/Venue
October 05-09, 2025/Slaysel 02 Meeting Room, Movenpick Hotel & Resort Al Bida'a Kuwait, City of Kuwait

Course Reference
FE0985

Course Duration/Credits
Five days (32 hours)/3.2 CEUs/32 PDHs

Course Description

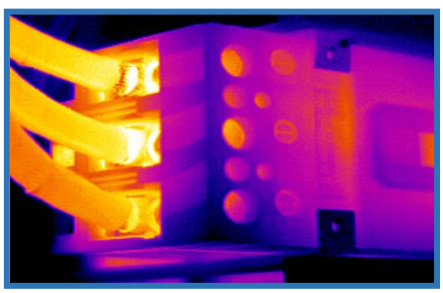


This practical and highly-interactive course includes various practical sessions. Theory learned will be applied using thermal imaging infrared cameras.

This course will provide participants the advanced concepts and principles of Thermal/Infrared Testing (IR) as per the ASNT Recommended Practice No. SNT-TC-1A for Personnel Qualification and Certification in Nondestructive Testing.

Infrared thermography technique which is non-contact, nondestructive test method uses an infrared imaging to detect, display and record thermal patterns and temperature across the surface of an object.

Thermography can be applied to any situation where thermal profile and temperature will provide meaning data about a system or object. It is equipment which senses infrared radiation by converting it into temperature and displays image of temperature distribution.



This course is designed to provide participants with a detailed and up-to-date overview of the thermography and thermal imaging reports. It covers the nature of heat and temperature and how it is measured/expressed; the heat transfer modes covering the fundamentals of heat conduction, heat convection and heat radiation; the radiosity concepts comprising of reflectivity, transmissivity, absorptivity, emissivity, infrared radiometry, imaging, spatial resolution concepts and error potential in radiant measurements; and the basic thermal/infrared operating including the operation of infrared thermal imager and operation of support equipment for infrared surveys.

During this interactive course, participants will learn the checking of equipment calibration with blackbody references; the infrared image and documentation quality; supporting data collection and detecting thermal anomalies resulting from differences in thermal resistance (quasi-steadystate heat flow); detecting thermal anomalies resulting from differences in thermal capacitance, using system or environmental heat cycles; detecting thermal anomalies resulting from differences in physical state, fluid flow problems and friction; detecting thermal anomalies resulting from non-homogeneous exothermic or endothermic conditions; and the field quantification of point temperatures covering simple techniques for emissivity, typical high emissivity applications and special problem of low emissivity applications.

Sample Questions for general examinations are presented in the separate question booklets that can be obtained from ASNT International Service Center. Participants will further demonstrate familiarity with and ability to operate the necessary equipment for IR, 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 Thermal/Infrared 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 the course, each participant will be able to:-

- Get certified as an *"Certified ASNT NDT Level I in Thermal/Infrared Testing"*
- Discuss the nature of heat and temperature and how it is measured/expressed
- Identify heat transfer modes covering the fundamentals of heat conduction, heat convection and heat radiation
- Recognize radiosity concepts comprising of reflectivity, transmissivity, absorptivity, emissivity, infrared radiometry, imaging, spatial resolution concepts and error potential in radiant measurements
- Carryout basic thermal/infrared operating including the operation of infrared thermal imager and operation of support equipment for infrared surveys
- Check equipment calibration with blackbody references and discuss infrared image and documentation quality
- Support data collection and detect thermal anomalies resulting from differences in thermal resistance (quasi-steadystate heat flow)
- Detect thermal anomalies resulting from differences in thermal capacitance, using system or environmental heat cycles
- Detect thermal anomalies resulting from differences in physical state, fluid flow problems and friction
- Detect thermal anomalies resulting from non-homogeneous exothermic or endothermic conditions
- Discuss field quantification of point temperatures covering simple techniques for emissivity, typical high emissivity applications and special problem of low emissivity 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 a wide understanding and deeper appreciation of thermal infrared testing for facility integrity engineers, inspection engineers, inspectors, maintenance engineers, maintenance supervisors, mechanical engineers and maintenance technical staff.

Exam Eligibility & Structure

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

Initial Training & Experience Levels			
Level	**Training Hours**	**Minimum Hours in Method**	**Total Hours in NDT**
I	32	210	400
II (Building Diagnostics)	34	1260	1800
II (Electrical and Mechanical)	34	1260	1800
II (Materials Testing)	34	1260	1800

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 than12 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 employer. 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 employer'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 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 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 applicable 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 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 Fee

US$ 8,500 per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

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 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 Thermography Inspector*". Qualification Certificate is valid for 5 years.

Recertification is FOC for a Lifetime.

Sample of Certificates

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

Qualification Certificate

Haward Technology Middle East

الشركة السعودية للكهرباء
Saudi Electricity Company

This is to certify that

Ahmed Al-Hajri

has met the established & published Requirements for Certification by ASNT in accordance with SNT-TC-1A (2020) and the company's Written Practice as

ASNT NDT Level I

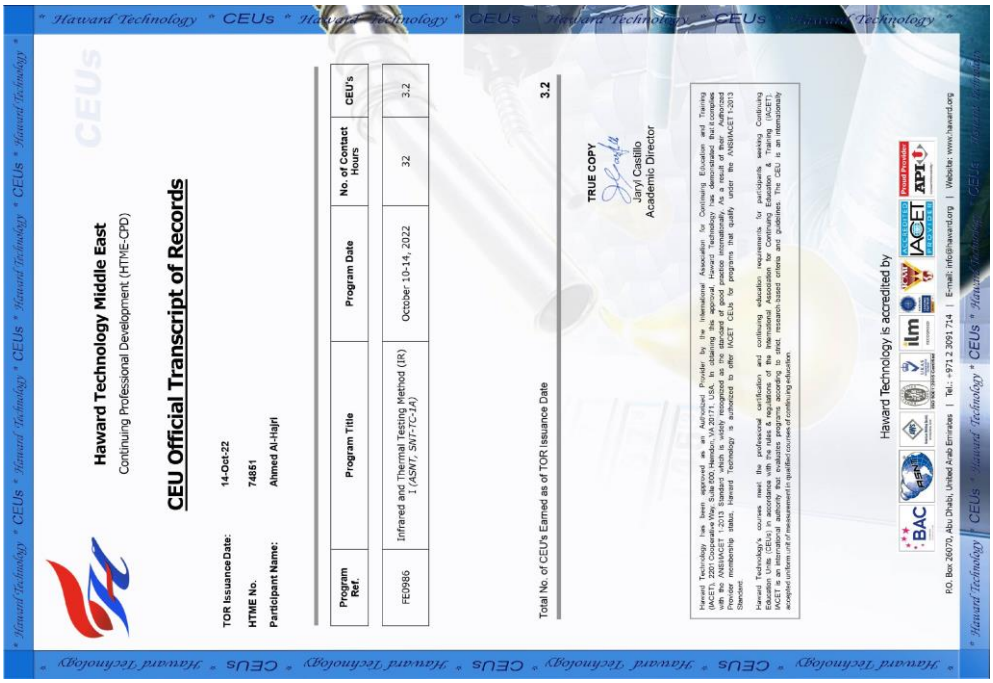
in the following Nondestructive Testing Methods:

Method	Product Form	Certificate No.	Issue Date	Expiry Date
Thermal/Infrared Testing	All Forms	74851/01/FE0986/DIA/14.10.22	10/22	10/27

ASNT Level III Examiner
Mr. Luis Lopez (ASNT# 219655)
Signature & Stamp:

Mr. Jaryl Castillo
Academic Director

(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



Haward Technology Middle East
Continuing Professional Development (HTME-CPD)

CEU Official Transcript of Records

TOR Issuance Date: 14-Oct-22
HTME No. 74851
Participant Name: Ahmed Al-Hajri

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
FE0986	Infrared and Thermal Testing Method (IR) 1 (ASNT, SNT-TC-1A)	October 10-14, 2022	32	3.2

Total No. of CEU's Earned as of TOR Issuance Date: 3.2

TRUE COPY
Jaryl Castillo
Academic Director

Haward Technology is accredited by

P.O. Box 26070, Abu Dhabi, United Arab Emirates | Tel.: +971 2 3091 714 | E-mail: info@haward.org | Website: www.haward.org

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- The American Society for Nondestructive Testing (ASNT)

  Haward Technology has certain instructors who are certified by **The American Society for Nondestructive Testing** (**ASNT**) and are authorized to conduct ASNT's certification programs for specific NDT methods. 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.

- 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 **3.2 CEUs** (Continuing Education Units) or **32 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.

- 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: Sunday, 05th of October 2025

0730 – 0800	*Registration & Coffee*
0800 – 0815	*Welcome & Introduction*
0815 – 0830	***PRE-TEST***
0830 – 0930	***The Nature of Heat – What is it & How is it Measured/Expressed?*** *Instrumentation ● Scales & Conversions*
0930 – 0945	*Break*
0945 – 1200	***Temperature – What is it & How is it Measured/Expressed?*** *Instrumentation ● Scales & Conversions*
1200 – 1300	*Lunch*
1300 – 1500	***Heat Transfer Modes Familiarization*** *Heat Conduction Fundamentals ● Heat Convection Fundamentals ● Heat Radiation Fundamentals*
1500 – 1515	*Break*
1515 – 1615	***Radiosity Concepts Familiarization*** *Reflectivity ● Transmissivity ● Absorptivity ●Emissivity ● Infrared Radiometry & Imaging ● Spatial Resolution Concepts ● Error Potential in Radiant Measurements (an Overview)*
1615 – 1630	***Recap***
1630	*End of Day One*

Day 2: Monday, 06th of October 2025

0730 – 0930	***Basic Thermal/Infrared Operating*** *Thermography Defined ● How Infrared Imagers Work ● Differences Among Imagers & Alternative Equipment*
0930 – 0945	*Break*
0945 – 1200	***Basic Thermal/Infrared Operating (cont'd)*** *Operation of Infrared Thermal Imager ● Operation of Support Equipment for Infrared Surveys*
1200 – 1300	*Lunch*
1300 – 1500	***Checking Equipment Calibration with Blackbody References***
1500 – 1515	*Break*
1515 – 1615	***Infrared Image & Documentation Quality*** *Elements of A Good Infrared Image ● Recording*
1615 – 1630	***Recap***
1630	*End of Day Two*

Day 3: Tuesday, 07th of October 2025

0730 – 0930	***Support Data Collection*** *Environmental Data ● Emissivity ● Surface Reference Temperatures ● Identification & Other*
0930 – 0945	*Break*
0945 – 1200	***Detecting Thermal Anomalies Resulting from Differences in Thermal Resistance (Quasi-Steadystate Heat Flow)*** *Large Surface-to Ambient Temperature Difference*
1200 – 1300	*Lunch*

1300 – 1500	***Detecting Thermal Anomalies Resulting from Differences in Thermal Resistance (Quasi-Steadystate Heat Flow) (cont'd)*** *Small Surface-to Ambient Temperature Difference*
1500 – 1515	*Break*
1515 – 1615	***Detecting Thermal Anomalies Resulting from Differences in Thermal Capacitance, Using System or Environmental Heat Cycles***
1615 – 1630	***Recap***
1630	*End of Day Three*

Day 4: Wednesday, 08th of August 2025

0730 – 0930	***Detecting Thermal Anomalies Resulting from Differences in Physical State***
0930 – 0945	*Break*
0945 – 1200	***Detecting Thermal Anomalies Resulting from Fluid Flow Problems***
1200 – 1300	*Lunch*
1300 – 1500	***Detecting Thermal Anomalies Resulting from Friction***
1500 – 1515	*Break*
1515 – 1615	***Detecting Thermal Anomalies Resulting from Non-Homogeneous Exothermic or Endothermic Conditions***
1615 – 1630	***Recap***
1630	*End of Day Four*

Day 5: Thursday, 09th of August 2025

0730 – 0930	***Field Quantification of Point Temperatures*** *Simple Techniques for Emissivity*
0930 – 0945	*Break*
0945 – 1030	***Field Quantification of Point Temperatures (cont'd)*** *Typical (High Emissivity) Applications*
1030 – 1115	***Field Quantification of Point Temperatures (cont'd)*** *Special Problem of Low Emissivity Applications*
1115 – 1215	*Lunch*
1215 – 1515	***Theoretical Examination***
1515 – 1530	*Break*
1530 – 1600	***Practical Examination***
1600 – 1615	***Course Conclusion***
1615 – 1630	*Presentation of Course Certificate*
1630	*End of Course*

Practical Sessions/Site Visit

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will carryout NDT inspection using our "MSX Thermal Imaging Camera".

FLIR

FLIR E4, E5, E6, E8 with MSX® Enhancement

FLIR E4, E5, E6, E8 with MSX® Enhancement
- Display: 3" color LCD
- On-board 640 x 480 Digital Camera
- Easy-to-use, weighs only 1.2lbs
- 2% accuracy
- File format: Radiometric jpg
- Swappable Li-ion Battery with 4 hour life
- Spot Measurement mode
- Simultaneous storage of IR/Visual/MSX images
- Picture in Picture image (E6 and E8)
- Area Box Measurement mode (E5, E6 and E8)

Each includes power supply/charger with four plugs, rechargeable battery, FLIR Tools software, USB cable, and hard transport case. E8 also includes extra battery and external battery charger.

FLIR E4
- 4,800 pixels (80 x 60)

FLIR E5
- 10,800 pixels (120 x 90)

FLIR E6
- 19,200 pixels (160 x 120)

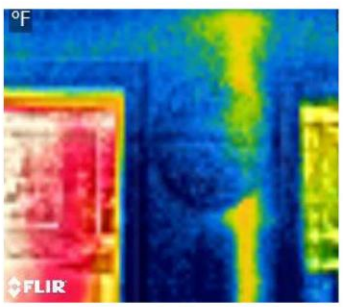
FLIR E8
- 76,800 pixels (320 x 240)

New Exclusive MSX Thermal Imaging Technology Made Affordable for Everyday Use

What is MSX?
Multi-Spectral Dynamic Imaging (MSX) for easier interpretation of an image - adds visible spectrum definition to IR images by detecting the edges of objects and including that detail in the thermal image. Text becomes clearly visible so that you can read a label or identifier within the IR image. This exclusive function provides extraordinary thermal detail that instantly highlights and orients problem locations and eliminates the need to refer back to a visual image for detail.

Breaker Panel
E8 with MSX

Missing Insulation – Summer Day
E6 with MSX



Warm Drain Pipe in Wall
E4 with MSX

Imaging Specifications

FEATURES	FLIR E4	FLIR E5	FLIR E6	FLIR E8
IR Pixel Resolution	4,800 (80 x 60)	10,800 (120 x 90)	19,200 (160 x 120)	76,800 (320 x 240)
Thermal Sensitivity	<0.15°C	<0.10°C	<0.06°C	<0.06°C
Temperature Range	-4 to 482°F (-20 to 250°C)			
Measurement modes	Centerspot	Centerspot, Area Box, Auto Hot/Cold detection	Centerspot, Area Box, Auto Hot/Cold detection	Centerspot, Area Box, Auto Hot/Cold detection
Frame Rate	9Hz			
Field of View	45° x 34°			
Focus	Focus free			
Auto Hot/Cold Detection	No	Auto min/max markers within area	Auto min/max markers within area	Auto min/max markers within area

Included in All Models

Additional Accessories Included with E8

Optional Accessories

Ordering Information

63901-0101 ..... FLIR E4 Compact Thermal Imaging Infrared Camera with MSX® Enhancement (80x60)
63901-0101-NIST..... FLIR E4 with Certificate Traceable to NIST

63905-0501..... FLIR E5 Compact Thermal Imaging Infrared Camera with MSX® Enhancement (120x90)
63905-0501-NIST ..... FLIR E5 with Certificate Traceable to NIST

63902-0202..... FLIR E6 Compact Thermal Imaging Infrared Camera with MSX® Enhancement (160x120)
63902-0202-NIST ..... FLIR E6 with Certificate Traceable to NIST

63903-0303..... FLIR E8 Compact Thermal Imaging Infrared Camera with MSX® Enhancement (320x240)
63903-0303-NIST..... FLIR E8 with Certificate Traceable to NIST

ACCESSORIES
T198529 ..... Pouch
T198530 ..... Replacement battery
T198531 ..... External battery charger
T198532..... Car Charger
T198534..... Power supply/charger with EU, UK, US and AU plugs
T198533..... USB cable
T198528..... Hard Transport Case

5-10-2 Protection

10-Year Detector Protection
5-Year Battery
2-Year Parts & Labor

Course Coordinator

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