

**COURSE OVERVIEW EE0095**  
**Fuse Selection & Application**

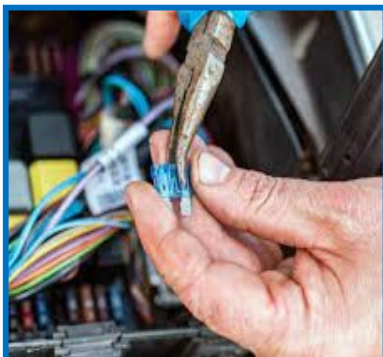
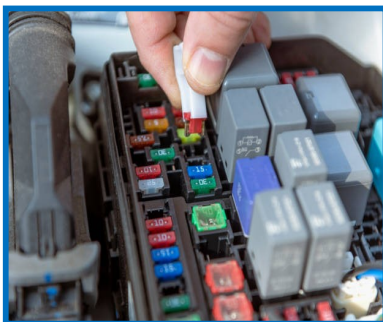
**Course Title**  
 Fuse Selection & Application

**Course Date/Venue**  
 Session 1: May 25-29, 2025/Boardroom 1,  
 Elite Byblos Hotel Al Barsha,  
 Sheikh Zayed Road, Dubai, UAE  
 Session 2: December 08-12, 2025/Fujairah  
 Meeting Room, Grand Millennium  
 Al Wahda Hotel, Abu Dhabi, UAE

**Course Reference**  
 EE0095

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

**Course Description**



***This practical and highly-interactive course includes real-life case studies and exercises where participants will be engaged in a series of interactive small groups and class workshops.***

This course utilizes lectures, student participation, videos, LCD slides, a workbook, and the International Electrical Testing Association (NETA) "Maintenance Testing Specifications." This course addresses the main elements of Electric Distribution Equipment Maintenance: safety; equipment and system principles and operation; inspection, test, evaluation, and maintenance procedures; and electrical maintenance programs

Discussion of electric safety procedures includes safety awareness, minimum approach distances, care and use of personal protective equipment, lockout-tagout, safety grounding, step and touch potentials, and special hazards of electric power distribution equipment. This course covers electrical safety training as required by OSHA (Occupational Safety and Health Administration – USA) for qualified electrical professionals.

The types of equipment and systems presented include cables and buses, switchgear circuit breakers, various types of motors, variable speed drives, rectifiers, inverters, fuses, meters and protective relays, surge arresters, and capacitors. Discussions include equipment operation and descriptions of the various inspection, testing, evaluation, and maintenance procedures available for the equipment and the test equipment and outage requirements for the various procedures.

The course will include references to British (BS), European (IEC), and United States (ANSI, IEEE, NEC) engineering standards. Participants are encouraged to bring their system single-line diagrams and recent problems for discussion during and after class. Practical electrical inspection, test, evaluation, and maintenance training based on NETA Maintenance Testing Specifications and the instructor's experience in the electric power field will be presented.

### Course Objectives

Upon the successful completion of this course, participants will be able to specify, select, commission and maintain electric distribution system equipment. Further, participants will have enough knowledge to achieve reduced capital, operating and maintenance costs along with increase in efficiency. During the duration of this seminar, participants will:-

- Gain more knowledge on electric power & dielectric principles and demonstrate the safety measures in electric distribution system equipment
- Identify the low & medium voltage cables & buses and be familiar with the MV & LV switchgear circuit breakers
- Select and maintain the different types of electrical motors and variable speed drives as well as their inspection and testing, failure modes and detection
- Learn about rectifiers, inverters and fuses including their different types & applications
- Recognize the various types & uses of meter & protective relays and define the difference between analog vs. electronic & their corresponding inspection & tests, meter/relay cautions & safety
- Know the types and ratings of surge arrestors as well as its inspections and tests
- Identify capacitors and achieve knowledge on electrical maintenance program
- Understand diagnostic testing and inspection, advanced fault detection techniques, critical components, and common failure modes
- Study selection criteria, commissioning requirements, predictive and preventive maintenance, reliability, testing and cost
- Discover the maintenance required to minimize their operating cost and maximize their efficiency, reliability and longevity

### 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 conveniently saved in a **Tablet PC**.

### Who Should Attend


This course is designed for those involved with the planning, implementation, and/or supervision of electrical preventive maintenance (EPM) programs for electric power equipment in industrial plants, utilities, and commercial facilities. You should be interested in learning how electrical power distribution equipment and systems operate, and how to maintain and trouble-shoot the equipment safely and effectively.

**Course Certificate(s)**

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


**Certificate Accreditations**

Certificates are accredited by the following international accreditation organizations:-

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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.

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

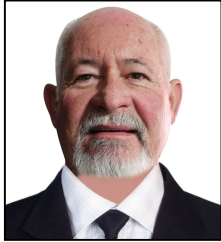
Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** 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 **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.

**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. Ken Steel** is a **Senior Electrical & Instrumentation Engineer** with over **30 years** of extensive experience. His expertise widely covers **Electrical Motors Testing, Heat Tracing & Insulation Installation & Testing, HV Terminations, High & Low Voltages on Overhead Cranes, HV/MV Cable Splicing, Cable & Over Head Power Line, HV/MV Switchgear, HV Cable Design, Medium & High Voltage Equipment, High Voltage Circuit Breaker Inspection & Repair, High Voltage Power System, HV Equipment Inspection & Maintenance, HV Switchgear Operation & Maintenance, Resin / Heat Shrink & Cold Shrink Joints, HV/LV Equipment, LV & HV Electrical System, Cable Splicing & Termination, High Voltage Electrical Safety, LV, MV & HV Cable Installations & Properties, LV Substation, MV & LV Cable, UPS Systems, MV & LV Direct on Line Motor Drives, MV & LV VSD Motor Drives, MV & LV Soft Starter Motor Drives, LV Two Speed Motor Drives, Underground Transformer Oil Containment Tank, Electrical & Instrumentation Construction Installation, 1500KW, 1000KW, 1752KW Diesel Power Plant Installation, 110KV Overhead Line, 110KV Outdoor Switchgear, 110KV/10KV 6500KVA Transformer, Transformer Substation, 1600KVA 10KV/0.4KV & 2 Off 1000KVA Diesel Generators, 1600KVA 10KV/0.4KV & 1650KVA Diesel Generator, 110KV/35KV/10KV Substation, 110KV/10KV Transformers, 110KV & 2 Off 6KV Overhead Lines, 34.5KV, 13.8KV, 4.16KV & 480V Switchgear, 4.16KV & 480V MCC, Transformers & Motor Drives Substations, Diesel Driven Generators, Overhead Cranes, Overhead Cranes & HVAC Units, AC & DC Drives, Data Logger, Electrical, Instrumentation & Mechanical Installation Maintenance, Slab Mills, Pre Heat Ovens, Hydraulic Shears, Stamping Machine, Gearboxes, Rollers, Pumps, Valves, Electro Magnets & Pump House Operation, Boilers Construction And Commissioning, Valve Calibration & Testing, Level Gauges, Pressure & Flow Transmitters Installation & Calibration, Pressure & Leak Testing of Boilers, Leak Testing, SMP, Elect, I&C, F&G, HVAC & Utility Services, Nitrogen Leak Test Operations, Steam Blowing Activities, SMP, Elect, I&C, F&G, HVAC & Utility Services, PTW Issue (PA/AC), Installation & Mechanical Piping and Hydro Testing & Leak Testing of Lines Installation.**

During Mr. Steel's career life, he has gained his practical experience through several significant positions and dedication as the **3GP PBF & Boilers SC Commission Support, SC Site Execution Superintendent, E&I Construction Superintendent, High Voltage Construction Supervisor, Control & Power Construction Supervisor, Electrical & Instrumentation Supervisor, Electrical Technician, Construction Support Electrical Engineer, E&I Engineer, Electrical/Instrumentation Site Supervisor, Q.A/Q.C Inspector, Electrical/ Instrumentation Technician, Maintenance Fitter Instrumentation Technician, Millwright, Apprentice Millwright and Senior Instructor/Lecturer** for Tengiz Chevron Oil Kazakhstan, Al Jubail Saudi Arabia, Escravos Delta state Nigeria, Lurgi S.A, SuD Chemie Sasol Catalysts, J C Groenewalds Construction (LTA), Tycon (Goodyear S.A.), Dragline Construction and Iscor Vanderbijlpark.

Mr. Steel has a **Diploma in Electronics Mechanic**. Further, he is a **Certified Instructor/Trainer** and delivered numerous trainings, courses, workshops, seminars 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**

**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.

**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><i>Electric Power &amp; Dielectric Principle</i></b> <i>Electric and Magnetic Fields and the Electric Power System • Behavior of Dielectric (Insulation) Materials • Conducting and Insulating Materials • Three-Phase Power Calculations • Transformer Principles; Short-Circuit Currents • Electrical Problems and Corrective Actions • Excess Heat and Voltage; Deterioration and Contamination • Partial Discharge (Corona)</i>
0930 - 0945	<i>Break</i>
0945 - 1230	<b><i>Electrical Safety</i></b> <i>Hazards Working Near or on Energized Electrical Equipment • Safeguards for Preventing Shock • “Qualified Electrical Workers” as Defined by OSHA; Use and Care of Electrical Personal Protective Equipment • Proper Lockout-Tagout Procedures</i>
1230 - 1245	<i>Break</i>
1245 - 1315	<b><i>Electrical Safety (cont'd)</i></b> <i>Minimum Approach Distances for Non-Qualified and Qualified Electrical Workers • Use and Care of Safety Grounding Sets • Estimating Short-Circuit Currents and Sizing safety Grounding Cables • Equipment Safety Interlocks; Understanding Step-Touch Potential Hazards</i>



1315 - 1420	<b>Low &amp; Medium Voltage Cables &amp; Buses:</b> Types, Construction, and Applications; Inspections, Tests, and Evaluations • Common Failure Modes; Cable/Bus Safety
1420 - 1430	<b>Recap</b> 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 - 0930	<b>Circuit Breakers</b> Theory of Circuit Interruption • Physics of Arc Phenomena • Circuit Breaker Rating • Conventional Circuit Breakers • Methods for Increasing Arc Resistance • Plain Break Type, Magnetic Blow-out Type • Arc Splitter Type, Application • Oil Circuit Breakers • Recent Developments in Circuit Breakers
0930 - 0945	Break
0945 - 1230	<b>AC Machine Fundamentals</b> The Rotating Magnetic Field • The Induced Voltage in AC Machines • The Induced Torque in a Three-Phase Machine • Winding Insulation in AC Machines • AC Machines Power Flow and Losses
1230 - 1245	Break
1245 - 1315	<b>Induction Motors</b> Induction Motor Construction, Basic Induction Motor Concepts • The Equivalent Circuit of an Induction Motor • Losses and The Power-Flow Diagram • Induction Motor Torque-Speed Characteristics • Control of Motor Characteristics • Control of Motor Characteristics By Squirrel-Cage Rotor Design • Starting Induction Motors
1315 - 1420	<b>Speed Control of Induction Motors</b> Speed Control by Changing the Line Frequency • Speed Control by Changing the Line Voltage • Speed Control by Changing the Rotor Resistance • Solid-State Induction Motor Drives • Motor Protection • The Induction Generator • Induction Motor Ratings
1420-1430	<b>Recap</b> 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 - 0930	<b>Maintenance of Motors</b> Characteristics of Motors • Enclosures and Cooling Methods • Application Data • Design Characteristics • Insulation of AC Motors • Failures in Three-Phase Stator Windings
0930 - 0945	Break
0945 - 1130	<b>Maintenance of Motors (cont'd)</b> Predictive Maintenance • Motor Troubleshooting • Diagnostics Testing for Motors • Repair and Refurbishment of AC Induction Motors • Failures in Three-Phase Stator Windings



1130 - 1230	<b>Power Electronics, Rectifiers &amp; Pulse-Width Modulation Inverters</b> Introduction to Power Electronics • Power Electronics Components • Power and Speed Comparison of Power Electronic Components • Basic Rectifier Circuits • Filtering Rectifier Output • Pulse Circuits
1230 - 1245	Break
1245 - 1420	<b>Power Electronics, Rectifiers &amp; Pulse-Width Modulation Inverters (cont'd)</b> A Relaxation Oscillator Using a PNP Diode • Pulse Synchronization • Voltage Variation By AC Phase Control • The Effect of Inductive Loads on Phase Angle Control • Inverters
1420 - 1430	<b>Recap</b> 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 - 0930	<b>Variable Speed Drives</b> Basic Principles of AC Variable Speed Drivers (VSD'S) • Inverters, Input Power Converter (rectifier), DC link Energy, Output IGBT Inverter • Input Sources for Regeneration or Dynamic • Regeneration • PWM-2 Considerations • Transients • Harmonics Power Factor and Failures • Thyristor Failures and Testing • AC Drive Application Issues
0930 - 0945	Break
0945 - 1130	<b>Variable Speed Drives (cont'd)</b> AC Power Factor • IGBT Switching Transients • Cabling Details For AC Drives • Cable • Motor Bearing Currents • Summary of Application Rules For AC Drives • Selection Criteria of VSD's • Maintenance • Common Failure Modes • Motor Application Guidelines
1130 - 1230	<b>Fuses</b> Types of Fuses • Features of Current Limiting Fuses • Advantages of Fuses Over Circuit Breakers
1230 - 1245	Break
1245 - 1330	<b>Meters &amp; Protective Relays:</b> Types and Uses • Analog versus. Electronic • Inspection and Tests • Meter/Relay Cautions and Safety
1330 - 1420	<b>Surge Arrestors</b> Types and Ratings • Inspections and Tests
1420 - 1430	<b>Recap</b> 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 – 0830	<b>Capacitors:</b> <i>Types of banks and their connection • Power factor correction • Connection points • Harmonic considerations • Inspection and testing</i>
0830 - 0930	<b>Bearings</b> <i>Types of Bearings • Statistical Nature of Bearing Life, Materials and Finish, Sizes of Bearings • Types of Roller Bearings • Thrust Bearings • Lubrication</i>
0930 - 0945	Break
0945 – 1130	<b>Electrical Maintenance Program:</b> <i>Testing intervals • InterNational Electrical Testing Association (NETA) Specifications</i>
1130 – 1230	<b>Used Oil Analysis</b> <i>Proper Lube Oil Sampling Technique, Test Description and Significance, Visual and Sensory Inspection, Chemical and Physical tests • Summary</i>
1230 – 1245	Break
1245 – 1315	<b>General Discussion, Questions &amp; Answers</b>
1315 -1345	<b>Vibration Analysis</b> <i>The Application of Sine Waves to Vibration • Multimass Systems • Resonance • Logarithms and Decibels (db) • The Use of Filtering • Vibration Instrumentation • Time Domain, Frequency Domain • Machinery Example • Vibration Analysis • Resonant Frequency • Vibration Severity</i>
1345 – 1400	<b>Course Conclusion</b> <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1400 – 1415	<b>POST-TEST</b>
1415 – 1430	Presentation of Certificates
1430	Lunch & End of Course



**Practical Sessions**

This practical and highly-interactive course includes real-life case studies and exercises:-



**Course Coordinator**

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