

**COURSE OVERVIEW HE0128**  
**Industrial Hygiene Certification Program**  
**W505: Control of Hazardous Substances**  
*(Accredited by OHTA-BOHS)*

**Course Title**

Industrial Hygiene Certification Program: W505: Control of Hazardous Substances *(Accredited by OHTA-BOHS)*

**Course Reference**

HE0128

**Course Duration**

Training: Five days/4.5 CEUs/45 PDHs  
 Exam: One day/3 Hours  
 Total: 6 Days



**Course Date/Venue**

Session(s)	Date	Venue
1	September 08-12, 2024	Al Aziziya Hall, The Proud Hotel Al Khobar, Al Khobar, KSA
2	November 17-21, 2024	Boardroom 1, Elite Byblos Hotel Al Barsha, Sheikh Zayed Road, Dubai, UAE

**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 is to describe the ways in which exposure to hazardous substances arises in the workplace and to introduce the methodologies and technologies available to control exposures and thereby reduce risks to health.



On completing this course successfully, participants will be able to :-



- Describe how airborne contaminants are generated by industrial processes, how this impacts on the control strategy, and how control solutions can thereby be optimised
- Recognise the range of approaches to risk reduction embodied in the hierarchy of control and select appropriate strategies for implementation
- Describe the meaning of “adequate control”, particularly in relation to personal exposures
- Discuss the importance of design considerations in terms of the workplace, process, and plant, as a means of reducing occupational exposures

- Describe the principal elements of a local exhaust ventilation system, give examples of typical installations and know how to carry out the necessary measurements to assess whether a local exhaust ventilation system is effective and operating to the design specification
- Recognise the limitations of local exhaust hoods and enclosures and the means to optimise their effectiveness
- Describe how personal protective equipment programmes may be used in an effective manner
- Recognise the impact that control measures may have on other workplace hazards and understand the need to take a holistic approach to the design of control solutions

The course normally run as a taught course over 5 days (minimum of 45 hours including practical/demonstration sessions, lectures, tutorials, guided reading, overnight questions and examination). There will be a 40 short answer question “open book” examination with an allowed time of 120 minutes.

This course is designed to provide participants with a detailed and up-to-date overview of control of hazardous substances. It covers the hazardous substances uses and processes; the workplace control principles covering hierarchy of control and achieving effective control; the process design and principles including design of equipment and workplace, prevention, elimination and substitution; the ventilation system and the various types, principles, general ventilation, local exhaust ventilation (LEV), measurement and testing of LEV systems; and the personal protective equipment (PPE) and its types, covering respiratory protective equipment, chemical protective clothing (CPC), gloves and dermal care.

During this interactive course, participants will learn the administrative elements comprising of reducing periods of exposure, exclusion of non-essential personnel, personal hygiene arrangements, coordinated approach to control, training and supervision; the access to hazardous areas and the role of assessment measurement, monitoring, health surveillance in initiating control measures; the role of written operating procedures, permits to work; and the role of occupational hygiene programmes in continuing control.

### **Course Objectives**

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

- Achieve the OHTA-BOHS Certificate in W505: Control of Hazardous Substances
- Recognize hazardous substances uses and processes as well as workplace control principles covering hierarchy of control and achieving effective control
- Illustrate process design and principles including design of equipment and workplace, prevention, elimination and substitution
- Carryout ventilation system and identify the various types, principles, general ventilation, local exhaust ventilation (LEV) and measurement and testing of LEV systems

- Enumerate personal protective equipment (PPE) and its types, covering respiratory protective equipment, chemical protective clothing (CPC), gloves and dermal care
- Identify administrative elements comprising of reducing periods of exposure, exclusion of non-essential personnel, personal hygiene arrangements, coordinated approach to control, training and supervision
- Control access to hazardous areas and discuss the role of assessment measurement, monitoring, health surveillance in initiating control measures
- Recognize the role of written operating procedures, permits to work and role of occupational hygiene programmes in continuing control

### **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 covers deeper appreciation and wide understanding of hazardous substance control for health and safety professionals, occupational health specialists including physicians and nurses. Specialists in subjects such as acoustics, ergonomics, human factors, occupational psychology, work organisation, biosafety, engineering, analytical chemistry and those who want a broader appreciation of how their role interfaces with other professions over health issues in the workplace.

### **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.

### **Accommodation**

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

### **Course Fee**

**US\$ 7,500** per Delegate + **VAT**. This rate includes H-STK® (Haward Smart Training Kit), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

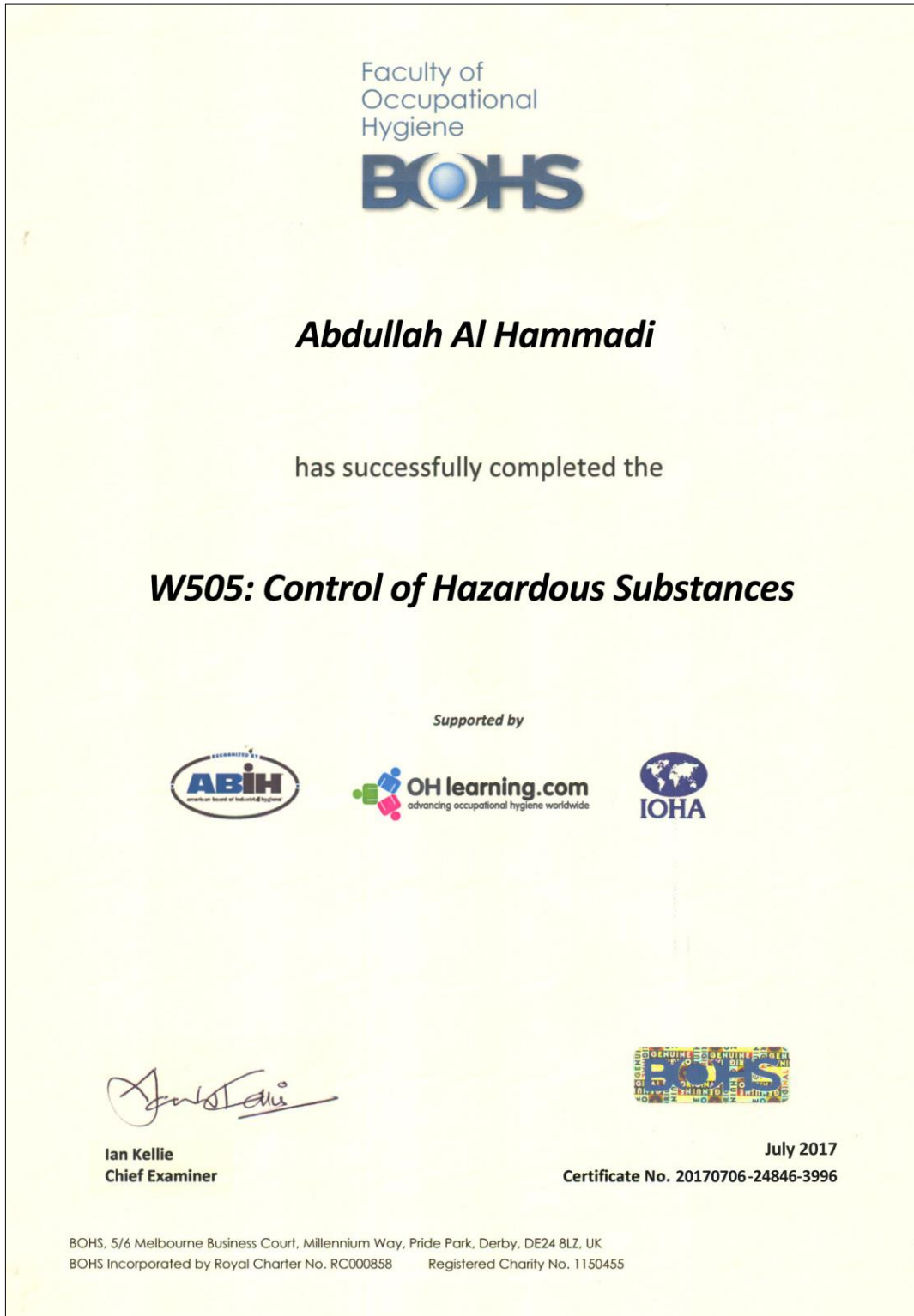


**Course Certificate(s)**

(1) BOHS Certificates will be issued to participants who have successfully completed the course and passed the exam of the course.

**BOHS Certificate(s)**

The following certificate is a sample of the BOHS 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.

\* Haward Technology \* CEUs \* Haward Technology \* CEUs \* Haward Technology \* CEUs \* Haward Technology \*



**Haward Technology Middle East**

Continuing Professional Development (HTME-CPD)

**CEUs**

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### CEU Official Transcript of Records

**TOR Issuance Date:** 06-July-17

**HTME No.** PAR233628

**Participant Name:** Abdullah Al Hammadi

Program Ref.	Program Title	Program Date	No. of Contact Hours	CEU's
HE128-IH	<b>W505: Control of Hazardous Substances</b>	July 02-06, 2017	45	4.5

**Total No. of CEU's Earned as of TOR Issuance Date** **4.5**

**TRUE COPY**



**Maricel De Guzman**  
Academic Director

Haward Technology is an Authorized Training Provider by the International Association for Continuing Education and Training (IACET), 11130 Sunrise Valley Drive, Suite 350 Reston, VA 20191, USA. In obtaining this approval, Haward Technology has demonstrated that it complies with the ANSI/IACET 1-2013 Standard which is widely recognized as the standard of good practice internationally. As a result of their Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for programs that qualify under the ANSI/IACET 1-2013 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 is accredited by











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\* Haward Technology \* CEUs \* Haward Technology \* CEUs \* Haward Technology \* CEUs \* Haward Technology \*

## Certificate Accreditations

Haward Technology is accredited by the following international accreditation organizations:-

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The British Occupational Hygiene Training Association (OHTA-BOHS)

Haward Technology is an OHTA Approved Training Provider under the W201 and W500 series modules that promote better standards of occupational hygiene practice throughout the world. OHTA is the British Occupational Hygiene Training Association.

Haward Technology supports hygiene professionals who wanted people around the world to enjoy the benefits of healthy working environments.


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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 2018-01 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 2018-01 Standard**.

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

Haward Technology Middle East will award **4.5 CEUs** (Continuing Education Units) or **45 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. Peter Jacobs**, is a **Senior HSE Consultant** with almost **25 years** of extensive experience within **Oil & Gas, Refinery** and **Petrochemical** industries. His wide experience covers in the areas of **Incident Command & Report Writing, HAZOP, HAZMAT, HAZID, Health Risk Assessment, Modern Safety Risk Management, Process Risk Management, Root Cause Analysis Techniques, HSE Management System Development & Implementation, SAESI Hazardous Materials for the First Responder Operations (NFPA 472), Industrial Safety & Housekeeping, Job Safety & Hazard Analysis, Hazardous Substances Measurement, Workplace Control, Physical Agents, Emergency Response, Chemical & Biological Operations, Basic Safety & Loss Prevention, Safety in Chemical Laboratory, Confined Space Safety, Industrial Hygiene, Occupational Health & Hygiene, Ergonomics, Biological Assessment, Radiation with Radon/Thoron Assessment, Radiation Protection Safety, Radiation Monitoring, Natural Radiation Sources, Nuclear Regulatory Act, Industrial Ventilation, Air Pollution Dispersion Modelling, Basic Clandestine Drug Laboratory Investigation, Chemical Engineering, Fire Safety & Evacuation, Evacuation Safety, Safety Orientation, Hand & Power Tools Safety, Isokinetic Stack Sampling, Dust Exposure, Quantifying Workplace Stressors, Noise & Airborne Pollutants, Thermal Stress, Illumination, Mine Health & Safety, Statistical Method Validation, Legal Audit Compliance, Riot & Crowd Control, ISO 14000, OHSAS 18000, ISO 17025 and ISO 9000.**

During his career life, Mr. Jacobs has gained his practical and field experiences through his various significant positions and dedication as the **Forensic Science Laboratory Manager, Occupational Hygienist, Radiation Protection Officer, Lead Practitioner, Safety, Health & Environmental (SHE) Specialist, First Responder, OHS Inspector, Ambulance Assistant** and **LPG Distributor Auditor** from various international companies like the Sedulitas, Richards Bay Minerals, Sasol and South African Police Service.

Mr. Jacobs has a **Master's degree in Public Health – Occupational Hygiene**, a **National Diploma in Purchasing Management** and held an Intermediate Certificate in Mine Environmental Control an **Accredited South African Emergency Services Institute (SAESI)**. Further, he is a **Certified Instructor/Trainer**, an Appointed Commissioned Officer, a SAIOH/ IOHA President, an Assessor/Moderator of Health & Welfare SETA, a **Registered Occupational Hygienist** of the Southern African Institute for Occupational Hygiene, awarded as a SAIOH **Occupational Hygienist of the Year Award** and a well-regarded member of the British Occupational Hygiene Society (**BOHS**), Mine Ventilation Society of South Africa (MVSSA) and South African Radiological Protection Association (SARPA). He has further delivered numerous trainings, courses, seminars, workshops and conferences worldwide.

## 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 – 0745	Registration & Coffee
0745 – 0800	Welcome & Introduction
0800 – 0815	<b>PRE-TEST</b>
0815 – 0930	<b>Hazardous Substances Uses &amp; Processes</b> Range of Properties of Airborne Contaminants including Dusts, Aerosols, Vapours, Gases & the Potential Hazards they may Present • Series of Short Case Studies • Health Hazards & Risks Overview
0930 – 0945	Break
0945 – 1200	<b>Hazardous Substances Uses &amp; Processes (cont'd)</b> Sources & Factors Affecting Emission of Airborne Contaminants in Order to Develop an Understanding of the Approach to Controlling Exposure Problems and How to Select Appropriate Control Strategies
1200 – 1230	Lunch
1230 – 1330	<b>Hazardous Substances Uses &amp; Processes (cont'd)</b> Use of Rotary Tools (Circular Saws, Rotary Sanders) Other Directional Processes (Paint Spraying) and Fume Yielding Processes (Welding & Soldering)
1330 – 1430	<b>Hazardous Substances Uses &amp; Processes (cont'd)</b> The Principles of Containment & Control Techniques for Common Process such as Weighing & Dispensing Solids & Liquids from Containers to Process Equipment Should be Considered for a Range of Materials from Low to High Hazard
1430 – 1445	Break
1445 – 1720	<b>Workplace Control Principles: Hierarchy of Control</b> Principles of Identifying Hazards & Risks in the Workplace • Hierarchy of Control & its Underlying Principles - Work Procedures, Process Engineering Control, Ventilation & PPE (Practicable Programmes may Involve a Combination of Measures)
1720 – 1730	<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
1730	End of Day One

### Day 2

0730 – 0930	<b>Workplace Control Principles: Achieving Effective Control (cont'd)</b> The Meaning of Adequate Control Including the Use of Occupational Exposure Limits, Other Published & In-House Standards Including those for Carcinogens, Asthmagens & Biological Agents • The Role of Assessment by All Routes to Identify Exposures, Confirm Compliance, Achieve Adequate Control, Risks at the Design Stage & in Existing Facilities, Risks from Normal Operations & During Non-Routine or Maintenance Activities
0930 – 0945	Break
0945 – 1200	<b>Workplace Control Principles: Achieving Effective Control (cont'd)</b> The Practical Application of the Hierarchy of Control such as the Use of a Combination of Measures, Stepwise Approach • Effective Control Strategies, Adopting the Principles of Reasonable Practicability Including COSHH Essentials/ILO Toolbox



1200 – 1230	Lunch
1230 – 1430	<b>Process Design &amp; Principles: Design of Equipment &amp; Workplace</b> General Design of Equipment & Workplace Layout & How this Influences Exposure • The Effects of Automation & Robotics
1430 – 1445	Break
1445 – 1720	<b>Process Design &amp; Principles: Prevention, Elimination, Substitution</b> Prevention of Exposure by Good Process Design, Including Containment, Elimination or Substitution of Hazardous Substances & Activities
1720 – 1730	<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
1730	End of Day Two

### Day 3

0730 – 0930	<b>Process Design &amp; Principles: Prevention, Elimination, Substitution (cont'd)</b> Examples of Industrial Processes Where Hazards may be Minimised by Changes to Substance or Form (Eg Reduction of Volatile Constituents, Granulation of Dusty Powders) or Changes to the Process (Eg Replacement of Paint Spraying by Brush Application) & Workplace Layout
0930 – 0945	Break
0945 – 1200	<b>Ventilation Systems: Types of System</b> General Ventilation Systems, Local Exhaust Ventilation (LEV)
1200 – 1230	Lunch
1230 – 1430	<b>Ventilation Systems: Principles</b> Basic Principles of System Design- Fans, Ducts, Air Cleaners and Discharges • Fan Types & their Typical Applications • Duct Sizing, Configuration & Duct Materials • Principles of System Balancing • Facilities for Thorough Examination, Maintenance, Examination & Testing • Air Cleaners -Types (Gravity & Centrifugal Collectors, Dry Fabric, Electrostatic, Wet Methods, Absorption Types) & their Performance
1430 – 1445	Break
1445 – 1720	<b>Ventilation Systems: General Ventilation Systems</b> Use as a Means of Controlling Airborne Exposures • Principles of Natural Ventilation & Infiltration • Mechanical Ventilation, Dilution or Displacement Including Methods of Delivery & Distribution
1700 – 1720	<b>Ventilation Systems: General Ventilation Systems</b> Determination & Calculation of Ventilation Requirements • Application & Limitations of General Ventilation
1720 – 1730	<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
1730	End of Day Three

### Day 4

0730 – 0930	<b>Ventilation Systems: Local Exhaust Ventilation (LEV)</b> Design Features • LEV Hoods; Enclosing Hoods, Receiving Hoods & Capturing Hoods • Capture Velocity, Face Velocity, Transport Velocities • Fletcher & Garrison Methods of Predicting Air Flows, Velocity Contours & Effects of Flanges
0930 – 0945	Break

0945 – 1200	<b>Ventilation Systems: Local Exhaust Ventilation (LEV) (cont'd)</b> Application of Hoods of All Types & Use of Partial & Total Enclosures in Industrial Situations • Limitations of LEV • Supply Air, Importance of Location & Direction, Use of Treated Recycled Air • Safe Discharge Arrangements (Treatment Before Discharge & Location of Discharge)
1200 – 1230	Lunch
1230 – 1430	<b>Ventilation Systems: Measurement &amp; Testing of LEV Systems</b> Measurement of Performance & Relation to Attainment of Control of Exposure • Calculations for Volume Flows from Pressure & Velocity Measurements
1430 – 1445	Break
1445 - 1720	<b>Ventilation Systems: Measurement &amp; Testing of LEV Systems (cont'd)</b> Maintenance Examination & Test; Periodic Checks & Inspections, Thorough Examinations & Testing • Continued Satisfactory Performance Indication
1720 – 1730	<b>Recap</b>
1730	End of Day Four

### Day 5

0730 – 0930	<b>Personal Protective Equipment: General</b> Types of Personal Protective Equipment (PPE) Including Respiratory Protective Equipment (RPE) Protective Gloves & Chemical Protective Clothing • Limitations of Use • Definition of Suitability • Importance of Selection, Training, Maintenance & Proper Use in the Development of a PPE Programme
0930 – 0945	Break
0945 – 1200	<b>Personal Protective Equipment: Respiratory Protective Equipment</b> Types of RPE & their Limitations Eg Dust Respirators; High Efficiency, Powered, Ventilated Visors, Disposables, Ori-Nasal, Breathing Apparatus • Respirators for Organic Vapours & Inorganic Gases • Selection, Use & Maintenance of RPE; Face Fit Testing
1200 – 1230	Lunch
1230 – 1330	<b>Personal Protective Equipment: Chemical Protective Clothing (CPC)</b> Types of CPC • Performance Criteria • Testing Effectiveness • Application, Limitations • Storage Arrangements, Laundering Arrangements, Role in Prevention of Spread of Contamination • Suitability for Use & Integrity
1330 – 1430	<b>Personal Protective Equipment: Gloves &amp; Dermal Care</b> Basic Dermal Exposure Assessment Techniques & Principles of Dermal Exposure Risk Management • Types of Gloves & their Performance Data • Permeation & Breakthrough • Glove Selection, Maintenance & Training in Use
1430 - 1445	Break
1500 – 1645	<b>Administrative Elements</b> Reducing Periods of Exposure • Exclusion of Non-Essential Personnel, personal Hygiene Arrangements • Co-Ordinated Approach to Control, Training, Supervision • Control of Access to Hazardous Areas • The Role of Assessment, Measurement, Monitoring & Health Surveillance in Initiating Control Measures • Role of Written Operating Procedures, Permits to Work Etc • Role of Occupational Hygiene Programmes in Continuing Control
1645 - 1700	<b>Course Conclusion</b> Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course
1700 – 1715	<b>POST TEST</b>
1715 – 1730	Presentation of Course Certificates
1730	End of Course

## MOCK Exam

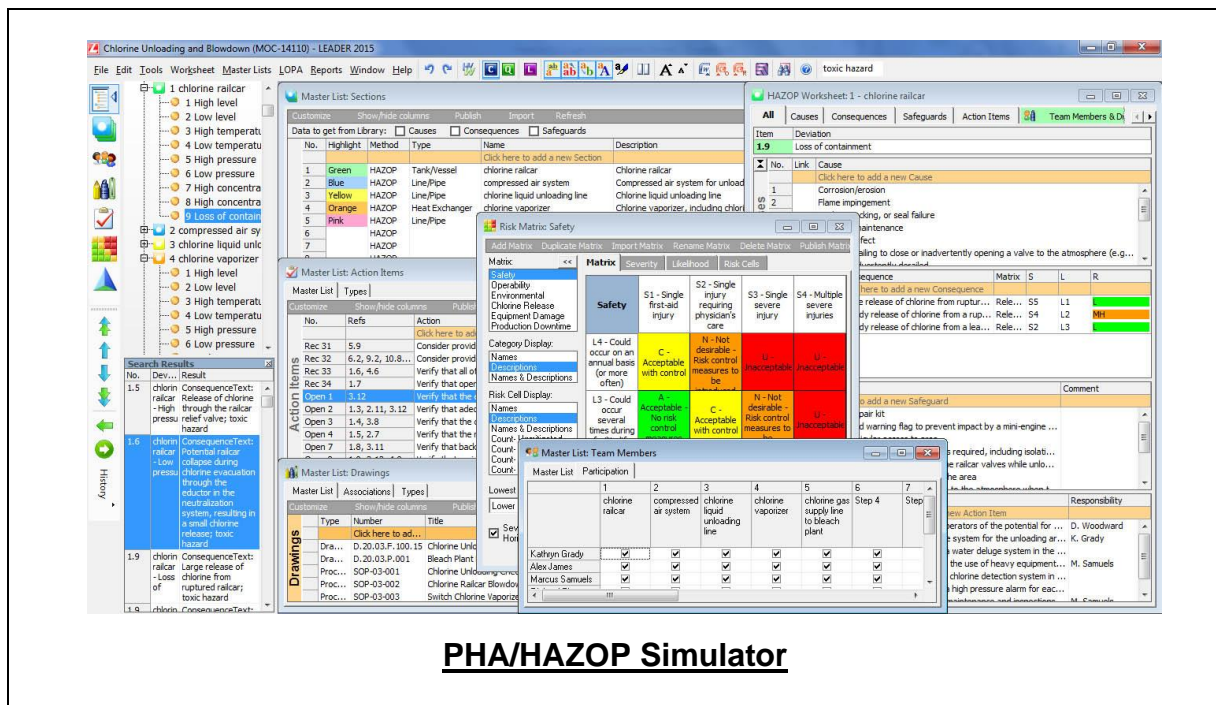
Upon the completion of the course, participants have to sit for a MOCK Examination similar to the exam of the Certification Body through Haward's Portal. Each participant will be given a username and password to log in Haward's Portal for the MOCK exam during the 7 days following the course completion. Each participant has only one trial for the MOCK exam within this 7-day examination window. Hence, you have to prepare yourself very well before starting your MOCK exam as this exam is a simulation to the one of the Certification Body.

### Day 6: OHTA BOHS Online Exam (to be scheduled within 30 days of course completion)

0900 - 0915	OHTA-BOHS Exam Registration/Briefing
0915 - 1145	OHTA-BOHS Exam
1145 - 1200	Closing Ceremony
1200	End of Exam

## Simulator (Hands-on 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 exercises using our state-of-the-art "PHA/HAZOP", "Workplace Risk Assessment" "Industrial Hygiene Virtual Laboratory" and "CIHprep V9.0" simulators.

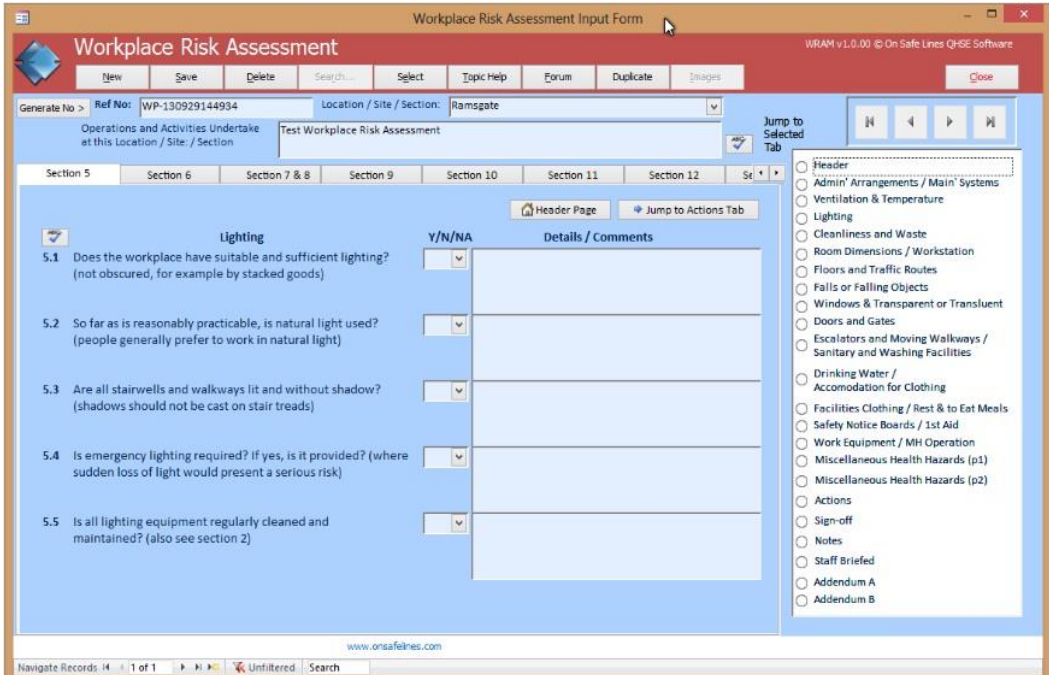


The screenshot displays the PHA/HAZOP Simulator software interface. The main window is titled "Chlorine Unloading and Blowdown (MOC-14110) - LEADER 2015". It features several panels:

- Master List Sections:** A tree view on the left showing sections like "1 chlorine railcar", "2 compressed air system", "3 chlorine liquid unit", "4 chlorine vaporizer", "5 High pressure", "6 Low pressure", "7 HAZOP", "8 High concentration", "9 Loss of containment", "10 Chlorine release", "11 High temperature", "12 Low temperature", "13 High pressure", "14 Low pressure", "15 Chlorine release", "16 Chlorine release", "17 Chlorine release", "18 Chlorine release", "19 Chlorine release", "20 Chlorine release".
- Master List:** A table with columns for No., Highlight, Method, Type, Name, and Description. It lists various equipment and processes.
- Risk Matrix Safety:** A matrix with columns for Severity (Safety, S1, S2, S3, S4) and Likelihood (L1, L2, L3). It shows risk levels for different scenarios.
- Master List: Action Items:** A table with columns for No., Refs, Action, and Status. It lists tasks like "Verify that the...", "Verify that the...", "Verify that the...".
- Master List: Drawings:** A table with columns for Type, Number, and Title. It lists drawings like "Chlorine Unloading", "Bleach Plant", "Chlorine Unloading", "Chlorine Railcar Blowdown", "Switch Chlorine Vaporizer".
- Master List: Team Members:** A table with columns for Master List, Participation, and checkboxes for team members like "Kathryn Grady", "Alex James", "Marcus Samuels".
- HAZOP Worksheet:** A table with columns for No., Link, Cause, and Consequences. It lists causes like "Loss of containment", "Corrosion/erosion", "Flame impingement".


## PHA/HAZOP Simulator





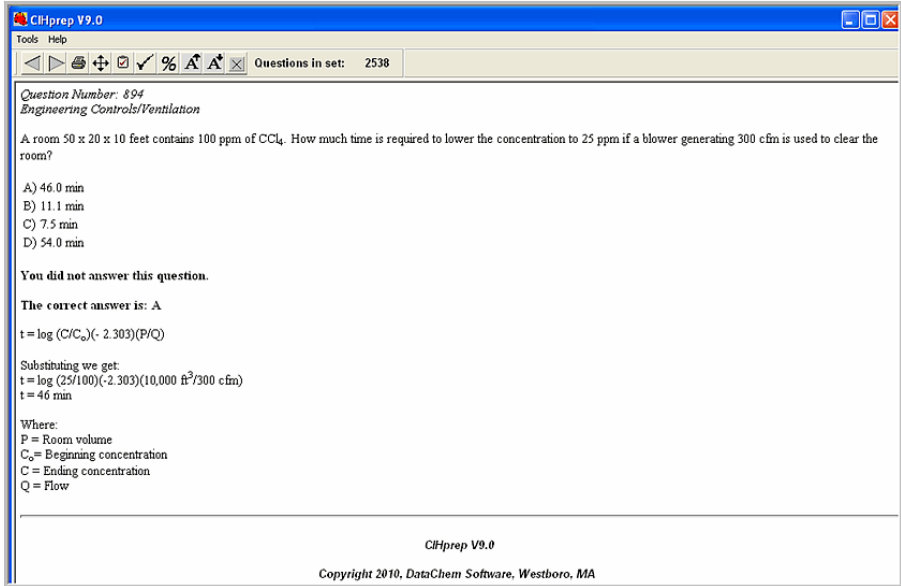
The screenshot shows the 'Workplace Risk Assessment Input Form' software. The interface includes a menu bar with options like 'New', 'Save', 'Delete', 'Search...', 'Select', 'Topic Help', 'Forum', 'Duplicate', and 'Images'. Below the menu, there are fields for 'Generate No.', 'Ref No: WP-130929144934', and 'Location / Site / Section: Ramsgate'. The main area is divided into sections, with 'Section 5' selected. It contains a table with columns for 'Lighting', 'Y/N/NA', and 'Details / Comments'. Five questions are listed under 'Lighting', each with a dropdown menu for 'Y/N/NA'. A right-hand sidebar contains a list of categories for risk assessment, such as 'Admin' Arrangements / Main' Systems, 'Ventilation & Temperature', 'Lighting', 'Cleanliness and Waste', etc.

**Workplace Risk Assessment**



The screenshot shows the 'Industrial Hygiene Virtual Laboratory Simulator' interface. It features a central 3D model of a calibration setup, including a burette, a pump, and a filter cassette. A text box on the left provides a 'CALIBRATION PROCEDURE' with detailed instructions. On the right, there are numerical input fields for flow rates (e.g., 1.0 LPM, 1.5 LPM, 2.0 LPM) and a 'Adjust Pump' control. The interface also includes navigation buttons at the bottom like 'Quit IIR Labs', 'Hide IIR Labs', 'Calculator', 'Glossary', 'NIOSH Methods', 'Go to Lab Index', and 'Go to Notebook'.

**Industrial Hygiene Virtual Laboratory Simulator**



**CIHprep V9.0**

Tools Help

Questions in set: 2538

Question Number: 894  
Engineering Controls/Ventilation

A room 50 x 20 x 10 feet contains 100 ppm of CCl<sub>4</sub>. How much time is required to lower the concentration to 25 ppm if a blower generating 300 cfm is used to clear the room?

A) 46.0 min  
B) 11.1 min  
C) 7.5 min  
D) 54.0 min

You did not answer this question.

The correct answer is: A

$$t = \log(C/C_0) \cdot (-2.303) \cdot (P/Q)$$

Substituting we get:  
 $t = \log(25/100) \cdot (-2.303) \cdot (10,000 \text{ ft}^3 / 300 \text{ cfm})$   
 $t = 46 \text{ min}$

Where:  
P = Room volume  
C<sub>0</sub> = Beginning concentration  
C = Ending concentration  
Q = Flow

CIHprep V9.0  
Copyright 2010, DataChem Software, Westboro, MA

**CIHprep V9.0 Simulator**

**Course Coordinator**

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