

CURRICULUM, TRAINING AND ASSESSMENT GUIDE

Competency Unit : Assess Confined Space for Safe Entry
and Work

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PURPOSE OF GUIDE

This Guide is designed for WDA's Approved Training Organisations (ATOs) and Adult Educators who are responsible for the design and delivery of programmes within the Specialist Diploma in Occupational Hygiene of the WSQ Occupational Hygiene (OH) Professionals Framework. This Guide aims to provide essential curriculum, training and assessment design advisory information, to guide developers, trainers and assessors in the interpretation and translation of competency standards into training and assessment programme. The Guide also contains training and assessment requirements stipulated by industry, and WSQ accreditation information for compliance. It is divided into 3 parts:

- Part I** - Provides an overview of the domain of Occupational Hygiene, the OH Professionals WSQ framework and the WSQ Specialist Diploma in OH qualification

- Part II** - Provides unit specific information, key delivery and assessment advice, equipment list and adult educator requirements for this competency unit under the OH Professionals WSQ framework

- Part III** - Provides a broad spectrum of information pertaining to the mandatory sections and includes the supporting information and documents related to this competency unit

PART I

CHAPTER 1: OVERVIEW OF OCCUPATIONAL HYGIENE

This chapter describes the overview and nature of Occupational Hygiene (OH), covering the following key components:

1.1 Domain of Occupational Hygiene

Occupational Hygiene (OH) is the practice of:

- Anticipating and recognising hazardous agents in the workplace that can cause disease or discomfort
- Evaluating the extent of the risks due to exposure to these hazardous agents
- Controlling of those risks to prevent ill-health in the long or short term.

OH issues exist in nearly all workplaces, with varied types of hazards and risks, where the health of persons at work can be affected due to their occupations. These hazards (also refer to as “stressors”) may be divided into the categories Physical, Chemical, Biological, Human Factor (Ergonomic) and Psychosocial. The materials and energy that the workers use or handle, and the environment in which they work may expose them to chemical agents, hazardous substances, or physical stressors like noise, heat, radiation, etc; as well as ergonomic and psychosocial stressors arising from the way that their jobs, equipment and workplaces are designed are organised. OH Professionals therefore would be engaged in a wide spectrum of workplaces, where such hazards may be present. These workplaces may include the key industries such as chemical, process, pharmaceutical, manufacturing, healthcare, construction, marine, research and development, etc.

In Singapore’s context, OH Professionals are employed as various “competent persons”, mostly for the compliance with relevant legal requirements that stipulates the requirements for such persons. These include noise monitoring officers, noise control officers, confined space assessors, competent persons for the management of hazardous substances, competent persons for sampling and monitoring of airborne contaminants, etc.

In this sector the main composition of the workforce makes up of professionals, executives, managerial and technicians employed or working in OH related fields.

1.2 Skills, Education Profile, Nature of Employment, Typical Occupational Titles in Occupational Hygiene

OH Professionals are people who use scientific methodology in determining hazards, assessing exposure and risks through environmental monitoring and analytical methods to detect the extent of worker exposure and employ engineering, work practice controls, and other methods to control potential health hazards and risks. The output of their tasks, for example, measurement of concentration of toxic gases, is the basis for decision making on the actions to be taken for the protection of health, or even lives of persons affected.

As for the education profile, majority of them would have at least educational level at

diploma and degree in science, engineering, and technical disciplines.

These OH Professionals are employed both in private companies and governmental agencies. Private companies may engage OH Professionals as OH officers, technicians, hygienists, coordinator and manager for monitoring and managing of the occupational hazards at the workplaces. The OH Professionals commonly find themselves employed by consultancy companies and laboratories that provide OH services such as air sampling, noise monitoring, ergonomic assessment etc. The public sector also engages OH Professionals, mostly for policy, directives and regulatory setting, as well as implementation, monitoring and enforcement of regulations in OH.

In their jobs, the OH Professionals involved in managing different occupational health hazards, at different levels of competency may have the job roles or titles such as:

- Occupational Hygiene Officer
- Noise Monitoring Officer
- Noise Control Officer
- Confined Space Safety Assessor
- Workplace Safety and Health Officer
- Hazardous substances permit holder
- Radiation Safety Officer
- L5/L6 (non-NDT work) licensee
- N3 licensee
- HS licensee
- Competent persons for sampling and monitoring of airborne contaminants

1.3 Expected Attitudes of Workers in the Profession

OH Professionals are expected to be self-directed, with an analytical mind and a meticulous approach to problem-solving. They should also be passionate and committed to ethical practice in OH and receptive to change in the light of new evidence.

1.4 Work Conditions and Context of Job Performance

The physical working environment settings of the OH Professionals vary largely according to industry. While OH Professionals may spend a fair proportion of their time in an office environment analysing data, writing reports, maintaining and preparing equipment it is expected of them to be on-site or in field too.

As their job tasks include the recognition, evaluation and control of workplace health hazards, they will be in environments where such hazards are present. For instance, they could be subjected to the heat stresses at the workplace where they are tasked to monitor and control heat stress. Other possible hazards include hazardous substances, radiation, noise, biological agents, flammable substances etc.

In these work environments, OH Professionals need to adhere to the same level of safety and health control measures as the operational staff. This may include wearing the same personal protective equipment, such as protective suits, respirator etc. A basic level of physical fitness is also preferred as the OH Professionals will need to carry and operate tools, instruments and equipment in field work. Working hours can also be irregular at times, for instance, when the sampling plan requires sampling to be taken outside normal working hours, or sampling is required in an emergency situation. However, OH Professionals face lower levels of risk compared to operational staff due to the shorter frequency and duration of exposure.

OH Professionals are also required to continually upgrade their knowledge and skills, keep abreast of developments in the OH field through reading and attending seminars and courses.

1.5 Skills Gaps and Key Challenges Facing the Profession

One of the key challenges in identifying appropriate approaches to tackle workplace health (WH) issues is the unique nature of WH hazards. Since the revamp of the national WSH framework, it was proposed that the local industry should draw from the experiences of leading countries to adopt a more proactive approach based on risk prevention and mitigation. The current focus of local industry's efforts has primarily been on tackling workplace safety lapses, which have an immediate and tangible impact in terms of injuries or fatalities. Due to the long latency and multi-factorial nature of occupational diseases, WH risks are complex and harder to quantify, and would often require higher order skills, which makes it difficult for employers and regulators to measure the impact of poor WH management and to take proactive measures to prevent the onset of ill health.

In addition to that, the domain of OH is currently under-developed with a lack of professionals working in the industry. They mainly reside in large petrochemical companies and pharmaceutical firms, government agency, laboratories and consultancy companies. This can be attributed to the low demand and a lack of emphasis on the importance of occupational hygienists in Singapore. This falls far below that of other developed countries.

As such, the national WH framework was launched to help stakeholders to take proactive measures to improve their management of WH hazards. One of the key strategies identified was the development of OH Professionals to assist employers to improve WH management.

CHAPTER 2: THE OCCUPATIONAL HYGIENE PROFESSIONALS WSQ FRAMEWORK AND WSQ SPECIALIST DIPLOMA IN OCCUPATIONAL HYGIENE

This chapter describes the overview of the OH Professionals WSQ Framework and the Specialist Diploma in OH, covering these components:

2.1 Overview of the Occupational Hygiene Professionals WSQ Framework

The framework's key purpose is, "To drive improvements in workplace health (WH) management and raise WH standards through quality professional development of competent and motivated Occupational Hygiene (OH) Professionals to assist employers, occupiers and other stakeholders in the anticipation, recognition, evaluation and control of Occupational Hygiene risks at the workplace."

A study was also done on the local OH landscape and there were a few courses accredited by the Singapore Ministry of Manpower (MOM) and National Environment Agency (NEA) which were found useful and relevant to this framework.

As such the development of this framework is closely referenced to particular MOM and NEA accredited courses. This framework has been validated and endorsed by industry practitioners and forms the benchmarks for competency-based training and assessment.

2.2 Overview of WSQ Specialist Diploma in Occupational Hygiene

The WSQ OH Professionals Framework consists of a single qualification titled 'WSQ Specialist Diploma in Occupational Hygiene (SDOH).' It is pegged at competency Level 5 in the WSQ Qualification Level system.

With reference to the competency map, a candidate must achieve the Statement of Attainment (SOA) for the competency units under the qualification in order to be awarded the WSQ SDOH which consists of:

- All 8 Core Units;
- 2 Electives Units from Group 1 Elective Units; and
- 1 Elective Unit from Group 2 Elective Units

PART II

CHAPTER 3: UNIT-SPECIFIC INFORMATION: ASSESS CONFINED SPACE FOR SAFE ENTRY AND WORK

3.1 Purpose and Focus of Competency Unit

On completion of this unit, the learner will have the knowledge and be equipped with the application skills in basic principles in working within/around confined space. This includes:

- Use of appropriate gas testing equipment to ascertain that the confined space atmosphere is safe for entry and work.
- Recognise the limitation of the test equipment used; calibrate the equipment and use it to obtain representative results for the assessment of confined space for safe entry and work
- Monitoring the atmospheric conditions to ensure that it is safe for entry and work.

3.2 Target Audience

The target audience of this competency unit may include:

- Persons who want to obtain the knowledge to be competent for taking up appointment of a confined space safety assessor.
- Workplace Safety and Health (WSH) professionals such as WSH Coordinators, Officers, and Auditors
- Occupational Hygiene (OH) professionals such as OH Technicians etc.

3.3 Recommended Learning Hours (RLH)

This section proposes the total hours of competency-based training and assessment for one of the elective **Competency Unit: Assess Confined Space Entry and Work** taking into account the time required for directed learning activities. Directed learning is broadly defined as trainer/assessor-directed & purposefully instructed to trainees to complete as part of instructional design of a structured training & assessment programme.

The specification of the RLH for **Competency Unit: Assess Confined Space Entry and Work** is **40 hours**.

3.4 Credit Exemption

Candidates who have successfully undertaken the NEA accredited course titled “Confined Space Safety Assessor Course” will be granted unit exemption for this WSQ unit. Documentary evidence will have to be submitted to the training provider before exemption can be granted.

CHAPTER 4: KEY DELIVERY ADVICE

This chapter describes the following components for one of the elective **Competency Unit: Assess Confined Space for Safe Entry and Work** only.

4.1 Content Coverage

In developing the programme for this **Competency Unit: Assess Confined Space for Safe Entry and Work**, ATOs should always make cross references to the Performance Statements (PS), Underpinning Knowledge (UK), Range of Application and Evidence Sources sections as stipulated in the said unit. Depending on the context, as a guide, at least 50% of the Range of Application should be covered.

Individuals taking this competency unit may come from the different organisations from various key industries. ATOs are advised to contextualise their programmes to better cater to trainee needs, based on the organisation that they come from. Contextualisation of the programme content normally revolves around the range of application of the competency unit.

4.2 Sequence of Coverage

The coverage for the **performance statements** and **underpinning knowledge** as specified in the competency standard for this unit should follow the sequence below:

Performance Statements	Underpinning Knowledge *
Prepare for confined space assessment with persons involved in confined space safety management in accordance with the applicable legal and other requirements.	<ul style="list-style-type: none">• Definition of confined space (Knowledge)• Duties and responsibility of confined space assessor and other persons involved in confined space safety management (Knowledge)• Confined space safety management (Knowledge)• Legal and other requirements on confined space (Application)
Identify hazards and take measures to prevent harm to safety and health when entering and working in confined space.	<ul style="list-style-type: none">• Types of hazards in confined space (Knowledge)• Harm to safety and health when entering and working confined space (Comprehension)
Conduct gas testing to ascertain the atmospheric condition in the confined space is safe for entry in accordance with the applicable legal and other requirements; organisational confined space programme and entry permit system.	<ul style="list-style-type: none">• Confined space entry permit (Application)

Participate in risk control and emergency response in accordance with legal and other requirements.	<ul style="list-style-type: none"> Control measures for confined space safety (Application) Emergency response plan (Knowledge)
Monitor the confined space conditions and control measures for safe working.	

* The verb in the bracket “()” after each underpinning knowledge indicates the cognitive level using Bloom’s Cognitive Domain.

Note: The Risk Assessment/Management process should consider the management of infectious disease outbreak, employees’ health (including mental well-being) and terrorist threats. Training Provider should take reference from the 3rd revision of the Code of Practice on Risk Management.

4.3 Learning Strategies and Delivery Methods

Curriculum developers are recommended to adopt the following structure for thinking about and planning a learning strategy:

- Summarise the learning strategy
- In this learning strategy, what learning principles are being applied?
- What learning theories or learning design theories underpin this strategy?
- How will this strategy resolve the identified learning problems? What is it about the learning strategy that will cause people to change in a way that resolves the learning problem?
- How would you describe the experience that learners will go through? How will this experience support their learning?
- What methods or tactics are most likely to be used to support this strategy?
- How will interface and media support this strategy?
- How will this strategy engage learners’ interests?
- How will this strategy assess learners’ progress or increased competence?

(Extracted from www.networked-learning.com, accessed 19 Sep 2010)

An example of instructional strategy selection for cognitive, affective and psychomotor domains is given in **Annex A**.

A non-exhaustive list of recommended delivery methods is provided below.

Delivery strategies	Applications
Presentation	This can be applied almost throughout this unit to introduce basic concepts and theory for the underpinning knowledge such as different types of confined space hazards, entry permit systems and other control measures, emergency response etc. It can also be used to show photographs, videos and graphics as an effective mean of explaining concepts and describing items.

Delivery strategies	Applications
Discussion	<p>Learner can be asked to discuss topics such as :</p> <ul style="list-style-type: none"> • Interpretation of applicable legal requirements • Roles and responsibilities of personnel involved in the entry and management of confined space • Hazards and risk assessment of confined space • Sharing of different types of confined spaces and their hazards • Way to ensure good communication among personnel involved in the entry and management of confined space personnel involved in the • Limitation of gas testing equipment and methods • Sharing about challenge in confined emergency response
Demonstration	<p>This will be useful in showing the learners:</p> <ul style="list-style-type: none"> • The methods of calibrating and use of confined space gas testing equipment • The sequence in checking different types of atmospheric hazards in a confined space • Factors that can affect direct reading instrument, such as by introducing a physical disturbance and demonstrating how the meter respond and the counter actions necessary • Emergency response procedures, which can be company-specific <p>Note that it is very important to consider logistical arrangement and safety and health aspects of a demonstration to address all these concerns before such strategy is to be used.</p>
Practice	<p>Learners may be asked to practice on:</p> <ul style="list-style-type: none"> • Selection, set up, calibration, use and maintenance of gas testing equipment • Selection, fit, use and maintenance of personal protective equipment
Observation and Feedback	<ul style="list-style-type: none"> • One group of learners or the adult educator may demonstrate the inspection, setup equipment, conduct a confined space gas test while the other learners observe and give feedback thereafter • Learners may be asked to make observation at their workplace if possible or a simulated environment on how control measures of a hazard are being executed in a confined space related environment and provide a rationale report.
Written Exercise	<p>Learners may be asked to:</p> <ul style="list-style-type: none"> • Sketch a schematics of confined space and locations where sampling would be taken • Filling up a confined space entry permit form, with a given scenario • Respond to question with written answers or perform calculations of concentration, flow rates etc. • Fill up the blanks in a diagram or short paragraph with the missing information

Delivery strategies	Applications
Case Study	Get the learners to work in groups. Issue them with a case study featuring different types of atmospheric hazards, and the safety data sheet of the chemicals that would be present in the confined space. Get them to determine the methods that will be most effective for the measurement of the health hazards and explain the reasons for choosing the method(s).
Workplace Delivery / Practices	Learners may be asked to: Identify and list the confined space at their workplace Use of appropriate gas testing equipment to assess confined space hazards at the workplace Write a safe work procedure for controlling a hazard identified

Where relevant and appropriate, the learning activities for the unit should be designed to shape or cultivate the expected attitudes of the candidates and to prepare them for their role in the sector.

Industry Requirements

The learning methods listed below must be used during training:

- Demonstration by the trainer on the calibration and use of gas testing equipment.
- Hands-on practice for the learners on the calibration and use of gas testing equipment.

4.4 Total WSH Presentation Slides

Total WSH presentation slides will be issued upon approval of the Training Provider.

The materials are provided strictly for the explicit use and guidance of training providers for the conduct of this course.

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4.5 Recommended Class Size and Facilitator-Learner Ratio

The recommended class size: 10 – 20. The maximum class size is 20.

For practical session, the group should not be more than 5.

CHAPTER 5: KEY ASSESSMENT ADVICE

This chapter describes the following components:

5.1 Assessment Strategies

A non-exhaustive list of assessment strategies and methods indicating the possible assessment methods or combination of assessment methods, as illustrated in below, can be used as a planning guide for determining the appropriate assessment strategy for the respective performance statements and underpinning knowledge in each Specialist Diploma in Occupational Hygiene competency unit.

Individual / Group Project report
Interview/ Oral Questioning
Written Assessment
Case Study
Practical Performance

In this Competency Unit: **Assess Confined Space for Safe Entry and Work**, the following assessment methods are suggested:

Assessment Methods	Application	Evidence Sources
<u>Demonstration</u>	The competent candidate may demonstrate, in a simulated confined space environment, how to identify hazards and assess confined space atmospheric hazards. The demonstration should include the selection, calibration and use of appropriate equipment in accordance to standards methods.	<u>Process Evidence</u> <ul style="list-style-type: none">• Conducting hazard identification for confined space• Reviewing relevant information, such as safety data sheets, necessary for the confined space entry permit• Selecting gas testing instruments and sensors according to the anticipated atmospheric hazards in the confined space• Selecting and preparing the equipment for the conduct of gas testing• Performing function test and calibrating the instrument prior to measurement• Observing safety precaution during gas testing

Assessment Methods	Application	Evidence Sources
		<ul style="list-style-type: none"> • Strategise the gas testing to collect representative data • Taking precautions to ensure quality and accuracy of gas testing results • Interpreting the gas testing results, taking into considerations factors that may affect the results • Making decision on whether the atmosphere in confined space is safe for entry and work • Communicating the confined space risks identified to relevant stakeholders • Monitoring atmospheric hazards in confined space throughout the work
<p><u>Written Report</u></p>	<p>The competent candidate may submit a written report on the identification, evaluation of data and control of hazards at a confined space. This may be in a form of a confined space entry permit with additional discussions on hazards, gas testing and control measures.</p>	<p><u>Product Evidence</u></p> <ul style="list-style-type: none"> • Completed confined space entry permit • Calibration records for gas testing equipment • Written report on confined space risk assessment <p><u>Process Evidence</u></p> <ul style="list-style-type: none"> • Gathering relevant information to characterise the confined space and the associated hazards • Anticipating and identifying confined space hazards • Apply legal requirements on the assessment and management of confined space safety • Strategize the gas testing to collect representative data • Proposing control measures to make safe the atmosphere in confined space prior to entry • Interpreting the gas testing results, taking into considerations factors that may affect the results

Assessment Methods	Application	Evidence Sources
		<ul style="list-style-type: none"> • Discussing on the limitation of the gas testing equipment
<p><u>Oral / Written Questioning</u></p>	<p>Learners may be asked questions relating to the content of written report for clarification of content, confirmation of competency, verification of knowledge and checking of report authenticity.</p> <p>Learners can also be asked on the underpinning knowledge covered in the unit, for instance, definition of confined space, nature of different types of hazards, meaning of elements of safety data sheets, interpretation of legal requirements, etc.</p> <p>Written questions may be given at the end of facilitated training of a topic or at the end of a training day to check knowledge learnt in that contact period. Written questions can also be given as at the end of course as a summative assessment. The answers to each written questions should be short, not exceeding 5 lines.</p> <p>Multiple choice questions can also be given.</p>	<p><u>Knowledge Evidence</u></p> <ul style="list-style-type: none"> • Definition of confined spaces • Legal duties and responsibilities of persons involved in entering confined space. • Relevant legal and other requirements on the control of confined space safety • Meaning of elements of safety data sheets • Types of confined space hazards • Selection criteria for gas testing instruments • Gas testing methodologies • Types of gas testing instruments • Operating principles of the gas testing methods • Control measures • Emergency response and rescue procedures

Industry Requirements

Following assessment methods must be use

- Demonstration by the learners on the calibration and use of gas testing equipment.
- Written / oral assessment on the WSH (Confined Space) Regulations.

5.2 Assessment Instruments and Tools

Assessments instruments and tools will be required to conduct the assessment planned. Examples of such templates include:

- An Evidence Sources Checklist to serve as a reporting snapshot of the types of evidence gathering that may be used. **(see Annex C)**
- A Performance Statement Criteria Checklist to record the performance statement been assessed **(see Annex D)**
- A Evidence Plan Checklist to list the down the expected evidence to be collected vis-à-vis sources of evidence. **(see Annex E)**
- Verbal/Written Assessment Checklists as an instrument for the recording of answers to questions concerning the performance statements and underpinning knowledge. **(see Annex F)**
- A Recording and Reporting Assessment Table Format as an instrument for the concise recording of competency and re-assessment information concerning the Competency Unit. **(see Annex G)**

5.3 Recommended Assessor to Candidate Ratio

- This section states the ratio of assessor to candidate. This ratio is dependent on the complexity of job performance, safety requirements and experience of the Assessor.
- The recommended assessor-candidate ratio for the various assessment strategies are shown as follows:

Quiz	1 to 20
Formative skill assessment	1 to 5
Written test	1 to 20
Summative oral questioning	1 to 1

CHAPTER 6: EQUIPMENT, FACILITIES AND WSH REQUIREMENTS

6.1 Equipment and Facilities Requirements

For this unit, the following equipment must be required:

- Confined space multi-meter
- Calibration gas
- Direct reading instruments such as photoionisation detectors, detector tubes
- Samples for simulation of hazardous atmospheric conditions
- A simulated confined space environment for the use of gas testing instruments

Precaution must be taken to ensure that safety and health measures such as proper ventilation, lighting, containment for spill, clear route of exit, emergency response kit etc. are implemented.

6.2 Workplace Safety and Health Requirements for Training Delivery and Assessment

Although training and assessment should be done in a manner that is as realistic as possible, due consideration shall be given to ensure the Occupational safety and health of the learners, trainers, assessors and all persons involved such as actors in the role play etc. Training and assessment centres should set a policy that commit to safety and health. Following are some measures that should be adopted whenever applicable:

- Ensure that environment and equipment used for training and assessment are safe prior to training or assessment sessions.
- Assess the risks of training and assessment activities, especially simulation, demonstration and role play, and take reasonably practicable measure to eliminate or minimise risks.
- Establish and implement relevant safety and health procedures, including action to be taken in case of emergency.
- Provide and ensure personal protective equipment are worn by the trainers, assessors and learners.
- Assign and communicate on the measures to be taken to minimise safety and health risks; and the safety and health responsibilities and accountabilities to trainers, assessor, learner and other persons involved on
- Maintain safety and health records, such as report of hazards, dangerous occurrence, near-miss, incident and accident.

Participants should only be required to undertake instruction and assessments in environments that comply with WSH regulations of Singapore.

Some suggested strategies that could apply to this training programme are:

- establish policies for safety and health
- establish roles and responsibilities with respect to safety and health
- specify procedures for safety and health

- communicate safety and health instructions to trainers, assessors, participants and administrative staff

There should be an emphasis on the interaction between everyone involved in the learning process. Mutual consultation should cover all aspects of the learning process. Trainers and assessors should make the participants aware of the WSH issues throughout the Competency Units in theoretical and practical situations. For more information on WSH regulations of Singapore please access <http://www.mom.gov.sg>.

CHAPTER 7: ADULT EDUCATOR REQUIREMENTS

This chapter articulates the Adult Educator (AE) requirements covering these components:

7.1 Trainer/Facilitator Requirements

This section articulates the AE requirements covering these components:

Domain Knowledge Requirements

The trainer must have a diploma or degree in Engineering, Physics or Chemistry. Those who qualify as a Certified Industrial Hygienist (CIH)/ Certified Occupational Hygienist (COH) or have a degree or post graduate degree in Occupational Health/ Industrial Hygiene or such equivalent certifications in the mentioned disciplines will be at an added advantage. Those who have passed the confined space safety assessor course or hot work safety assessor course are preferred.

Domain Work Experience

The trainer must have at least 5 years' WSH experience in confined space related work. Such experience must include job roles as a confined space assessor or authorised manager or roles in training confined space related courses, or management of projects with confined space work. The trainer must also be able to provide evidence of maintaining currency, for example, through recent work in the industry as confined space assessor, hot work safety assessor, occupational hygienist, manager, consultant or trainer, or professional development or active membership of a professional association in the relevant mentioned disciplines.

WSQ Trainer's Pedagogic Requirements

The trainer must have at least 2 years of training experience in a workplace health related programme over the last 4 years. The trainer should have been certified competent and awarded the Advanced Certificate in Training and Assessment (ACTA) or Advanced Certificate in Learning and Performance (ACLP) or Diploma in Adult Continuing Education (DACE) or Diploma in Design and Development of Learning for Performance (DDDLP).

7.2 Developer Requirements

This section articulates the AE requirements covering these components:

Domain Knowledge Requirements

The developer must have a Degree or post graduate degree in Occupational Health/ Industrial Hygiene such as MSc (Safety Health and Environmental Technology), or in related disciplines Engineering, Physics and Chemistry. Those who qualify as a Certified Industrial Hygienist (CIH)/ Certified Occupational Hygienist (COH) or have attained equivalent certifications in the mentioned disciplines will be at an added advantage. Those who have undertaken the confined space safety assessor course will also have an added advantage.

Domain Work Experience

The developer should have at least 5 years' WSH experience in Occupational Hygiene or Workplace Health. Experience as an Approved WSH Officer and confined space assessor, in training confined space related courses, or management of confined space is an added advantage. The developer must also be able to provide evidence of maintaining currency, for example, through recent work in the industry as WSH occupational hygienist, manager, consultant or trainer, or professional development or active membership of a professional association in the relevant mentioned disciplines.

WSQ Developer's Pedagogic Requirements

The developer must have at least 2 years of training experience in a workplace health related programme over the last 4 years. The developer must also have been certified competent and awarded the Advanced Certificate in Training and Assessment (ACTA) or Advanced Certificate in Learning and Performance (ACLP) or Diploma in Adult Continuing Education (DACE) or Diploma in Design and Development of Learning for Performance (DDDLP).

With effect from 1 October 2015, a Diploma in Adult and Continuing Education (DACE) or Diploma in Design and Development of Learning for Performance (DDDLP) is required.

7.3 Assessor Requirements

This section articulates the AE requirements covering these components:

Domain Knowledge Requirements

The assessor must have a diploma or degree in Engineering, Physics or Chemistry. Those who qualify as a Certified Industrial Hygienist (CIH)/ Certified Occupational Hygienist (COH) or have a degree or post graduate degree in Occupational Health/ Industrial Hygiene or such equivalent certifications in the mentioned disciplines will be at an added advantage. Those who have passed the confined space safety assessor course or hot work safety assessor course are preferred.

Domain Work Experience

The assessor must have at least 5 years' WSH experience in confined space related work. Such experience must include job roles as a confined space assessor or authorised manager or roles in training confined space related courses, or management of projects with confined space work. The assessor must also be able to provide evidence of maintaining currency, for example, through recent work in the industry as confined space assessor, hot work safety assessor, occupational hygienist, manager, consultant or trainer, or professional development or active membership of a professional association in the relevant mentioned disciplines.

WSQ Assessor's Pedagogic Requirements

The assessor must have at least 2 years of training experience in a workplace health related programme over the last 4 years. The assessor must have been certified competent and awarded the Advanced Certificate in Training and Assessment (ACTA) or its equivalent.

PART III

CHAPTER 8: SUMMARY OF MANDATORY SECTIONS / INFORMATION

This chapter summarizes all the mandatory sections and required information, for easy reference. ATOs / Adult Educators are expected to note the information indicated in the following Sections and to comply with the stated requirements, where appropriate:

<u>Section</u>	<u>Title</u>
2.5	Recommended Learning Hours (RLH)
2.6	Recommended Class Size and Trainer-Trainee Ratio
2.8	Recommended Assessor to Candidate Ratio
4.1	Content Coverage <i>On percentage of items under Range and Application and Evidence Sources to be covered</i>
4.3	Learning Strategies and Delivery Methods - Industry Requirements
5.1	Assessment Strategies - Industry Requirements
7.1	Trainer Requirements
7.2	Developer Requirements
7.3	Assessor Requirements

CHAPTER 9: RESOURCE INFORMATION

This chapter indicates the various literatures, journals, articles and researched information on the competency unit 'Assess Confined Space for Safety Entry and Work' and within the domain of Occupational Hygiene. The Harvard Referencing Guide is adopted. An illustration is given below:

References

Plog , Barbara A , 2001. Fundamentals of Industrial Hygiene. 5th ed. USA: National Safety Council .

Neil, McManus., 1998. Safety and Health in Confined Spaces. USA: CRC Press

Renee, MacKenzie., 2011. Confined Spaces. Blue Feather Books Ltd

Water Environment Federation Special Publication, 1998. Confined Space Entry, Second Edition 2nd ed. Water Environment Federation

Alan, D.Veasey. and et al, 2005. Confined Space Entry and Emergency Response. USA: Wiley-Interscience

John, F.Rekus., 1994. Complete Confined Spaces Handbook. CRC Press

OHTA Approved Training Materials:

Red Magma. 2010. W501 Measurement of Hazardous Substances. [ONLINE]
Available at: <http://www.ohlearning.com/training/training-materials/w501-measurement-of-hazardous-substances.aspx>. [Accessed 16 May 11].

PART III

1. Glossary of Terms

This section presents the list of terms and abbreviations used in this document as well as terms frequently encountered in the training and assessment.

Assumed Attitudes, Skill and Knowledge: Attitudes, skills and knowledge that the individual should preferably have to confidently undertake the unit and to be successful subsequently on the job

Competency Category: The broad area or function in which competency are mainly found. This information is use to provide additional contextual information on the background of the competency standard.

Competency Units: Describes a particular work role, duty or function, which forms the smallest group of skills, knowledge and abilities that are ale t be recognised separately for certification.

Credit Value: A value assigned to the competency unit by WDA based upon the WSQ Credit System.

CTAG: Known as Curriculum Training and Assessment Guide (CTAG) is prepared by the Singapore Workforce Development Agency (WDA) to aid Approved Training Organisations (ATOs) in the design and delivery of competency-based training programme for the respective competency units

Directed learning: The trainer/assessor-directed and purposefully instructed to trainees to complete as part of instructional design of a structured training & assessment programme.

Evidence Sources: Types of proof (product, process and knowledge evidences) and individual may produce to demonstrate competent performance.

National Accreditation Recognition (NAR): IOHA National Accreditation Recognition scheme. A system for ensuring comparability of professional levels of Occupational Hygiene qualifications

Occupational Hygiene: The practice of anticipation, recognition, evaluation and control of workplace health hazards and risks to prevent ill health and protect the wellbeing of persons at work. Such health hazards may include chemical, physical and biological; and those related to human factors. It is also commonly known as “Industrial Hygiene”.

Performance Statements: The critical aspects of job performance, stating the evaluative criterion and expected outcome of tasks

Range of Application: Ranges, contexts or circumstances under which competent performance may be demonstrated. It gives further references to specific areas or terms in the Performance Statements and Underpinning Knowledge.

Recommended Learning Hour (RLH): The total hours of competency-based

training and assessment, taking into account the time required for directed learning activities. The RLH includes examples as follows:

- Facilitated training and assessment
- E-learning and assessment
- Structured On-Job-Training (OJT)
- Practicum or Project Work if any

Underpinning Knowledge: Knowledge that is acquired during the course of training and is essential to support competent performance. It may include principles, processes, methods, procedures, legislative / legal requirements. Workplace Literacy and Numeracy (*WPLN*):

2. List of Acronyms

ATO	Approved Training Organisation (by WDA)
ACTA	Advanced Certificate in Training and Assessment
ABIH	American Board of Industrial Hygiene
BOHS	British Occupational Hygiene Society
CIH	Certified Industrial Hygienist
CS	Competency Standard
CPE	Certified Professional Ergonomist
CTAG	Curriculum Training and Assessment Guide
GSD	Generic Skills Development Division, WDA
MOM	Ministry of Manpower
NEA	National Environmental Agency
NAR	National Accreditation and Recognition
OH	Occupational Hygiene
IOHA	International Occupational Hygiene Association
OHTA	Occupational Hygiene Training Association
PPE	Personal protective equipment
PS	Performance Statement
RLH	Recommended Learning Hours
SDOH	Specialist Diploma in Occupational Hygiene
UK	Underpinning Knowledge
WDA	Singapore Workforce Development Agency
WH	Workplace Health
WPLN	Workplace Literacy and Numeracy
WSH	Workplace Safety and Health
WSQ	Singapore Workforce Skills Qualifications

3. Version Control Record

Version	Effective Date	Status / Changes
0	1 July 2011	-
1	1 Aug 2011	-
1.1	1 June 2012	Changes to AE requirements
2.0	21 Jan 2021	Update

Instructional Strategy Selection Chart

Instructional Strategy	Cognitive Domain (Bloom, 1956)	Affective Domain (Krathwohl, Bloom, & Masia, 1973)	Psychomotor Domain (Simpson, 1972)
Lecture, reading, audio/visual, demonstration, or guided observations, question and answer period	1. Knowledge	1. Receiving phenomena	1. Perception 2. Set
Discussions, multimedia CBT, Socratic didactic method, reflection. Activities such as surveys, role playing, case studies, fishbowls, etc.	2. Comprehension 3. Application	2. Responding to phenomena	3. Guided response 4. Mechanism
On-the-Job-Training (OJT), practice by doing (some direction or coaching is required), simulated job settings (to include CBT simulations)	4. Analysis	3. Valuing	5. Complex response
Use in real situations. Also may be trained by using several high level activities coupled with OJT.	5. Synthesis	4. Organize values into priorities	6. Adaptation
Normally developed on own (informal learning) through self-study or learning through mistakes, but mentoring and coaching can speed the process.	6. Evaluation	5. Internalizing values	7. Origination

The chart does not cover all possibilities, but most activities should fit in. For example, self-study could fall under reading, audio visual, and/or activities, depending upon the type of program you design.

(extracted from <http://www.nwlink.com/~donclark/hrd/strategy.html>, accessed 19 Sep 2010)

Annex B: Occupational Hygiene Professionals Competency Map and Qualifications Framework

Key Purpose: To drive improvements in workplace health (WH) management and raise WH standards through quality professional development of competent and motivated Occupational Hygiene (OH) Professionals to assist employers, occupiers and other stakeholders in the anticipation, recognition, evaluation and control of occupational hygiene risks at the workplace				
Entry Requirements Literacy, Numeracy and Science Requirements - ES WPLN Level 6, or - Grade C6 in GCE 'O' Level for English and Mathematics and - Grade C6 in GCE 'O' Level Science (Chemistry and Physics) Assumed Attitude, Skills and Knowledge (ASK) Working Experience Recommended to have at least 2 years of working experience in any industry Attitude Self-directed, with an analytical mind and a meticulous approach to problem-solving. Passionate and committed to ethical practice in Occupational Hygiene. Receptive to change in the light of new evidence. Key Industries Chemical, Process, Pharmaceutical, Manufacturing, Healthcare, Marine, Construction, Education and Research & Development	Competency Category	Core Units		Elective Units
	Physical Hazards Include hazards arising from heat, cold, radiation, noise and vibration at the workplace. These hazards can cause varying forms of strain and injury to the body.	- Interpret Basic Workplace Health Practices (OH-GE-501C-1) - Monitor Noise and Vibration (OH-PH-501C-1) - Control Noise and Vibration (OH-PH-502C-1)	Elective Units (Group 1) - Assess and Control Thermal Stressors (OH-PH-503E-1) - Manage Radioactive Materials and Irradiating Apparatus (OH-PH-504E-1) - Control Hazards in Handling Laser Devices (OH-PH-505E-1)	Qualification: Specialist Diploma in Occupational Hygiene Requirements: 8 Core Units + 2 Electives Units from Group 1 + 1 Elective Unit from Group 2 Occupational Title OH Officer Recommended Learning Hours (RLH) Total: 308-344 hours
	Chemical Hazards and Biological Hazards Include hazards arising from exposure to chemical substances that may be hazardous to health of persons at work if inhaled, swallowed, or absorbed through the skin. These chemical substances may be present in the workplaces in solid, liquid or gaseous states.	- Measure Exposure and Assess the Risks due to Hazardous Substances (OH-CB-501C-1) - Evaluate Health Effects due to Hazardous Substances (OH-CB-502C-1) - Manage Hazardous Substances (OH-CB-503C-1)	- Manage Asbestos and Other Fibres Risks (OH-CB-504E-1) - Manage Skin Exposure Risks (OH-CB-505E-1) - Assess Confined Space for Safe Entry and Work (OH-CB-506E-1) - Manage Indoor Air Quality (OH-CB-507E-1) - Evaluate and Control Biological Hazards (OH-CB-508E-1)	
	Human Factors Also include hazards arising from exposure to substances of biological origin at the workplace. The sources of these hazards include bacteria, viruses, insects, plants, birds, animals, and humans, and their products which may present a potential risk to the health and well-being of humans.	- Evaluate Ergonomics-Related Hazards (OH-HF-501C-1)		
	Non-Technical Skills These skills will enable learners to generate feasible, efficient and innovative solutions to solve work problems, enhance productivity and capitalise on new opportunities, as well as to work and communicate effectively in a diverse team environment and negotiate for mutually beneficial outcomes.	- Compose Technical Report (OH-NT-501C-1)	Elective Units (Group 2) - Lead Workplace Communication and Engagement (ES-IP-401G-1) - Solve Problem and Make Decision at Managerial Level (ES-ACE-402G-1) - Apply Systems Thinking in Problem Solving and Decision Making (ES-ACE-501G-1) - Plan, Prepare for and Deliver Presentations (WP-IC-505E-1)	

Map Summary

Core Units: 8
 Elective Units: 12
 Total Units:

Legend



Core Units



Elective Units (Group 1)



Elective Units (Group 2)

Imported Units

Occupational Roles/Competent Persons Regulated by MOM/NEAⁱ

Competency Units	RLH	Credit Value	Courses Accredited by MOM/NEA		Occupational Roles/ Competent Persons
			Unit Title	Duration (hours)	
Core Units					
Interpret Basic Workplace Health Practices	40	4	-	-	-
Monitor Noise and Vibration	24	2	Noise Monitoring Course	24	Noise Monitoring Officer
Control Noise and Vibration	16	2	Industrial Noise Control Course	20	Noise Control Officer
Measure Exposure and Assess the Risks due to Hazardous Substances	40	4	Sampling & Monitoring of Airborne Contaminant	24	Competent persons for sampling and monitoring of airborne contaminants
Evaluate Health Effects due to Hazardous Substances	40	4	-	-	-
Manage Hazardous Substances	40	4	Management of Hazardous Substances	28	HS licensee
Evaluate Ergonomics-Related Hazards	40	4	-	-	-
Compose Technical Report	8	1	-	-	-
Elective Units – Group 1					
Assess and Control Thermal Stressors	40	4	-	-	-
Manage Radioactive Materials and Irradiating Apparatus	30	3	Basic Ionising Radiation Safety (General) Course	16	L5/L6 (non-NDT work) licensee
Control Hazards in Handling Laser Devices	20	2	Basic Laser Radiation Safety Course	16	N3 licensee
Manage Asbestos and Other Fibres Risks	40	4	Asbestos Removal and Management	16	-
Manage Skin Exposure Risks	40	4	-	-	-
Assess Confined Space for Safe Entry and Work	40	4	Confined Space Safety Assessor Course	39	Confined Space Safety Assessor
Manage Indoor Air Quality	28	3	Management of Indoor Air Quality	20	-
Evaluate and Control Biological Hazards	24	2	-	-	-
Elective Units – Group 2					
Lead Workplace Communication and Engagement	16	2	-	-	-
Solve Problem and Make Decision at Managerial Level	16	2	-	-	-
Apply Systems Thinking in Problem Solving and Decision Making	16	2	-	-	-
Plan, Prepare for and Deliver Presentations	16	2	-	-	-

The OH Professionals WSQ Framework is largely referenced to the mandatory courses for competent persons accredited by Ministry of Manpower (MOM) and National Environment Agency (NEA)

RLH: Recommended Learning Hours: This refers to the total hours of competency-based training and assessment, taking into account the time required for directed learning activities

Performance Statement Checklist

Name of Candidate and Organisation	
Name of Assessor	
Date & Venue of Assessment	
Competency Unit(s)	

Assessment Strategy		Performance Statement Assessed	Result		Remarks
			C	NYC	
1.	Work Observation				
2.	Written / Oral Test				
3.	Written / Verbal/ Management reports				
4.	Presentation				
5.	Others				

Evidence Plan Checklist

Evidence Plan		
Name of candidate & Organisation		
Name of assessor		
Competency Unit(s)		
Sources of Evidence	Expected Evidence	Received
Research Project		<input type="checkbox"/>
Work Observation		<input type="checkbox"/>
Written Activities /		<input type="checkbox"/>
Personal Statement/Resume		<input type="checkbox"/>
Workplace Documents (verified)		<input type="checkbox"/>
Training Records		<input type="checkbox"/>
Case Studies		<input type="checkbox"/>
Projects		<input type="checkbox"/>
Journal/Diary		<input type="checkbox"/>
Testimonials		<input type="checkbox"/>
Skills development activities		
Arrangements		
Agreement		
<input type="checkbox"/> Evidence to be submitted by:		
<input type="checkbox"/> Interview date:		
<input type="checkbox"/> I agree to the evidence plan:		
<input type="checkbox"/> Candidate (name) (signature)
<input type="checkbox"/> Assessor (name) (signature)

Verbal/Written Assessment Checklist

Record of Interview Questions			
Name of Candidate & Organisation			
Name of assessor			
Date and Venue of Assessment			
Competency Unit(s)			
Questions	Satisfactory Response		Remarks
	Yes	No	
Q1.	<input type="checkbox"/>	<input type="checkbox"/>	
Q2.	<input type="checkbox"/>	<input type="checkbox"/>	
Q3.	<input type="checkbox"/>	<input type="checkbox"/>	
Q4.	<input type="checkbox"/>	<input type="checkbox"/>	
Q5.	<input type="checkbox"/>	<input type="checkbox"/>	
Q6.	<input type="checkbox"/>	<input type="checkbox"/>	
Q7.	<input type="checkbox"/>	<input type="checkbox"/>	
Q8.	<input type="checkbox"/>	<input type="checkbox"/>	
Q9.	<input type="checkbox"/>	<input type="checkbox"/>	
Q10.	<input type="checkbox"/>	<input type="checkbox"/>	
The candidate's underpinning knowledge and understanding was:			
Satisfactory <input type="checkbox"/> Not satisfactory <input type="checkbox"/>			
Signed by the candidate: _____		Date: _____	
Signed by the assessor: _____		Date: _____	
Feedback to candidate:			
.....			
.....			
.....			
.....			

Suggested Format for Recording and Reporting Assessment

Competency Unit(s)	
Name of Candidate & Organisation	
Name of assessor	
Date and Venue of Assessment	

Assessment Criteria For...	Competent	Not Yet Competent
{Performance Statement 1}		
{Performance Statement 2}		
{Performance Statement 3}		
{Underpinning knowledge 1}		
{Underpinning knowledge 2}		
Feedback to participant:		
Assessor's Signature : _____ Date: _____		

Re-assessment information

Date of re-assessment _____	Competent	Not Yet Competent
Item/s to be re-assessed		
Assessor's Signature : _____ Date: _____		