MINISTRY OF MANPOWER

TECHNICAL NOTES

For

Commercial Self Contained Underwater Breathing Apparatus (CSCUBA) Diver

Part II

Version 1.0
14 October 2014

Workplace Safety and Health Council, Ministry of Manpower, Singapore (MOM)

All rights reserved.

This document is provided for explicit use and guidance of Learning Service Providers (LSPs) as information resource for curriculum development and test purposes. Any other use of this document or parts thereof, including reproduction, publication, distribution, transmission, retransmission or public showing, or storage in a retrieval system in any form, electronic or otherwise, for purposes other than that expressly stated in this advice without the expressed permission of MOM is strictly prohibited.
<table>
<thead>
<tr>
<th>Version</th>
<th>Effective Date</th>
<th>Changes</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>14 Oct 2014</td>
<td>MOM Technical Notes (First issue)</td>
<td>ICB, WSH Council Office</td>
</tr>
<tr>
<td>Table of Contents:</td>
<td>Page</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------</td>
<td>------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1  Aim of MOM Technical Notes</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2  MOM Technical Notes</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3  Overview of Course Requirements</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4  Training Delivery Advice</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5  Assessment Advice</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6  Facilitator and Assessor Requirements</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7  End of Course Evaluation and Feedback</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8  Related WSH Legislations, Industrial Code of Practice, and other References</td>
<td>17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Annex A: Course Reference Matrix
Annex B: Assessment Plan
Annex C: List of MOM Recognised Commercial Diving Certifications
1 AIM OF THE MOM TECHNICAL NOTES

1.1 The MOM Technical Notes is a document listing the requirements expected of the Learning Service Providers (LSPs), the facilitators, course and facilities suitable for the conduct of the WSH course. It also aims to help facilitate LSPs learning process, deliver effective training and conduct competency-based training and assessment.

1.2 The main part of this document contains key information on the Commercial Self Contained Underwater Breathing Apparatus (CSCUBA) Diver [CSCUBA-Diver] including the course aim, learning objectives, target audience, assumed skills and knowledge, course syllabus, course duration, class size, and facilitator/learner ratio. It also sets forth guidelines for training delivery and test for the course.

1.3 LSPs shall refer to the Curriculum, Training and Assessment Guide (CTAG) for guidance on curriculum design, training delivery and development of assessment plans; to Competency Standard (CS) for the competency and training requirements.

1.4 This MOM Technical Notes shall be reviewed on a regular basis and or whenever it is deemed necessary due to changes in MOM policy and or requirements, training syllabus and or industrial requirements.

2 MOM TECHNICAL NOTES

2.1 LSP Criteria:

Organisation

- Organisation profile and relevant registration certificates from the regulatory or registration bodies
- LSP’s in-date insurance policy:-
  - Employers Liability
  - Third Party Public Liability
  - Equipment Liability
- Public Liability Insurance (minimum S$1,000,000)
- Comprehensive Risk Management Plan
- Comprehensive Emergency Response Plan
- Workmen Compensation Insurance
- 1 full time Principal/Manager
- 1 full time Facilitator & 2 Associate Facilitators
- bizSAFE Level 3
- Paid up Capital $500,000
• ACTA or DACE
• Advanced Certificate in WSH (Level B) (for worker/diver course)
• Trainer certified under the List of Foreign Accreditation/ Certifications recognised by the Ministry of Manpower (Annex C)
• Certified ISO 29990:2010
• Any other course specific requirement/s *(as stipulated in the CTAG Clause 2.1)*

2.2 **LSP Training Location/ Facilities:**

All locations and facilities to be used for training and assessment have to be approved by the Accreditation Authority. The Competency Standard for Inland/Inshore CSCUBA Diver requires two types of facilities for training and assessment - a classroom environment for theory training and a practical work site (dive site) for diving.

To ensure a safe and conducive location is available for the training and assessment, the following shall be provided within the training facility.

2.2.1 **For theory-base Competency Units/Elements**

• Sufficient-sized classroom with air-conditioning, comfortable tables and chairs to accommodate learners. Classroom should be conducive for training e.g. free from noise and odour
• Audio and visual equipment (e.g. projector and projection screen, DVD player) to display presentation slides and play DVD/CD/video to the learners in a classroom
• IT facilities e.g. computers and internet connection (if the activities require)
• White board, flip chart and marker pens
• Sufficient writing materials/calculators for each trainee for the training period
• Sufficient lighting
• Sufficient portable firefighting appliances (in date ready for use)
• Training facility floor plan identifying emergency escape routes and emergency muster location
• Hazard-free access to training facility
• First aid box (in date and complete)
• Adequate and clean sanitary facilities
• Facilities for provision of drinks and snacks
2.2.2 For practical-base Competency Units/Elements

- Sufficient-sized classroom/workshop to accommodate learners.
- Appropriate and sufficient diving equipment in compliance with the requirements of SS 511 and TA for the method of diving being trained.
- Access to recompression chamber for training and emergency use (established within the emergency plan).
- Access to sufficient locations with a controlled and manageable working environment with suitable depths of water to allow for the practical training and assessment as specified in this document.
- Sufficient and suitable personal protection equipment (PPE) in good condition for the type of work being carried out.
- Sufficient portable firefighting appliances (in date ready for use)
- First aid box (in date and complete) and suitable onsite medical equipment i.e. AED/ Oxygen providing equipment etc
- Adequate and clean sanitary facilities.
- Facilities for provision of drinks and snacks.

2.2.3 LSP is to adhere to the conditions stipulated in the MOM Technical Notes Parts I and II at all times, where applicable. Adequate safety control measures must be undertaken to ensure the safety of the learners and facilitators during the conduct of the course/training at all times.

It is recommended that the LSP consults relevant publications such as the Code of Practice for Diving at Work, SS511, and the Technical Advisory (TA) for Inland/Inshore Commercial Diving Safety and Health in preparation of the training and assessment activities.

2.2.4 Emergency Procedures and Equipment

During all training operations, appropriate emergency response procedures and emergency first aid equipment shall be in place in accordance with the requirements in WSH Act, SS511, and the TA.

2.3 Checklist for LSPs:

- URA approved use of venue: Commercial School (theory only) or Industrial Training (theory and practical)
- Facilitators to be approved by authority by course, language and venue
- Updated register of all facilitators by course, language and venue
- Course information including cancellation and refund policy must be made available to the public
- Accountability for all test related materials including test question sets i.e. number of sets produced and destroyed
• Guidelines for invigilator and assessors
• Code of conduct for Invigilators and assessors
• Register to show production, issuance and destruction of safety
certificates/pass/card
• All safety certificates/safety pass/card to be issued by LSPs to learners no later
than one month from test date
• End of course evaluation for each course, to be completed by the Learners
• LSPs to have copy of the MOM Technical Notes Parts I and II, Facilitators’
Guide, SOP and any other related training documents

3 OVERVIEW OF THE COURSE REQUIREMENTS

3.1 Learning objectives:
Learners for CSCUBA or SSDE Diver has to first complete the common Core
Competence Units, thereafter, the learner diver may progress and obtain
competencies as a CSCUBA Diver (Level 1) or directly as a SSDE Diver (Level 2)
by completing the respective Specific Competency Units

3.1.1 Core Competency Units for CSCUBA Diver
• Legislation and Standards
• Diving Theory - Physics
• Diving Theory - Physiology
• Diving Procedures
• Underwater and Surface Operational Hazards
• Documentation and Records

3.1.2 Specific Competency Units for CSCUBA Diver
• CSCUBA Diving Equipment, Systems, Procedures and Practices
• CSCUBA Diving

3.2 Target audience: This course is designed to train commercial divers to safely and
competently carry out diving operations using CSCUBA.
3.3 Pre-Requisites for CSCUBA Diver:

- The trainee must be in possession of a valid certificate of medical fitness to dive (refer to Singapore Standards SS 511) issued, after examination, by a doctor experienced in underwater medicine and who is trained and qualified in Underwater Medicine, basic and advanced courses in diving medicine or courses of a similar standard.
- Be at least 18 years of age.
- Be a competent swimmer.
- Be able to add, subtract, multiply and divide whole numbers, decimals and simple fractions
- Be able to calculate percentages; and transpose and solve simple formulas e.g. gas laws
- Understand written and verbal communications (using English), and communicate easily with other persons (Note: This is particularly important where trainees or instructors are of differing nationalities)
- Hold a certificate from a recognized first aid course (this may be included in the training / assessment process)
- Persons requiring commercial diver certification must meet all competencies in the Singapore Commercial Diving Competency Standard for Inland/Inshore CSCUBA for the particular level of certification being sought.
- The TWO (2) levels of commercial diver qualification are:
  - Level 1: CSCUBA Diver (No Decompression; maximum depth 30m)
  - Level 2: SSDE Diver (Maximum depth 30m)

  NOTE: The CTAG/CS does not apply to diving operations conducted within the Offshore Oil & Gas Industry
- During practical training or diving operations, the training provider must conduct risk assessment to identify the appropriate number of divers in the water, as well as the supervision, stand by divers, tenders and additional support required to ensure the diving is conducted safely and in accordance with SS 511 and TA for Inland/Inshore Commercial Diving Safety and Health
- Persons holding commercial diver certificates to this Standard may upgrade their diving qualifications by completion of all the remaining modules in this Standard to qualify for SSDE Diver certification.

3.4 Recommended facilitator/learner ratio:

3.4.1 Theory Lesson/ Assessment = 1:15 max (theory)

This facilitator-learner ratio is required to ensure adequate communication and information transfer during the training process.
3.4.2 Practical Training or diving operation = 1:5 (practical)

The training provider must conduct risk assessment to identify the appropriate number of divers in the water, as well as the supervision, stand by divers, tenders and additional support required to ensure the diving is conducted safely and in accordance with SS 511 and TA for Inland/Inshore Commercial Diving Safety and Health.

3.5 Course attendance: 100% attendance.

3.6 Scope of Working Conditions

The scope of environmental working conditions for the commercial diver is dependent on the geographic location where the work is carried out. Under this competency standard the training and assessment shall be undertaken within the waters and facilities available in Singapore. This environment provides for many variables such as:

- Good visibility
- Poor visibility
- Tides and Currents
- Rivers and reservoirs
- Warm water
- Water salinity/bouyancy
- Fresh water
- Marine life hazards
- Underwater hazards – pressure differentials
- Fishing nets
- Subsea structures, confined space/overhead obstructions, varied surface weather conditions
- Soft and hard sea bed condition

Each of these variables when included during the training and assessment process provides for equivalent conditions for that of a diving project worksite.
4 TRAINING DELIVERY ADVICE

4.1 Facilitator’s guide and learners’ workbook/handouts

4.1.1 In order to deliver more effective instruction and ensure consistency in training, a copy of the facilitator’s guide shall be prepared. The guide provides the facilitator with information on the course including:

- Course aim
- Learning objectives
- Target audience
- Assumed skills and knowledge
- Course duration
- Class size and facilitator/learner ratio
- Lesson plan
- Course contents and instructional materials according to the course requirements
- Training methodologies
- Areas of focus/emphasis for each slide/topic
- Training resource requirements
- Course administration instruction

4.1.2 The LSP shall also facilitate the learning process by providing each learner with a learners’ workbook/handouts to summarize (with illustrations, where possible) key learning points of all the topics covered in the syllabus. This may be in the form of drawings/illustrations rather than words.

4.1.3 The LSP is required to prepare and submit a course reference matrix (see Annex A) for coverage of course contents with respect to the training slides and the practical test modes. This is to facilitate cross references between topics and training slides on the said topics.

4.1.4 It is the responsibility of the LSP to ensure that no part of the materials used for the training infringe on patent, design, copyright and intellectual property rights of any individual or organization.

4.1.5 The LSP shall retain an updated version of the training course syllabus, lesson plan, facilitator’s guide and a learners’ workbook/handouts at all times for inspection and verification by appointed auditors.
4.2 Training Methodology

4.2.1 Facilitators are expected to draw upon their facilitator-training in the development and delivery of the training programme and to apply appropriate principles of training in the design and delivery of the course.

4.2.2 A robust and qualitative assessment process is essential to ensure the commercial diver has attained competency. For the Specific Competency Units, at least 2 assessment methods should be used for each performance criteria required of the trainee. Where appropriate, 2 or more performance criteria may be assessed collectively in an assessment activity. The following assessment strategies should be used:

- Authenticated testimonies from authorized course assessors
- Case studies
- Demonstration of activity
- Interview
- Group discussion
- Individual and group exercises
- Individual study of the applicable information and knowledge review
- Observed performance in practical exercises
- Facilitator presentation on knowledge and skills
- Multiple-choice question examination
- Verbal and written reports
- Role play
- Skill practice
- Workplace project
- Written examination

4.2.3 To enhance the transfer of learning, an adult-oriented approach to learning is encouraged in the development and delivery of the course. For adult learning, instructional techniques are designed with the following factors in mind:

- Adults are self-directed
- Adults have acquired a large amount of knowledge and experience that can be tapped as a resource for learning
- On-the-job and workplace learning
- Adults show a greater readiness to learn tasks that are relevant to the roles they take on in life
- Adults are motivated to learn in order to solve problems or address needs, and they are expect to apply what they learn to address problems and needs in general.
4.3 Training Requirements:

4.3.1 Training site emergency evacuation route – to be briefed at start of course
4.3.2 Training SOP must be available before the conduct of the course
4.3.3 Photos/slides of the various types of hazards and control measures associated with explosive powered tools activities leading to incidents at the workplace.
4.3.4 Local case studies, where possible, relating to incidents/accidents while working on commercial diving activities
4.3.5 Appropriate and relevant PPEs and equipment for classroom demonstration must be made available during the course
4.3.6 Training videos

4.4 Practical Training Requirements

LSP shall ensure that the training and assessment comply with all safety and health requirements, including those set out in Workplace Safety and Health (WSH) Act and its subsidiary legislations, Singapore Standards SS 511, Technical Advisory (TA) for Inland/Inshore Commercial Diving and Maritime Port Authority (MPA) Regulations and Notices.

4.5 Training Records

The training record documents the training progress of the trainee and identifies additional training needs to attain the required competencies. The LSP shall keep comprehensive records for each trainee, including the following:

- Personal details
- Passport-sized photograph and copy of identification card/passport
- Completed course registration form
- Current curriculum vitae
- Copies of relevant certification e.g. education and first aid certification
- Copy of medical examination showing in-date fit to dive
- Course identification number
- Detail of all training activities e.g. attendance records, lessons completed, diving operations carried (real or simulated)
- Ongoing observation of the trainee’s general demeanour, maturity, ability to work as a team member
- Training completion date for each Competency Unit
- Certification reference number (if awarded)
- Name and qualifications of facilitators and assistants
- Record of incidents
5 ASSESSMENT ADVICE

5.1 The learner must pass BOTH written and practical assessment in order to be issued with the certificate of successful completion. Failure to pass either of the assessment shall render a “FAIL” outcome for the participant, and he must then re-attempt the course and assessments.

5.1.1 Theory Assessment

Theory assessments should be conducted throughout the course to gauge the learner’s ability and progress. These assessments should adopt various modes relevant to the subject and course content covered, e.g. written reports or interview. The final theory assessment should include an overall course examination. The following assessment strategies should be used:

a) Authenticated testimonies from authorized course assessors.

b) Case study.

c) Demonstration of activity.

d) Interview.

e) Observed performance in practical exercises.

f) Multi-choice question examination.

g) Verbal and written reports.

h) Role play.

i) Workplace project.

j) Written examination.

5.1.1.1 During the administration of the written assessment, there shall be an invigilator to ensure the integrity of the assessment process. The facilitator for the course is not permitted to be the assessor or invigilator for the same course learners during the assessment.

5.1.2.1 SOP on the upkeep of the confidentiality of the written assessment questions

5.1.2 Practical Assessment

5.1.2.1 Practical assessments should be conducted throughout the training period e.g. at the completion of each practical competency unit/element. These practical exercises shall cover a range of diving operations that bring together the broad range of skills required to dive safely and competently.
5.1.2.2 During assessment activities, learners shall be required to demonstrate safe working practices at all times. Learners shall be provided with any required equipment and documentation. Where practicable, the assessor should not be the facilitator who is training for the Competency Unit/Element.

5.1.2.3 The final practical assessments should cover at least 5 different diving scenarios and involve the trainee diver in all aspects of the diving operation, including at least 3 simulated emergency situations while acting as a stand by diver. The practical assessments may be completed at the training providers’ facility or at an actual work site location.

5.1.2.4 Each practical assessment shall contribute to the final outcome upon the completion of training. The learner shall be assessed either “Competent” or “Not Yet Competent”. 100% pass for all the practical components is required.

5.1.3 Practical Assessment – Emergency Response

A commercial diver’s ability to respond to emergencies is a critical skill that is difficult to assess. Hence, practical assessment should include a range of realistic simulations during the training period; these may be diving-related, or other emergency scenarios related to a diving work site e.g. simulated decompression illness on the surface, injured diver underwater, diver rescue and recovery, unconscious diver underwater, gas toxicity and fire on the work site.

5.2 Guidelines on Practical Assessment

The assessment plan shall comprise the following:

- Overview of the assessment tools and its duration
- Clear instructions on the conduct of the assessment
- SOP on the upkeep of the confidentiality of the practical assessment questions
- Instruments or tools of the practical assessment (e.g. question paper, diving equipment/ accessories checklist)
- Practical assessment summary record

5.3 Assessment of Personnel with Previous Diving Experience or Training

Learning providers may offer Assessment-Only Pathway to a person with previous commercial diving experience or diving qualifications, subject to approval from the Accreditation Authority. If the person successfully completes the assessments in accordance with the CTAG, he can be certified as a commercial diver under the Competency Standards for Inland/Inshore CSCUBA Diver.
5.4 **Recording and reporting outcome of the Test**

5.4.1 All practical assessment outcomes must be accurately recorded in the assessment summary record form.

5.4.2 The practical assessment outcome must be conveyed to the learners at the end of the assessment.

5.4.3 The LSP shall maintain a record of the assessment results for 2 years for inspection by the authorities, when requested.

6 **FACILITATOR AND ASSESSOR REQUIREMENTS**

This section outlines the recommended minimum levels of the following personnel:

- Facilitators
- Assistant Facilitators
- Specialist Facilitators for Core Competency Units
- Assessors
- Stand by Divers

For the detailed information on the competence of the above 5 personnel, please refer to **Section 4.1 to 4.3 of the CTAG for Inland/ Inshore CSCUBA and SSDE Diver**.

6.1 A Facilitator/ Assistant Facilitator/ Specialist Facilitator, Assessor and Stand By Diver of this course should also possess the following:

6.1.1 Advanced Certificate in WSH

6.1.2 **Relevant Experience**

- **For Facilitators/Assistant Facilitators**
  - The facilitator should have at least 3 years of experience working as a diving supervisor for the equipment which they are providing training, have significant practical experience and good communication and interpersonal skills.
  - Facilitator has been certified under the List of Foreign Accreditation/ Certifications recognized by the Ministry of Manpower

- **For Assessors**
  Assessors should have at least 3 years of experience working as a diving supervisor for the equipment which they are assessing, have significant practical experience and good communication and interpersonal skills.
6.1.3 **Instructional Qualification**

*For Facilitators/ Assistant Facilitators/ Specific Facilitators for Core Competency Units / Assessors*

- WSQ Advanced Certificate in Training and Assessment (FULL ACTA)/ DACE

6.1.4 **Technical or Vocational Qualification**

For the list of MOM recognised Commercial Diving Certifications, please refer to **Annex C**.

- **For Facilitators**
  Facilitators for specific practical skill components shall have current supervisory experience and a broad background of general diving operations. In addition to being an experienced dive supervisor, the facilitators shall have substantial experience in the subject which he is providing training. Facilitators shall be able to devise tasks that will develop practical aptitudes and to know the advantages and disadvantages of different methods of presentation and assessment.

- **For Assistant Facilitators**
  Assistant Facilitators should hold a recognized instructional qualification OR have prior suitable experience as a trainer in the subject matter being trained.

- **For Specialist Facilitators**
  Instruction for some Core Competency Units/ Elements, e.g. legislation, physics, physiology or medical topics, may be given by specialist facilitators with demonstrated competence and qualification in their specialist field. While such facilitators need not hold a formal qualification as dive supervisor, they must be familiar with commercial diving operations.

- **For Assessors**
  Assessors for Specific Competency Units shall have current supervisory experience and a broad background in general commercial diving operations. In addition to being an experienced dive supervisor, the assessor shall be very experienced in the operation/task being assessed.

6.1.5 **Stand By Diver**

The stand by diver shall be trained and certified in the method of diving training being carried out. In addition, the stand by diver shall have a minimum of 30 hours bottom time documented in his personal log book of which a **minimum of 3 hours** shall be at the depth the training is being carried out.
7 END OF COURSE EVALUATION AND FEEDBACK

7.1 The LSP shall conduct an end-of-course evaluation after each course, where learners provide quantitative and qualitative feedback on the course content, duration, training delivery, training materials, training venue, training resources, quality of facilitators and assessors.

7.2 The LSP shall analyse the feedback provided to improve the delivery of the course. Immediate actions shall be taken to address issues with ratings below 3. The actions taken to address issues with a rating of 1 or 2 shall be recorded and kept for audit purpose.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
<td>Fair</td>
<td>Satisfactory</td>
<td>Very Good</td>
<td>Excellent</td>
</tr>
</tbody>
</table>

8 RELATED WSH LEGISLATIONS, INDUSTRIAL CODE OF PRACTICE AND OTHER REFERENCES (the list is not exhaustive)

- Workplace Safety and Health Act 2006 and its Subsidiary Legislations
- WSH (Risk Management) Regulations 2006
- WSH (Incident Reporting) Regulations
- Code of Practice for Diving at Work (Singapore Standards SS511)
- Technical Advisory (TA) for Inland/Inshore Commercial Diving Safety and Health
- Maritime Port Authority (MPA) Regulations and Notices
## APPROVED TRAINING SYLLABUS
COMMERCIAL SELF CONTAINED UNDERWATER BREATHING APPARATUS (CSCUBA) DIVER

<table>
<thead>
<tr>
<th>S/N</th>
<th>Content</th>
<th>Duration</th>
<th>Indicate slide number e.g. Slide #2</th>
<th>Mode of Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>CORE COMPETENCY UNIT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Legislation and Standards</strong></td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>• Shall have an understanding of the following:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• SS 511 – Code of Practice for Diving at Work</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Technical Advisory – Inland / Inshore Commercial Diving Safety and Health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Workplace Safety and Health Act (WSHA) 1st March 2006 and supporting regulations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Basic Marine Signals and chart symbols</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><strong>Diving Theory: Physics</strong></td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Shall have an understanding of the following:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Diving Physics - Gas Laws</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Boyle’s Law</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Charles’s Law</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Henry’s Law</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Dalton’s Law</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Archimedes Principle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Visibility underwater</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diving Theory: Physiology</td>
<td>Shall have a detailed knowledge of the following:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------</td>
<td>--------------------------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Physiology of Diving</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Body Anatomy and Systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Effects of breathing various gases at elevated pressures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Temperature effects – thermal balance for the diver</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Pressure Injury and effects to the body</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Barotraumas; Ear; Sinus; Lung</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Arterial gas Embolism</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Gas Toxicity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Oxygen (Chronic / Acute)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Hypercapnia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Carbon Monoxide</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Hydrocarbons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Nitrogen Narcosis</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Sound Underwater
- Heat on the diver
- Basic math’s skills in simple equations used in basic physics calculations involving gases
- Air Consumption requirements for normal and emergency use
- Relationships between that states of matter and basic concepts of weight, density, mass and energy
- Partial Pressure of gases
<table>
<thead>
<tr>
<th>Topic</th>
<th>Subtopics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decompression Physiology</td>
<td>Principles governing compression and decompression, the uptake, distribution, and elimination of gases</td>
</tr>
<tr>
<td></td>
<td>Effects of breathing various gases at elevated pressures</td>
</tr>
<tr>
<td>Management of Diving Emergencies</td>
<td>Causes manifestations and treatment of decompression illness</td>
</tr>
<tr>
<td></td>
<td>In water diver emergencies</td>
</tr>
<tr>
<td></td>
<td>Emergency response planning</td>
</tr>
<tr>
<td>Marine Animals</td>
<td>Types of marine life that can injury a diver</td>
</tr>
<tr>
<td></td>
<td>The signs and symptoms of marine life injuries</td>
</tr>
<tr>
<td></td>
<td>Treatment protocols of marine life injuries</td>
</tr>
<tr>
<td>Flying after diving</td>
<td>Effects of and Restrictions of flying after diving</td>
</tr>
<tr>
<td>Drowning</td>
<td>Wet drowning</td>
</tr>
<tr>
<td></td>
<td>Dry drowning</td>
</tr>
<tr>
<td>Medical Emergencies signs, symptoms and treatments</td>
<td>Asphyxia</td>
</tr>
<tr>
<td></td>
<td>Pulmonary Edema</td>
</tr>
<tr>
<td></td>
<td>Respiratory arrest</td>
</tr>
<tr>
<td></td>
<td>Cardiac arrest</td>
</tr>
</tbody>
</table>
### Dive Planning/Procedures

Shall have an operational knowledge of the following:

- Roles and Responsibilities of the dive team members and others supporting the dive operation
- Minimum dive Team size
- The (dive procedures) documentation required
- Dive check lists
- Dive Briefing / Toolbox meetings
- Basic marine chart reading skills
- Basic meteorology skills
- Dive Check Lists
  - Pre dive Checks
  - Post Dive Checks
- Decompression Procedures
  - No decompression diving
  - Decompression diving
  - Omitted decompression
  - Decompression treatment requirements
  - Use of appropriate decompression tables
- Diving Emergency Procedures
  - Emergency response procedures
  - In water diver emergencies
  - Surface emergencies
### Underwater and Surface Operational Hazards

Shall have an operational knowledge of the following:

- Identification of hazards for diving operations
- HAZIDS/ Job Safety Assessments / Risk Assessment for the dive operation
- **Underwater Hazards**
  - Known hazards when diving from vessels
  - Tides, Currents, underwater entrapment
  - Hazardous marine life - review from
  - Physiology
  - Confined space / overhead environments
  - Contaminated environments
  - Differential Pressures
  - Use of tools; hand tools; hydraulic tools; cutting equipment
  - Simultaneous operations
  - Structures on the seabed
- **Surface related hazards**
  - Known hazards when diving from vessels- surface related i.e positioning; other marine craft; loss of power
  - Surface Visibility
  - Weather – rain, heat, wind
  - Fire in control room/ onboard vessel

<p>|   |   | 20 |   |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vessel Collision</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lifting objects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other contractors working in area</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Simultaneous operations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Documentation and Records</strong></td>
<td>Shall have an understanding of the following:</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>• Permit to Work systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Record keeping</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Diver certification and medicals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Personal Dive Records and log books</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Project documentation</td>
<td></td>
</tr>
<tr>
<td><strong>Course Examination</strong></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL DURATION</strong></td>
<td></td>
<td>96</td>
</tr>
</tbody>
</table>

**SPECIFIC COMPETENCY UNITS**

| **CSCUBA Diving Equipment, System, Procedures and Practices** | Shall have an operational knowledge of the following: | 16 |
| | • Minimum CSCUBA Diving equipment required: half mask, full face mask and communications systems and their use |   |
| | • Equipment limitations |   |
| | • Life Line Management |   |
| | • Dry session assembly of equipment and Pre dive checks |   |
- Personnel diving equipment
- Safe Means to access / egress of the water
- The theory & understanding of confined water diver basic exercises using CSCUBA Skills
  - Buoyancy Exercises
  - Sharing Air source (Buddy Breathing)
  - Rescue Skills
  - Navigation skills
  - CSCUBA (With full-face mask; life line and hard wire communications)
  - Confined space / overhead environments
  - Use of Buoyancy control device, Wet suit and Dry Suit
- Dive team personal roles and responsibilities
- Understanding the methods of Communications
- Hard wire and through water
- Life line signals
- Handling High pressure Air cylinders, hoses and fittings
- Understanding of the Emergency Situations and drills
  - Uncontrolled Ascent
  - Equipment malfunction; loss of air; loss of communications
  - Trapped Diver
  - Unconscious / injured diver in the water recovery
  - Contaminated air supply
  - Vomiting Underwater
  - No visibility
- The duties as a Stand By diver
  - Standby diver Drills and Training
- Compressors: LP and HP Compressors
  - Air Purity Test
  - Fault Finding
  - Cylinders, regulators, valves, hoses and pipe work
- Planned Maintenance of diving equipment
  - Personnel Diving equipment
  - Compressors
  - Communication systems
  - Cylinders (HP and LP Supplies)
<table>
<thead>
<tr>
<th>CSCUBA Diving</th>
<th>Complete and demonstrate safe use and operations during the following:</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Use of Self Contained Underwater Breathing Apparatus (CSCUBA)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Handling of High Pressure Air cylinders, hoses and fittings</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Basic knots and rigging</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Dry session assemble of equipment and pre-dive checks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Confined water dive basic CSCUBA Skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Buoyancy Exercises</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Sharing Air source (Buddy Breathing)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Emergency drills (as outlined below)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Rescue Skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Navigation skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- CSCUBA (With full-face mask; life line and hard wire communications)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Confined space / overhead environments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Open water dive skills</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Diving in other environments such as quarry, lake, river, open water and conducting the skills learnt during the pool training period</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Use of Buoyancy control device, Wet suit and Dry Suit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Tender role and responsibilities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Use of full face mask – AGA; Kirby Band Mask; EXO Mask</td>
<td></td>
</tr>
</tbody>
</table>
- Communications
  - Hard wire and through water
  - Life line signals
- Emergency Drills
  - Uncontrolled Ascent
  - Equipment malfunction; loss of air; loss of communications
  - Trapped Diver
  - Unconscious / injured diver in the water recovery
  - Contaminated air supply
  - Vomiting Underwater
  - No visibility
- Act as a Stand By diver
  - Standby diver Drills and Training
- Compression Chamber Dive to 30m
- Basic marine chart reading skills (practical)
- Basic meteorology skills (practical)

| TOTAL DURATION | 36 |
**Declaration by LSP**

I hereby declare that all the training materials and related particulars / information given are true and correct nor have I infringed any copyright related issues in this entire accreditation process/application.

<table>
<thead>
<tr>
<th>Name of LSP</th>
<th>Name of Applicant</th>
<th>Designation of Applicant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Applicant's Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Head/Principal's Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Annex B

Assessment Plan

1 Overview
2 Assessment Form (SAMPLE)
3 Summary of Assessment (SAMPLE)
1. **Overview of Assessment Plan (listed by topics)**

1.1 **Recommended training and assessment duration – CORE COMPETENCY UNITS**

<table>
<thead>
<tr>
<th>Topics</th>
<th>Recommended hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legislation and Standards</td>
<td>8</td>
</tr>
<tr>
<td>Diving Theory : Physics</td>
<td>20</td>
</tr>
<tr>
<td>Diving Theory : Physiology</td>
<td>16</td>
</tr>
<tr>
<td>Diving Procedures</td>
<td>24</td>
</tr>
<tr>
<td>Underwater and Surface Operational Hazards</td>
<td>20</td>
</tr>
<tr>
<td>Documentation and Records</td>
<td>6</td>
</tr>
<tr>
<td>TOTAL (Hours) – Written Test</td>
<td>2</td>
</tr>
<tr>
<td><strong>TOTAL (Hours)</strong></td>
<td><strong>96</strong></td>
</tr>
</tbody>
</table>

1.2 **Recommended training and assessment duration – SPECIFIC COMPETENCY UNITS**

<table>
<thead>
<tr>
<th>Specific Competency Unit - CSCUBA</th>
<th>Recommended hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSCUBA – Diving Equipment, Systems, Procedures and Practices</td>
<td>16</td>
</tr>
<tr>
<td>CSCUBA Diving</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total Duration</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>
### Assessment Form (SAMPLE)

**Core Competency Unit:** Legislation and Standards  
**Competency Element:** Describe the requirements of the Singapore Standards SS 511 Code of Practice for Diving at Work

<table>
<thead>
<tr>
<th>Performance Criteria</th>
<th>Assessment Method</th>
<th>Outcome (C or NYC)</th>
<th>Date</th>
<th>Assessor’s Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Assessor Name: ____________________________  Assessor’s Signature: ____________________________

Acknowledged by Candidate: ____________________________  Candidate’s Signature: ____________________________

Date: ____________________________  *(By signing, the candidate accepts the assessment outcome)*
### 3 Summary of Assessment (SAMPLE)

<table>
<thead>
<tr>
<th>Competency Unit</th>
<th>Competency Element</th>
<th>Outcome (C or NYC)</th>
<th>Date</th>
<th>Assessor Name</th>
<th>Assessor Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Overall Assessment Outcome (Please Tick)**

Competent [ ] Not Yet Competent [ ]

**Comments from Assessor or Candidate**

(including any limitations or restrictions to be noted on the certificate)

Assessor Name: ____________________________ Assessor’s Signature: ____________________________

Acknowledged by Candidate: ____________________________ Candidate’s Signature: ____________________________

Date: ____________________________ *(By signing, the candidate accepts the assessment outcome)*
# List of MOM Recognised Commercial Diving Certifications

<table>
<thead>
<tr>
<th>Country / Accreditation</th>
<th>CSCUBA (30m)</th>
<th>CSSDE (30m)</th>
<th>Offshore (50m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia / New Zealand (ADAS)</td>
<td>ADAS part 1</td>
<td>ADAS part 2</td>
<td>ADAS Part 3 &amp; Part 4</td>
</tr>
<tr>
<td>Canada (DCBC)</td>
<td>Unrestricted SCUBA</td>
<td>Restricted Surface Supplied Diver</td>
<td>Unrestricted Surface Supplied Diver &amp; above</td>
</tr>
<tr>
<td>Malaysia (CIDB)</td>
<td>Construction Diver Level I</td>
<td>Construction Diver Level II</td>
<td>ADAS part 3 &amp; part 4</td>
</tr>
<tr>
<td>United Kingdom (HSE) pre 1998</td>
<td>HSE part 4</td>
<td>HSE part 3</td>
<td>HSE part 1 &amp; HSE part 2</td>
</tr>
<tr>
<td>United Kingdom (HSE) post 1998</td>
<td>HSE SCUBA</td>
<td>HSE Surface Supplied</td>
<td>HSE Surface Supplied with Top Up &amp; above</td>
</tr>
</tbody>
</table>

**Association/Agency**

| IMCA approved training member | N/A | N/A | IMCA Surface Supplied Diver |

**Diving Supervisor Competency**

| IMCA | Onshore SCUBA Supervisor | Onshore SSBA Supervisor | Offshore Air Diving Supervisor & Bell Diving Supervisor |
| ADAS | NIL | NIL | |
| CIDB | Onshore SCUBA Supervisor | Onshore SSBA Supervisor | ADAS part 3 & part 4 |
| DCBC | Onshore Supervisor | | Offshore Air/Saturation Diving Supervisor |
| MOM | CSCUBA Supervisor | CSSDE Supervisor | N/A |

**Abbreviations:**

- **ADAS**: Australian Diver Accreditation Scheme
- **CIDB**: Construction Industry Development Board (Malaysia)
- **DCBC**: Diving Control Board of Canada
- **CSSDE**: Commercial Surface Supplied Diving Equipment
- **CTAG**: Curriculum, Training and Assessment Guide
- **CSCUBA**: Commercial Self-Contained Underwater Breathing Apparatus
- **HSE UK**: Health Safety Executive (United Kingdom)
- **MOM**: Ministry of Manpower
- **IMCA**: International Marine Contractors Association