

European Diving Technology Committee

Inshore and Offshore
Diving Industry
**Personnel
Competence
Standards**

August 2026

Document Preparation

This document was prepared following Consultation among the members of EDTC and detailed discussion in the EDTC Work Group.

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1 Introduction

1.1 EDTC

The European Diving Technology Committee was formed in 1973 with the aim of promoting good standards for diving and coordinating, where possible, differing standards. Membership of the EDTC, at the time of publication of this guidance note is drawn from the countries and organisations listed below:

Austria	Belgium	Bulgaria
Czech Republic	Denmark	Estonia
Finland	France	Germany
Greece	Ireland	Italy
Latvia	Lithuania	Montenegro
The Netherlands	Norway	Poland
Portugal	Romania	Slovak republic
Slovenia	Spain	Sweden
Switzerland	Turkey	United Kingdom
International Marine Contractors Association (IMCA)	International Oil and Gas Producers (IOGP)	International Transport Workers' Federation (ITF)
International Diving Schools Association (IDSA)	European Underwater Federation	European Defence Agency (EDA)
International Diving Regulators and Certifiers Forum (IDRCF)	Corresponding members (medical)	

Membership of the EDTC at the time of document update in May 2026

1.2 Purpose

The EDTC aims to make European professional diving safer. Its motto is *Securitas per unitatem*, and the EDTC seeks to reach its aim by:

- Providing an independent European forum which may make recommendations relating to diving safety, technology and diving medicine,
- Providing a place for discussions on matters related to manned underwater operations and in particular types of diving, types of equipment and their use, together with medical aspects, examination and monitoring for fitness of divers,
- Where applicable, recommending harmonisation so that common standards may be achieved,
- Providing where appropriate, advice to governments, other organisations and individuals concerned with diving,

The intent of this document is to draw together all the accumulated knowledge of the various members of EDTC in the area of competence requirements for the various grades of diving personnel.

The document provides a “high level” minimum set of competences that are required for a person to function safely and efficiently at the appropriate grade in the commercial diving industry. It covers most grades of personnel who work in the diving industry, both inshore and offshore, although there will be specialised situations (police, military, rescue etc) where other competences may be more relevant.

The document describes the required levels based on a progression in levels of education, training and ultimately, competence – for example from SCUBA diver right through to saturation/bell diver. Similar progression routes exist for most other grades of personnel within this document.

Good operational practices and technical solutions should form the basis for the diver training, and we refer to the EDTC document Principles for Harmonized Diving Standards in Europe.

The document is intended to be the reference point for competence of diving personnel. Individual countries or organisation may use the relevant sections of this document to develop their own detailed standards.

2 Scope

2.1 Legal Status

This document has no legal status in any country. It is prepared as guidance to promote commonality of requirements for the competence of various grades of diving industry personnel throughout Europe. This should assist with free movement of labour, assessment of suitability of one country's nationals by the authorities in another country etc.

2.2 Training and Competence

The training should clarify the requirements for clear organisational descriptions, responsibilities and duties of all members of the diving team. Responsibilities and clearly defined lines of reporting for all personnel should be documented.

This document is largely based on the achievement of various competences by the person involved. The difference between training and competence needs to be understood.

Training is where a person is given formal instruction and information about a subject. This normally takes place over a defined number of hours, and sometimes a task has to be repeated a defined number of times.

Competence can be defined as a combination of training, skills, experience and knowledge that a person has and their ability to apply them to perform a task safely. Other factors, such as attitude and physical ability, can also affect someone's competence.

Competence assessment requires that the individual demonstrates that they know what is required of them and can carry out the necessary tasks properly. This may be tested by written or verbal examination or by carrying out a required task one or more times.

Appendix 1 and Appendix 2 outlines the requirements for formal training, including approximate numbers of hours of theoretical and practical training. The alternative is to use a formal, prescribed competency assessment process where skills are assessed and progress from simple to complex, each skill being learned, mastered and assessed before the candidate progresses to the next stage. The diver's learning progresses at their own rate depending on ability. This may mean that courses can be completed in a smaller number of hours.

Appendix 3 and 4 describes a possible way of making a diving course detailed syllabus. In this case, the IDRCF documents for surface oriented and bell diver training is used as an example.

2.3 Age of Personnel

Within this document, EDTC has set minimum age for certain grades of personnel. Within any country that has minimum or maximum ages set by regulation then these will obviously take precedence over the EDTC limits.

EDTC considers that a person should not start working in the commercial diving industry at any grade until they are aged at least 18. Some elements of training may be undertaken earlier than that, from the age of 16 onwards, however experience should only be gained from the age of 18.

For any post that can be considered "promoted" or "supervisory" EDTC considers that an element of maturity is required along with extensive experience. For that reason, an age of 24 has been chosen as a recommendation.

3 Requirements for Training/Assessment Establishments

3.1 General

Any establishment used for formal training of diving industry personnel shall be suitable for that purpose. Similarly, any location or establishment used for assessment of competence should provide all the required facilities.

Safety and quality management should be structured and documented according to international standards, and EDTC recommend ISO 9000 series for Quality Management System; and likewise, the ISO 45001 Occupational Health and Safety Management Systems as guidance.

Safety should be understood in the broadest sense, and should cover health, working environment, technical- and operational issues. Safety principles should apply to all diving operations.

The guidance given below is general and will need to be interpreted on a case by case basis. What is required for the theoretical training or assessment of a diving supervisor will be very different from what is required to train/assess the practical attributes of a commercial diver.

The training establishments should give the students a perception of risks associated with diving as a profession, and this should be highlighted during theoretical and practical training. Risk Management should be part of the training syllabus to give the students a tool to control and mitigate risk.

Example of risk presentation format for specific diving activities:

		Severity		
		Low(1)	Middel (3)	High(5)
Likelihood	Unlikely. No knowledge of any such cases (1)	1	3	5
	Now and then, occurs occasionally (3)	3	9	15
	Frequently, could occur regularly (5)	5	15	25

3.2 Facilities

Classrooms and lecture areas should meet the following:

- ◆ Indoors, enclosed and weatherproof
- ◆ Enough space for the number of persons inside
- ◆ Means of heating/cooling to maintain a comfortable temperature
- ◆ Adequate lighting for reading
- ◆ Proximity to toilet and washing facilities
- ◆ Situated away from external noise sources or soundproofed
- ◆ Supplied with a separate chair for each person with suitable facilities for writing and spreading out of books or notes
- ◆ Supplied with necessary teaching aids

Practical areas used for training/assessment should meet the following:

For diver training/assessment

- ◆ Access to open water (not a tank, pond, small lake or other enclosed area)
- ◆ Access to moving water (tidal or otherwise)
- ◆ Access to water of a suitable depth for the type of training proposed.
- ◆ Access to an area (this may be a tank, pond, small lake or sheltered water) suitable for training/assessment of specific skills such as safe use of tools.
- ◆ Complete range of equipment as required for the type of diving
- ◆ Equipment in good condition and maintained to manufacturer's recommendations

For non-diver training/assessment

- ◆ Complete range of equipment as required for the type of diving operation
 - Equipment in good condition and maintained to national or international standards, manufacturers' recommendations or current industry best practice
- ◆ Workshops (if required) to meet requirements for classrooms as relevant

3.3 Instructor/Assessor Qualifications and Experience

It is not possible to set specific requirements for instructors/assessors. Some individuals do not make good instructors while others are very good instructors but may not hold high qualifications. The list of requirements below should be used as a guide, but individuals can be considered separately.

- ◆ Normally an instructor/assessor should be qualified to a higher level than that which they are instructing/assessing. At the higher grades however, this may not be possible, in which case the instructor/assessor should normally be qualified to the level at which they are assessing.
- ◆ They should have several years' experience working at the level (or higher) that they are training/assessing. This experience should preferably be recent or else the person should have been working at training/assessing for the preceding several years
- ◆ They should either have formal training in instruction/assessment techniques or should have several years' practical experience at such work
- ◆ They should have good communication and interpersonal skills

3.4 Safety Standards

As part of the training/assessment is for the individual to become used to and demonstrate their ability to comply with the safety standards and practices of the diving industry. All instruction/assessment, whether practical or theoretical, should be carried out to the normal safety standards of the country in which the instruction/assessment is taking place.

The instruction/assessment for particular grades of diving should also reflect the safety standards which that grade of diving would be subject to in real life. For example, offshore divers should be trained/assessed using normal offshore safety standards.

3.5 Documentation and Record Keeping

Any establishment that carries out training/assessment in line with this document should operate its management, control and documentation systems in line with a recognised standard such as ISO 9000. This can then be audited by an independent body if required.

All assessments should be documented in sufficient detail so it can be demonstrated exactly who assessed each item, where and when this was done, how the assessment was carried out and the result. Such records should be retained for least two full years from the date that the last item in the overall assessment was completed. Some countries may have specific requirements to retain such records for a longer period and if that is the case then the longer period should be complied with.

3.6 Auditing

Any organisation carrying out training/assessment of the competences laid out in this document would be expected to carry out its operations in line with a recognised quality standard such as the ISO 9000 series. Such a standard will require periodic audits of the operations.

Third party audits may be required in some countries, and these may provide the objectivity supplied by a third-party audit.

Internal audits by the organisation themselves are of course useful quality checks and demonstrate clear intent to comply with recognised standards but they do not replace audit.

4 Detailed Competence Standards

4.1 General

The minute detail of exactly what tasks should be instructed/assessed, how this should be done, the number of times it needs to be done etc. cannot be included in this document, if for no other reason than the extent of such information. It is also not for EDTC to suggest the detail of the assessment of competence as that is a matter for individual national authorities, training establishments etc.

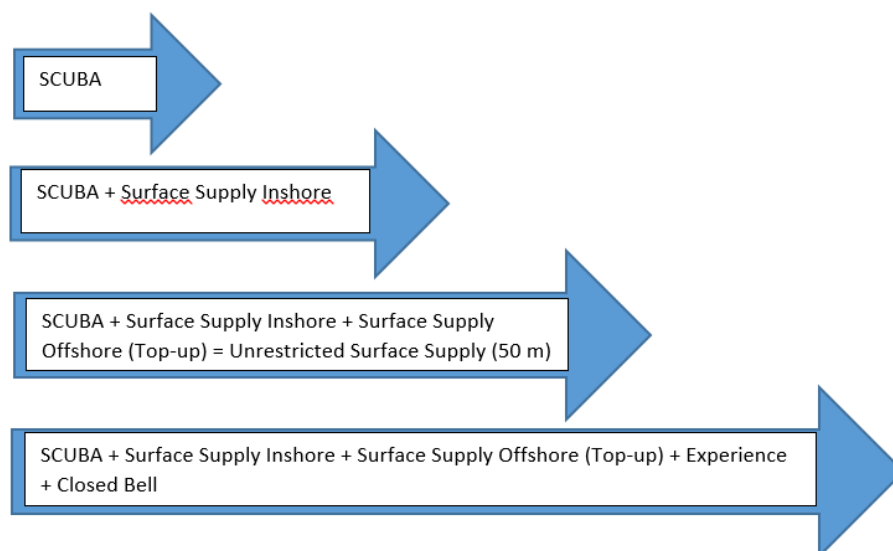
This document gives the “high level” competences required for each occupation without attempting to specify in detail the way in which these competences should be achieved. We have provided examples of detailed schedules for diver training in the appendices for information or use.

It is the intent of this guidance that the training is based on development of a diver’s competence. The more advanced certificate and training a diver has, it should be concluded that he also holds qualifications of a lesser grade.

The training of scuba techniques should be a part of the Surface supplied diver training (at some point) and not necessarily a qualification that is present as a prerequisite for the surface diver training.

All divers mentioned in this document should hold a valid health certificate prior start of training, ref the EDTC Fitness to dive standards, Guidelines for medical assessment of working divers.

The figure below illustrates the development of a diver’s competence. This implies SCUBA to 30 m, Inshore Surface Supplied to 50 m, Offshore Surface Supplied to 50 m, Diving experience and Closed Bell.



4.2 Commercial SCUBA Diver

Entry Requirements:

The entry requirements for a COMMERCIAL SCUBA DIVER are:

- ◆ At least 18 years old (this may be 21 in some countries) for actually working although some elements of training may be able to start after age 16
- ◆ Medically fit to work as a commercial diver
- ◆ Sufficient elementary education to be able to carry out the necessary calculations, communicate and understand written instructions etc.

Competences:

The competences required of a COMMERCIAL SCUBA DIVER are the ability (all in relation to a SCUBA diving operation) to:

4.2.1 Academic/Administrative Procedures

- ◇ Understand the statutory requirements of the country in which they are working
- ◇ Understand the rules, requirements and procedures of a typical employer
- ◇ Understand the need to monitor the health and safety of themselves and other members of the diving team
- ◇ Understand diving physics, physiology and medicine as it may affect them

4.2.2 Routine Diving Operations

- ◇ Work as a member of a diving team including developing suitable relationships with others in the team
- ◇ Understand and be able to assist in preparing a work plan for the dive
- ◇ Dive in open water, in a variety of conditions to a depth of at least 30 meters. The conditions which the diver should be able to cope with include:
 - Variations in visibility
 - Different surface entry conditions
 - The effect of currents and tides
 - Different seabed conditions
- ◇ Understand and be able to use decompression procedures
- ◇ Act as a surface attendant during a dive
- ◇ Use communication systems effectively, both as a diver and a surface attendant
- ◇ Be familiar with the safe use of a range of tools appropriate to the kind of tasks to be undertaken as a diver

4.2.3 Emergency Procedures

- ◇ Act as a surface standby diver
- ◇ Act as an in water standby diver (when divers are near enough to communicate and act as standby diver for each other)
- ◇ Carry out a self -rescue as a diver in an emergency situation
- ◇ Act as a member of the surface team in an emergency

4.2.4 Equipment

- ◇ Prepare all the equipment which is needed
- ◇ Carry out the pre dive checks properly on all equipment

- ◇ Operate high pressure compressors properly, including checks, simple maintenance and testing for air purity
- ◇ Correctly charge up breathing air cylinders ready for use
- ◇ Assist another diver to dress correctly and put on all equipment ready to enter the water
- ◇ Dress themselves and don all equipment needed to enter the water as a diver
- ◇ Correctly remove all equipment and undress on completion of a dive
- ◇ Assist another diver to remove equipment and undress after a dive
- ◇ Carry out all necessary post dive equipment checks
- ◇ Correctly clean equipment after use, carry out simple maintenance and store ready for subsequent use

4.2.5 First Aid

- ◇ Understand how to provide first aid in a diving situation
- ◇ Demonstrate the ability to provide basic emergency procedures such as CPR (see definition)
- ◇ Assess the status of a diving casualty and establish their needs for assistance and treatment
- ◇ Assist in the treatment, under supervision, of diving related illness and conditions

4.2.6 Chamber Operations

- ◇ Understand the procedures for operating a two compartment compression chamber under supervision
- ◇ Understand the pre-dive procedures necessary for using a two compartment compression chamber
- ◇ Act as an inside attendant in a compression chamber
- ◇ Understand the conduct of a therapeutic recompression
- ◇ Understand the post dive checks and user maintenance needed after using a two-compartment compression chamber

Note: The above competences are based on diving using compressed air as the breathing mixture. Divers intending to use different breathing mixtures or complex equipment such as rebreathers will require to demonstrate the additional competences necessary for these activities.

4.3 Surface Supplied Diver (Inshore)

Entry Requirements:

The entry requirements for a SURFACE SUPPLIED DIVER (INSHORE) are:

- ◆ At least 18 years old (this may be 21 in some countries)
- ◆ Medically fit to work as a commercial diver
- ◆ Sufficient elementary education to be able to carry out the necessary calculations, communicate and understand written instructions etc.
- ◆ Passed competence assessment for commercial scuba diver
- ◆ Commercial SCUBA training may be a part of the Surface Supplied Diver Training

Competences:

Note: In most European countries, surface supplied diving is carried out using lightweight helmets/masks while the diver wears a neoprene or rubber protective suit. The competences below are based on this type of operation.

In some countries however, “Standard Dress” is still used comprising a canvas/rubber suit which is fixed to a heavy (normally metallic) helmet. Such equipment requires different operational techniques and any diver using, or intending to use, this type of equipment will need to demonstrate the necessary competences specifically relevant to using that equipment

The competences required of a SURFACE SUPPLIED DIVER (INSHORE) are the ability (all in relation to a surface supplied diving operation) to:

4.3.1 Academic/Administrative Procedures

- ◇ Understand the statutory requirements of the country in which they are working
- ◇ Understand the rules, requirements and procedures of a typical employer
- ◇ Understand the need to monitor the health and safety of themselves and other members of the diving team
- ◇ Understand diving physics, physiology and medicine as it may affect them

4.3.2 Routine Diving Operations

- ◇ Work as a member of a diving team including developing suitable relationships with others in the team
- ◇ Operate under supervision a surface supplied dive panel with divers in the water
- ◇ Understand and be able to assist in preparing a work plan for the dive
- ◇ Dive in open water, in a variety of conditions to a maximum depth of 50 meters. The conditions which the diver should be able to cope with include:
 - Variations in visibility
 - Different surface entry conditions
 - The effect of currents and tides
 - Different seabed conditions
- ◇ Understand and be able to use decompression procedures
- ◇ Act as a surface attendant during a dive
- ◇ Use communication systems effectively, both as a diver and a surface attendant
- ◇ Be familiar with the safe use of a range of tools appropriate to the kind of tasks to be undertaken as a diver

4.3.3 Emergency Procedures

- ◇ Act as a surface standby diver
- ◇ Act as an in water standby diver (when divers are near enough to communicate and act as standby diver for each other)
- ◇ Carry out a self-rescue as a diver in an emergency situation
- ◇ Act as a member of the surface team in an emergency

4.3.4 Equipment

- ◇ Prepare all the equipment that is needed
- ◇ Carry out the pre- dive checks properly on all equipment
- ◇ Operate high- and low-pressure compressors properly, including checks, simple maintenance and testing for air purity
- ◇ Correctly charge up breathing air cylinders ready for use
- ◇ Carry out pre-dive operational/function checks on a surface supplied dive panel
- ◇ Assist a diver to dress correctly and put on all equipment ready to enter the water
- ◇ Dress themselves and don all equipment needed to enter the water as a diver
- ◇ Correctly remove all equipment and undress on completion of a dive
- ◇ Assist another diver to remove equipment and undress after a dive
- ◇ Carry out all necessary post dive equipment checks
- ◇ Correctly clean equipment after use, carry out simple maintenance and store ready for subsequent use
- ◇ Check and operate launch and recovery systems (LARS) for bringing the divers in- and out of the water using cage/stage or wet bell.

4.3.5 First Aid

- ◇ Understand how to provide first aid in a diving situation
- ◇ Demonstrate the ability to provide basic emergency procedures such as CPR (see definition)
- ◇ Assess the status of a diving casualty and establish their needs for assistance and treatment
- ◇ Assist in the treatment, under supervision, of diving related illness and conditions

4.3.6 Chamber Operations

- ◇ Undertake a compression chamber dive to at least 40 meters but less than 50 metres
- ◇ Under supervision operate a two compartment compression chamber
- ◇ Under supervision carry out pre-dive procedures necessary for using a two compartment compression chamber
- ◇ Under supervision act as an inside attendant in a two compartment compression chamber
- ◇ Under supervision undertake a therapeutic recompression
- ◇ Under supervision undertake post dive checks and user maintenance needed after using a two compartment compression chamber

Note: Within some European countries, particularly those with very deep/cold water inshore, it may be necessary for a surface supplied diver (inshore) to be assessed for competences normally associated with a surface supplied diver (offshore) such as the use of hot water suits and diving from a wet bell.

4.4 Unrestricted Surface Supplied Diver (Offshore)

Entry Requirements:

The entry requirements for an UNRESTRICTED SURFACE SUPPLIED DIVER (OFFSHORE) are:

- ◆ At least 18 years old (this may be 21 in some countries)
- ◆ Medically fit to work as a commercial diver
- ◆ Sufficient elementary education to be able to carry out the necessary calculations, communicate and understand written instructions etc.
- ◆ Passed all the competence assessments for surface supplied diver (inshore)

Competences:

The competences required of an UNRESTRICTED SURFACE SUPPLIED DIVER (OFFSHORE) are those required for a surface supplied diver (inshore) plus the following. An already qualified surface supplied diver (inshore) need only obtain and demonstrate these additional competences to become a surface supplied diver (offshore)

4.4.1 Dynamic Positioning

- ◇ Understand the hazards of diving from a dynamically positioned vessel

4.4.2 Wet Bell Operations

- ◇ Undertake Wet Bell diving operations and in particular:
 - Check and prepare equipment for a wet bell diving operation
 - Dive in open water to 20m using a wet bell
 - As a diver diving from a wet bell, act in an emergency to recover dive partner
 - Act as surface standby diver during wet bell diving operations
 - Operate wet bell diver supply panel
 - Operate wet bell deployment and recovery systems
 - Carry out post dive equipment checks on wet bell system
 - Decontaminate and clean all relevant equipment on wet bell system

4.4.3 Hot Water Systems

- ◇ Undertake surface supplied diving operations using hot water suits and in particular:
 - Check and prepare diver's hot water suit equipment
 - Dress correctly in a hot water suit ready for entering the water
 - Assist another diver to dress correctly in a hot water suit ready for diving
 - Operate surface hot water supply system both as a diver and as a member of the dive team on the surface
 - Dive in open water to 20m dressed in a hot water suit
 - Undress correctly on completion of a diving operation wearing a hot water suit
 - Assist another diver to undress correctly on completion of a diving operation wearing a hot water suit
 - Carry out post dive checks on the hot water equipment
 - Decontaminate and clean relevant hot water equipment
 - Ensure proper care and storage of hot water equipment

For more details of how the Surface Supplied Offshore Diver training recommended by EDTC could be described, we refer to Appendix 1 and the International Diving Regulators and Certifiers Forum (IDRCF) training guidelines in Appendix 3. We also refer to the IMCA Document C 003, Guidance on Competences Assurance and Assessment.

4.5 Closed Bell/Saturation Diver (Offshore)

Entry Requirements:

The entry requirements for a CLOSED BELL/SATURATION DIVER are:

- ◆ At least 18 years old (this may be 21 in some countries)
- ◆ Sufficient elementary education to be able to carry out the necessary calculations, communicate and understand written instructions etc.

In addition, the following list contains the minimum prerequisite requirements of a trainee attending Closed Bell Diver Training.

- ◆ The applicant will hold a valid and approved surface supplied diving qualification to 50m and have held that qualification for a minimum period of 12 months, prior to commencing closed bell training. The standard of that qualification will be as required in the country of training delivery e.g. the EDTC diving competency standards for offshore or inshore surface supplied diver qualification.
- ◆ Hold a valid and approved Unrestricted Surface Supplied Diver Qualification
- ◆ Hold a valid certificate of medical fitness to dive which remains in date for the duration of the training course.
- ◆ Hold a valid certificate of competence in first aid at work, which remains in date for the course, or undertake that training as part of the course of instruction. Where first aid training is undertaken during the course that training is not included in the minimum times outlined within the course guidance.
- ◆ Have recorded in a daily record of diving since being qualified as an offshore surface supplied breathing apparatus (SSBA) diver
 - a) at least 100 offshore dives using SSBA, and
 - b) at least 100 hours of bottom time.

NOTE 1:

The qualifying dives and dive times can be made up of either onshore or offshore dives or a combination of both.

NOTE 2:

Candidates who have completed all their dives inland/inshore shall have logged 20 dives deeper than 12 metres.

For more details on the recommended prerequisites and qualifying dives, we refer to the guidance document for Closed Bell Diver Training given by the IDRCF in Appendix 4

Competences:

The competences required of a CLOSED BELL/SATURATION DIVER are the ability (in relation to a closed bell diving operation) to:

4.5.1 Academic/Administrative Procedures

- ◇ Understand the statutory requirements of the country in which operations are to take place
- ◇ Understand the laws of physics as they apply to diving using mixed gases
- ◇ Understand the need to monitor the health and safety of themselves and other members of the dive team
- ◇ Understand the rules, requirements and procedures of a typical employer

4.5.2 Routine Diving Operations

- ◇ Work as a member of the diving team including developing suitable relationships with others in the team
- ◇ Undertake a closed bell dive as a diver
- ◇ Act as a bell man during a bell dive
- ◇ Support a closed bell diving operation as part of the surface team
- ◇ Establish and maintain effective communications, both as a diver and as a member of the surface team
- ◇ Carry out 3 bell lock outs at a minimum bell depth of 50 metres with a minimum diving depth of 65 meters of sea water

4.5.3 Emergency Procedures

- ◇ Act in a self - rescue emergency situation
- ◇ As a Bellman, act in an emergency situation
- ◇ Act as a rescue diver
- ◇ Act from inside chamber in an emergency situation
- ◇ As a member of the support team, assist in a chamber complex emergency

4.5.4 Equipment

- ◇ Prepare a chamber complex for use
- ◇ Check and prepare the diver's equipment
- ◇ Carry out pre dive checks on the Bell (internal and external)
- ◇ Carry out post dive checks on chamber and closed bell
- ◇ Maintain a closed bell and chamber complex in accordance with checklist

4.5.5 Chamber Operations

- ◇ Follow routine chamber procedures
- ◇ Monitor internal chamber operations
- ◇ Monitor closed bell and chamber gas quality and gas system quality
- ◇ Operate the built in breathing system (BIBS)
- ◇ Live in saturation conditions and undertake decompression from a minimum storage depth of 50 metres

4.5.6 First Aid

- ◇ Understand human physiology as it applies to mixed gas diving and saturation
- ◇ Assess and establish the needs of a diving casualty
- ◇ Demonstrate the ability to provide first aid in a bell diving situation
- ◇ Assist in treatment, under supervision, of diving related health conditions

For more details of how the bell diver training recommended by EDTC could be done, we refer to Appendix 2 and to the guidance document for Closed Bell Diver Training given by the IDRCF in Appendix 4.

We also refer to the IMCA Document IMCA C 003, Guidance on Competences Assurance and Assessment.

4.6 Assistant Life Support Technician (Offshore)

Note: This title does not equate in any way with the use of “Life Support” in a medical context. It refers in the diving industry to personnel who monitor and control the environmental parameters inside the pressure chambers inhabited by divers. This job can also be described as an assistant chamber operator.

Entry Requirements:

As this is the basic entry grade, there are no specific entry requirements other than the required standard of medical fitness and a minimum age of 18.

Prior to appointment as an assistant LST an individual must successfully complete a basic training course covering the competences listed below.

Competences:

The competences required of an ASSISTANT LIFE SUPPORT TECHNICIAN are:

4.6.1 Academic/Administrative Procedures

- ◇ Understand the following:
 - The main points of current legislation in the country concerned, relevant to diving
 - The main duties of employer and employee
 - The specific duties and responsibilities of all members of the diving team
 - The requirements of and procedures for testing, examining and certifying equipment
 - The requirements of diving operation logs
 - All relevant codes, guidance notes, safety notes or memoranda published by the relevant national governing bodies.

4.6.2 Principles of Saturation and the Equipment

- ◇ Understand the following aspects of typical saturation diving plant and equipment:
 - the construction and purpose of valves, fittings, gauges, regulators, hoses and pipework
 - how to carry out normal operations, maintenance and basic repairs on gas and fluid systems
 - the difference between various thread forms and the reasons for their use
 - the principles of chamber life support systems with priority on pre-operational checklists, monitoring during use, routine maintenance and basic repairs
 - the possible emergencies which could occur on life support systems and what actions should be taken
 - the operation, function testing and selection of gas supplies for BIBS and dump systems, including routine maintenance and repairs
 - pre and post dive checks of a chamber complex using checklists
 - the safe operation and design of hyperbaric sanitary systems, in particular safety interlock systems
 - the operation and design of medical locks, including various types of interlocks and safety devices
 - the correct procedures to be used and dangers involved with TUP
 - the principles of operation of various items of equipment used in a typical diving system, such as compressors, gas reclaim systems and transfer pumps

- the use of various types of fire suppression systems including regular maintenance and checks
- the various substances and materials which are prohibited inside a chamber, such as medical preparations, combustible materials, etc.

4.6.3 Medical/First Aid

- ◇ Understand human physiology related to diving. In particular this will include:
 - The respiratory, circulatory, basic skeletal and nervous systems of the body
 - The problems of maintaining divers in thermal balance and the symptoms and treatment of hypo- and hyperthermia
 - The effects of gases on the body and their limits under pressure (in particular oxygen and carbon dioxide)
 - The effects of pressure on the body and the principles of decompression and therapeutic procedures
 - The causes and symptoms of decompression sickness, barotrauma and HPNS
 - The need for hygiene during saturation, the problems of bacterial growth in a chamber and methods of control, detection and treatment
 - The contents, requirements and maintenance of various types of diving medical kits.

4.6.4 Gas Systems

- ◇ Understand the following aspects in relation to gas systems:
 - The physical properties of liquids and gases and specifically the relationship as appropriate between depth, volume, pressure, temperature, partial pressure and solubility of gases
 - The need for purity of gases and the effects of impurities
 - Typical gas schematics including symbols, logic and functions.
 - Carrying out chamber operational procedures by calculation.
 - The principles of gas mixing and changes of mixture for heliox and nitrox
 - The basic properties of gases and potential problems encountered in their use
 - The principles and use of various types of gas analysers
 - Methods of identifying gas impurities likely to be found in hyperbaric atmospheres
 - The importance of oxygen cleanliness and the methods used to achieve it
 - Chamber emergency problems
 - The reasons for gas stratification and methods used to prevent it

4.6.5 Routine Operations

- ◇ Understand and be able to explain typical pressurisation and decompression procedures covering various options
- ◇ Understand and be able to explain typical tables for saturation, bounce and air diving
- ◇ Understand the need for, and be able to help to prepare, procedures for chamber operations and life support systems
- ◇ Demonstrate the ability, under supervision, to:
 - Maintain a legible and accurate record of all aspects of a saturation dive
 - Maintain a gas status board showing gas reserves and mixtures
 - Analyse stored gases and chamber atmosphere with various types of equipment
 - Calibrate gas analysers
 - Transfer diving gases around a system and put diving gases online to chambers and control panels including the BIBS systems

- Monitor the chamber for depth, temperature and humidity using various types of equipment
- Calibrate that equipment
- Operate helium speech unscramblers, telephone emergency signals and other communications systems
- Compress and decompress a diving system using different schedules
- Operate a system of chamber management and housekeeping including routine schedules (such as meals, sanitation systems, medical locks, etc.)

For more details of how the Assistant Life Support Technician training recommended by EDTC could be described, we refer to the guidance document for Closed Bell Diver Training given by the IDRCF in Appendix 4 and to the IMCA Document IMCA C 003, Guidance on Competences Assurance and Assessment.

4.7 Life Support Technician (Offshore)

Note: This title does not equate in any way with the use of “Life Support” in a medical context. It refers in the diving industry to personnel who monitor and control the environmental parameters inside the pressure chambers inhabited by divers. This job can also be described as a chamber operator.

Entry Requirements:

The entry requirements of an LST are:

- ◆ Qualified as an assistant LST
- ◆ Considered suitable by their employer
- ◆ Pass a written examination of theoretical knowledge
- ◆ Have logged at least 2400 panel hours as an assistant LST (If not a bell diver)

OR

- ◆ Have logged at least 360 panel hours as an assistant LST plus 5 years total diving experience, of which at least 3 must be as a bell diver.

Competences:

The competences required of a LIFE SUPPORT TECHNICIAN are the same as those for an assistant LST, but obviously all knowledge and understanding should be in more detail than that required of an assistant.

For more details of how the Life Support Technician training recommended by EDTC could be described, we refer to the guidance document for Closed Bell Diver Training given by the IDRCE in Appendix 4, the IMCA Document IMCA C 003, Guidance on Competences Assurance and Assessment, and also to the IMCA D 013. IMCA offshore diving supervisor and life support technician certification schemes.

4.8 Life Support Supervisor (Offshore)

Note: This title does not equate in any way with the use of “Life Support” in a medical context. It refers in the diving industry to personnel who monitor and control the environmental parameters inside the pressure chambers inhabited by divers. This job can also be described as a chamber operations supervisor.

Entry Requirements:

The entry requirements of a LIFE SUPPORT SUPERVISOR are:

- ◆ Be a Minimum of 24 years old
- ◆ Qualified as a Life Support Technician
- ◆ Considered suitable by their employer
- ◆ Have logged at least 2400 panel hours as a Life Support Technician (unless qualified as a bell diving supervisor)
- ◆ Have a minimum of 4 years in the diving industry
- ◆ Have received formal training in leadership

Competences:

The competences required of a LIFE SUPPORT SUPERVISOR are those for a Life Support Technician plus:

- ◆ Ability to assume responsibility
- ◆ Have a suitable temperament to cope with emergencies

For more details of how the Life Support Supervisor training recommended by EDTC could be described, we refer to the IMCA Document IMCA C 003, Guidance on Competences Assurance and Assessment.

In addition, we refer to the IMCA Document C 011 concerning Outline Syllabus for Training of Personnel in Supervisory Positions.

4.9 Air Diving Supervisor (Inshore)

Entry Requirements:

The entry requirements of an INSHORE AIR DIVING SUPERVISOR are:

- ◆ Be a Minimum of 24 years old, see section 2.3
- ◆ Hold a suitable surface supplied diving qualification for at least two years
- ◆ Have carried out a minimum of 200 surface supplied commercial dives
- ◆ Be considered suitable by their employer

Competences:

Note: In most European countries, surface supplied diving is carried out using lightweight helmets/masks while the diver wears a neoprene or rubber protective suit. The competences below are based on this type of operation.

In some countries however, “Standard Dress” is still used comprising a canvas/rubber suit which is fixed to a heavy (normally metallic) helmet. Such equipment requires different operational techniques and any supervisor intending to supervise this type of equipment will need to demonstrate the necessary competences specifically relevant to using that equipment.

He should also have carried out at least 100 surface supplied commercial dives as a diver using Standard Dress equipment

The competences required of an INSHORE AIR DIVING SUPERVISOR are the ability to:

4.9.1 Academic Knowledge

- ◇ Understand physics related to air diving. In particular this will include:
 - Basic calculations for the conversion of common units used in diving (examples are feet/ meters, psi/bar/Pa, Kg/pound etc).
 - Basic physical units used in diving
 - Boyle’s Law (calculating air volumes and diver’s air consumption)
 - Dalton’s Law (partial pressure of gases at various depths)
 - Charles’ Law (the relationship between pressure changes and temperature changes)
 - Archimedes’ Principle (calculating the buoyancy and lifting requirements of various objects)
 - Henry’s Law (the effect of partial pressures on the solubility of gases in liquids and the corresponding effects on decompression)
 - The principles of heat transfer by conduction, convection and radiation.

4.9.2 Medical/First Aid

- ◇ Understand human physiology related to air diving. In particular this will include:
 - The respiratory, circulatory, basic skeletal and nervous systems of the body
 - The problems of maintaining divers in thermal balance and the symptoms and treatments of hypo- and hyperthermia
 - The effects of gases on the body and their limits under pressure (in particular, oxygen, carbon dioxide, carbon monoxide and nitrogen)
 - The effects of pressure on the body and the principles of decompression and therapeutic procedures
 - The causes and symptoms of decompression sickness and barotrauma
 - The contents, requirements and maintenance of various types of diving medical kits.

4.9.3 Leadership and Control

- ◇ Demonstrate an understanding of the requirement for a supervisor to exercise leadership and control. In particular this will include:
 - The ability to compile and supervise the use of pre- and post-dive check lists for all equipment under their control
 - The reporting of accidents occurring in the water or on the surface
 - Leadership and communication, including the role of a leader, communication and possible conflicts
 - Planning and organising work, including assigning work tasks and team building
 - Leadership in emergency and stress situations, including symptom recognition, preventative measures, courses of action and transfer of experience
 - Keeping accurate records of all operations under their control

4.9.4 Health and Safety

- ◇ Demonstrate familiarity with health and safety requirements. In particular this will include:
 - Familiarity with all relevant published codes of practice, guidance notes, safety notices, etc. affecting air diving operations
 - Familiarity with the statutory requirements of the country in which they are working
 - Safety on the surface, including the use of tools
 - Safety in the water, paying particular reference to currents and sea states etc.
 - Working methods of, and safe procedures for, commonly used tools and equipment
 - The responsibilities of all members of the diving team

4.9.5 Equipment and Procedures

- ◇ Demonstrate familiarity with the equipment used in air diving and the various operational requirements for such work. In particular this will include:
 - Construction of valves and fittings used in air diving equipment
 - Control panels and systems
 - Air and gas requirements, handling, purity, oxygen cleanliness and analysis
 - Surface supplied diving procedures and emergencies
 - Scuba limitations
 - Decompression and therapeutic procedures

Note: The above competences are based on diving using compressed air as the breathing mixture. If the diver is to use different breathing mixtures or complex equipment such as rebreathers then the supervisor will require to demonstrate the additional competences necessary for these activities.

For more details of how the Air Diving Supervisor training recommended by EDTC could be described, we refer to the **relevant parts** of IMCA Document IMCA C 003, Guidance on Competences Assurance and Assessment for Air Diving Supervisor (Offshore).

Likewise, we refer to **relevant parts** of the IMCA Document C 011 concerning Outline Syllabus for Training of Personnel in Supervisory Positions.

4.10 Air Diving Supervisor (Offshore)

Entry Requirements:

The entry requirements for an OFFSHORE AIR DIVING SUPERVISOR are:

- ◆ Be a Minimum of 24 years old
- ◆ Hold a suitable offshore surface supplied diving qualification
- ◆ Have at least three years of experience as an offshore air diver
- ◆ Have carried out a minimum of 200 offshore commercial air dives
- ◆ Have satisfactorily completed a suitable diving supervisor training scheme
- ◆ Have logged at least 200 hours offshore over at least 60 working days as a trainee supervisor
- ◆ Be considered suitable by their employer

Competences:

The competences required of an OFFSHORE AIR DIVING SUPERVISOR are the same as those for an Inshore Air Diving Supervisor plus the ability to:

- ◆ Demonstrate familiarity with the equipment used offshore in air diving and the various operational requirements for such work. In particular this will include:
- ◆ Control of chambers
 - ◇ Use and maintenance of BIBS systems
 - ◇ Operation and design of medical locks
 - ◇ Use of interlock systems
 - ◇ Wet bell procedures and emergencies
 - ◇ Chamber procedures and emergencies
 - ◇ Hot Water suit procedures and emergencies
 - ◇ Surface decompression procedures and emergencies
 - ◇ General safety requirements of dive support vessels used in air diving operation
 - ◇ Air diving from dynamically positioned vessels

For more details of how the Air Diving Supervisor training recommended by EDTC could be described, we refer to the IMCA Document IMCA C 003, Guidance on Competences Assurance and Assessment.

In addition, we refer to the IMCA Document C 011 concerning Outline Syllabus for Training of Personnel in Supervisory Positions, and the D 013. IMCA offshore diving supervisor and life support technician certification schemes

4.11 Bell Diving Supervisor (Offshore)

Entry Requirements:

The entry requirements of a BELL DIVING SUPERVISOR are:

- ◆ Be a Minimum of 24 years old
- ◆ Hold a suitable offshore bell/saturation diving qualification
- ◆ Have at least three years of experience as a bell diver
- ◆ Have carried out a minimum of 400 hours locked out of a bell
- ◆ Have satisfactorily completed a suitable bell diving supervisor training scheme
- ◆ Have acted as a trainee air diving supervisor on at least 10 offshore commercial air dives (unless already qualified as an offshore air diving supervisor)
- ◆ Have logged at least 350 hours offshore over at least 90 working days as a trainee bell diving supervisor (If already qualified as an offshore air diving supervisor this requirement is reduced to at least 150 hours offshore over at least 45 working days as a trainee bell diving supervisor)
- ◆ Have logged at least 360 panel hours working as an LST or assistant LST
- ◆ Be considered suitable by their employer

Competences:

The competences required of a BELL DIVING SUPERVISOR are the following:

- ◆ All of the competences required of an offshore air diving supervisor
- ◆ All of the competences required of an assistant LST and LST

PLUS

4.11.1 Administrative Procedures

- ◇ Be familiar with all relevant published codes, guidance notes, safety notes or memoranda affecting bell diving

4.11.2 Routine Operations

- ◇ The ability to efficiently run all types of diving operations
- ◇ The ability to supervise and have a sound working knowledge of:
 - bell launching systems
 - use of guidewires and weights
 - cross hauling
 - constant tension devices
 - umbilicals
- ◇ The ability to supervise the operation and control of:
 - diving bells
 - compression chambers
 - ancillary equipment
 - the bell mating trunking
 - medical locks

4.11.3 Gas Systems

- ◇ Be familiar with the composition, uses and mixing of breathing gas mixtures and the need for their constant monitoring
- ◇ Be familiar with the principles and function of inspired gas and diver heating systems

4.11.4 Emergency Procedures

- ◇ The ability to remain in charge at all times, including emergencies.
- ◇ Be conversant with all methods of diver evacuation and be able to relate them to a particular work site, both in respect of divers in a diving bell and dives under pressure in a decompression chamber.

For more details of how the bell Diving Supervisor training recommended by EDTC could be described, we refer to the IMCA Document IMCA C 003, Guidance on Competences Assurance and Assessment.

In addition, we refer to the IMCA Document C 011 concerning Outline Syllabus for Training of Personnel in Supervisory Positions and the D 013 IMCA offshore diving supervisor and life support technician certification schemes.

4.12 Diving Superintendent

Entry Requirements:

The entry requirements of a DIVING SUPERINTENDENT/OFFSHORE MANAGER are very difficult to quantify precisely as there are several ways in which such a person may develop their career to the point at which they are considered for promotion to such a position.

The most likely routes to this position are:

- ◆ Be a very experienced diving supervisor, qualified as such for the type of diving involved
- ◆ Be considered suitable by their employer

There may be other acceptable routes to this position, and each case will need to be judged on its own merits.

Competences:

The competences required of a DIVING SUPERINTENDENT/OFFSHORE MANAGER are the following:

4.12.1 Academic/Knowledge Requirements

- ◇ Be very knowledgeable about all relevant regulations, codes, guidance notes and safety notices or memoranda affecting the diving operations
- ◇ Be very knowledgeable about the diving techniques and equipment to be used
- ◇ The ability to understand in detail the technical aspects of the work to be carried out

4.12.2 Leadership and Control

- ◇ The ability to exert leadership over the personnel under their control
- ◇ The ability to communicate efficiently with all parties involved
- ◇ Have the necessary management skills to carry out the tasks required of them
- ◇ The ability to remain in charge at all times, including emergencies and unplanned events

For more details of how the Diving Superintendent training recommended by EDTC could be described, we refer to the IMCA Document IMCA C 003, Guidance on Competences Assurance and Assessment.

In addition, we refer to the IMCA Document C 011 concerning Outline Syllabus for Training of Personnel in Supervisory Positions.

4.13 Diver Medic

Note: This title is used in the diving industry to describe a person who has undergone a period of extra training in medical emergency techniques related to diving. They are functionally speaking diving emergency medical technicians. Any member of the diving team may hold this function.

Entry Requirements:

The entry requirements for a DIVER MEDIC are only that the person be capable of going under pressure in order to render assistance to an injured diver.

Competences:

The competences required of a DIVER MEDIC are the ability to:

4.13.1 Academic/Knowledge Requirements

Understand and have knowledge of:

- ◇ Relevant aspects of anatomy and physiology sufficient to meet the competence requirements below. Particular areas in which this understanding and knowledge need to be demonstrated are:
 - the musculo-skeletal system
 - nervous system
 - heart
 - blood vessels
 - circulation and blood
 - lungs, ears, sinuses and vestibular organs
- ◇ Relevant effects of changing pressure on the human body. In particular have sufficient understanding of the pathophysiology of decompression illness (DCI), including pulmonary barotrauma (PBT) and arterial gas embolism (AGE)
- ◇ The importance of personal routine hygiene, especially in saturation conditions
- ◇ Medical record keeping (including confidentiality)

4.13.2 Casualty Management

- ◇ Manage casualties in a hyperbaric environment including
 - recovery into a diving bell
 - provide CPR (see definition) inside a diving bell
 - transfer from diving bell to living chamber
 - lost bell emergency procedures
 - hyperbaric evacuation
- ◇ Transfer medical information using a standard format
- ◇ Use various techniques for handling casualties including
 - minimising the effects of movement upon shock, fractures and other injuries
 - considering the effect of movement on possible vertebral column damage
 - recovery from the water
 - transfer under various conditions
 - transfer by helicopter
- ◇ Understand and have knowledge of signs and symptoms of the following diving illnesses and accidents. Have the ability to provide initial advanced first aid and assist in the management of them:

- squeeze and other barotrauma
- ear problems
- vomiting under water
- near-drowning
- secondary drowning
- CO₂ retention and poisoning
- CO poisoning
- Other gas contaminants
- O₂ toxicity
- anoxia and hypoxia
- N₂ narcosis
- high pressure nervous syndrome
- DCI, PBT and AGE
- thermal stress and performance
- hypothermia and hyperthermia
- maritime animal injuries
- recognition and first aid of dental problems
- underwater blast injury
- infections and insufficient hygiene in saturation
- skin and eye injuries

4.13.3 Practical Skills

- ◇ Use and maintain medical equipment available at the site of a diving operation
- ◇ Be able to carry out relevant diagnostic procedures such as:
 - gather an accurate medical history
 - elicit physical signs like pulse, respiratory rate, high and low thermometer reading, blood pressure.
 - perform a neurological assessment
- ◇ Be able to carry out advanced first aid techniques such as:
 - use appropriate clean and sterile techniques
 - suture open wounds
 - set up intravenous infusions and provide the parenteral administration of drugs
 - airway management (intubation)
 - insertion of pleural drains
 - catheterisation
 - provide cardiopulmonary resuscitation (CPR) (see definition)
- ◇ Administer oxygen, both at atmospheric pressure and while under increased pressure
- ◇ Properly use and understand the hazards of drugs and intravenous fluids in a hyperbaric environment (normally under instruction from a diving medical physician)

Retraining/Re-Assessment:

Since much of the competence of such an individual relies on regular application of the skills, retraining or re-assessment of competence will normally be required at regular intervals. In most European countries, this will be at intervals no greater than every three years.

For more details of how the Diver Medic training recommended by EDTC could be described, we refer to the IMCA Document IMCA D 020, IMCA scheme for recognition of Diver Medic Training.

For information; Retraining or re-assessment of competence will normally be required every 2 years by IMCA

4.14 Hyperbaric First Aider

Note: This title describes a person capable of going under pressure in order to render assistance to an injured diver. They are functionally speaking assistant diving emergency medical technicians. Any member of the diving team may hold this function.

Entry Requirements:

The entry requirements for a HYPERBARIC FIRST AIDER are only that a person be capable of going under pressure in order to render assistance to an injured diver.

Competences:

The competences required of a HYPERBARIC FIRST AIDER are the ability to:

4.14.1 Academic

- ◇ Have sufficient understanding of the pathophysiology of decompression illness (DCI) and barotraumas as well as the assessment of the respective symptoms
- ◇ Understand the importance of personal hygiene

4.14.2 Casualty Management:

- ◇ Carry out various rescue and diver recovery procedures for an injured diver
- ◇ Communicate with a diving medical physician by telephone during an emergency situation
- ◇ Carry out simple neurological testing
- ◇ Carry out basic life support such as CPR (see definition) and airway maintenance
- ◇ Administer oxygen, both at atmospheric pressure and while under increased pressure
- ◇ Demonstrate skills in basic first aid procedures for both traumatic and medical disorders
- ◇ Prepare an injured diver for evacuation by ambulance or helicopter
- ◇ Prepare suitable incident reports to be used for risk analysis and medical care

Retraining/Re-Assessment:

Since much of the competence of such an individual relies on regular application of the skills, retraining or re-assessment of competence will normally be required at regular intervals.

For more details of how the Hyperbaric First Aider could be described, we refer to the IMCA Diver Medic training Document IMCA D 020, to select subjects that will be relevant for training of the Hyperbaric First Aider.

4.15 Diving Equipment Technician

Entry Requirements:

The entry requirements for a DIVING EQUIPMENT TECHNICIAN are difficult to quantify precisely as there are several ways in which such a person may obtain the necessary initial skills to be considered suitable for such a position.

Technicians may have a background in and knowledge of electrical, electronic, mechanical or hydraulic engineering. Some may have knowledge and background in more than one of these areas.

The most likely entry routes are:

- ◆ Be a qualified and experienced tradesman in one of the above disciplines

OR

- ◆ Have gained relevant experience and qualifications in a military environment

OR

- ◆ As a result of extensive experience in previous employment, have a detailed knowledge in their chosen discipline

OR

- ◆ As a result of advanced academic education, have a detailed knowledge in their chosen discipline

In all cases the person must be at least 18 years of age and have the necessary standard of fitness to work in the area that diving will take place.

Competences:

The competences required of a DIVING EQUIPMENT TECHNICIAN are the ability to:

- ◆ Work efficiently when faced with breakdown situations
- ◆ Carry out planned maintenance to a designated schedule
- ◆ Accurately document work done
- ◆ Communicate clearly, on a technical level, with others by electronic means
- ◆ Understand the technical aspects of the equipment they are working on
- ◆ Understand all relevant legislation, regulations, codes, guidance notes and safety notices or memoranda affecting the equipment they are working on
- ◆ Understand the purpose of and the use intended for the equipment they are working on

For more details of how the Diving Equipment Technician training recommended by EDTC could be described, we refer to the IMCA Document IMCA D 001, Dive Technician Competence and Training

4.16 Air Chamber Operator

Note: This title refers to diving operations where the ambient atmosphere inside the chamber is natural compressed air. It contains some of the competences of the life support technician in offshore diving.

Air Chamber Operators will ALWAYS work under supervision.

Entry requirements:

There are no specific entry requirements other than a minimum age of 18. Since the person is not intended to go under pressure there are no specific health or medical requirements.

Prior to appointment as an inshore chamber operator however an individual must successfully complete a basic training course covering the competences listed below and have logged 35 panel hours as a "chamber operator in training" under supervision.

Note: Offshore assistant LSTs and closed bell/saturation divers have already obtained the necessary level of competence and may be appointed as chamber operators without further assessment.

Competences:

The competences required as an AIR CHAMBER OPERATOR are the ability to understand the following:

- ◆ Main points of current legislation in the country concerned relevant to diving, including codes of practice, guidance notes, safety notes etc.
- ◆ Documentation and record keeping requirements during a diving operation
- ◆ Principles of compression chambers including the construction and purpose of valves, fittings, gauges, regulators, hoses, pipe work, pressure locks etc.
- ◆ Safety measures concerning prevention of fire, oxygen toxicity and decompression illness
- ◆ Operation and checking of air compressors, compressed air reserves,
- ◆ pneumatic circuits and control systems

4.16.1 Routine operations:

- ◇ Perform pre-dive chamber checks
- ◇ Compress and decompress a compression chamber using different schedules
- ◇ Carry out routine maintenance, calibration and repairs related to the operation of the chamber systems, including BIB systems.

4.16.2 Emergency procedures:

- ◇ Carry out, under supervision, the emergency procedures for fire alarm and medical emergency inside the chamber
- ◇ Carry out basic life support such as CPR (see definition) and airway maintenance
- ◇ Prepare appropriate incident reports

For more details of how the Air Chamber Operator training recommended by EDTC could be described, we refer to **relevant parts** of the IMCA Document IMCA D 007 and D 008, Life Support Technician and Assistant Life Support Technician Competence and Training

5 Documentation

This section identifies the records that need to be maintained and the other documentation that is required in order to meet the requirements of this document.

It is not intended that this document will give detailed instructions, layouts etc. of the documentation involved, rather that it gives an outline upon which a national government or training/assessment organisation can base their detailed documentation.

5.1 Individual Identification

It is obviously important that any records maintained, certificates issued etc clearly refer to a specific individual. This is particularly important when assessing an experienced person where cheating by an impostor is more likely.

Identification will normally be achieved by photographic means. It is suggested that organisations complying with this document should confirm at the start of any training/assessment that the candidate is indeed who they claim to be. This can be established by the provision of suitable official documentation bearing a photograph. Typical examples are passports, identity cards, military passes etc. The organisation would normally take a copy of such a document and lodge it in their files along with a number of photographs of the individual that can be subsequently affixed to certificates, etc.

5.2 Entry Requirements

Prior to any training/assessment taking place, it is clear that the requirements for entry are checked and validated. In order not to waste time, as much of this as possible should be checked well in advance of the individual commencing training/assessment.

A typical routine would be for the individual to be asked to send copies of their qualifications, certificates and logbooks (as relevant) to the organisation carrying out the training/assessment. These could then be checked to ensure that they met the minimum entry requirements. If there were any doubts about the validity of any of the documents, then this could be checked by telephone etc.

The individual would be instructed to bring the originals of all of these documents with them to the place where the training/assessment was going to take place. Upon arrival the original documents would be checked by a responsible person in the organisation and confirmed to match the copies sent earlier.

The organisation would then place a copy of all of these documents into the individual's records, duly validated by the responsible person.

5.3 Documentation Issued

Upon the completion of any training/assessment based on the competences in this document, the individual should be issued with a document clearly stating what they have been assessed to do, the results of that assessment plus where, when and by whom it was carried out. The document should contain information of the trained person that is unique to that person for identification purposes.

Certificates issued by a governmental body or a national accredited institution should carry a photograph with the name of the individual and should be designed such that they cannot be altered.

If desired, a more detailed list of competences assessed with results and comments may accompany the certificate.

5.4 Record Keeping

Any establishment that carries out training/assessment in line with this document would normally be expected to operate its management, control and documentation systems in line with a recognised standard such as the ISO 9000 Series. This should allow for ease of audit by an independent body, if required.

It would be anticipated that a detailed record would be kept of all competence assessments. These should document in sufficient detail exactly who assessed each particular item, where and when this was done, how the assessment was carried out and the result.

5.5 Tests and Examinations

In the case of written tests or examinations, the answer paper from the individual, duly corrected and marked, should be placed into the individual's record file.

5.6 Retention of Records

All records should be retained for at least two full years from the date that the last item in the overall assessment was completed. Electronic storage is acceptable.

Some countries may have specific requirements to retain such records for a longer period and if that is the case then the longer period should be complied with.

6 References

6.1 General

There are many different documents and publications in existence, which have a bearing, directly, or indirectly, to the competence standards of personnel who work in the commercial diving industry.

An exhaustive list would be difficult to produce. However, the references given below may assist in expanding this document into the detail required for implementation.

6.2 Specific

The following references are given.

Note: The references below are the specific regulatory requirements of certain countries at the time of publishing of this document. Other countries may well have their own legal requirements which are not listed here. Similarly, the references listed below may well have changed or been updated subsequently and thus it is suggested that a check is made with the legal authorities of any specific country if the subject of diving personnel competence to work in that country is being considered.

6.2.1 Denmark

- ◆ Consolidated Act No. 18 of the 7th of January 2000 on Diving Equipment etc.
- ◆ Order No. 828 of the 1st of September 2000 on the Safe Performance of Diving Operations
- ◆ Order No. 823 of the 5th of November 1999 on Diving Equipment
- ◆ Order No. 685 of the 12th of July 2000 on Offshore Diving Operations and Offshore Diving Equipment
- ◆ Order No. 476 of the 17th of June 1999 on Medical Examination of Divers
- ◆ Order No. 830 of the 1st of September 2000 on Diving Educations.

6.2.2 Sweden:

Statute book of the Swedish Work Environment Authority [NB Prior to 2001 this was The Swedish National Board of Occupational Safety and Health] Ordinance (2010 AFS2010:16) Diving.

6.2.3 United Kingdom:

The Diving at Work Regulations 1997. Statutory Instrument 2776 of 1997, plus the relevant Approved Code of Practice (ACoP) for the type of diving being carried out.

6.2.4 Germany:

- ◆ BGV C23 - Current Legislation for Rules and Regulations for Safe Diving Operations dd. 01.01.2001
- ◆ Regulation governing the examination leading to the accredited qualification of Certificated Diver dd. 25.02.2000
- ◆ Recommendations of the Committee “Tiefbau” for Diving with Mixed Gas dd. 09.2001
- ◆ Safety Regulations for Diving in Contaminated Water dd. 09.2001
- ◆ BVOT – Mining Directive for Deep Drilling dd. 15.12.1981,
- ◆ Ordinance relating to Work in Compressed Air (Compressed air work regulations) dd. 4.10.1974, amended 19.6.1997

- ◆ BGI 690 Leaflet for the treatment of illnesses in Compressed Air (Diving and Compressed Air Work) dd. October 1996

6.2.5 France

- ◆ Decree No. 90-277 of 28 March 1990 relating to the protection of workers operating in a hyperbaric environment;
- ◆ Decree of 28 January 1991 defining the procedures for safety training of personnel taking part in hyperbaric operations (Journal Officiel of 2 March 1991);
- ◆ Decree of 28 March 1991 defining recommendations to medical doctors responsible for the medical supervision of workers operating in a hyperbaric environment;
- ◆ Decree of 20 August 1991 prescribing the conditions under which, a derogation may be granted as regards the age limit for applying for a certificate of competence in hyperbaric operations (Journal Officiel of 30 August 1991);
- ◆ Decree of 15 May 1992 defining procedures to be used in a hyperbaric environment, as regards access, work duration, evacuation and organization of work;
- ◆ Order of 22 December 1995 relating to the safety training methods of some marine equipment companies operating in a hyperbaric environment.

6.2.6 Norway

Relevant Norwegian petroleum legislation for offshore work.

6.2.7 The Netherlands

Arbeidsomstandighedenwetgeving (the section covering diving) –in force from 1 January 2003, Rev 4 Issued March 2017.

6.2.8 Portugal

Mergulhador-inicial

Mergulhador-técnico

Mergulhador-especialista - Wet bell Offshore Diver

Mergulhador-chefe - Closed bell offshore diver

Being new categories, under the recent legislation, there are no courses for these categories. However, there are recognized divers with these categories.

6.2.9 Not Country-Specific:

- ◆ The various diving personnel training standards published by The International Diving Schools Association
- ◆ The various guidance documents published
 - The International Marine Contractors Association (IMCA)
 - The Diving Medical Advisory Committee (DMAC)
 - The Association of Offshore Diving Contractors (AODC) – note: this organisation became part of IMCA in 1995

7 Definitions

The following definitions clarify what is meant by various words, abbreviations or phrases used in this document, where various groups sometimes use these differently. Most terms used in this document do not require any definition to a knowledgeable reader.

Ambient Pressure	The external pressure to which the diver is subjected underwater or in a compression chamber.
Anoxia	A condition caused by a complete absence of oxygen.
Assessment	The process by which a check is made on an individual by a knowledgeable person to establish if that individual possesses the necessary competence.
Attendant	A person on the surface who monitors the length of umbilical of lifeline paid out to the diver in the water and as far as possible, the diver's actions during the dive. Also called a Tender.
Bail Out System	A reserve supply of breathing mixture carried by a diver.
Bell	A submersible compression chamber. See diving bell.
Bell Diving	A diving operation in which the divers are deployed from an enclosed diving bell.
Bell Handling Equipment	Equipment used for the launch and recovery of a diving bell and its mating to the deck compression chamber.
Bell Man	Common name for the diver who remains inside a diving bell to act as standby diver.
Bounce Diving	A form of bell diving in which the dive is terminated before the dissolved gases in the diver's tissue reach saturation and he is decompressed to atmospheric pressure.
Breathing Gas	General term for oxygen, air, oxygen-enriched air, nitrox or a mixed gas (see below) used in a diving operation for breathing by divers.
Competence	The ability to carry out a task safely and efficiently as well as being knowledgeable about the task.
Compression	A process by which a diver is subjected to progressively increasing pressure as he descends in the water or is pressurised inside a chamber
CPR	Stands for cardiopulmonary resuscitation. In the context of this document means the actions of a first aider in carrying out external cardiac massage coupled with assisting a casualty to breathe. It is a conventional term for what is known in medical terminology as "basic life support". It does not include what is known in medical terminology as "advanced life support".
Deck Compression Chamber	An appropriately equipped chamber on the surface in which routine decompression or therapeutic

	recompression can be carried out. Also known as a surface compression chamber.
Decompression	The process by which a diver is returned to atmospheric pressure so as to facilitate the safe discharge of dissolved gases in his tissues.
Decompression Illness	Potentially harmful effects due to excess gas in the bloodstream and tissues of the body.
Decompression Schedules	The procedures by which decompression is carried out. Commonly referred to as “Tables”
Diver	A person who has been trained and is competent to dive commercially using underwater breathing apparatus.
Diver Medic	This is terminology used in the diving industry to describe a person who has undergone training in advanced first aid.
Diving	A person is considered to be diving when they enter water or any other liquid and in order to survive in such an environment, they breathe air or other gas at a pressure greater than atmospheric pressure.
Diving Bell	A submersible pressure vessel in which divers can be transported safely from the surface to the worksite under water and returned to the surface under pressure. The diving bell shall provide necessary life support to the divers using it.
Diving Contractor	The person, company or organisation responsible for the diving operation, whether or not actually the employer of the divers. (Note that in some European countries the diving contractor is legally defined – often as the employer of the divers)
Diving Depth	In surface diving this is the maximum depth to which the diver is exposed. In bell diving it can be this but may also be the most extreme actual depth (upwards or downwards) at which the diver works during his lock out from the diving bell.
Diving Manual	A comprehensive set of instructions and information issued by the diving contractor to enable all persons engaged in the diving operations under their control to carry them out safely and efficiently.
Diving Rules	Written rules, issued by the diving contractor, for regulating the conduct of all persons engaged in diving operations under their control.
Diving Supervisor	A trained person, appointed by the Diving Contractor to act as the leader of the diving team and be in control of the diving operation.
Diving System	The common name used to cover all pieces of equipment necessary to support a diving operation.
EDTC	The European Diving Technology Committee

Emergency	Any incident which may affect the health or safety of any person taking part in the diving operation.
Excursion Diving	The method of conveying divers in saturation to a work site which is deeper or shallower than the pressure (depth) to which they are saturated, performing work and returning them to the pressure (depth) of their original saturation.
Heliox	A breathing mixture of oxygen and helium.
Hyperbaric Evacuation System	Equipment that allows divers under pressure to be evacuated from the diving system in an emergency while remaining under pressure.
Hypoxia	A condition in which there is a lower oxygen content in the body than is needed to sustain complete consciousness.
Inshore	Can also be referred to as inland/inshore or onshore. This normally refers to activities taking place within a country's national boundaries and up to 12 miles off the coast. (In some countries this may be defined as at the high water line)
Life Support Supervisor	A person trained, and appointed by the Diving Contractor, to supervise life support functions for a diver or divers in a compression chamber. Note: this title does not equate in any way with the use of "Life Support" in a medical context.
Life Support System	The equipment installed in a diving system in order to keep the occupants alive. It includes breathing systems, temperature and humidity controls, waste disposal and toxic fume removal plus food and water supplies. Note: This should not be confused with the medical use of the term "Life Support".
Life Support Technician	A person trained and competent to carry out life support functions for a diver or divers in a compression chamber. Note: this title does not equate in any way with the use of "Life Support" in a medical context.
Mixed Gas	A manufactured mixture of oxygen and one or more inert gases used as a breathing mix for diving. (A predetermined mixture of oxygen and nitrogen is not a mixed gas in the context of this definition) Diving using mixed gas should only be carried out from an enclosed diving bell.
Nitrox	A breathing mixture of oxygen and Nitrogen.
Offshore	This may be defined in national regulations. It normally refers to activities taking place on a countries continental shelf, out with the 12 mile limit and often associated with the oil and gas industry.
Onshore	Can also be referred to as inland or inshore. This normally refers to activities taking place within a country's national boundaries and up to 12 miles off the coast. (In some countries this may be defined as at the high water line)

Recompression	The process by which a diver is given treatment in a compression chamber at increased pressure if he is thought to be suffering from a diving related illness. Can also be used to describe the process where a diver is subjected to increased pressure inside a compression chamber as part of some decompression procedures.
Saturation	A condition in which a diver is subjected to an ambient pressure, greater than atmospheric pressure, such that their body tissues and blood become equilibrated with the inert element of the breathing mixture.
SCUBA	Self-contained underwater breathing apparatus (this term is reserved for open circuit demand apparatus. Other self-contained apparatus such as mixed gas closed circuit should not be included in this category). If SCUBA equipment is used, a lifeline to the surface should be used.
Stand By Diver	A diver who is appropriately positioned and dressed to render immediate assistance to a diver, in an underwater emergency.
Standard Dress	Diving equipment in which the diver wears a rigid helmet attached to a closed diving suit. The breathing mixture is normally supplied by a hose from the surface.
Stops	The planned periods during ascent, when the diver “stops” at specific depths or pressures during the decompression schedule, to allow the safe elimination of excess inert gases absorbed by the body.
Storage Depth	The depth equivalent pressure at which divers are kept in a deck compression chamber during a saturation dive.
Submersible Compression Chamber	Another name for a diving bell
Supervisor	See Diving Supervisor
Surface Compression Chamber	An appropriately equipped chamber on the surface in which routine decompression or therapeutic recompression can be carried out.
Surface Decompression	A decompression procedure in which a surface orientated diver returns to the surface and is recompressed in a surface compression chamber prior to final decompression.
Surface Orientated Diving	A diving operation, other than bell diving, where the diver enters the water at the surface, descends to his working depth and returns to the surface while fully exposed to variations in water pressure. The primary supply of breathing gas for the diver is supplied from the surface to the diver via an umbilical (surface supplied), or the diver carried all his own gas (SCUBA))
Surface Supplied Diving	A diving operation where the primary supply of breathing gas for the diver is supplied from the surface via an umbilical.

Tender	Popular name for an attendant.
Therapeutic Schedules	The procedure by which a diver who is suffering from decompression illness is treated. It involves recompression to a pressure to relieve the symptoms, followed by decompression using a special schedule.
Training	This refers to the process of formal instruction
Transfer Under Pressure	A technique by which a diver can be transferred from one compression chamber to another compression chamber in such a way that there is no change in pressure on the diver.
Trimix	A breathing mixture of three gases, one of which is oxygen. Commonly used to describe a suitable mixture of oxygen, helium and nitrogen.
Umbilical	A connecting link between the surface and a diver, between the surface and a diving bell, or between a diving bell and a diver, which can contain life support, surveillance, communications, power supply cables and a strength member.
Wet Bell	A device to transport two or more divers to/from the working depth. It cannot contain pressure and is fitted with an enclosed top into which air can be used to provide a dry space in which a diver can put his head. It has a main supply umbilical from the surface, and each diver has his own excursion umbilical that terminates in the wet bell.

For information.

Further guidance on terms and acronyms used in diving operations are contained in IMCA's glossary of technical terms IMCA D057 ADCI/IOGP/IMCA Diving Terms published in August 2016

Appendix 1 – Recommended details of requirements for Surface oriented diver training

Purpose

The purpose of the present Appendix 1 is to show how the EDTC in more detail propose provisions concerning training and qualification requirements for personnel to work as divers in Europe.

The guidelines are not legally binding. The user may consequently choose other solutions than those mentioned in these guidelines, but he should then produce documentation to show that such solutions comply with the level of these recommendations.

As the guidelines constitute a whole, the user should exercise great care in using only parts of it.

Aims

The aims of the training shall be to enable the divers to carry out their work safely to a depth of

- a 30 meters using self-contained diving equipment, and
- b 50 meters with surface oriented diving equipment.

Furthermore, the aims are to provide the diver with the understanding and knowledge of basic skills required in order to complete various underwater tasks safely and efficiently.

Medical

All trainees undergoing diver training shall have a valid certificate of medical fitness for diving issued by a medical practitioner approved for the examination of divers.

Course Duration

Due to the nature of surface oriented diver training, the duration of the training program may be dependent on the number of students undertaking the training program. As a rule of thumb, the course duration should be approximately 12 weeks. First aid or Diver Medic Training (DMT) courses may be added to this.

The training may be undertaken in conjunction with other training programs such as DMT, however the course content or duration for each course should not be compromised by the combination.

Whilst distance-learning options may be used to refresh existing knowledge or provide initial knowledge, the face-to-face component of the course should not be shortened by the availability of that training.

Surface oriented diver- training requirements

Minimum Course Requirements

In water diver training during course.

The following minimum times shall be achieved during controlled practice in open water (not a tank, pond, small lake or other enclosed area). Time in water should include decompression stops. Time in compression chamber shall not be included.

The following minimum times shall be achieved during controlled practice in water. Time in water should include decompression stops. Time in compression chamber shall not be included.

0-19 meters at least (Including at least 16 hours in the depth range 10 – 19 meters)	40 hours
20-39 meters at least	5 hours
30-39 meters at least	4 hours
40-50 meters at least Including at least 3 dives in open sea with a total bottom time no less than 1 hour	3 hours
Total in water training at least	50 hours

Dives should not be shorter than 15 minutes duration.

A significant proportion of the practical diving exercises should be completed using surface oriented equipment, and during at least one dive to a depth exceeding 35 meters an exercise with a hydraulically/pneumatically/electrically powered tool should be carried out. The exercise should have a duration of at least 20 minutes.

Hours theory

1 Diving physics	30
2 Use of equipment	40
3 Seamanship	10
4 Diver communication	10
5 Underwater tasks	20
6 Underwater hazards	10
7 Diving plant and equipment	20
8 Compression chamber operations	10
9 Decompression	20
10 Legislation, statutory instruments	10
11 Physiology and first aid	20

Total theory minimum hours	200
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Number of hours for theoretical training is intended as a guideline.

1 Diving physics **30 hrs theory**

Properties of liquids and gases:

- a) the relationship between pressure and volume (Boyle's Law)
- b) the relationship between volume and temperature (Charles' Law)
- c) partial pressure of gases (Dalton's Law)
- d) solubility of gases (Henry's Law)
- e) buoyancy (Archimedes' Principle)

2 Equipment **40 hrs theory**

2.1 Theory

- a) Diving equipment
- b) Chamber theory
- c) Hot water plant
- d) Wet bell plant

2.2 Use of equipment

- a) Diving in open sea
- b) Diving with self-contained breathing equipment
- c) Diving with surface oriented diving equipment
- d) Practice of emergency procedures
- e) Pre- and post-dive procedures
- f) Maintenance and repairs
- g) Diving suits
- h) Closed and semi-closed circuit breathing apparatus
- i) Wet bell
- j) Practice time in water

3 Seamanship **30 hrs theory**

- a) Seamanship, theory
- b) Tides
- c) Charts and navigation
- d) Safety equipment
- e) Seamanship, practice
- f) Small boat handling
- g) Safety equipment practice
- h) Act as crewmember

4 Diver Communication **10 hrs theory**

- a) Theory
- b) Hand and line signals
- c) Underwater oral communication
- d) Practice
- e) Practice hand and line signals
- f) Practice use of underwater communication

5 Underwater tasks

10 hrs theory

5.1 Theory

The diver should be given a theoretical introduction to a variety of commonly used tools in underwater work and to their safe use. Reference is given to the list of tools proposed for the practical training below.

5.2 Practice

The practice of underwater tasks should provide the trainees with a general appreciation of the techniques, problems and safety aspects related to work under water.

For operations such as cutting, welding, use of explosives and non-destructive testing (“NDT”) further practice will be required before the diver may be considered to be qualified.

For all work involving use of special equipment, the trainee shall be familiar with statutory testing and examination requirements, and their frequency.

The practical training should introduce the diver to safe use of e.g.:

- a) Underwater search, inspection and survey
- b) Rigging
- c) Tools
- d) Water jetting, airlifts and lifting bags
- e) Bolt guns
- f) Cutting equipment
- g) Welding equipment
- h) Explosives
- i) Construction techniques

6 Underwater hazards

10 hrs theory

- a) Theory
- b) Underwater structures
- c) Dynamically positioned vessels
- d) Stages, baskets and wet bells

7 Diving plant and equipment

20 hrs theory

- a) Theory
- b) Air compressors and cylinders
- c) Winches, air motors etc.
- d) Fire fighting equipment
- e) Practice

8 Chamber operation

10 hrs theory

- a) Theory, covered under item 2.1
- b) Practice
- c) Practical compression chamber operation
- d) Chamber diving

9 Decompression

20 hrs theory

- e) Theory
- f) Decompression tables
- g) Decompression stops in water
- h) Surface decompression
- i) Practice

10 Legislation, statutory instruments

10 hrs theory

The diver is required to be familiar with and understand relevant legislation, regulations, guidelines, safety notices etc. He shall further be able to assess problems and situations in connection with relevant diving operations subjected to the abovementioned legislation etc.

11 Physiology and first aid

20 hrs theory

11.1 Structure and function of the human body

Structure and function of:

- a) musculo/skeletal systems
- b) nervous system
- c) heart, blood vessels, blood circulation
- d) lungs
- e) ears, sinuses and vestibular organs

11.2 First aid

Causes, prevention, symptoms and management under normal and hyperbaric conditions of:

- a) bleeding
- b) fractures, sprains and muscle trauma
- c) shock
- d) burns
- e) electrocution
- f) asphyxia, pulmonary oedema
- g) respiratory arrest
- h) cardiac arrest
- i) hypothermia
- j) hyperthermia
- k) underwater blast injury

Importance of personal hygiene in the management of injuries. Measures at the casualty site and during transportation of injured person. First aid equipment and its use during a manned underwater operation.

11.3 Diving related injuries and side effects

Cause, effect, symptoms and treatment of:

- a) decompression sickness

- b) pressure related injuries
- c) pressure equalization - ear and sinuses
- d) drowning
- e) vomiting under water
- f) gas embolism and pulmonary barotrauma
- g) carbon dioxide poisoning
- h) carbon monoxide poisoning
- i) oxygen toxicity
- j) anoxia and hypoxia
- k) nitrogen narcosis

Appendix 2 – Recommended details of requirements for Bell diver training

Purpose

The purpose of the present Appendix 2 is to show how the EDTC in more detail propose provisions concerning training and qualification requirements for personnel to work as divers in Europe.

The guidelines are not legally binding. The user may consequently choose other solutions than those mentioned in these guidelines, but he should then produce documentation to show that such solutions comply with the level of these recommendations.

As the guidelines constitute a whole, the user should exercise great care in using only parts of it.

Aims

The aims of the training shall be to enable experienced surface oriented divers to carry out work safely as bell divers and standby divers in a diving bell.

Medical

All trainees undergoing diver training shall have a valid certificate of medical fitness for diving issued by a medical practitioner approved for the examination of divers.

Course Duration

Due to the nature of closed bell training, the duration of the training program may be dependent on the number of students undertaking the training program. As a rule of thumb, the course duration (for the closed bell competencies) should be approximately 18 days. First aid or Diver Medic Training (DMT) courses may be added to this.

The training may be undertaken in conjunction with other training programs such as DMT, however the course content or duration for each course should not be compromised by the combination.

Whilst distance learning options may be used to refresh existing knowledge or provide initial knowledge, the face to face component of the course should not be shortened by the availability of that training.

Bell diver- training requirements

Prerequisites

The following list contains the minimum prerequisite requirements of a trainee attending Closed Bell Diver Training.

- The applicant will hold a valid and approved offshore surface supplied diving qualification to 50m and have held that qualification for a minimum period of 12 months, prior to commencing closed bell training. The standard of that qualification will be as required in the country of training delivery e.g. the EDTC diving competency standards for offshore surface supplied diver qualification.
- Hold a valid certificate of medical fitness to dive which remains in date for the duration of the training course.
- Hold a valid certificate of competence in first aid at work which remains in date for the course or undertake that training as part of the course of instruction. Where first aid training is undertaken during the course that training is not included in the minimum times outlined within the course guidance.
- Have recorded in a daily record of diving since being qualified as a surface supplied breathing apparatus (SSBA) diver as per section 1,
 - a) At least 100 dives using SSBA, and
 - b) At least 100 hours of bottom time.

NOTE 1:

The above dives and bottom time are to include 20 dives over 12 meters
The above dives and bottom time are not to include any dive time undertaken at a depth of less than 6 meters

NOTE 2:

The above mentioned dives and dive time can be made up of either onshore or offshore dives or a combination of both.

NOTE 3:

Training dives and dive time shall not be considered to fulfil the entry requirements.

Minimum Course Requirements

Bell diving - Practical experience - minimum requirements

The practical experience shall comprise work both as diver and as standby diver in a diving bell.

Familiarization:

An instructor shall be present in the bell until satisfied that the trainee has the necessary knowledge of the functions of diver and of standby diver.

Practical training

The following elements should constitute the practical training during the bell diver course:

1. 23 bell lockouts as diver.
Lockouts undertaken as a diver should incorporate an expected diver activity or a rescue procedure. Lockouts undertaken as a diver should be of a suitable duration to accomplish the proposed activity for the lockout. Excursions and umbilical lengths should be such that both the diver and bellman must consider and apply effective umbilical management.
2. 23 bell lockouts acting as bellman (standby diver).
3. The trainee diver may make only one lockout from the bell at any one depth during each bell run. The diver and bellman may change roles so that each carries out a lockout at a particular depth.
4. 11 complete bell-runs including 10 transfer under pressure (TUP).
5. The trainee diver must undergo practical training and assessment in the following bell emergency procedures:
 - a) Simulated rescues of unconscious diver (at least 5).
 - b) Loss of gas to the bell.
 - c) Loss of gas to the diver.
 - d) Loss of communications.
 - e) Loss of umbilical (communications, gas, hot water, power and internal pressure).
 - f) Communicating with a lost bell.
 - g) Lifting an unconscious diver into the bell sealing the bell and monitoring the diver during the ascent.
 - h) Transferring an unconscious diver through the TUP trunking to the chamber. Performing CPR and then placing on BIBS.
 - i) Donning survival equipment.
6. The trainee diver must undergo theoretical training and assessment in the following bell emergency procedures:
 - a) Loss of main lift to the bell.
 - b) Loss of main and secondary lift, umbilical attached.
 - c) Total loss of the bell.
 - d) Ways of locating a lost bell.
 - e) Loss of internal pressure in the bell.
 - f) Bell contaminated atmosphere.
 - g) Loss of electrical power to a chamber.
 - h) Hyperbaric evacuation systems.
 - i) Therapeutic and abort decompression tables.
 - j) Breakdown of the main ECU.
7. The trainee diver must undergo practical training and assessment in the following chamber emergency procedures:

- a) Emergency evacuation of a chamber with a fire inside the chamber.
 - b) Emergency evacuation of a chamber with a loss of pressure.
 - c) Simulated evacuation to HLB.
 - d) Using secondary communications with a chamber.
 - e) Use of BIBS.
8. Trainees must be supervised by an instructor in the bell until the trainee is deemed competent at the lockout and bellman procedures. As a minimum the instructor is to be in the bell for at least the first three bell lockouts. These supervised runs may be made from "deck to deck" without "transfer under pressure" (TUP). All subsequent bell runs should be made using full TUP procedures.
 9. Perform at least 4 chamber pressurizations, including pre-dive checks of living- and transfer chamber.
 10. Under supervision, monitor the chamber atmosphere while occupants are in saturation.
 11. Undertake bell pre-dive checks on at least 4 separate days.
 12. Operate the bell panel under supervision.
 13. Operate the chamber panel under supervision.
 14. Undertake training in the process associated with hyperbaric evacuation and launch procedures.
 15. Act as a diver during 3 bell lockouts at a minimum bell depth of 50 metres with a minimum diving depth of 65 msw.
 16. Act as a diver from a minimum storage depth of 50 meters on two bell runs. The lockout for these bell runs should be at least 15 minutes for each dive on each occasion. During these runs the diver should swim away from the closed bell to the full extent of the diver's umbilical.
 17. Act as a bellman from a storage depth of minimum 50 meters on two bell runs.
 18. Activate secondary life support during at least one of the shallow dives.
 19. Undertake decompression from a living depth of minimum 50 meters.

Other elements being part of the practical training are:

- Monitoring and recording
- Bell gas distribution system
- Carbon dioxide absorption system
- Heating systems
- Communications
- Emergency recovery system for diving bell
- Handling system for diving bell
- Checks, pre- and post-dive procedures

- Emergency measures
- Breathing gas recovery systems
- Survival equipment
- Dynamically positioned vessels
- Surface team

Course syllabus - Recommended theory

1 Diving physics	20
2 Chamber operation	10
3 Bell diving operations	12
4 Legislation, statutory instruments	6
5 Physiology and first aid	36
Total theory recommended hours	84

Number of hours for theoretical training is intended as a guideline.

1 Diving physics 20 hrs theory

1.1 Properties of liquids and gases

- a) the relationship between pressure and volume (Boyle's Law)
- b) the relationship between volume and temperature (Charles' Law)
- c) partial pressure of gases (Dalton's Law)
- d) solubility of gases (Henry's Law)
- e) buoyancy (Archimedes' Principle)

2 Compression chamber operations 10 hrs theory

- a) Built-in breathing system ("BIBS") - functioning and operation
- b) Gas distribution system
- c) Gas monitoring and recording
- d) Carbon dioxide absorption system
- e) Impurities in gas distribution systems
- f) Gas purity
- g) Cleaning of gas distribution systems
- h) Monitoring and recording of parameters during chamber operation
- i) Firefighting equipment
- j) Checks and maintenance
- k) Sanitary arrangements
- l) Medical locks
- m) Communications
- n) Emergency procedures
- o) Compression and decompression
- p) Dive log
- q) Surface team
- r) Diving operation

3 Bell diving operations

12 hrs theory

Theory of practical issues related to carrying out bell diving operations and the roles and responsibilities of the dive team with all its functions.

The theory shall cover all aspects that will be elements in the practical training.

4. Legislation, statutory instruments

6 hrs theory

The diver is required to be familiar with and understand relevant legislation, regulations, guidelines, safety notices etc.

He shall further be able to assess problems and situations in connection with relevant diving operations subjected to the above mentioned legislation.

5. Physiology and first aid

36 hrs theory

Diver Class II will need to have a broader understanding of diving physiology and first aid than that required for a diver Class I. He must be able to assess vital symptoms and to apply first aid in the diving bell.

5.1 Structure and function of the human body:

- a) musculo/skeletal systems,
- b) nervous system,
- c) heart, blood vessels, blood circulation,
- d) lungs,
- e) ears, sinuses and vestibular organs.

5.2 Oxygen toxicity

Cause, effects, symptoms and management of oxygen toxicity. Calculation of oxygen partial pressure and the significance of this pressure to the safety of the divers.

5.3 First aid

Causes, prevention, symptoms and management under normal and hyperbaric conditions, including a diving bell, of:

- a) bleeding,
- b) fractures, sprains and muscle trauma,
- c) shock,
- d) burns,
- e) injuries caused by electricity,
- f) asphyxia, pulmonary oedema,
- g) respiratory arrest,
- h) cardiac arrest,
- i) hypothermia,
- j) hyperthermia,
- k) underwater blast injury.

Importance of personal hygiene in the management of injuries. Patient examination. Checking pulse, respiratory rate and temperature. Measures during transfer of injured person from diving bell to chamber. Measures at the casualty site and during

transportation of injured person. First aid equipment and its use during a manned underwater operation.

5.4 Diving related injuries and side effects

Cause, effect, symptoms and management of:

- a) pressure related injuries,
- b) ear related injuries and illnesses,
- c) drowning (both primary and secondary),
- d) vomiting under water,
- e) carbon dioxide poisoning,
- f) carbon monoxide poisoning,
- g) high pressure nervous syndrome (“HPNS”),
- h) nitrogen narcosis,
- i) anoxia and hypoxia.

5.5 Decompression related illness

Causes, effects, symptoms, diagnosis and management of illnesses requiring recompression, e.g. decompression sickness, gas embolism, pulmonary barotrauma and related conditions.

Other

For more detailed programmes/syllabus for bell diver training, please see the IDRCF guideline for Closed Bell Diver Training in Appendix 4.

Surface Supplied Diver Training

International Diving Regulators and
Certifiers Forum (IDRCF)

International Diving Regulators and Certifiers Forum (IDRCF)

Surface Supplied Diver Training Guideline

Part 1 – Organisation and Facilities

March 2026

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1 Introduction

The scope of this document is to provide the diving schools with a guideline on minimum requirements on how to organise and prepare their facilities for training competent surface-oriented divers for the offshore industry.

This guideline should be read in conjunction with the latest revision of the following documents:

1. Australian training standards (ADAS)
2. HSE diver competencies requirements (UK)
3. NORSOK U-100 Annex B (Norway)
4. DCBC diver competencies requirements and CSA Z.4 Competency Standard for diving, hyperbaric chamber, and remotely operated vehicle operations (Canada)
5. ADCI diver competencies requirements (US)
6. DOEL Training Standards for Commercial Diving (South Africa)

Other documents for further reading:

7. EDTC Guidance on Safe Working Practices in Commercial Diving
8. EDTC Diving Industry Personnel Competence Standards

1.1 Definitions

shall (requirement): Criteria to be fulfilled to be in compliance with this document. No deviation is permitted.

should (recommendation): A suggested possible choice or course of action. Alternative solutions that have the same functionality and quality is acceptable.

2 Facilities

2.1 General requirements

The diving school organisation shall be able to effectively manage the number of candidates on a course. The course capacity should be based on a documented risk assessment. The diving school facilities should be adequate for the training offered. This includes sheltered changing areas, changing rooms, toilets, showers and indoor storage areas for the students and the employees.

2.2 Classroom facilities

The classroom design should meet the following minimum criteria.

- Classroom area shall be suitable for the number of students attending the diving course
- Sufficient space and suitable desks and seating

Working environment

Classrooms should be:

- Indoors, enclosed and sheltered from weather
- Well ventilated – a supply of fresh, clean air drawn from outside or a ventilation system
- A reasonable working temperature so it is comfortable
- Adequately lit for reading
- Clean with appropriate waste containers
- Situated away from noise or soundproofed

Welfare Facilities

Candidates and staff must have access to:

- Toilets and hand basins with soap and towels or a hand-dryer
- Drinking water
- A place to store clothing
- Somewhere to rest and eat meals

Technical

- Adequate teaching aids such as white boards, projectors, pc and other presentation materials
- Wi-Fi or internet access

Safety, hygiene and maintenance

- Keep floors and traffic routes free of obstructions
- Ensure there is suitable first aid provision
- Maintain the premises and clean regularly

2.3 Diving equipment requirements

The diving equipment used for training should be on the same level of quality, functionality and safety standards similar to the equipment used in the industry.

General requirements:

- Ensure that the equipment is safe for the intended use.
- Ensure that the equipment maintenance, use and storage in compliance with the manufacturer's recommendations and instructions for safe use and according to local legislation and / or regulations

Diving Equipment:

- The diving equipment shall be in good condition and maintained according to manufacturer's recommendations
- Diving equipment shall comply with all relevant national health and safety requirements
- The equipment should be made of suitable materials that provide adequate protection
- The diving school shall ensure that the equipment undergo necessary testing and provide documentation (e.g., Declaration of Conformity, technical documentation, instructions)
- Proper labelling is required (e.g., CE marking, traceability information)

Maintenance and Testing:

- Ensure that any chemicals used in maintenance and cleaning of diving equipment are safe for human health and the environment
- Diving equipment should undergo testing to ensure compliance with local legislation & safety standards
- Audit, testing and certification bodies should provide certification, documentation and labelling as proof of compliance
- Follow the equipment manufacturers recommendations for maintenance and testing

2.4 Dive sites and facilities

The diving school shall have a description of the dive sites to be used. These plans need to include water depths, tidal conditions access and egress to the water, and any known in-water features that may be a hazard to the diver.

The dive site and facilities shall meet the following minimum criteria:

- Shallow area or tank for initial diving and familiarisation of students
 - The area used for initial diving shall be sheltered from any heavy currents, tides, waves or swell
 - The water shall have good visibility during the introduction to diving for new students
- The dive site and facilities should be sheltered and protected from any marine traffic in the area. Means of diverting / signalling to any interfering marine traffic should be in place.
- The dive site and facilities should be protected from any hazards in the area including, but not limited to the following:
 - Pollution or spills
 - Marine traffic or small boat traffic
 - Any risks located on the seabed. E.g. inlets, outlets, debris, cables, etc.

- Adverse weather conditions
 - Simultaneous diving or other training activities
 - Lifting operations / training
- The diving school should have access to a variety of dive sites including open water with sufficient depth
- The site shall have access for emergency vehicles and medical evacuation
- Chamber for recompression shall be in close vicinity of the diving site as mandated by local regulations. An operational recompression chamber shall be located on-site under the following conditions:
 - decompression diving is undertaken
 - free or buoyant ascent training is being conducted
 - diving is planned to greater than 30 m water depth
 - the nature of the environment or work to be conducted creates risk of extended bottom time, entrapment or uncontrolled ascent
 - where the nature of plant or equipment used during the dive or on the dive site can be reasonably foreseen to result in a substantial increase in risk.

NOTE: 'On-site' chamber means at the dive control position or, if this is impossible, close enough to the dive control position to ensure that an injured diver could be recompressed within the chamber within 5 min of reaching the surface.

In all other cases, there shall be provisions for ensuring that any diver suffering decompression illness can be recompressed promptly in an appropriate facility in order to prevent death or serious disability and to optimize the diver's chance of full recovery.

3 QHSE requirements

3.1 General Requirements

The school shall plan and conduct the training to avoid any health and safety risk to the students and their employees.

The training establishments should give the students detailed information on the risks associated with diving. This should be highlighted during theoretical and practical training.

Safety and quality management should be structured and documented according to national standards, or alternatively international standards such as ISO 9000 series for Quality Management System and the ISO 45001 for Occupational Health and Safety Management Systems.

As a minimum a DMT shall be on site during all diving activity. A medical advisor, e.g. a diving medical physician (DMAC level 2D) should be available for guidance in case of a diving incident or accident. The contact details of the medical advisor / diving doctor should be made available for all personnel involved in the diver training.

3.2 Working environment

The working environment for both employees and students shall be safeguarded. Safety and Security shall be safeguarded by implementing measures to prevent incidents, accidents and injuries.

A healthy physical work environment shall be promoted, and the diving school should also promote a healthy and supportive psycho-social environment.

Control of Substances Hazardous to Health shall be implemented by:

- Control measures to prevent exposure to hazardous substances
- Ensure proper storage, labelling, and disposal of chemicals
- Ensure the proper use of Personal Protective Equipment (PPE)
- Meet all legal requirements for use, storage and disposal of hazardous materials and chemicals

3.3 Safety

The school shall conduct risk assessments and establish a risk management plan to identify and mitigate any potential hazards that may arise from the planned work or training. The school shall develop emergency plans for incidents and accidents that may occur for both students and employees.

Safety and quality management should be structured and documented according to international standards e.g. ISO 45001 and ISO 9001.

3.4 Incident & Emergency Management

Emergency plans shall be developed and made available to all staff and students. The contents should include as a minimum:

- Emergency procedures and instructions for handling any foreseeable emergency including retrieving injured and/or unconscious divers from the water
- Roles and responsibilities
- A communication plan including back-up communication
- Contact details of team members or key personnel.
- Contact details for reporting to authorities in countries where this may be required
- Requirements for training and emergency drills
- Evacuation plans

General emergency training and exercises should be carried out regularly by the staff and with both staff and students at the start of each course.

Location specific emergency plans should be in place. They should detail the specific roles and responsibilities of each assigned team member during various emergency situations.

This should be displayed in the staff facilities and in the dive stations or other suitable places on to ensure everyone is aware of their assigned duties in case of an emergency.

First aid equipment shall be available at dive stations and in classrooms.

3.5 Stand-by diver

Stand-by diver coverage shall be available on all operational dive stations at all times during the diver training.

Start-up of diver training shall not be commenced before a confirmation that a stand-by diver is dressed and ready for deployment is received.

The range of the stand-by diver shall be documented, and the range shall cover the entire area where the diver training is performed.

3.6 Emergency chamber

An emergency chamber shall be present on site and operational during all diving exercises.

The capacity of the chamber shall be sufficient to cover multiple incidents if diving is performed at multiple diving stations simultaneously.

4 Administrative requirements

The diving school shall have a management system containing all written instructions, policies, manuals and procedures for the safe and efficient operations of the school.

4.1 Organisation

The diving school shall have an overview of the management structure:

- Organisation chart
- The names of the primary designated signatory and their deputy who will act for the primary person in their absence
- Contact details
- Names and duties of instructors, dive team members and assessment staff

4.2 Documentation

The following management documentation is recommended as a minimum:

- QHSE and emergency management
- Policies, manuals and procedures covering all routine operations
- Checklists
- Compliance verifications
- Staff policy, competence & training records
- Procedure for document numbering, document updates and revision logging
- Retention period for records, student documentation and GDPR policy

For all equipment that has been subject to maintenance and testing the school should be able to provide documentation. E.g. Declaration of Conformity, certification, technical documentation, instructions.

4.3 Student entry requirements

The applicant shall:

- Provide a recognised form of photographic identification
- Should be at least 18 years old
- Hold a valid certificate of medical fitness in accordance with national guidelines which applies to all candidates undergoing diver training
- Have sufficient elementary education to be able to carry out the necessary calculations
- Be able to communicate and understand written instructions in English language
- Pass the training institutes assessment as required to commence a commercial diving career

4.4 Logging / logbook

During the training the students shall log all dives. The logbook shall also contain the Dive Supervisors stamps & signatures for the dives. The diving doctor should also sign/stamp the logbook for the health certificate where this is a national requirement. All dives performed during training shall be logged and archived by the school. The dive logs shall be retained according to local regulations.

4.5 Audits

The diving school should be subject to periodic audits from a national regulator or an appointed independent certifying body.

The diving schools would be expected to carry out its operations in line with a recognised quality standard such as the ISO 9000 series, or a recognised standard as per national legislative guidelines.

Internal audits by the organisation themselves should be performed periodically as quality checks and demonstrate clear intent to comply with recognised standards. However, they do not replace the external audit.

4.6 Limitations for Absence

All attendance should be recorded and the limitations for absence should be kept to a minimum. However, for the theory lessons no more than 10% absence should be allowed.

For the practical in water exercises no absence from the minimum required bottom times shall be allowed. In cases where students have missing bottom time the diving school shall schedule for additional exercises/training where the missing bottom time shall be acquired.

4.7 Record keeping

The diving school should operate its management, control and documentation systems in line with a recognised standard such as ISO 9000 or a recognised standard as per national legislative guidelines.

All assessments of the students shall be documented. A record of the assessments completed must be maintained in such a way that the diving school and the candidate can clearly see at any time what the student have achieved and what they have left to achieve.

When practical exercises under supervision have been performed the type of exercise, the name of the student and the assessor/instructor, the location, time and date of the exercise shall be recorded.

The documentation shall contain sufficient details in order to verify that the students have received the required theoretical and practical training.

As a minimum the following information shall be recorded and archived:

- The results from theoretical and practical examinations
- Attendance in practical exercises using key equipment and tooling
- Dive logs
- Type of certification issued
- Validity of the issued certification and potential restrictions

4.8 Reporting

The schools shall keep statistics over all diving activities and issued certification.

This shall be reported to the national certifier organisation.

Incidents and accidents shall be reported according to the national regulations.

As a minimum the following shall be reported:

- Diving statistics
- Incidents, accidents and injuries during diving
 - Any incident requiring first aid or medical treatment
 - DCI or any other incident requiring hyperbaric treatment
 - Near-accidents
 - Every form of unconsciousness
- Type of courses
- Number of certificates
- Type of certificate issued
- Statistics over passed / failed courses

5 Staffing and Competence Requirements

5.1 General

For all in water training the number of staff members on site shall be sufficient to handle any emergency situations.

5.2 Instructor

The diving school should have an overview of the formal competencies of their instructors. The following requirements could be used as a guide, but individuals should be considered separately:

- **Subject matter expertise:** The instructors should be qualified to the same level at which they are instructing.
- **Relevant experience:** They should have several years of experience working at the level that they are training.
- **Teaching skills:** They should either have formal training in instruction techniques or should have several years practical experience at such work.
- **Communication skills:** Clear and concise language, both written and verbal, along with the ability to engage participants. They should have good communication and interpersonal skills.
- **Credibility and professionalism:** The instructor should be capable of managing student appropriately, remaining calm trustworthy and showing respect for course participants.

5.3 Dive supervisor

The instructor supervising the dives during the in-water training should have formal training and competence as a Dive Supervisor.

The Dive Supervisor shall not be distracted or involved in other work during the diving.

5.4 Chamber Operator

The appointed chamber operator during the diver training shall be certified as a surface supplied diver. The chamber operator shall also be familiarised on the specific chamber in use.

5.5 Stand-by Diver

It is required to have an appropriately qualified and dressed standby diver whenever any in-water student activities either diving or surface swimming is taking place. The standby diver will normally be on the surface but shall be dressed to enter the water. They need not be wearing a mask or helmet, but the equipment should be

immediately to hand. The stand-by diver shall be ready and able to enter the water as quickly as possible after notification.

The stand-by diver shall not be directly involved with diver training nor any other activity that would distract them from their duty.

At no time should students under training be allowed to enter the water without a dressed standby diver ready on site.

5.6 Training and Familiarisation of Stand-by Diver

The stand-by diver should be a fully certified diver to the level of training being conducted.

The stand-by diver shall be exercised to the maximum depth of the site they are covering and must have been assessed as competent to fulfil the duties of a standby diver in a training environment. The diving school must document that the stand-by diver is able to manage student emergencies and in addition, have operated to the minimum at the depth of the planned dive. All divers fulfilling the role as stand-by diver during training must have demonstrated competence in managing the relevant risks associated with student divers under training.

These risks may include, but are not limited to:

- Serious entanglement
- Narcosis
- Problems with ears and sinuses
- Equipment issues
- Poor buoyancy control
- Apprehension/panic at depth

The diving school shall ensure that the stand-by divers are exercised regularly. This training shall be documented and should also be entered into the daily dive log and the diver's logbook.

Standby divers should be proficient in conducting rescues in all diving operations and at the depth they are responsible including:

- Surface supply including shore entry
- Boat, barge or platform entry
- Basket diving
- Wet Bell diving

Scenarios which may be practiced should include, but not limited to:

- Unconscious diver recovery
- Flooded mask
- Guiding a lost diver to a shot line
- Awareness of airway management on ascent
- Unconscious diver recovery
- Loss of gas

- Entangled diver including switching to bailout and cutting through an old piece of umbilical before recovering the diver
- Rescue to a dive basket and use of the basket emergency gas cylinder
- Rescue to a wet bell including switching to on-board gas and preparing the wet bell to leave bottom
- Raising the wet bell with loss of comms to the divers

6 Examination

6.1 Theory exam

Candidates' theoretical competence shall be tested by written examination. The theoretical examinations should cover all aspects of theory lessons and contain a sufficient number of questions to cover for a minimum duration of 45min for each subject. The theoretical examinations should have a minimum correct response rate of 80%.

The diving school can arrange classroom or on-line examinations. However, if on-line examinations are performed the following measures should be in place:

Technical:

- A stable internet connection
- Appropriate technical equipment, such as camera and microphone
- Required software

Identity Verification:

- Verification of ID and student number
- A camera may be used to monitor participants in real-time

Integrity Rules:

- Clear rules to avoid cheating, which may include prohibiting the use of aids or communication with others during the exam
- Specialised software that can detect suspicious activities may be used

Data Protection:

- Procedures for handling and storing data during the exam

6.2 Practical exam

The diving school shall have a method for evaluating practical examinations. The method should include scores with a set of corresponding execution criteria to achieve each score. The score can be set on a scale of numbers, letters, or simply passed/not passed.

The methods of assessment may be a continuous assessment throughout the course or practical exams on key subjects.

The method of evaluation and minimum requirement for passing the exam or exercise should be defined in the school's management system or training manual.

International Diving Regulators and Certifiers Forum (IDRCF)

Surface Supplied Diver Training Guideline

Part 2 – Training Program

March 2026

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1 Introduction

The scope of this document is to provide the diving schools with a guideline for training competent surface-oriented divers for the offshore industry.

After the training the divers should be capable to plan, organise and carry out diving operations in a safe and professional manner.

This guideline can be useful for students, employers and educational institutions in the diving industry.

This guideline should be read in conjunction with the latest revision of the following documents:

1. Australian training standards (ADAS)
2. HSE diver competencies requirements (UK)
3. NORSOK U-100 Annex B (Norway)
4. DCBC diver competencies requirements and CSA 275.4 Competency Standard for diving, hyperbaric chamber, and remotely operated vehicle operations (Canada)
5. ADCI diver competencies requirements (US)
6. DOEL Training Standards for Commercial Diving (South Africa)

Other documents for further reading:

7. EDTC Guidance on Safe Working Practices in Commercial Diving
8. EDTC Diving Industry Personnel Competence Standards

1.1 Definitions

shall (requirement): Criteria to be fulfilled to be in compliance with this document. No deviation is permitted.

should (recommendation): A suggested possible choice or course of action. Alternative solutions that have the same functionality and quality is acceptable.

1.2 Required Levels of Knowledge

The student competence shall be assessed in accordance with the achieved level of knowledge at the end of the course.

The competence the students are expected to achieve during the training are defined by three levels of knowledge:

1. Level 1 (Basic): The student has some basic knowledge of the subject. These subjects are less vital for the diver's health and safety. The student should be familiar with the subjects and be able to perform practical exercises safely.
2. Level 2 (Intermediate): The student has more in-depth knowledge of the subjects. These subjects are required to function as a competent diver in an offshore environment. The student is expected to explain the subject in general and to be able to perform practical exercises safe and efficient.

3. Level 3 (Advanced): The student is expected to have detailed understanding of the subject. Competence in these subjects are vital for health and safety during diving. The student is expected to demonstrate flawless execution of the practical exercises and should be able to explain the subjects in detail. The student shall be thoroughly assessed in these subjects.

1.3 Assessments

The theoretical assessments should be by written examination.

The practical exercises could be assessed by continuous assessment throughout the course, or by practical examinations both in-water and dry.

2 Theory

There shall be minimum 95h of theoretical lessons.

The aims are to provide the diver with the understanding and knowledge of basic skills required in order to complete various underwater tasks safely and efficiently.

2.1 Diving physics

The student shall be able to understand the properties of liquids and gases, the behaviour of light and sound and the principles of buoyancy and how it may affect them and the diving operations.

ID 2.1	Topics – Diving physics	Level		
		1	2	3
1.	Archimedes principle <ul style="list-style-type: none"> A good understanding of the principle Being able to calculate the buoyancy of an object in both fresh water and sea water 		X	
2.	Boyles law <ul style="list-style-type: none"> A good understanding of the relationship between pressure and volume Being able to calculate volume changes with changing depths 			X
3.	Daltons law <ul style="list-style-type: none"> A good understanding of the partial pressure of gases Being able to calculate the partial pressure of gases at different depths 			X
4.	Henry's law <ul style="list-style-type: none"> A good understanding of the solubility of gases in solution A good understanding of the need for decompression 			X
5.	Charles law <ul style="list-style-type: none"> A good understanding of the relationship between volume and temperature Being able to calculate pressure and volume changes with changes in temperature 		X	
6.	Light and sound in water <ul style="list-style-type: none"> Refraction and reflection Light wavelength absorption and colours Understanding how sound behaves in water Understanding of speed and travel of sound in water 		X	

2.2 Diving physiology

The student shall have a basic understanding of anatomy and physiology and be able to describe the following:

ID 2.2	Topics – Diving Physiology	Level		
		1	2	3
1.	The muscle and skeletal systems	X		
2.	The nervous system	X		
3.	The lungs, heart, blood vessels and circulatory system	X		
4.	The respiratory system	X		
5.	The ears, sinuses and vestibular organs	X		

2.3 First aid

The student shall be able explain the general principles of to perform basic first aid and be able to recognise symptoms of diving related illness.

ID 2.3	Topics – First Aid	Level		
		1	2	3
1.	General first aid <ul style="list-style-type: none"> • Bleeding • Fractures, sprains and muscle trauma • Shock • Burns • Electrocution • Asphyxiation • Pulmonary oedema • Respiratory arrest • Cardiac arrest • Hypo- and hyperthermia • Personal hygiene 		X	
2.	Diving related injuries <ul style="list-style-type: none"> • Decompression sickness • Gas embolism and pulmonary barotraumas • Barotrauma and pressure related injuries • Drowning • CO and CO₂ poisoning • O₂ toxicity • Anoxia and hypoxia • N₂ narcosis • Hyperventilation 			X

ID 2.3	Topics – First Aid	Level		
		1	2	3
3.	The student shall be able to perform basic first aid at a dive site. As a minimum there should be practical exercises in: <ul style="list-style-type: none"> • First aid equipment and use • Cardiopulmonary resuscitation • Administration of oxygen • Preventive measures at the site of the incident • First aid during transportation 		X	

2.4 Legislation & Standards

The students should be familiar with the legislation and standards of the country in which the training is performed.

The student should understand how both national and international regulations may affect diving operations, team composition and diving spread requirements.

As a minimum the students shall be able to describe the difference between laws, regulations, standards and guidelines and where they are applicable.

ID 2.4	Topics – Legislation & Standards	Level		
		1	2	3
1.	They should have knowledge of the following: <ul style="list-style-type: none"> • IMCA guidelines and safety notices • IOGP report 411 • EDTC PCS • DMAC 	X		
2.	They should be familiar with national regulators and certifiers such as: <ul style="list-style-type: none"> • Norwegian regulations and NORSOK U-100 standard • NOPSEMA and ADAS • HSE-UK The Diving at Work Regulations and ACOP • ADCI – International Consensus Standards for Commercial Diving and Underwater Operations • Diver Certification Board of Canada (DCBC) • Canada-Newfoundland and Labrador Offshore Energy Regulator (C-NLOER) Regulations 	X		
3.	National legislation in the country where the training takes place.			X

2.5 Risk Management

Risk Management should be part of the training syllabus to give the students a tool to control and mitigate risk.

The student should be able to explain the different steps in a risk assessment process, and how this can be put into practical use.

ID 2.5	Topics – Risk Management	Level		
		1	2	3
1.	The student should be familiar with all the concepts in a risk analysis. <ul style="list-style-type: none"> • HAZID • HAZOP • Task Based Risk Assessment • Toolbox Talk 		X	

2.6 QHSE routines and procedures

QHSE Routines should be part of the training syllabus.

The student should be familiar with the different QHSE routines and understand how these are used during a diving operation.

ID 2.6	Topics – QHSE routines and procedures	Level		
		1	2	3
1.	The student should be familiar with the following routines: <ul style="list-style-type: none"> • Management of Change (MoC) • QA programs • Non-conformance 	X		
2.	The student should be able to identify and use the following processes: <ul style="list-style-type: none"> • Permit to Work (PtW) • Isolations and Lock-out / tag-out 			X
3.	The student should have knowledge of the Safety Delegate / Safety Representative function and responsibilities.	X		
4.	Use of PPE			X

2.7 Diving spread and equipment

The student shall have thorough knowledge of the most commonly used surface-oriented diving equipment and how to use it.

ID 2.7	Topics – Diving spread and equipment	Level		
		1	2	3
1.	Personal equipment used for surface oriented diving <ul style="list-style-type: none"> • Masks • Helmets • Bail-out and HP cylinders • Diving suits • Diver communication equipment 			X
2.	Surface supplied diving systems <ul style="list-style-type: none"> • Layout and main components • Safety features • Umbilical • HP and LP compressors 			X
3.	Gas analysers		X	
4.	Electronic depth monitoring system		X	
5.	Video camera and recorder		X	
6.	Rebreathers. Closed and semi-closed	X		

2.8 Diving methods

The student should be familiar with the main surface oriented diving techniques and be able to give a detailed description of the benefits, limitations, technical and legal requirements when using these techniques. The student should also be introduced to other diving methods, however no detailed knowledge is required.

ID 2.8	Topics – Diving Methods	Level		
		1	2	3
1.	Surface Supplied			X
2.	Surface decompression			X
3.	Nitrox			X
4.	SCUBA			X
5.	Basket			X
6.	Wet Bell			X
7.	Introduction to TUP and closed bell diving	X		

2.9 Diving tables

The student shall have detailed knowledge of the diving tables used the country in which the training is performed. Also, the student shall have some knowledge of other tables used in other regions.

As a minimum the student should have detailed theoretical knowledge of the following subjects:

ID 2.9	Topics – Diving Tables	Level		
		1	2	3
1.	Decompression			X
2.	Bottom time limitations			X
3.	Surface decompression			X
4.	Nitrox and EAD Tables			X
5.	Treatment tables			X
6.	Repetitive dive calculations			X

2.10 Underwater Hazards

The student shall be able to identify the most common underwater hazards and be able to take necessary precautions. The training should emphasize on relevant examples from actual incidents, near misses and hazard observations from the industry.

ID 2.10	Topic – Underwater Hazards	Level		
		1	2	3
1.	Differential pressure <ul style="list-style-type: none"> Awareness of the hazards and potential consequences due to differential pressure Knowledge of locations and situations where this may occur 			X
2.	Tides, waves and current		X	
3.	Entrapment and snagging <ul style="list-style-type: none"> Gates, sluices and culverts Umbilical management Calculation of max. umbilical length with safe distance from potential hazards 			X
4.	Pollution and spills		X	
5.	Seabed obstructions, underwater structures and debris		X	
6.	Diving in the vicinity of inlets & outlets			X
7.	Diving in the vicinity of ships, thrusters and propellers			X
8.	Diving in enclosed space without free ascent to the surface			X
9.	Underwater electricity <ul style="list-style-type: none"> Diving in vicinity of electrical currents Impressed current cathodic protection Subsea electrical units 			X
10.	Diving in wrecks		X	
11.	Diving on DP <ul style="list-style-type: none"> DP system & station keeping Surface oriented diving from DP-vessels 			X

ID 2.10	Topic – Underwater Hazards	Level		
		1	2	3
12.	Underwater explosion <ul style="list-style-type: none"> Blasting and demolition work Underwater mines and unidentified explosives 	X		
13.	Dangers during underwater cutting operations			X
14.	Dropped objects <ul style="list-style-type: none"> Causes and consequences How different shapes behave when dropped under water 			X

2.11 Emergency Procedures

The student shall understand and be able to act in accordance with procedures necessary to deal with an emergency, both as a diver and as a member of the diving team. The training should include emergency drills for different sites and situations.

ID 2.11	Topics – Emergency Procedures	Level		
		1	2	3
1.	Firefighting and evacuation			X
2.	Emergencies onboard vessels and platforms			X
3.	Diver in water and diver recovery			X
4.	Communication including hand and line signals			X
5.	Emergencies during chamber operations			X
6.	Deployment of stand-by diver			X

2.12 Dive panel

The student shall have theoretical knowledge of the following subjects related to dive panels:

ID 2.12	Topics – Dive panel	Level		
		1	2	3
1.	Dive panel design and minimum regulatory requirements			X
2.	Dive panel components			X
3.	Valves type and function		X	
4.	Materials and chemicals (e.g. grease and oxygen, suitable lubricants, etc.)		X	
5.	Gas management and associated risks			X

2.13 Chamber Design

The student shall have theoretical knowledge of the following subjects related to decompression and emergency chambers.

ID 2.13	Topics – Chamber Design	Level		
		1	2	3
1.	Basic chamber design			X
2.	Basic functions and maintenance			X
3.	Set up for emergency and treatment			X
4.	General maintenance		X	
5.	Specific risks related to chamber set up and operations.			X
6.	Monitoring the chamber atmosphere (e.g. O2 levels and CO2 management)			X

2.14 Diving from DP

The student shall have theoretical knowledge of the following subjects related to diving operations from a DP operated vessel:

ID 2.14	Topics – Diving from DP	Level		
		1	2	3
1.	DP-systems description	X		
2.	Position reference and station keeping	X		
3.	Surface oriented diving from a DP vessel		X	
4.	Umbilical management		X	
5.	Hazards and mitigations when diving from a DP vessel			X

2.15 Underwater tools, equipment & work tasks

The student should be given an overview of the most common underwater tools, equipment and the associated hazards during use. Lessons in tasks undertaken by the different members of a dive team and development of work plans should be given. Also, lessons should include an overview of the most common work tasks where underwater tools are used.

This should include, but not be limited to:

ID 2.15	Topics – Underwater tools, equipment & work tasks	Level		
		1	2	3
1.	Safety aspects of powered tooling			X
2.	Welding	X		
3.	Oxy arc cutting and O2 under water		X	
4.	HP water jetting	X		
5.	Grit blasting	X		
6.	Air lifts and dredging	X		
7.	Rigging and lifting		X	
8.	Pneumatically and hydraulically powered tools		X	

ID 2.15	Topics – Underwater tools, equipment & work tasks	Level		
		1	2	3
9.	Bolt gun	X		
10.	Use of winches	X		

2.16 Nitrox theory

The student should understand and have the following theoretical knowledge level of the subjects related to Nitrox:

ID 2.16	Topics – Nitrox Theory	Skill Level		
		1	2	3
1.	Benefits and limitations of using nitrox		X	
2.	Oxygen toxicity and hyperoxic exposure			X
3.	Equivalent air depth			X
4.	Use of dive tables			X
5.	Hazards related to handling oxygen			X

2.17 Basic lifting & rigging

The student shall be able to select the correct lifting equipment in order to prevent hazardous situations and incidents. The student should demonstrate knowledge of:

ID 2.17	Topics – Basic lifting and rigging	Skill Level		
		1	2	3
1.	Basic rigging components and rigging design		X	
2.	Wires, slings, chains, shackles, etc.		X	
3.	Winches and hoists	X		
4.	Seabed suction forces	X		
5.	Uplift forces and buoyancy		X	

3 Diver Training Program

3.1 Duration and Required Bottom Times

The duration of the training program may be dependent on the number of students undertaking the training program. As a rule of thumb, the course duration for unrestricted surface supplied diver training should be approximately 12 weeks. First aid or Diver Medic Technician (DMT) courses may be added to this.

Training program	Minimum training
Initial diving and Scuba training (max 30msw)	4 weeks
Surface Supplied Diver	6 weeks
Offshore top-up	2 weeks
Total	12 weeks

3.1.1 Minimum bottom time on depth

The following minimum bottom times in open water should be achieved during controlled practice training. The listed dive times are minimum requirements for each depth range. Maximum depth shall be limited to 50 msw and the student shall reach 50 msw depth during the training. Neither in water decompression nor time in a chamber shall be included in the minimum bottom times.

Depth	Bottom time
0 – 10 msw	1200 min
11 – 20 msw	400 min
21 – 30 msw	150 min
31 – 40 msw	100 min
41 – 50 msw	150 min
Total	2000 min

The students should undertake minimum two chamber dives to respectively 18m and 50m depth.

During these dives they should perform the following emergency exercises:

- Act as a tender during therapeutic recompression exercise
- Act as an inside attendant in a double-lock chamber

Note:

The chamber dives should be performed before the students are exposed to deeper dives (30msw) in water in order to experience N₂ narcosis in a safer environment.

3.1.2 Required training at each depth interval

The following minimum bottom times should be allocated for training in the various diving methods:

Depth	Duration	Task / Exercise
0 – 20 msw	250 min	Scuba
18 – 50 msw	75 min	Wet bell training
31 – 50 msw	75 min	Use of a dive basket
35 – 50 msw	20 min	Exercise with powered tooling
41 – 50 msw	150 min	Simple rigging or work tasks using hand tools

A significant proportion of the practical diving exercises should be completed using surface oriented equipment, and during at least one dive to a depth exceeding 35m an exercise with a hydraulically/pneumatically/electrically powered tool should be carried out. The exercise should have a duration of at least 20 minutes.

3.2 Routine Diving Operations

This section describes the minimum in water training performing typical diving work tasks. Apart from the initial introduction to new diving equipment and method the majority of in-water exercises should be performed by executing routine work tasks. The students should dive in a variety of conditions to a depth of 50msw and cope with variations in visibility, and different seabed conditions and currents.

The in water exercises should also be combined with emergency drills. The exercises should emphasise on effective communication, identifying unforeseen hazards and include unannounced rescue drills from all diving platforms e.g. basket, wet bell, and from a boat or barge using a dive ladder and rescue hoist.

ID 3.2	Topics – Routine Diving Operations	Level		
		1	2	3
	General Operations			
1.	Assist in preparing work plan for a dive		X	
2.	Pre- and post-dive checks			X
3.	Work as a member of a dive team		X	
4.	Daily maintenance of tooling and equipment, cleaning and appropriate storage for subsequent use		X	
	Communication and Line signals			
5.	The student shall be able to communicate clearly and concisely, both as a diver and surface attendant, during routine diving operations and emergency drills.			X
6.	The student shall be able to use line signals in case of communication failure.			X
7.	Surface crane signals			X

ID 3.2	Topics – Routine Diving Operations	Level		
		1	2	3
	Inspection Work			
8.	Basic visual inspection techniques		X	
9.	Survey task using a helmet mounted video camera		X	
10.	Produce a survey / inspection report	X		
	Underwater construction work			
11.	Basic Steel Construction, Mechanical, Piping & Flanges		X	
12.	An introduction to various aspects of concrete construction work should be given.	X		
13.	Use of formwork and casting frames	X		
14.	Grouting and sand bagging	X		
15.	Operation of LP/HP Equipment such as: <ul style="list-style-type: none"> • Water jet • Grit blasting • Hydraulic tooling • Air lift 		X	
	Safe Operation of Rotating Equipment			
16.	The students shall be able to operate rotating equipment in a safe manner			X
17.	Grinders and cutting machines	X		
18.	Impact wrenches	X		
19.	Drilling tools	X		
	Safe Lifting & rigging operations			
20.	Tying basic knots under water		X	
21.	Use of lift bags			X
22.	Mattress handling frame	X		
23.	Lifting of clump weights	X		

3.3 Surface Supplied diver equipment

All training in the use of surface supplied diving equipment shall include the role as both a diver, stand-by diver, bellman and surface attendant.

ID 3.3	Topics – Surface Supplied diver equipment	Skill Level		
		1	2	3
1.	Dress and don all equipment ready to enter the water as a diver			X
2.	Assist another diver to dress and don all equipment ready to enter the water			X
3.	Use of dry suits			X
4.	Use of SCUBA equipment		X	
5.	Band mask			X

ID 3.3	Topics – Surface Supplied diver equipment	Skill Level		
		1	2	3
6.	Diving helmet			X
7.	Use of diving basket		X	
8.	Wet bell diving to a minimum of 20msw: <ul style="list-style-type: none"> • Check and prepare equipment • Operate wet bell diver supply panel • Operate wet bell LARS • Perform emergency recovery of diver to wet bell • Post-dive equipment checks and maintenance • Loss of gas and loss of communication to the wet bell exercise 		X	
9.	Hot water system and suits including: <ul style="list-style-type: none"> • Pre- and post-dive checks • Decontaminate and clean equipment • Care and storage of equipment • Operate surface hot water supply system both as a diver and on the surface 		X	
10.	Pre-dive operational and function checks on a surface orientated dive panel			X
11.	Dive panel operation during diving. The student shall be able to act as a panel operator during diving operations, emergency training and exercises. <ul style="list-style-type: none"> • Diving operations to different depths and work tasks • Emergency drills with deployment of stand-by diver • Emergency recovery of basket and wet bell 			X
12.	Gas management			X
13.	Maintenance and Repairs <ul style="list-style-type: none"> • Clean diving equipment after use and daily maintenance • Be able to do basic repairs of the diving equipment • Understand the manufacturers guidelines for repairs 			X

3.4 Chamber Operation

The student shall be able to act as a chamber operator, under supervision, during diving operations and emergency situations. Chamber operations should also include SurDO2 diving and simulated treatment exercises.

Practical training exercises for a double lock chamber should include:

ID 3.4	Topics – Chamber operation	Skill Level		
		1	2	3
1.	Chamber set up, breathing gas connection and testing		X	

ID 3.4	Topics – Chamber operation	Skill Level		
		1	2	3
2.	Chamber pre- and post-dive checks		X	
3.	Routine maintenance, calibration and repairs related to the operation of the chamber systems, including BIBS		X	
4.	Gas management and analysis		X	
5.	Set up and testing of communication systems		X	
6.	Set up and operation for SurDO2		X	
7.	Compression and decompression with divers in the chamber		X	
8.	Emergency drills and simulated treatment exercises			X

3.5 In Water and Surface Decompression

The students shall perform in water decompression and perform exercises using surface decompression (SurDO2).

They shall demonstrate a thorough understanding of decompression tables and procedures. The SurDO2 training may be performed in combination with other training e.g. wet bell and/or Nitrox diving.

ID 3.5	Topics	Skill Level		
		1	2	3
1.	In water decompression			X
2.	Surface decompression using O2			X

3.6 Nitrox diving

The students should prepare a work plan for the dive and shall, under supervision, operate the dive panel during the in water diver training.

The students shall demonstrate knowledge in:

ID 3.6	Topics – Nitrox diving	Skill Level		
		1	2	3
1.	Conservative choice of EAD tables			X
2.	Considering Nitrox mix for depth & pO2 vs bottom time			X
3.	Control of gas sources and breathing gas contents			X
4.	Use of O2 sensors and gas alarm settings			X
5.	Nitrox mixes vs. emergency gas on dive panel and bailout			X
6.	Nitrox safety considerations			X

The Nitrox diver training may be performed in combination with other training e.g. wet bell, basket and/or SurDO2.

Note:

During the practical exercises the contents of the bail-out should be the same as the surface supply. In the case where the content is breathed by the diver (deliberately or inadvertently) the decompression will not be altered if the bail-out mix is the same as the main surface supply.

3.7 Safety & Emergency procedures

3.7.1 Diver rescue and recovery

Rescue exercises shall be performed using all available surface supplied methods. As a minimum the students shall perform rescue drills in the role as diver, in-water and surface stand-by diver and surface team members. The exercises should include relevant scenarios from the industry.

The stand-by diver training drills should include deployment from a range of diving platforms with different methods of deployment. The drills should include rescue at different depths.

- Diving using a basket
- Wet bell rescue scenarios
- Small boat or Light Dive Craft scenarios
- Barge using a dive ladder and/or a rescue hoist.

The rescue exercises should include the following steps:

- Deployment of bellman, or basket in water stand-by or surface stand-by diver
- Locate the injured / unconscious diver in poor visibility
- Recover the diver back to the basket / wet bell
- Recover the diver to surface in a safe and controlled manner
- Recover the diver to deck
- Transport the diver to the emergency chamber and/or emergency services

As the diving course progress, the exercises should include multiple failure modes to gradually increase the complexity and the level of difficulty of the exercises.

The emergency exercises shall contain as a minimum:

ID 3.7	Topics – Emergency procedures	Skill Level		
		1	2	3
1.	Self-rescue as diver in emergency situation			X
2.	Act as a surface standby diver			X
3.	Act as standby diver in basket and wet bell			X
4.	Act as standby diver at surface during basket and wet bell operation			X
5.	Act as a member of the surface team in an emergency situation			X

3.7.2 Umbilical Management

Emergency situations caused by poor umbilical management should be included in the training program.

As a minimum this should include scenarios where the umbilical is trapped or snagged and a simulation of cutting of umbilical is necessary to free the diver.

The exercises should also include relevant scenarios from the industry and lessons learned, e.g. diving from DP, incidents from ship husbandry and exposure to differential pressure. The exercises should include use of in-water tend point "golden gate" diving and umbilical management.

The training should include scenarios where tender in basket, bellman or stand-by diver is deployed.

3.8 Seamanship

The student should be able to perform basic tasks as a crew member onboard a diving vessel. The students shall perform practical exercises in:

ID 3.8	Topics – Seamanship	Skill Level		
		1	2	3
1.	Act as a crew member on board a vessel			X
2.	Basic knots and use of simple/useful knots			X
3.	Small boat handling	X		
4.	Consider weather, swells and tidal current		X	
5.	General rigging		X	
6.	Marine signs and signals		X	
7.	Understanding of basic dive work boat/barge set up and operation		X	
8.	Demonstrate knowledge in the fundamentals of navigation and nautical charts, including calculating tides using tide tables	X		

3.9 Tools and equipment

The students should be familiar with various tools and equipment and perform practical exercises efficiently using the following equipment:

ID 3.9	Topics – Tools and equipment	Skill Level		
		1	2	3
1.	Davit / LARS / winch operation	X		
2.	HP/LP Compressors	X		
3.	Photo / video equipment	X		
4.	Use of hand tools	X		
5.	Hydraulic tooling		X	
6.	Pneumatic tooling	X		

ID 3.9	Topics – Tools and equipment	Skill Level		
		1	2	3
7.	HP Water jetting and grit blasting	X		
8.	Air lift bags			X
9.	Air lift dredging operations	X		
10.	Cutting	X		
11.	Oxy arc cutting, burning and welding	X		
12.	Introduction to handling of explosives	X		

3.10 Basic lifting & rigging

The student shall be able to use lifting equipment correctly in order to prevent hazardous situations and incidents.

The practical exercises should include:

ID 3.10	Topics – Basic lifting and rigging	Skill Level		
		1	2	3
1.	Identification of correctly marked lifting equipment		X	
2.	Control of lifting equipment and identification of defects that will compromise the integrity of the equipment		X	
3.	Correct use of lifting equipment for basic subsea lifting operations		X	
4.	Chose the correct lifting and rigging equipment for different items and loads		X	
5.	Lifting objects from the seabed			X

Closed Bell Diver Training

International Diving Regulators and
Certifiers Forum (IDRCF)

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Rev. August 2026

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1 Document Revision History

Rev	Section	Revision updates
2	2	Added definitions and acronyms
2	2	Added note <i>"Dive Plan 2 TUP Exercises may be carried out at 1 ata or under pressure"</i>
2	3	Restricted closed bell diver requirements
2	4	Updated course entry requirements – Training / Competency / Safety
2	4	Updated course entry hours – Gaps in expectations of training schools
2	5	Diving methodology and depth – Safe practices / Breathing medium / Contingency
2	6	Course duration and costs – Baseline using defined duration / candidate numbers
2	8	Training materials – Physical equipment / virtual / classroom
2	8	Dive equipment assurance – Legislative / DESIGN / Local standards
2	9	Dive school resources – Minimum manning / Training certification / Competency
2	App. A	Updated training curriculum – Legislative / Value adding / Contractor's requirements
2	App. B	Framing curriculum criteria – Competency framework / visibility of training achievements
2	App. C	Diving activities – Defined bell run activities / Breathing medium / Depth / Lock-out durations. Reduced the minimum depth of the saturation dive (Dive 6)

2 Definitions & Acronyms

Assistant Life Support Technician (ALST) – A person with the proper theoretical qualification to support life in a saturation diving system. ALSTs are trainee level operatives who is undergoing a period of planned work experiences, training to gain a LST qualification, working under the supervision of a Life Support Supervisor (LSS).

Bell run – The entire period of transporting divers from locking off the deck chamber, to locking back on after their bell dive – i.e. the period that begins when the clamp between the bell and the chamber is first loosened and ends when the clamp is reconnected, ready for pressure equalization and final transfer of the divers back to the chamber complex.

Note: Where the bell run does not involve a lock-on for TUP to the chamber, the bell run shall be taken as the period from bell initial blowdown until the bell arrives on surface and bell internal pressure is at ambient pressure.

Bell Survival Equipment – Through water transfer suit, survival equipment, consisting of thermal survival bag, thermal regenerator/CO₂ unit, towel, emergency rations and any other company-specific kit provided in the bells. (IMCA D017 Lost Bell Survival – Trainers' Guide)

Competent person – A qualified person who has demonstrated and documented the necessary skills, knowledge, experience and suitability for the role, and has the employer authorisation for performing a specified function.

Diver Medic Technician (DMT) – A professional certification for administering advanced medical care and first aid in case of injury in a hyperbaric environment.

Diver Rescue and Recovery – A full diver rescue and recovery entails the retrieval of an unconscious diver from the end of the umbilical to the bell, followed by securing the diver inside the bell and closing the bell hatch.

Instructor – The instructors should be deemed competent by the employer and shall be qualified to the same level at which they are instructing and have several years of experience working at the level that they are training. Instructors should either have formal training in instruction techniques or should have several years practical experience at such work. The instructor shall be formally appointed in writing by the employer.

Life Support Technician (LST) – A qualified person operating a saturation chamber complex under the control of a life support supervisor (LSS).

Lock-out – Diver exit from the bell into the water fully dressed, submerged and breathing from their umbilical.

Note: Diver's lock-outs durations shall be no less than 15 minutes except for diver rescue drills.

Lock-in – Diver entry into the Bell after a period spent in the water breathing from their umbilical.

Qualified person – person with the formal training and certification required for performing a specified function.

shall (requirement): Criteria to be fulfilled to be in compliance with this document. No deviation is permitted.

should (recommendation): A suggested possible choice or course of action. Alternative solutions that have the same functionality and quality is acceptable.

SSBA – Surface Supplied Breathing Apparatus.

Supervisor – A competent person in control of the chamber complex or the dives during the training. The Supervisor shall be formally appointed in writing by the employer. The Supervisor shall not be distracted or involved in other work during the diver training.

TUP – Transfer Under Pressure. The divers are transferred to/from the diving bell to a deck decompression chamber maintaining pressure.

Note: Dive Plan 2 TUP Exercises may be carried out at 1 ata or under pressure.

3 Restricted Closed Bell Diver Training (Air / Nitrox)

The proposed training curriculum now encapsulates a staged training process for experienced surface supply divers with offshore top-up certificates. This allows the schools to issue an endorsement (diploma / proof of competence) for restricted closed bell (air/Nitrox) diver on completion of Dive Plans 1 to 5, as detailed in Appendix C.

This restricted closed bell diver training endorsement is only valid in jurisdictions where it is compliant with local regulations.

The restricted closed bell diver training endorsement will allow experienced surface supplied divers with offshore top-up certificates to work on restricted closed bell work scopes which use air and Nitrox as breathing medium to a maximum depth of 50 meters.

Restricted closed bell endorsement can be issued on successful completion of the shallow training, i.e. Dive Plans 1-5, provided all practical and theoretical assessments associated with the course have been successfully completed.

If the candidate chooses to defer the final stage of the training for gaining the unrestricted certification, the following requirements shall be adhered to.

3.1 Prerequisites for Restricted Closed Bell Diver Training

The prerequisites to attend the restricted closed bell diver training shall be the same requirements as described in section 4 except for the number of dives and bottom time:

1. at least 50 dives using SSBA, and
2. at least 50 hours of bottom time

3.2 Restricted Closed Bell Diver Training Validity

The validity of the initial restricted closed bell training before enrolment into unrestricted closed bell training are as follows:

1. Within 36 months of training as a restricted closed bell diver of the initial closed bell training, or
2. Within 60 months of training as a restricted closed bell diver of the initial closed bell training if they have documented evidence of a minimum of 12 restricted closed bell dives carried out on a commercial worksite and subject to a logbook review.

3.3 Minimum Refresher Training

The requirements for refresher training prior to undertaking final training for unrestricted bell diver training are as follows:

1. Fully familiarised with dive system – on surface – 1 Day
2. Successful completion of Dive Plan 4 or 5 as per training curriculum in this document – 1 day.

4 Prerequisites Closed Bell Diver Training

To attend Closed Bell Diver Training, the candidates shall:

- 1) Hold a valid and approved offshore surface supplied (SSBA) diving qualification to 50 m and have held that qualification for a minimum period of 12 months.
- 2) The SSBA diver certificate shall be internationally recognised, e.g. compliant with the IDRCF training guidelines for offshore surface supplied diver qualification.
- 3) Hold a valid certificate of medical fitness to dive which remains in date for the duration of the training course.
- 4) Hold a valid certificate of competence as a Diver Medic Technician (DMT) which remains in date for the duration of the training course.

Note: Depending on the Risk Assessment the DMT qualification can be achieved as an integrated part of the Closed Bell Diver training program and shall be achieved prior to performing Dive Plan 6.

- 5) Have recorded in a daily record of diving since being qualified as an offshore surface supplied diver as per item 1) above:
 1. at least 100 dives using SSBA, and
 2. at least 100 hours of bottom time

Note 1: The qualifying dives and dive times can be made up of either onshore or offshore dives or a combination of both.

Note 2: Candidates who have completed all their dives inland/inshore shall have logged 20 dives deeper than 12 metres.

4.1 Diver's logbook and certificate verification

The diving schools shall be responsible for ensuring that all candidates satisfy the applicable admission requirements. With regards to candidates holding surface supplied diver certificates issued from another institution, the course provider and certifying institution shall have the authenticity and validity of the certificates verified by contacting the issuing authority or institution. Furthermore, the diving schools are obliged, at any point, to reject any candidate who demonstrate diving skills that do not match the stipulated prerequisites.

The training organisation should sample verify the entries in the diver's logbook with at least three of the diving contractors whom the diver worked for. One of the verifications should include a dive deeper than 12m.

Falsifications of diver certificates, health certificates or logbooks shall be reported to the issuing authority or institution without delay.

The diver certificate and logbook verifications shall be in writing and the documentation retained with the candidate's assessment record. In the case that the diver has worked for the same contractor to gain all of their experience, this should be confirmed in writing from that contractor, and a record kept.

4.2 Qualifying dives

The qualifying SSBA dives shall be conducted using a diving helmet or band mask and demonstrate a diversified and relevant professional background within construction-related activities. This should include documented practical experience in the use of both hand tools and powered tools.

Furthermore, the experience shall reflect an understanding of applicable safe work practices and use of diving equipment relevant for the offshore working environment.

Non qualifying dives:

1. SSBA training dives and dive time shall not be counted towards the qualifying dives requirements
2. Dives conducted in connection with work in tanks, aquariums, enclosed pools or similar shall not count toward the qualifying dives
3. Dives using SCUBA equipment
4. Dives conducted without communication between the diver and surface
5. Dives conducted in conjunction with:
 - recreational diving
 - media diving
 - scientific and archaeological diving
 - harvesting abalone / shellfish / lobster / scallop, etc.

5 Minimum Course Requirements

Closed Bell Diver training covers:

1. Bell & Divers on surface
2. Bell & Divers at 5-10 m – Air
3. Bell at 50 m & Divers at 65 m – Heliox.

For detailed information on dive plans see Appendix C.

The minimum course requirements for a candidate to complete restricted (shallow) and un-restricted (shallow and deep) training are:

- 1) 23 bell lock-outs as diver. Dive plans in Appendix C describes 19 shallow lock-outs and 4 deep lock-outs as a diver
 - a) Lock-outs undertaken as a diver should incorporate expected diver activities or emergency procedures.
 - b) Diver lock-outs shall be executed with a minimum duration of 15 minutes to allow completion of the intended activities, with the exception of diver rescue drills
- 2) Act as a bellman on a minimum of 23 lock-outs.
 - a) While acting as a bellman (Standby diver), undertake expected bellman monitoring and communication activities and emergency procedures.
 - b) On at least five occasions, whilst acting as bellman (standby diver), undertake a diver rescue and recovery exercise as a standby diver.
- 3) Excursions and umbilical lengths should be such that both the diver and bellman consider and apply effective umbilical management.
- 4) 11 complete bell-runs including minimum 10 transfer under pressure. Dive plans in Appendix C describes 11 complete bell runs.
- 5) The candidate shall undergo practical training and assessment in managing the following bell emergencies:
 - a) simulated rescues and recovery of unconscious diver on at least five occasions
 - b) loss of gas to the bell, including contaminated gas w/use of BIBS and /or bell scrubber
 - c) loss of gas to the diver including contaminated breathing gas
 - d) loss of communications
 - e) loss of bell umbilical; communications, gas, hot water, power and internal pressure
 - f) communicating with a lost bell; through water comms and tapping codes.
 - g) lifting an unconscious diver into the bell sealing the bell and monitoring the diver during the ascent
 - h) transferring an unconscious diver through the TUP trunking to the chamber; performing CPR and then placing on BIBS
 - i) donning survival equipment (can be a surface exercise)
 - j) undertake a bell door O-ring replacement (surface exercise).
- 6) The candidate shall undergo theoretical training and assessment in the following bell emergency procedures:

- a) loss of main lift to the bell
 - b) loss of main and secondary lift, umbilical attached
 - c) total loss of the bell
 - d) ways of locating a lost bell
 - e) loss of internal pressure in the bell
 - f) bell contaminated atmosphere
 - g) therapeutic and abort decompression tables
- 7) The candidate shall undergo practical training and assessment in the following chamber emergency procedures:
- a) emergency evacuation of a chamber with a fire inside the chamber
 - b) emergency evacuation of a chamber with a loss of pressure
 - c) simulated evacuation to HLB
 - d) using secondary communications with a chamber
 - e) use of BIBS
 - f) breakdown of the main ECU.
 - g) loss of electrical power to a chamber
 - h) hyperbaric evacuation systems
- 8) As a minimum the students shall be accompanied in the bell by a staff member qualified as a closed bell diver for the first three diver lock-outs, or until the instructor decides that the candidate is deemed capable in operating from a bell both as a diver and a bellman. The accompanied runs may be made from “deck to deck” without “transfer under pressure” (TUP). All subsequent bell runs should be made using full TUP procedures.
- 9) Perform at least 4 chamber pressurisations, including pre-dive checks of living- and transfer chamber.
- 10) Under supervision, monitor the chamber atmosphere while occupants are in the chamber complex under pressure.
- 11) Undertake bell external & internal pre-dive checks on at least 4 separate days.
- 12) Operate the bell panel under direct supervision.
- 13) Operate the chamber panel under direct supervision.
- 14) Undertake training in the process associated with hyperbaric evacuation and launch procedures.
- 15) Act as a diver from a minimum bell depth of 50 metres on one bell run, using heliox as a breathing medium/chamber atmosphere. The 4 bell lock-outs for these bell runs should be at least 15 minutes for each dive on each occasion to minimum 65 meters (or as excursion tables permit).
- a) During these runs the diver shall swim away from the closed bell to the allowable extent of their umbilical which shall be a minimum distance of 15 metres.
 - b) The divers can safely work within the excursion window as defined within the diving tables, using heliox as the breathing medium/bell atmosphere.
- 16) Act as a bellman from a minimum bell depth of 50 metres on one bell run.
- 17) Undertake decompression from a minimum storage depth of 50 metres.

The objective of the exercises required above is to build familiarity and confidence, therefore repetition of tasks and equipment checklists done on the surface or at the shallow depths better prepares candidates for deeper dives where the risks are greater.

Where the activities are carried out on surface, the difficulties of carrying out these activities within the confines of the bell shall be highlighted.

6 Course Duration and Examination

Course duration will be dependent on candidate numbers and the diver training school's capacity. The school minimum manning and competency requirements shall be assessed based on candidate numbers.

Whilst distance-learning options may be used to refresh existing knowledge or provide initial knowledge, the face-to-face component of the course shall not be shortened by the availability of that training.

The candidate's theoretical competence shall be tested by written examination. The theoretical examinations should cover all aspects of theory lessons and contain a sufficient number of questions to cover for all the subjects listed in Appendix A.

The theoretical examinations should have a minimum correct response rate of 80%.

The school shall establish an assessment procedure and forms for evaluating the practical performance of the candidates in accordance with Appendix B and Appendix C. Practical assessments shall be documented.

7 Dive Plans

7.1 General

- 1) Listed below are an example of the practical training exercises for a closed bell diver training course.
- 2) The dive plans are to be used in conjunction with the pre-dive briefing (toolbox talk) and the risk assessment procedures.
- 3) The dive plans will include activities listed in the competency frameworks (see Appendix B) and these activities shall be signed if the candidates have been deemed capable by the instructor / assessor.

7.2 Outline of Practical Training Exercises

- 1) Each dive starts with the instructor presenting the pre-dive briefing (toolbox talk).
- 2) The next step is to set the system up using the checklists provided. The mobilisation, panel and chamber checks are carried out daily and the bell checks between each dive.
- 3) The standby diver equipment is assembled.
- 4) The candidates are divided into teams. They are assigned roles (under supervision) which are rotated between dives, including:
 - a) Bellman – completes internal bell checks and then is in control of the bell internal (on a minimum of three days).
 - b) Diver – completes lock-out checks then locks out of the bell.
 - c) Dive controller – Dive panel operator / chamber panel operator. Completes panel checks. In control of the comms, and relays messages between the supervisor or instructor and the diver or bellman, under supervision.
 - d) Dive recorder – records panel checks in cooperation with Dive controller and surface worker, then checks off the dive plans and enters the time that each procedure is carried out.
 - e) Surface worker – completes external/internal chamber checks, external bell checks, then locks the bell on and off the chamber system as well as assisting in the launching of the bell, including running of TUP panel under supervision.
- 5) During decompression from saturation, candidates may be assigned the role of the Assistant Life Support Technician (ALST), which includes:
 - a) chamber pressurisation/decompression, including pre-dive checks of living and transfer chamber
 - b) under supervision, monitoring the chamber atmosphere while occupants are in saturation
 - c) under supervision operating the chamber panel.
- 6) Each dive is undertaken following a prepared dive plan.
- 7) Competency assessment shall be carried out in accordance with Appendix B and Dive Plans in Appendix C.
- 8) If conducting training without the use of a bellman bailout, this shall be risk assessed and additional controls put in place to minimise probability of bellman lost gas scenario.

8 Equipment

The dive system should be inspected and maintained in accordance with IMCA D024 – *DESIGN for saturation (bell) diving systems*. It is recognised that closed bell diver training takes place in inland/inshore waters therefore not all the requirements of IMCA D024 will apply. Some equipment may be inspected and maintained in accordance with national regulations. Where local standards are used in place of DESIGN the standard will be reviewed as part of the training school's acceptance audit.

Equipment not listed in IMCA D024 should be inspected and maintained in accordance with the manufacturer's requirements.

Training schools should ensure they have an FMEA / FMECA which identifies any single point failures and possible causes and consequences of a potential or actual failure. They shall also have a robust safety management system which includes a planned maintenance system for the equipment used for training.

Training schools shall have a verified hyperbaric evacuation plan which is defined for its area of operation and considers key elements such as alternative bell recovery, distance to the HRU / safe haven and weather etc.

The primary method of diver's evacuation shall be a Hyperbaric Rescue Unit (HRU) which has a dedicated LARS, sufficient capacity for the intended maximum manning in the saturation chamber system plus two for medical assistance. The HRU shall have the equipment to manage the internal oxygen levels, thermal balance and scrubbing for the duration defined in the Hyperbaric Evacuation Plan (HEP). An emergency life support package that can be connected to the HRU to provide external services to support the HRU should meet the requirements as laid out in IMCA D053 – *DESIGN for the hyperbaric reception facility (HRF) forming part of a hyperbaric evacuation system (HES)* or, when applicable, national regulations.

Note: For the shallow diver training, i.e. Dive Plans 1 – 5, the system should be compliant with relevant parts of IMCA DESIGN D23 and D24.

9 Minimum Training Personnel Requirements

Personnel involved in closed bell diver training should have the necessary qualifications and experience to deliver the training and operate the equipment. Where required, they should be issued with a formal letter of appointment from the school. The certification for diving supervisors, divers, standby divers and life support personnel should meet the regional requirements or equivalent IMCA standard where applicable.

The number of staff required shall be determined by a risk assessment for the diving platform being used.

The minimum manning shall be used for the shallow diving phase:

- ◆ 1 x Closed Bell Supervisor
- ◆ 1 x Instructor
- ◆ 1 x Closed Bell Diver (as long as candidates need assistance inside the bell)
- ◆ 1 x Standby Diver
- ◆ 1 x Dive Technician

At least 1 of the above should have an in-date DMT. Other staff may be required to act as deck supervisor, chamber operator or winch handler.

The minimum manning shall be used for the deep diving phase:

- ◆ 1 x Closed Bell Supervisor
- ◆ 1 x Instructor
- ◆ 1 x Life Support Supervisor
- ◆ 1 x Life Support Technician
- ◆ 1 x Standby Diver (bell rescue)
- ◆ Tender for stand-by diver
- ◆ 1 x Dive Technician

The minimum manning shall be used per shift for the decompression phase:

- ◆ 1 x Life Support Supervisor (shall be on floating shift immediately available)
- ◆ 1 x Life Support Technician
- ◆ 1 x Assistant Life Support Technician
- ◆ 1 x Dive Technician

At least 1 of the above should have an in-date DMT qualification.

Note: Following personnel should be on call during decompression phase

1. *Mechanical Tech*
2. *Electrical Tech*
3. *Diver Medic*
4. *Dive Supervisor*

10 Onshore Diving Medical Support

A medical advisor, e.g. a diving medical physician should be available for guidance in case of a diving incident or accident.

The diving project plan and risk assessment will need to consider the situation where a diver is injured but a doctor is not available at the worksite. In such a circumstance, arrangements will be needed to allow personnel at the site to communicate over radio or telephone links with a diving medical specialist. It is the responsibility of the training provider to make such arrangements, before any training commences, with a suitably qualified and experienced doctor (ref. DMAC 29) such that medical advice and treatment is available at any time to the diving personnel.

Such an arrangement is normally the subject of a 'standby' agreement with a doctor experienced in diving medicine and means that an emergency contact is available at all times for medical advice. This arrangement should be documented with the necessary details readily available during training.

Part of the planning will need to be the pre-agreement of a suitable method for recording and transferring medical information from worksite to doctor (ref. DMAC 01). All risk assessments and diving project plans will need to account for the fact that a seriously ill or injured diver in saturation cannot be treated as if the diver was at atmospheric pressure (ref. DMAC 28).

If the required treatment cannot be administered by the personnel at the worksite, then trained medical staff and specialised equipment will need to be transported to the casualty.

Treatment will be given to the injured diver inside the saturation chamber. The diver will not be decompressed or transferred to any other location until in a stable condition on advice from the Diving Medical Advisor.

To enter a chamber a suitable diving qualification is not required by medical staff unless local regulations dictate otherwise. They should, however, be examined and certified fit before entering the chamber.

This guidance deems it is not acceptable practice to have someone in a compartment on their own during blow-down into saturation. This includes medical specialists in emergency situations.

11 Assistant Life Support Technician (ALST)

The competencies in the IDRCF closed bell diver training include all the learning objectives required for ALST training. ALSTs are trainee level operatives.

The end of course examination contains questions relating to both closed bell diving and ALST.

Candidates who successfully completes the course can be appointed ALST. In cases where the candidate fails the theoretical examination a closed bell diving certificate cannot be issued.

Appendix A – Competencies

A1 Apply First Aid within a Chamber and Bell

Competence No.	Element	Performance Criteria	Knowledge / Scope
CB 001 ALST 001	Assess the situation	<ol style="list-style-type: none"> 1 Identify, assess and minimise hazards 2 Evaluate the equipment to be held in the closed bell of a diving operation (DMAC15) 3 Minimise immediate risk to self and casualty's health and safety 4 Assess casualty and identify injuries, illnesses and conditions 5 Immediately recognise symptoms that may require the need for recompression treatment 6 Demonstrate the ability to recognise the cause, effect, signs and symptoms of diving related ill health conditions in others and self 	<p>Awareness of the contents of DMAC guidance notes including:</p> <ul style="list-style-type: none"> ◆ DMAC 04 ◆ DMAC 15 ◆ DMAC 21 ◆ DMAC 26 ◆ DMAC 28
CB 002 ALST 002	Apply first aid procedures	<ol style="list-style-type: none"> 1 Reassure and seek consent from casualty 2 Maintain hygiene standards 3 Give elementary first aid and cardio-pulmonary resuscitation to an injured or unconscious person in a closed bell or chamber to stabilise the condition. 4 Administer therapeutic gases to the casualty where necessary 5 Provide first aid management 6 Assist a qualified person in the treatment of diving related ill health conditions / illness or provide such treatment until an appropriately qualified person is available 7 Follow instructions relayed by the dive/life support supervisor from the medical adviser to a 	<ul style="list-style-type: none"> ◆ Awareness of how to manoeuvre injured or unconscious person from a diving bell to a deck compression chamber complex or from a deck compression chamber complex into a hyperbaric evacuation chamber, recognising the possible dangers of damage to the nervous system. ◆ Understanding the effects of high partial pressures of component gases of artificial breathing mixtures, and the applications and implication, of this in the care of divers. ◆ Observed Performance ◆ Carrying out a systematic examination of an injured or ill diver. ◆ Positioning casualty to facilitate ABC assessment. ◆ Taking immediate actions to assure clear airway, restore breathing, including mouth to mouth resuscitation, assure heart function and stop massive bleeding. ◆ Maintaining stability and protecting from further harm whilst assistance is obtained from more qualified persons. ◆ Summoning additional help without undue delay.

Competence No.	Element	Performance Criteria	Knowledge / Scope
		<p>patient under saturation and during decompression from saturation</p> <p>8 Make the casualty comfortable with available resources</p> <p>9 Use safe manual handling techniques when moving unconscious or incapacitated patients into the bell, or into and out of the chamber complex</p> <p>10 Monitor casualty's condition and respond in accordance with effective first aid principles</p> <p>11 Assist in casualty management</p>	<ul style="list-style-type: none"> ◆ Giving appropriate first aid to and responding to needs of person sustaining injuries. ◆ Maintaining acceptable standards of hygiene ◆ Using first aid equipment correctly including administering emergency therapeutic gases when required ◆ Use of DMAC15 kit in the confines of the bell. ◆ Able to communicate with a medically trained person in the event of an injury or diving ill health matter relating to self or another diver. ◆ Able to stabilise condition of unconscious or injured diver in diving bell until bell is locked onto chamber ◆ Control of one of: <ul style="list-style-type: none"> – major haemorrhaging, amputation – crush/impact injury – chemical burn or stabilisation of unconscious person during bell transit to surface ◆ Responding to needs of a diver who has asphyxia. ◆ Checking of a pulse. ◆ Following instructions from the surface to carry out overall visual checks, monitor vital signs, i.e. pulse, respiratory rate, temperature, and make simple neurological tests and to report the results. ◆ Assisting in TUP or evacuation procedures. ◆ Recognising signs and symptoms of ill health conditions in others whilst conducting closed bell diving operations; and ◆ Responding to the needs of a diver who is drowning
CB 003	Communicate details of the incident	<p>1 Explain the nature of casualty's injury/condition</p> <p>2 Request support and/or appropriate medical assistance</p> <p>3 Accurately convey assessment of casualty's condition and management activities</p>	DMAC 01 <i>Aide Mémoire for Recording and Transmission of Medical Data to Shore</i>

Competence No.	Element	Performance Criteria	Knowledge / Scope
		4 Accurately record details of casualty's physical condition 5 Prepare / contribute to reports	
CB 004	Evaluate own performance	1 Seek feedback from clinical expert 2 Demonstrate an awareness of the possible psychological impacts on rescuers of involvement in critical incidents	Participate in debriefing/evaluation including self-debrief.

A2 Work Safely in Closed Bell Diving Operations

Competence No.	Element	Performance Criteria	Knowledge / Scope
CB 005	Conform to statutory requirements	<ol style="list-style-type: none"> 1 Identify and explain applicable legislative requirements 2 Identify duty of care requirements 3 Understand and observe the main duties of the employer and employee 4 Understand and apply permit to work systems 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Main duties, requirements and purposes across all relevant Regulations, including local legislation. ◆ Types and frequency of emergency drills. <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Recognising the requirement for safe systems of work, safe plant and equipment, safe use of hazardous substances, safe access to and from workplace. ◆ Recognising the need during assessment dives for a properly supervised and a properly constituted diving team under the control of the supervisor, including at least one standby diver.
CB 006 ALST 003	Conform to general requirements	<p>Understand the relevance, status and significance of the following that should or could be applied in closed bell diving:</p> <ol style="list-style-type: none"> 1 Approved Codes of Practice (ACoPs) 2 Guidance, official memoranda 3 International, European and National Standards 4 Industry codes and guidance 5 Requirements for testing and examination applicable to plant and equipment are understood. 6 Company safety management systems 7 Understand career progression requirements 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Main duties, requirements and purposes of general guidance, codes and official memoranda for diving operations and in particular specialised operations. ◆ An awareness of the role of IMCA and guidance produced to support closed bell diving operations and saturation system inspection and maintenance. ◆ Understand the importance of completing diver logbook entries for each dive. Logbook shall be brought to doctors examination for new health certification. Logbook is the basis for proof of experience when applying for higher level diver certification or dive supervisor certification. ◆ Understand the importance of competence progression and logging in personal competency portfolio and having this countersigned by responsible employer representative.

Competence No.	Element	Performance Criteria	Knowledge / Scope
CB 007 ALST 004	Identify hazards and control measures	<ol style="list-style-type: none"> 1 Demonstrate the basic principles of risk management 2 Identify and discuss common hazards 3 Identify measures for controlling hazards and risks 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Understanding of the requirements to maintain own health and safety and that of others. ◆ IMCA D061 Guidance on health, fitness & medical issues in diving operations ◆ Understand that there are a variety of configurations and layouts of closed bell diving systems using a variety of breathing apparatus and if the diver and dive team have not used the particular equipment recently or before then familiarisation training should be undertaken. ◆ Flying after diving. ◆ Fitness to return to diving. <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Understanding shown by diver that they have the ability to carry out the task. ◆ Informing the supervisor if diver feels unfit to dive. ◆ Following diving rules as far as they apply to diver. ◆ Maintaining daily record of diving (logbook) and recording all dives for presentation at medical examinations and retaining for two years after last entry.
CB 008	Identify workplace health and safety communication and reporting processes	<ol style="list-style-type: none"> 1 Workplace health and safety communication processes, information and documentation are identified and discussed 2 Role of designated workplace health and safety personnel is identified and explained 3 Safety signs and symbols are identified and explained 4 Procedures and relevant authorities for reporting hazards, incidents and injuries are identified 5 Management of change procedures are understood 	

A3 Carry Out Pre-Dive Preparations in Closed Bell Diving Operations

Competence No.	Element	Performance Criteria	Knowledge / Scope
CB 009 ALST 005	Understand the principles of physics and physiology applicable to closed bell diving	<ol style="list-style-type: none"> 1 Apply knowledge of the relationship between pressure, volume and temperature of gases to diving operations 2 Apply knowledge of the effects of pressure, volume and temperature changes on the diver and their implications for diving operations 3 Apply knowledge of partial pressure and solubility of gasses and their effect on the diver 4 Understand and apply operational and therapeutic tables 	<ul style="list-style-type: none"> ◆ Unit conversion ◆ Boyle's Law ◆ Dalton's Law ◆ Charles' Law ◆ Henry's Law ◆ Heat transfer ◆ Gas mixing ◆ The General Gas Law
CB 010	As a member of a dive team check the bell	<ol style="list-style-type: none"> 1 Complete pre dive internal bell check in accordance with check list ensuring readiness for use 2 Complete pre dive external bell check in accordance with checklist ensuring readiness for use 3 Calculate gas requirements of the diver, chamber and closed bell systems 	<p>Observed Performance: <i>Internal checks to include:</i></p> <ul style="list-style-type: none"> ◆ Ensuring chamber is clean and free from extraneous materials ◆ Checking BIBS are connected to appropriate gases, are in good condition and operational ◆ Bringing online appropriate primary and secondary gas supplies and checking pressures ◆ Checking onboard gas and O₂ supply pressures and percentages ◆ Checking O₂ system for adding O₂, O₂ buffer tank & valve pressure gauge control system ◆ Ensuring door seals and faces are undamaged ◆ Confirming that spare O-ring present and silicone grease ◆ Ensuring door equalising valves are functioning ◆ Checking primary and secondary lights are working ◆ Checking primary and secondary communications are working ◆ Ensuring emergency power is operational & onboard battery voltage indicator ◆ Securing drop weight release mechanism if applicable ◆ Checking view ports undamaged

Competence No.	Element	Performance Criteria	Knowledge / Scope
			<ul style="list-style-type: none"> ◆ Ensuring the divers seat harness is serviceable ◆ Visually inspecting and function testing emergency man lift to ensure it is secured ◆ Visually inspecting electrical wiring and gas pipe work for material integrity ◆ Ensuring valves numbered & aligned in accordance with bell check list ◆ Checking comms, gas & bailout gas to divers & bellman's hats (if bellman's umbilical is outside this is done prior to diver lock-out) ◆ Checking scrubbers & heater are working on mains & emergency power ◆ Checking bell emergency equipment & DMAC 15 medical kit ◆ Checking tool kit including hacksaw & blades ◆ Confirming the presence of emergency procedures, emergency tapping code card, torch, food & drinking water, Draeger pump & in-date tubes, spare soda lime. Bell survival suits. <p><i>External checks to include:</i></p> <ul style="list-style-type: none"> ◆ Ensuring door seals & O-rings undamaged ◆ Ensuring primary and secondary lights working ◆ Checking drop weight release mechanism is secure if applicable ◆ Ensuring door equalising valves are functioning ◆ Ensuring on board gas supply is at suitable pressure and percentage ◆ Checking bell connections on bell emergency panel and emergency bell umbilical ◆ Checking view ports are undamaged ◆ Ensuring main lift wire attachment is secure ◆ Ensuring umbilical attachment is secure ◆ Ensuring guide wires to bell are secure ◆ Checking bell location transponder is fitted ◆ Ensuring strobe light is fitted and working & through water comms transponder present ◆ Visually inspecting electrical wiring and gas pipe work for material integrity

Competence No.	Element	Performance Criteria	Knowledge / Scope
			<ul style="list-style-type: none"> ◆ Ensuring valves set in correct sense & numbered as per the checklist ◆ Checking that no equipment marked or tagged as defective is used for the diving project ◆ If any faults are found in the equipment, they are reported promptly to the supervisor ◆ Checking security and condition of onboard gas cylinders is acceptable ◆ Checking bellman's umbilical, if fitted outside, including comms.
CB 011	<p>As a member of a dive team check and prepare closed bell systems, including a good understanding of emergency procedures.</p> <p>Bell blowdown and diver's gas supply, primary and secondary.</p> <p>Bellman and diver's hot water supply.</p> <p>Hydraulic system for doors.</p> <p>Diver's depth and analysis.</p> <p>Emergency drills.</p> <p>Oxygen make up.</p> <p>Bell scrubbing</p>	<ol style="list-style-type: none"> 1 Check gas resources and mixture availability in accordance with requirements 2 Confirm the launch and recovery systems are operational in accordance with requirements 3 Check the environmental control unit in accordance with requirements 4 Ensure emergency response systems are checked and operative 	<p>Observed Performance:</p> <p><i>Systems to include:</i></p> <ul style="list-style-type: none"> ◆ Basic gas and fluid flow paths ◆ Electrical sources (J-Box/Penetrators) ◆ Regulators ◆ Drop weight appliances ◆ Procedures and checklists.

Competence No.	Element	Performance Criteria	Knowledge / Scope
CB 012	As a member of a dive team check and prepare diver's equipment for a bell diving operation	<ol style="list-style-type: none"> 1 Inspect all personal equipment carefully for signs of deterioration, damage or corrosion and function tested where appropriate 2 Prepare divers equipment in accordance with checklists ensuring readiness for use 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Function and methods of operation of personal diving equipment. ◆ Common types of equipment fault. ◆ Legal and regulatory requirements and procedures. <p>Observed performance:</p> <p><i>Checked:</i></p> <ul style="list-style-type: none"> ◆ Diver's helmet secure ◆ Gas to the hat and comms checked ◆ Independent and combined primary and secondary gas supply sources ◆ Checking umbilical ◆ Checking individual equipment ◆ Checking that no equipment marked or tagged as defective is used for the diving project ◆ Cleaning and disinfection of diving equipment, including helmets and suits ◆ Umbilical buoyancy – prepare diver's excursion umbilical for mid water swimming ◆ If any faults are found in the equipment they are reported promptly to the supervisor.
CB 013	As a member of a dive team understand the hazards and risk controls of diving from a dynamically positioned (DP) vessel	<ol style="list-style-type: none"> 1 Understand how a vessel maintains its position using thrusters and navigational reference data; controlled by a computer system and the risks to diving operations 2 Understand the hazards of dynamic positioning that can affect the safety of diving operations and participate appropriately in controlling the risk to divers 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ IMCA Guidance documents D010 and D078 ◆ Function of a dynamically positioned system ◆ Hazards effecting the diver ◆ Propulsion systems ◆ Loss of position ◆ Shallow water effects ◆ DP alerts ◆ Risk control procedures ◆ Control of umbilical length ◆ Communications, dive control to bridge and dive control to diver.

Competence No.	Element	Performance Criteria	Knowledge / Scope
			Observed Performance: <ul style="list-style-type: none">♦ Control of umbilical length for shallow water diving – prepare diver's excursion umbilical for shallow water diving with tie-back restrictions to nearest thruster hazard

A4 Complete Closed Bell and Chamber Surface Procedures

Competence No.	Element	Performance Criteria	Knowledge / Scope
CB 014 ALST 006	Follow routine chamber procedures	<ol style="list-style-type: none"> 1 Observe chamber procedures in accordance with policy 2 Provide assistance in accordance with directions from the dive or life support supervisor 3 Assist in maintaining effective health and hygiene procedures in saturation 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ The routine chamber procedures relating to gas quality, locks, fire risk and hygiene. ◆ The selection of decompression schedules for a saturation dive, for therapeutic decompression, for excursions. ◆ The causes and symptoms of anoxia, hypoxia and hyperoxia. ◆ The procedure in the event that the correct decompression schedule cannot be followed. ◆ All aspects of assisting in a decompression situation. ◆ Prevention and remedy of skin fungus infections, cut and laceration management. ◆ Suitability of medication and supplements under pressure. <p>Observed Performance:</p> <ul style="list-style-type: none"> ◆ Changing CO₂ adsorbents in ECU and scrubbers as appropriate. ◆ Using hand/equipment locks as appropriate. ◆ Observing hygiene procedures, following correct procedures when using sanitary system and attending to personal hygiene, with particular attention to ear prophylactic regimes. ◆ Checking chamber contents against check list at pre dive stage, keeping paper to a minimum, keeping clothing/materials away from hot surfaces to minimise risk of fire and maintaining awareness of fire zone implications. ◆ Excluding inappropriate or unsafe substances from chamber including foodstuffs, cigarettes, matches, lighters, tobacco, hydrocarbon based chemicals, unauthorised drugs, alcohol, solvents and after-shaves, quantities of paper, books, magazines, fountain pens and similar, non-fire retardant bedding, explosives, items likely to implode or explode, mercury and alcohol thermometers, items of an electrical nature (see IMCA guidance note D041). ◆ Assisting during decompression, following instructions to regulate chamber pressure, understanding oxygen make up system procedures, operating the BIBS system, understanding the effect of increased partial pressure of oxygen

Competence No.	Element	Performance Criteria	Knowledge / Scope
			on the fire zone, selecting correct gas mixture on instruction of supervisor and maintaining environmental conditions.
CB 015	Prepare chamber complex for use	<ol style="list-style-type: none"> 1 Prepare chamber for use in accordance with checklist 2 Check the environmental control unit in accordance with requirements 3 Ensure emergency response systems are checked and operative 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Function, procedures and methods of operation of diving chamber equipment. ◆ The principles of operation of various items of equipment used in a typical diving system, such as compressors, gas reclaim systems and transfer pumps ◆ Legal and regulatory requirements and procedures. ◆ The construction and purpose of valves, fittings, gauges, regulators, hoses and pipework and how to carry out normal operations, maintenance and basic repairs ◆ This includes the difference between various thread forms and the reasons for their use ◆ The principles of chamber life support systems with priority on pre-operational checklists, monitoring during use, routine maintenance and basic repairs. This includes understanding the possible emergencies which could occur and what actions should be taken ◆ The construction and maintenance of system complex emergency plant and equipment ◆ The minimum quantities of gas required offshore <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Following all procedures and instructions correctly. ◆ Ensuring chamber is clean and free from extraneous materials. ◆ Checking door seals and sealing faces are undamaged. ◆ Checking firefighting and other internal equipment to inventory. ◆ Ensuring sanitary system is working. ◆ Ensuring valves on the chamber and control panel are free and aligned in accordance with DCC/panel checklist (open or closed to instructions / checklist). ◆ Ensuring the BIBS are connected to the appropriate gases.

Competence No.	Element	Performance Criteria	Knowledge / Scope
			<ul style="list-style-type: none"> ◆ Calibration of gas analysers ◆ Ensuring primary and secondary gas supplies are analysed and gauged and connected to chamber. ◆ Function testing BIBS. ◆ Checking lights are working ◆ Ensuring primary and secondary communications are working. ◆ Ensuring safety interlocks or hand locks/medical locks are operational. ◆ Checking that no equipment marked or tagged as defective is used for the diving project. ◆ Transferring diving gases around a system, putting diving gases online to chambers and control panels including the BIBS ◆ Charging of bell, HRC or SPHL on board gas including both bailouts and fire extinguishers ◆ If any faults are found in the equipment, they are reported promptly to the supervisor
CB 016 ALST 007	Monitor internal chamber operations	<ol style="list-style-type: none"> 1 Monitor chamber environment and take appropriate actions to keep the supervisor informed 2 Recognise abnormal readings and their significance and inform supervisor 3 Monitor closed bell and chamber gas quality and gas system quality 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Significance of abnormal readings during chamber operation. ◆ The effects of high pressure oxygen on combustible materials. ◆ The importance of ensuring that no oils or greases are present in oxygen systems. ◆ The effects of impurities in diver's breathing gas chamber and bell atmospheres, BIBS gas. ◆ How gas systems can become contaminated and likely points of contamination. ◆ Understand the methods and issues with a chamber blow down, including: <ul style="list-style-type: none"> – Gas switching – Gas layering (stratification) – Understand the role played by the LST during a TUP <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Assisting with chamber blow down, under supervision

Competence No.	Element	Performance Criteria	Knowledge / Scope
			<ul style="list-style-type: none"> ◆ Assisting with TUP from sat control, under supervision ◆ Monitoring chamber environment and reporting readings to supervisor as instructed re. depth, temperature, humidity, oxygen and carbon dioxide levels, time. ◆ Immediate reporting to the supervisor when previously determined levels are reached. ◆ Identifying gases and gas percentages in mixed gases by colour coding and markings. ◆ Using continuous read-out oxygen and carbon dioxide monitors. ◆ Using gas sample test kits to determine impurities in gases used. ◆ Under supervision assist with a chamber decompression ◆ Maintain a gas status board showing gas reserves and mixtures ◆ Maintain a legible and accurate record of all aspects of a saturation dive ◆ Demonstrate the effective operation of helium speech unscramblers, sound powered phones, emergency signals and other communications systems ◆ Demonstrate an understanding and practical knowledge of operating a system of chamber management and housekeeping including routine schedules such as meals, including food hygiene, sanitation systems, medical locks, etc.
CB 017 ALST 008	As a member of a dive team operate the built in breathing system (BIBS)	1 Operate the BIBS in accordance with instructions and operational procedures	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Awareness of the function and method of operating BIBS supply systems. <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Bringing online correct gas for the BIBS. ◆ Setting correct pressure and opening up supply from the control panel. ◆ Checking overboard dump system and back pressure regulator are operational.

A5 Undertake Underwater Deployment in Closed Bell Diving Operations

Competence No.	Element	Performance Criteria	Knowledge / Scope
CB 018	As a diver undertake a closed bell dive	<ol style="list-style-type: none"> 1 Undertake closed bell dives in accordance with pre-determined plans. 2 Undertake lock-outs and re-entry to closed bell in accordance with operational procedures 3 Conduct transfer under pressure (TUP) operation in accordance with the supervisor's surface instructions 4 Use a reclaim helmet understanding the diver's valve operation and importance of correct neck dam and Oral Nasal sealing. Can be done as a surface exercise 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ♦ Awareness of operational procedures for bell divers, including lock-outs and re-entry. ♦ Awareness of procedures for TUP operations. ♦ Understand the theory and differences associated with air and Nitrox diving in a closed bell, utilising Equivalent Air Depth (EAD) tables and operating with two different gas mixes. ♦ Fundamental understanding, set-up and operation of a rebreather bailout system ♦ Theoretical knowledge of reclaim helmets/systems ♦ Understand the components of the reclaim helmet and its function, as well as complete reclaim system. Importance of the seco valve indicator and its purpose as well as the Reclaim Negative Depth gauge and bell BPR setting in the bell. Water trap operation and opening valve slowly to reclaim exhaust going on to external water trap float valve & bell main umbilical <p>Observed performance:</p> <ul style="list-style-type: none"> ♦ Undertaking bell dives to varied pre-determined depths. ♦ Undertaking lock-outs and re-entries in a safe manner. ♦ Following supervisor's surface instructions to safely carry out a TUP operation. ♦ Undertake an excursion dive. ♦ Moving to the extent of the umbilical and demonstrating effective umbilical management.
CB 019	Act as a bellman	<ol style="list-style-type: none"> 1 Assist diver to don equipment before leaving the bell 2 Assist diver to exit and re-enter the closed bell and tend the diver's umbilical 3 Act in accordance with operational and safety procedures 4 Maintain appropriate checks and controls 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ♦ Awareness of function and methods of operation of diving bell and of individual items of personal diving equipment. ♦ Common types of equipment fault. ♦ Legal and regulatory requirements and procedures.

Competence No.	Element	Performance Criteria	Knowledge / Scope
		<p>5 Manage gas reclaim systems demonstrating an understanding of the set up and operating principles. (When not available in the bell, this competency can be achieved by means of a classroom based reclaim panel)</p> <p>6 Conduct post dive checks</p>	<ul style="list-style-type: none"> ◆ Understand gas sampling using gas sample tubes in the internal bell environment (Carbon Dioxide and common trace contaminants of hydro-carbon distillate). ◆ Fundamental understanding, practical set-up and operation of the diver's gas reclaim systems. ◆ Fundamental understanding, practical set-up and operation of the diver's gas reclaim systems & terminology both in bell and on surface. ◆ Fundamental understanding, set-up and operation of a rebreather bailout system – bellman's role <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Performing through water communication checks. ◆ Assisting diver to don equipment before leaving the bell, ensuring diving helmet is fitted correctly, bail out cylinder valve is open if applicable, side block valve is closed if applicable, and pressure reported to surface, helmet locking devices and all hose connections are secured, diver's umbilical free for exit, communications cable connection is secure, hot water and gas mixture are supplied to diver and diver has checked for leaks in trunking. ◆ Set up the bell and divers supply regulators in the bell and how they are set up for diving in the bell ◆ Connecting up to hat & check for gas, comms and hot water at depth, if using external bellman's umbilical at depth ◆ At dive depth, assisting diver to exit and enter the bell. ◆ Tending diver's umbilical. ◆ On instructions from the supervisor, controlling bell environment throughout duration of dive by: <ul style="list-style-type: none"> – Monitoring O₂ parameters – Adding O₂ to the bell – Monitoring CO₂ – Changing CO₂ scrubber charge where necessary – Monitoring and regulating bell temperature – Monitoring hot water temperature to diver.

Competence No.	Element	Performance Criteria	Knowledge / Scope
			<ul style="list-style-type: none"> – Monitoring internal and external depth gauges. – Operating bell gas system and monitoring diver's breathing. – Conducting post dive checks on diver's equipment. – Undertake gas sampling using gas sample tubes in the internal bell environment (Carbon Dioxide and common trace contaminants of hydro-carbon distillate).
CB 020	As a member of the surface team support a closed bell diving operation	<ol style="list-style-type: none"> 1 Observe surface procedures to ensure safety of diver(s) during a bell run 2 Maintain diving operations log 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Basic understanding of programmable logic controllers (PLCs) used in diving operations. ◆ Awareness of surface procedures during a bell run. ◆ Maintenance of diving operations log. <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Locking and unlocking bell onto the chamber. ◆ Operating locks during saturation to lock materials in and out of the chamber. ◆ Operating chamber sanitation system safely. ◆ Maintaining diving operations log in accordance with industry guidance.
CB 021	As a member of a dive team establish and maintain effective communications	<ol style="list-style-type: none"> 1 Follow correct communications procedure ensuring voice communications are passed, received and acknowledged as diver, bellman or member of surface team and keeping line open for emergencies 2 Use emergency communication and helium unscramblers where appropriate 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Communications procedures for bell diving. ◆ Emergency communications procedures. <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Passing, receiving, and acknowledging voice communications as diver, bellman or member of surface team, following correct communication procedure. ◆ Keeping line open for emergencies. ◆ Operating communications equipment using helium unscrambler where necessary. ◆ Using emergency communications, testing through water communication systems on instructions from surface, using line signals and emergency bell tapping code both to give and receive messages.

Competence No.	Element	Performance Criteria	Knowledge / Scope
			♦ Testing through water communications systems.

A6 Implement Emergency Procedures in Closed Bell Diving Operations

Competence No.	Element	Performance Criteria	Knowledge / Scope
CB 022 ALST 009	As a diver act in a rescue emergency situation	<ol style="list-style-type: none"> 1 Maintain communication with surface 2 Follow procedures for switching to reserve supplies when necessary and for returning to bell where appropriate 3 Take appropriate actions in accordance with operational procedures as a rescue diver in a lost bell situation 4 As a diver, perform a self-rescue back to the bell 	<p>Theoretical knowledge:</p> <p>Prevention and mitigation of lost bell emergencies IMCA D077</p> <ul style="list-style-type: none"> ♦ How and when a closed bell might be lost. ♦ Relocation procedures and various methods of bell recovery. ♦ How a wet transfer is achieved when a bell is lost or cannot obtain a seal. ♦ Actions to be taken by divers in a lost bell and by the surface team. ♦ Lost bell survival strategies. IMCA D 017 ♦ Awareness of bailout durations. ♦ Damaged bell door O-Rings. Divers to understand the seriousness of the situation & pay future attention to mating surfaces and O-Rings <p>Observed performance:</p> <ul style="list-style-type: none"> ♦ Informing surface of a problem and returning to bell. ♦ On failure of main gas supply, switching to bail out bottle and returning immediately to bell upon failure of main gas supply. ♦ If fouled, advising surface and requesting assistance if unable to clear.
CB 023	As a diver, respond to a DP alert	<ol style="list-style-type: none"> 1 Maintain communication with surface 2 Follow procedure for a yellow alert 3 Follow procedure for a red alert 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ♦ Understands the importance of responding quickly to DP alerts ♦ Understands the meaning of green, yellow and red DP status <p>Observed performance:</p> <p>This exercise can be implemented at the end of a bell run when the candidates are sufficiently familiar with returning to the bell and preparing the bell to leave bottom.</p>

Competence No.	Element	Performance Criteria	Knowledge / Scope
			<p><i>Yellow alert:</i></p> <ul style="list-style-type: none"> ◆ Acknowledges status change reported by the supervisor and is returning to the standoff basket. ◆ Manages their umbilical avoiding excess umbilical being left behind. ◆ Reports when returned to the standoff basket. ◆ Reports on umbilical status. <p><i>Red alert:</i></p> <ul style="list-style-type: none"> ◆ Acknowledges status change reported by the supervisor and is returning to the bell. ◆ Manages their umbilical avoiding excess umbilical being left behind. ◆ Reports when arrived at the standoff basket and entering the bell. ◆ Reports when in the bell and assists the bellman to prepare the bell to leave bottom.
CB 024	As a bellman, implement bell emergency procedures	<ol style="list-style-type: none"> 1 Maintain communication with surface to ensure they are informed of problems and actions taken 2 Follow bell emergency procedures 3 Understand the theory of bell to bell (wet) transfers 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ The various secondary recovery methods in common use. ◆ The purpose and methods of bell ballasting and ballast release systems. ◆ The procedures for slipping ballast in emergencies and the associated dangers. ◆ The principles of bell survival equipment. ◆ Preparation of bell to be recovered using secondary recovery system on failure of primary bell recovery system. ◆ The procedures used during and the hazards of wet transfers, including: <ul style="list-style-type: none"> – bell to basket – bell to surface – bell to bell ◆ Understanding the procedures for dealing with a contaminated bell atmosphere: <ul style="list-style-type: none"> – washdown of contaminated equipment prior to stowing in bell (umbilical's / hats)

Competence No.	Element	Performance Criteria	Knowledge / Scope
			<ul style="list-style-type: none"> – dealing with contaminated oversuits when working in drill muds etc <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Reporting switching to on-board gas. ◆ Advising surface using through water communication system. ◆ Preparing bell for recovery on simultaneous loss of surface supplied gas and/or communications to diver and/or bell, or bell and surface. ◆ Recovering diver to bell, informing supervisor and preparing bell for recovery on failure of the heating system. ◆ Good knowledge of instructions/written procedures on: <ul style="list-style-type: none"> – failure of secondary recovery system – making a wet transfer to a rescue bell – slipping attached remnants of hoisting wire – umbilical and guide wires – ensuring bottom doors are closed – adding O₂ to the bell – testing the bell atmosphere – preparing to slip ballast weights if fitted – donning and utilising survival equipment – using lung powered scrubbers – as a last resort, if communication not established, slipping ballast weights (if fitted) in accordance with written instructions – recognising dangers of surfacing under a vessel. ◆ On loss of bell and secondary communications failure: <ul style="list-style-type: none"> – understanding actions to be taken by surface team – following procedures for loss of primary gas, heat and communication – responding to external assistance – using lost bell emergency tapping code. ◆ Assisting diver in difficulties including: <ul style="list-style-type: none"> – switching to on-board gas

Competence No.	Element	Performance Criteria	Knowledge / Scope
			<ul style="list-style-type: none"> – deploying diver recovery device (man lift) – venting the bell to raise water level so recovered diver can be floated in – informing surface of intention, and locking out – following diver's umbilical – checking diver's breathing gas by flushing through helmet – diver switching to independent and combined primary and secondary gas supply sources (if necessary) – returning to bell on bellman's umbilical – assisting diver into bell, using buoyancy and the man lift – taking off diver's breathing apparatus – applying expired air resuscitation and closed chest cardiac massage (simulated).
CB 025	As a bellman, respond to a DP alert	<ol style="list-style-type: none"> 1 Maintain communication with surface 2 Follow procedure for a yellow alert 3 Follow procedure for a red alert 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Understands the importance of responding quickly to DP alerts ◆ Understands the meaning of green, yellow and red DP status <p>Note: This exercise can be implemented at the end of a bell run when the candidates are sufficiently familiar with returning to the bell and preparing the bell to leave bottom.</p> <p><i>Yellow alert:</i></p> <ul style="list-style-type: none"> ◆ Acknowledges status change reported by the supervisor and is preparing to recover the diver's umbilical <p><i>Red alert:</i></p> <ul style="list-style-type: none"> ◆ Acknowledges status change reported by the supervisor and is preparing to recover the diver's umbilical ◆ Assist the diver into the bell ◆ Prepares the bell to leave bottom
CB 026 ALST 010	As a diver act from inside chamber in an emergency situation	<ol style="list-style-type: none"> 1 Deal with chamber complex emergencies in accordance with written procedures 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Emergencies which might occur in chambers and the procedures to be followed.

Competence No.	Element	Performance Criteria	Knowledge / Scope
		2 Evacuate chamber occupants to another chamber or hyperbaric lifeboat if an emergency cannot be controlled	<ul style="list-style-type: none"> ◆ Moving an unconscious/injured diver into a wet pot/chamber system/medical bunk ◆ Use of firefighting equipment in a saturation diving system and the necessary pre and post diving checks and safety precautions. ◆ The role of the surface team in a fire in chamber situation. ◆ Understand procedures for hyperbaric evacuation including: ◆ HEU launch systems (access to and manning including transfer of injured diver) ◆ HEU equipment (Helmets, neck restraints, body harness restraints, entry positions) ◆ HEU survival techniques ◆ SPHL life support and boat auxiliary systems ◆ SPHL considerations including, dehydration, seasickness, effluent contamination, ergonomics, DVT ◆ HRC life support systems ◆ Life Support Packages (LSP, Flyaway Pack) services ◆ Hyperbaric Reception Facility (HRF) ◆ Sequence of events for launching, stabilizing, transfer and decompression. <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Handling chamber complex emergency in accordance with authorised procedures. ◆ Handling isolation procedures in accordance with written procedures. ◆ Carrying out a chamber evacuation and isolation procedure in simulated conditions ◆ Moving an unconscious/injured diver into a SPHL/HRC
CB 027 ALST 011	As a member of the support team act in a chamber complex	1 Undertake actions in various emergency situations in accordance with company, operational or communications procedures 2 Assist in a chamber evacuation to ensure safety of diver(s)	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Effects of pure oxygen supply in contact with combustible material. ◆ Use of firefighting equipment in association with a saturation diving system. ◆ Emergencies that may occur in a chamber and procedures to be followed.

Competence No.	Element	Performance Criteria	Knowledge / Scope
	emergency situation		<ul style="list-style-type: none"> ◆ Emergency decompression/Abort Tables ◆ Breakdown of the main ECU ◆ System layout and importance of safe chambers <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Operating standby communications systems if the main system fails. ◆ Good knowledge of procedure for fighting a fire and using a deluge system if fitted. ◆ Using hand signals or written communications if standby system fails. ◆ Good knowledge of procedure in event of loss of chamber pressure. ◆ Assisting in chamber evacuation.

A7 Conduct post-Dive Procedures in Closed Bell Diving Operations

Competence No.	Element	Performance Criteria	Knowledge / Scope
CB 028	As a member of a dive team carry out post dive checks on chamber and closed bell complex	<ol style="list-style-type: none"> 1 Check chamber and closed bell and prepare for next use using checklists 2 Undertake routine maintenance 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Legal and regulatory post dive requirements and procedures for chamber/bell complexes. ◆ Awareness of closed bell/chamber complex maintenance requirements in accordance with the manufacturers or organisations instructions and procedures. ◆ Awareness of the danger of using incompatible lubricants and chemicals. <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Cleaning closed bell/chamber ensuring no extraneous materials left inside and without undue damage or deterioration. ◆ Equipping bell to inventory. ◆ Highlighting and Reporting system defects ◆ Completing maintenance checklist. ◆ Changing CO₂ scrubber cartridge. ◆ Tightening gas fittings, when necessary, under close supervision ◆ Under close supervision lubricate fittings with correct lubricants. ◆ Inspecting door/bell, mating/medical lock seals and replacing where necessary. ◆ Inspecting BIBS masks and replacing where necessary. ◆ Cleaning bell and chamber using non-toxic chemical cleaners. ◆ Calibrating gas analysis monitors. ◆ Preparing bell for surfacing – flushing out surfaced bell with air prior to entry – Permit to enter bell Preparing panel, helmets masks and reclaim system

A8 Maintain Effective Working Relationships in Closed Bell Diving Operations

Competence No.	Element	Performance Criteria	Knowledge / Scope
CB 029	As a member of a dive team establish and maintain effective working relationships with dive team	<ol style="list-style-type: none"> 1 Establish and maintain constructive relationships with colleagues and demonstrate capability to live in an enclosed environment with other people under saturation conditions 2 Meet commitments to colleagues within agreed timescales 3 Offer appropriate assistance to colleagues where difficulties arise 4 Provide colleagues with information and support to meet identified needs 5 Give and receive feedback constructively to contribute to a positive framework for improving future performance 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Own work role and responsibilities. ◆ Colleagues' roles and responsibilities. ◆ Ways of establishing constructive relationships. ◆ Ways of seeking and exchanging information, advice and support. ◆ Use of different styles of approach in different situations. ◆ Ways of informing and consulting with others about problems and/or proposals. ◆ Relevant legal and regulatory requirements ◆ Ways of dealing with disagreements and conflict. ◆ Methods of motivating people. <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Agreeing actions and meeting commitments. ◆ Offering and supplying support and essential information to team and colleagues. ◆ Identifying and providing essential information to colleagues. ◆ Co-ordinating own work with that of colleagues. ◆ Contributing fully to team discussions, planning and conveying of information, and to the minimisation of interpersonal conflict. ◆ Discussion with colleagues on work activities and plans. ◆ Identifying issues which affect team relationships and taking appropriate action. <p>Participate in creation of:</p> <ul style="list-style-type: none"> ◆ work plans ◆ records of meetings ◆ records of discussions

Competence No.	Element	Performance Criteria	Knowledge / Scope
CB 030	As a member of a dive team contribute to effective teamwork	<ol style="list-style-type: none"> 1 Participate in discussion and planning activities involving team members 2 Ensure sufficient information about proposed activities, progress, emerging threats and opportunities is conveyed to and by all team members at all times 3 Offer appropriate assistance to colleagues where difficulties arise 4 Identify, minimise and resolve interpersonal conflict in a way that maintains respect. 	<p>Theoretical knowledge:</p> <ul style="list-style-type: none"> ◆ Relevant legal and regulatory requirements ◆ Ways of dealing with disagreements and conflict. <p>Observed performance:</p> <ul style="list-style-type: none"> ◆ Always use appropriate language (refraining from offensive, aggressive, threatening and intimidating language) ◆ Treat everyone with respect regardless of gender, race, sexual orientation, culture or ability (refrain from slurs, hate speech, inappropriate jokes or comments) ◆ Do not engage in, or support, behaviours that intend to cause harm or upset in other team members ◆ Maintain behaviour that does not create, contribute to, or condone workplace bullying ◆ Resolve interpersonal conflict in a way that maintains respect ◆ Work to support, not impede, another team member's development or understanding

Appendix B – Competency Framework

Competence No.	When taught or practised
CB 001 ALST 001	Classroom lesson
CB 002 ALST 002	Dive Plans 4 & 5
CB 003	Dive Plans 4 & 5
CB 004	Dive Plans 4 & 5
CB 005	Classroom lesson and Dive Plan 6
CB 006 ALST 003	Classroom lesson
CB 007 ALST 004	Classroom lesson and when diving
CB 008	Classroom lesson and vessel familiarisation
CB 009 ALST 005	Classroom lesson
CB 010	Daily when diving
CB 011	Daily when diving
CB 012	Daily when diving
CB 013	Classroom lesson and Daily when diving
CB 014 ALST 006	During decompression Dive Plan 6
CB 015	Daily when diving
CB 016 ALST 007	During decompression Dive Plan 6
CB 017 ALST008	During decompression Dive Plan 6
CB 018	Dive Plan 3 or simulated reclaim panel
CB 019	Dive Plan 3 or simulated reclaim panel
CB 020	On every dive
CB 021	On every dive
CB 022 ALST 009	Classroom Dive Plan 2
CB 023	Dive Plans 4 & 5
CB 024	Dive Plans 2-3-4-5-6 and during decompression
CB 025	Dive Plans 4 & 5
CB 026 ALST 010	During decompression Dive Plan 6
CB 027 ALST 011	During decompression Dive Plan 6
CB 028	At the end of each diving day
CB 029	Throughout the course
CB 030	Throughout the course

Appendix C – Closed Bell Training Dive Plans

Dive Plans 1-5 are required for restricted closed bell training certification.

Dive Plan 6 is required for unrestricted closed bell diver training certification.

Dive Plan	Practical Training Exercise	Depth (metres)
Dive Plan 1	Bell and lock-out checks, plus unconscious diver rescue exercise with a bell instructor in the bell. Dive consists of 2 bell runs, familiarisation and a rescue drill for each diver. 3 lock-outs each diver. Dive from the deck.	5-10
Dive Plan 2	Dive consists of 2 bell runs and 4 lock-outs each diver. 2 transfers under pressure procedures each diver with the divers starting and ending in the chamber transfer lock at 1 ata. During the lock-outs five emergency procedures shall be executed: <ol style="list-style-type: none"> 1. loss of comms to the diver, 2. loss of comms to the bell, 3. loss of bell umbilical, 4. loss of gas to the diver and 5. an unconscious diver rescue is practised for each diver. 	5-10
Dive Plan 3	Dive consists of 2 bell runs, 4 lock-outs each diver 2 transfers under pressure procedures each diver with the divers starting and ending in the chamber transfer lock. During the lock-outs four emergency procedures are practised: <ol style="list-style-type: none"> 1. communicating with a lost bell, 2. lost umbilical, 3. tapping codes, 4. A rescue drill for each diver Dive using gas reclaim hat and bellman to operate bell gas reclaim panel (if fitted).	5-10
Dive Plan 4	Simulated saturation run. A full team, ref section 7.2, pressed to storage depth of 6 metres. Dive consists of 2 bell runs, 4 lock-outs and 2 transfers under pressure procedures for each diver. One diver being rescued simulating unconsciousness from clump weight to main chamber. During the lock-out four emergency procedures are assessed: <ol style="list-style-type: none"> 1. DP yellow, 2. DP red, 3. Lost bell, 4. A rescue drill for one diver in each team 5. Surprise emergency 	6-10
Dive Plan 5	Same as Dive 4, but with the other diver being rescued from dive 4 and the diver from dive 4 that was rescued to act as the bellman for the dive 5 rescue. DP scenarios from dive 4 replaced with the following on dive 5: <ol style="list-style-type: none"> 1. loss of bell pressure, i.e. water raising, 2. and contaminated atmosphere 3. A rescue drill for the other diver in each team 	6-10
Dive Plan 6	Saturation dive. A full team, ref section 7.2, pressed to storage depth Deep Dive: Dive consists of 1 bell run, 4 lock-outs each diver and 2 transfers under pressure procedures for each team with the divers pressed down the chamber and ending in the saturation chamber.	Minimum 50 m bell depth. Minimum 65 m diver depth

Dive Plan	Practical Training Exercise	Depth (metres)
	<p>Before the dive the bellman is assessed as capable to carry out internal checks. During the lock-outs one unconscious diver rescue for each diver is assessed.</p> <p>Four emergency drills:</p> <ol style="list-style-type: none"> 1. Preparing to slip ballast (simulated if not fitted), 2. Loss of comms and use of Through-Water Communication (TWC), 3. Loss of hot water, 4. Loss of gas to bell <p>On the deepest lock-out an excursion to a minimum distance of 15 metres or the depth as excursion tables dictate.</p> <p>In saturation decompression, an evacuation to the Hyperbaric Lifeboat including and use of lung powered scrubbers. Also, during decompression the team will use secondary communications, deal with a fire and loss of pressure scenarios</p>	(or depth as excursion tables dictate)

Dive Plan 1

Exercise	Bell checks and lock-out checks, bell familiarisation dive plus rescue exercise. Dive consists of two bell runs and three lock-outs for each diver. The divers shall be accompanied in the bell by a Closed Bell Diver. ¹
Objective	To show the divers how to carry out internal bell checks, lock-out checks, familiarisation with the bell, locating valves, attachments, rescues as well as the general procedures for diving from a bell and preparing the bell to leave bottom. Diving in Hot Water Suits and Helmet for divers in water and Band Mask for bell man, including bailout checks.
Equipment	<p>Diver's equipment: Each diver will wear Hot Water Suits and Helmet for divers in water and Band Mask for bell man.</p> <p>Dive controller – Dive panel operators / chamber panel operators equipment: The procedures for set up of dive panel and the dive comms box.</p> <p>Dive recorder's equipment: The dive plans for the dive.</p> <p>General equipment: The mobilisation checklists which include the panel checks, internal and external bell checks, transfer lock and chamber checks.</p>
Method	<p>Prior to diving the candidates should receive copies of the bell internal checklist and the lock-out checks and should be familiar with what each item is.</p> <p>The candidates will attend a dive briefing. The instructor will demonstrate the Helmet/Band Mask daily checks in accordance with the manufacturer's requirements. All checks are then carried out on the system. One member of staff will be assigned to the panel, one to the chamber and one to the bell. The divers dress and enter the bell and carry out internal bell checks with the Closed Bell Diver.</p> <p>The dive starts when the Closed Bell Diver compresses the bell. The dive then continues with the dive controller and the dive recorder logging each step on the dive plan under the direction of the Closed Bell Supervisor.</p> <p>The Closed Bell Diver accompanies the divers in the bell for the dive.</p>
Outcome	At the end of the dive the candidates should be able to understand the general process of diving from a bell including rescues and umbilical management. Using the relevant checklist, they should be able to locate the valves and ancillary items listed.
Dive Depth	5-10 metres

¹ The Closed Bell Diver will continue to accompany the divers until they are considered capable to dive unassisted.

Dive Plan 2

Exercise	The dive consists of two transfer under pressure exercises, two bell runs, four lock-outs for each diver. During the lock outs, emergency procedures are practised, including loss of comms to the diver, loss of comms to the bell, loss of umbilical, loss of gas to the diver including activation of secondary life support and switching to onboard gas.
Objective	To let the divers practise internal bell checks, lock-out checks and rescues as well as the general procedures for using a bell and transfers under pressure. To introduce loss of gas to the diver, loss of comms, loss of umbilical preparing steps for loss of bell. Familiarisation with chamber systems and TUP clamping equipment.
Equipment	<p>Diver's equipment: each diver will wear whilst in the water a hot water suit and Helmet for divers in water and Band Mask for bell man.</p> <p>Dive controller – Dive panel operators / chamber panel operators equipment: The procedures for set up of dive panel and the dive comms box.</p> <p>Dive recorder's equipment: The dive plans for the dive.</p> <p>General equipment: The mobilisation checks which include the panel checks, internal and external bell checks, TUP clamp, transfer lock and chamber external/internal checks. Surface standby diver equipment.</p>
Method	The candidates will attend a dive briefing. The dive begins after the TUP at 1 ata from entry lock into the SDC and the bell is sealed with greater than 1 ata pressure. The dive then continues with the dive controller under the direction of the Closed Bell Supervisor. After the dive finishes the divers will decompress in the bell and perform a TUP at 1 ata and exit from the entry lock
Outcome	At the end of the dive the candidates should be building confidence in using the bell including bell internal checks and rescue procedures. The candidates should understand the emergency procedures for loss of gas to the diver and loss of comms to the bell and diver. The divers will have completed their first TUPs as a dry run at 1 ata
Dive Depth	5-10 metres

Dive Plan 3

Exercise	The dive consists of two bell runs, four lock-outs for each diver and two transfers under pressure procedures for each diver. The diver starts and ends with the divers in the chamber transfer lock. During the lock-outs, emergency procedures are practised, including communicating with a lost bell, lost umbilical, tapping codes and a rescue. Dive is conducted using gas reclaim hat. The bellman will operate bell gas reclaim panel. The exercise using reclaim can be conducted as a simulated classroom session for both panel and hat.
Objective	To let the divers practise internal bell checks, lock-out checks and rescues as well as the general procedures for using a bell, transfer under pressure and gas reclaim panel (if fitted) and hat use. To introduce communicating with a lost bell and loss of umbilical, rescues and tapping codes.
Equipment	Diver's equipment: each diver will wear a hot water suit and gas reclaim hat. Dive controller – Dive panel operators / chamber panel operators equipment: The procedures for set up of dive panel and the dive comms box. Dive recorder's equipment: The dive plans for the dive. General equipment: The mobilisation checks which include the panel checks, internal and external bell checks, transfer lock and chamber checks. Surface standby diver equipment.
Method	The candidates will attend a dive briefing. The dive begins when the transfer lock is compressed with the divers inside. The dive then continues with the dive controller, the dive recorder logging each step on the dive plan under the direction of the Closed Bell Supervisor. At the end of the dive the divers transfer to the chamber and are decompressed in the chamber.
Outcome	At the end of the dive the candidates should be building confidence in using the bell including bell internal checks and rescue procedures. The candidates should understand the emergency procedures for communicating with a lost bell and loss of umbilical to the bell. The divers should be familiar with the use of reclaim hats and the bell reclaim panel. Familiar with chamber operations and safe TUP practices.
Dive Depth	5-10 metres

Dive Plans 4 & 5

Exercise	<p>Simulated saturation run. A full team pressed to storage depth of 6 metres. Dive consists of 2 bell runs, 4 lock-outs and 2 transfer under pressure procedures for each diver. One diver being transferred simulating unconsciousness (rescue) From clump weight to main chamber with a cervical collar. During the lock-outs three emergency procedures are assessed. DP yellow alarm, DP red alarm, lost bell, plus an unannounced emergency drill. Dive Plan 5 is a repeat of Dive Plan 4 with the full rescue being on the bellman from Dive Plan 4 as the diver in Dive Plan 5. i.e. both divers will have been the bellman and the diver in the full rescue from outside the bell to the main chamber at the completion of Dive Plan 5. DP scenarios from Dive Plan 4 replaced with loss of bell pressure, and contaminated atmosphere on Dive Plan 5. The rescue will be done on the last lock-out. Bellman will make up oxygen in the bell.</p> <p>During the dive the bellman will undertake regular checks including gas sampling with a handheld sampler along with injecting oxygen into the bell.</p>
Objective	<p>To practise a saturation dive with a team compressed in the main chamber. While the dive team is locked off the dive team in waiting will experience living life in the chamber with use of the toilet, shower, bilging out water, transferring drinks and food, changing out scrubber cannister if applicable. This will prepare the divers for the deep dive.</p> <p>To practise a full rescue from the water into the bell and transferring the injured diver to the main chamber as a full team effort</p>
Equipment	<p>Diver's equipment: each diver will wear a hot water suit and Helmet for divers in water and Band Mask for bell man. A cervical collar.</p> <p>Dive controller – Dive panel operators / chamber panel operators equipment: The procedures for set up of dive panel and the dive comms box.</p> <p>Dive recorder's equipment: The dive plans for the dive.</p> <p>General equipment: The mobilisation checks which include the panel checks, internal and external bell checks, transfer lock and chamber checks. Surface standby diver equipment.</p>
Method	<p>The candidates will attend a dive briefing. During the dive after the two DP emergencies the instructor should choose an unbriefed but practised emergency procedure which will be assessed. During the last lock-out, which will be a rescue, the exercise is suspended when the rescued diver is in the bell. The bell is made ready for leaving bottom then the exercise is restarted. The bell is raised with the diver simulating unconsciousness and wearing a cervical collar. The diver is transferred to the transfer lock by the bellman and the next two divers in waiting then put the diver on BIBS. The divers carry out a primary survey. The exercise ends at this point and the next team of divers TUP. After all teams have completed the dives, the divers decompressed as if a saturation decompression.</p>
Outcome	<p>At the end of Dive Plan 5 the candidates should be confident in performing a full saturation dive having experienced living in the chamber. They should be ready for the deep dives and confident in the bell. The divers should understand how to carry out bellman regular checks.</p>
Dive Depth	5-10 metres

Dive Plan 6

Exercise	<p>Saturation dive. Deep Dive. A full team are compressed to storage depth.</p> <p>Deep Dive: Dive consists of 1 bell run, 4 lock-outs each diver and 2 transfers under pressure procedures for each team</p> <p>Before the dive the bellman is assessed as capable to carry out internal checks. During the lock-outs one unconscious diver rescue each is assessed. Four emergency drills</p> <p>Preparing to slip ballast, loss of comms use of TWC. Loss of hot water. Loss of gas to bell.</p> <p>On the deepest lock-out the divers shall undertake a minimum excursion of 15 metres, or the depth as excursion tables dictate, away from the bell.</p> <p>In Saturation decompression, an evacuation to the Hyperbaric Lifeboat including donning survival suits and using lung powered scrubbers. Also, during decompression the team will use secondary communications, deal with a fire and loss of pressure scenarios</p>
Objective	To assess the divers as capable to live in saturation and to carry out internal bell checks and all the divers as capable to carry out a rescue.
Equipment	<p>Diver's equipment: each diver will wear a hot water suit and Helmet for divers in water and Band Mask for bell man. The bell will be equipped for deep dives.</p> <p>Dive controller – Dive panel operators / chamber panel operators equipment: The procedures for set up of dive panel and the dive comms box.</p> <p>Dive recorder's equipment: The dive plans for the dive.</p> <p>General equipment: The mobilisation checks which include the panel checks, internal and external bell, HRC, transfer lock and chamber checks. Surface standby diver equipment.</p>
Method	<p>The candidates will attend a dive briefing. The divers are compressed in the chamber on heliox. The first team will then TUP to the bell and are assessed on bell checks. When the bell is at depth, the divers will be assessed on the emergency drill. The divers then return back to the system and TUP to the chamber. The next team TUP to the bell and carry out the same exercises.</p> <p>During this time emergency exercises, including using secondary communications with a chamber and use of BIBS, evac to the Hyperbaric Lifeboat including donning survival suits and using lung powered scrubbers are assessed.</p>
Outcome	At the end of the dive candidates should be confident in their ability to dive from a bell and to live in saturation.
Dive Depth	<p>Minimum bell depth of 50 m</p> <p>Minimum dive depth of 65 m</p>