



European Diving Technology Committee

EDTC

**COMPETENCE STANDARDS for
PHYSICIANS of OCCUPATIONAL
DIVING and TUNNELLING
COMPANIES**

January 2019

Document Preparation

This document was prepared following consultation among the members of EDTC and detailed discussion in the EDTC Medical Subcommittee.

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1 Introduction

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 organizations listed below:

Austria	Belgium	Croatia
Czech Republic	Denmark	Estonia
Finland	France	Germany
Italy	Latvia	Romania
The Netherlands	Norway	Poland
Portugal	Spain	Slovak republic
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
International Diving Regulators and Certifiers Forum (IDRCF)	Corresponding members (medical)	

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:

- Proving an independent European forum which may make recommendations relating to diving safety, technology and diving medicine
- Providing a place for discussions on matter 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 harmonization so that common standards may be achieved
- Providing, where appropriate, advice to governments, other organizations 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 medicine physicians.

The document provides a "high level" minimum set of competences that are required for a medical doctor to provide medical support to the commercial diving industry at an appropriate rate of knowledge and skills. It covers all kinds of medical support for divers and diving companies, inshore and offshore, including other specialized situations (police, military, rescue, science and archaeology) where special competences will be needed. The similarities with the hyperbaric medical requirements of the compressed air tunneling industry have been recognized and much of the guidance in this document is of use to doctors practicing in that field also. Where significant differences occur, these are noted.

The training to get a knowledge base for diving medicine is described in the "**Training Standards for Diving and Hyperbaric Medicine by EDTC and ECHM 2011**". These training modules are the common basis for diving medicine physicians as well as those who will work as hyperbaric specialists in a clinical setting. A diving medicine physician (after Level 2D training) will have the knowledge base for:

- General health considerations. Diving as an environmental challenge including epidemiology of health impacts, for recreational and professional divers
- Scientific research on decompression illness, bubbles, apnea effects, effect on interaction of other gases for all kind of divers and tunnel workers
- Treatment of decompression injuries (mostly performed in a hospital setting)

While these items are common for hyperbarists and diving medical advisors of occupational divers, those who only participate in these activities may be called "Diving Medicine Physician" as described by the Medical Training Standards of EDTC and ECHM 2011. Physicians engaged as **appointed or contract medical advisors for diving or tunneling operations** however are focused mainly on other tasks:

- Hazard identification and risk assessment (HIRA) of professional diving and tunneling operations, advice and assistance for diving companies to establish preventive programs including advice on decompression profiles (e.g. operational manuals), and emergency response organization
- Job specific assessment of occupational divers or tunnellers for their work under water resp. under pressure
- Treatment of decompression injuries on-site, which is normally performed so in tunneling and often in commercial diving operations.

This means, occupational medicine is a major part of their competence (either in form of a certificate of basic competence or full specialty) and they need to be familiar with the commercial diving equipment, procedures and epidemiology of health impacts. We therefore call those doctors "**Diving Medical Advisor DMA**" in this document (being aware that tunneling is more than "dry-diving", but the term hyperbaric medicine is commonly reserved for clinical hyperbaric oxygen therapy).

The competencies described in this document should contribute to make professional diving operations safer and to keep the divers in good health. We refer to the EDTC document "Principles of harmonized diving standards in Europe".

In tunneling doctors need to be familiar with the tunneling environment and with working practices associated with tunneling. For those specializing in tunneling applications "Guidelines for good practice in high pressure compressed air 2018" and "Safe Working in tunneling 2011" by ITA (International Tunneling Association) and "Guidance for appointed doctors on the Work in Compressed Air Regulations" by HSE (UK health and safety executive) should be referred to as standards.

This document is also intended to be a reference point for an **international registry of doctors** competent as advisors for occupational diving and compressed air work, thus offering diving contactors the possibility to find their diving medical advisor according to their special needs. This should also enable mutual recognition of diving medicals and medical examiners of divers to interact in different countries.

2 Scope

Legal status

This document has no legal status in any country. It is prepared as guidance to promote communality of requirements for the competence of various grades of medical doctors interacting with the diving or compressed air tunneling industry throughout Europe. This should assist with free movement of labor, assessment of suitability of one country's nationals by the authorities in another country, etc. We are however aware that adhering to these standards does not mean that the competences of a physician, who is qualified as described here below, will automatically be recognized as appointed or licensed doctor by the national legal authorities. Regulations show significant differences between countries and EDTC standards shall not overrule those.

Training and competence

This document is largely based on the achievement of specific competencies by the medical doctors involved. The difference between training and competence need 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 items.

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 diligently. 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 when, and that they can carry out the necessary tasks properly. This may be tested by written or verbal examination or by carrying out a required task.

Appendices 1 and 2 describe practical skills training for specific competencies needed for the application as a Diving Medical Advisor. These modules aim to replace the practical experience someone could get in having an appropriate employment on such work sites, which will only exceptionally be available.

Appendix 3 describes a module for a short course in occupational medicine, mainly offered in a blended learning setting (web-based and practical). This module should provide basic knowledge in occupational medicine for those physicians who have no board certification or occupational medical diploma valid in their country.

3 Requirements for Training and Assessment Establishments

3.1 Courses

Training programs to get appropriate knowledge in diving and hyperbaric medicine are defined in the "Educational Standards ECHM/EDTC 2011" (see references). In order to assure an adequate setting, such courses, if aimed to teach the knowledge base for DMAs, should be approved by an international expert institution (e.g. the Diving Medical Advisory Committee DMAC according to its guidance note 29 "Approval of diving medicine courses", in cooperation with the International Diving Medical Expert Board IDMEB).

For candidates with diplomas from other, non-approved courses or those who have passed a more extensive postgraduate master training, applications for a certificate of competence should include a detailed documentation of such courses. The certifying board will decide whether such trainings or experience can be considered equivalent to the knowledge base provided by an approved level 1 course.

Approved DMAC/EDTC courses are published online at www.dmac-diving.org and on the website of the IDMEB

3.2 Practice

According to the educational standards ECHM-EDTC 2011 Chapter 6 "Certification" those physicians who want to get a certificate of competence after having done a Level 2 diploma course, need to provide proof of some additional practical skills and other proficiencies:

- *Attestation of skills and practical experience in fitness to dive assessment, management of diving accidents, safety planning for professional diving operations.*
- *Attested skills in basic and advanced life support (for instance ACLS).*
- *Certified skills in acute trauma care (for instance preclinical ATLS)*
- *Basic proficiency in occupational medicine"*

As postgraduate trainees such as being an intern in a hospital do not easily experience these skills, EDTC defines here more detailed criteria, which help a training provider to offer specific experience, and have it finally attested, based on the prescribed checklist. Direct experience from the work would be of a high value, but difficult to get. Such practice experience can be acknowledged as equivalent on a portfolio basis.

Three such modules are described in more detail in the annex:

1. Practical experience in commercial surface supplied diving
2. Practical experience in oxygen decompression and use of oxygen enriched mixtures
3. Practical training in onsite treatment of DCI

Basic proficiency in occupational medicine can be achieved in some countries by national programs of about 80 study hours, attested by a university diploma in occupational medicine, recognized by the national health and safety authorities. For those who have no such training available and are not disposed to go to one of these countries, an equivalent module is available as a university certificate by SSSA Pisa. This course was elaborated in cooperation of IDMEB, the Stellenbosch University South Africa and EDTC medical members. A short description follows in the Annex 3.

Skills in advanced cardiac life support and pre-hospital trauma care can be obtained in every country by specialized institutions. Such certifications are highly recommended and useful for the work of a Diving Medical Advisor, however in most instances these skills will not be needed by the medical advisor himself, but for those physicians appointed to perform emergency support. Therefore, advanced cardiac life support and trauma life support certifications are not considered mandatory as a prerequisite for a certificate of competence as DMA. However basic knowledge and skills of pre-hospital trauma care and advanced cardiac life support must be part of the competence of a DMA. This is to be assessed through the final examination.

DMAs with valid certifications for these emergency procedures will be published on the website thus serving as supplementary information for contractors of the diving industry.

3.3 Final assessment of training for DMA (examination)

In order to assess knowledge of all candidates in a fair way, independent of the faculty of the institution providing the training courses, the certifying board organizes a final examination, which the candidates can sit in their countries in an approved institution (mostly academic or governmental). The examination is an online web-based test composed of multiple choice questions and others.

The questions shall cover all topics including all training objectives of the diving medical courses Level 1 and Level 2D and all the practical and additional mandatory modules.

The International Diving Medical Expert Board (IDMEB) is designated to act as the "Certifying Board" as defined in the Educational standards of ECHM-EDTC 2011 in order to certify diving medical advisors for the diving industry and hyperbaric companies. IDMEB is in charge of organizing final assessments and the certificates are to be signed by the chairman of IDMEB and of the academic host SSSA Pisa.

The certifying board makes a big pool of questions available for the candidates when they apply, so that they can train themselves on these questions. As the questions are known and there will be no surprise questions, the pass/fail threshold would however be very high (85 - 90%). The national coordinators are responsible for finding appropriate places for candidates to sit the exam.

If someone has not passed, the examination can be repeated until the pass criteria are fit

4 Detailed competence standards

MEDs (Level 1) are designated on a portfolio bases, while DMAs get Certificates of competence as defined in these standards, handed out by the International Diving Medical Expert Board IDMEB. Nationally accredited institutions or other internationally acknowledged agencies may hand out equivalent certificates if conformity with these standards is declared and verified by the IDMEB.

4.1 Level 1 - Medical examiner of divers

Entry requirements

Medical assessment of fitness to dive or to perform work under pressure is a legal obligation in almost every country of the world. In contrast, this is generally not mandatory for recreational divers and, in many countries, for self-employed professional divers. These standards should specify the competency of physicians performing medical examinations of occupational divers or hyperbaric workers (for national references see chap.6).

For Level 1 training in diving medicine, every physician with a board certified medical competence and a license to practice medicine is accepted. In many countries however, only physicians with an attested training in occupational medicine (board certified specialists or occ-med diploma) can legitimately perform fitness to dive assessments of professional divers.

As occupational medicine specialists often have only rudimentary knowledge and no experience with hyperbaric work and, on the other side, many diving medicine physicians never experienced training in occupational medicine, there are several acceptable ways to get a diligent medical assessment of a diver. In many cases the examination is organized in two steps, first an assessment of fitness to dive in general by a diving medical physician, then a second assessment by the occupational medicine specialist for the diver's fitness for a job.

In order to avoid unfair decisions or incompetent outcome of a double examination, we strongly recommend that all MEDs have at least passed a basic training in occupational medicine and that there should be a close cooperation of the two specialists (see Appendix 3).

Diving medicine Level 1 training is however also designed to be a knowledge upgrade for occupational medicine specialists who are designated to perform fitness to dive assessments.

Competencies

Medical assessment of fitness to dive or work under pressure is a preventive action for those professionals working under special risks. Although such examinations are mostly defined by national authorities, EDTC has defined in its standards for fitness to dive a consensus procedure how to perform such assessments (see references).

We recommend to distinguish:

- the initial medical assessment before starting a diving career/training
- Periodical medical assessment of working divers and hyperbaric workers. We refer here to the EDTC standards for Medical Assessment of Fitness to Dive. This guidance describes an in-depth assessment that is to be performed every few years (normally 5 years in young divers), and annual assessments with minimal technical examinations.
- Medical assessment to resume diving after accidents/illnesses including DCI. This is an expert assessment including analysis of circumstances and pathophysiology of the health problem and its consequences for further continuation of occupational diving.
- Certificate of fitness to dive for a job. This is a check immediately before performing a defined diving job in the sense of a permit to work. This latter examination needs understanding and knowledge of the job, its physical demands and hazards. In many countries this certificate therefore needs to be attested or signed by an occupational medical physician or the contract diving medical advisor.

Level 1 training and, in consequence, the certification as a MED is considered appropriate for performing the initial and periodical medical assessments. Assessment to resume diving after accidents/illnesses however should be performed by a Diving Medicine Physician with higher level training (Level 2D), whereas as the certificate of fitness to dive for a job would certainly need at least a basic proficiency in occupational medicine.

Conditions for certifications

Recognition of Level 1 "MED" competence can be designated by the IDMEB. Designation is accepted after verification of the following conditions:

- Diploma of a Level 1 course, recognized by DMAC or equivalent
- Authorization to perform diving medical examinations in the candidate's home country
- Proof of adequate continuous professional development.

Candidates can apply individually at the international diving medical databank website www.edmd.eu and their application will be checked by the national coordinator of the IDMEB

4.2 Level 2D - Diving medical advisor for occupation divers and compressed air workers (DMA)

Entry requirements

The prerequisites before getting a Level 2 training should be the same as for Level 1. Furthermore, Level 1 training is assumed to be done before going to the Level 2D.

Competencies

The competence of a DMA is based on the qualification of a diving medicine physician according to the "Educational Standards EDTC-ECHM 2011":

- *Competent to perform the initial and all other assessments of working and recreational divers or compressed air workers.*
- *Can manage diving accidents and advise diving contractors and others on diving medicine and physiology (with the backup of a diving medical expert or consultant).*
- *Should have knowledge in relevant aspects of occupational health. He or she does not need to be certified specialist in occupational medicine to be in accordance with the standards. Such a basic proficiency is also recommended for those of Level 1 who examine commercial divers and compressed air workers.*
- *Should have certified skills and basic practical experience in fitness-to-dive assessment, management of diving accidents, safety planning for professional diving operations.*

The formal training by courses as described by the mentioned standards provides the basis for an activity in diving medicine as it is needed in a research or a clinical hyperbaric setting:

- general health considerations, diving as an environmental challenge including epidemiology of health impacts, for recreational and professional divers.
- scientific research on decompression sickness, bubbles, apnea effects, effects on interaction of other gases for all kind of divers.
- treatment of decompression incidents.

Besides these clinical and scientific engagements in diving medicine, the medical advisory job for commercial and other occupational diving and hyperbaric operations needs more:

- competence in HIRA (risk assessment) of professional diving and tunneling operations, advice and assistance for diving companies to establish preventive programs (operational manuals) and emergency response organization.
- job specific assessment of occupational divers for their work under pressure / under water.

Therefore, in contrast to the "Diving Medicine Physician" as described by the "Educational Standards ECHM/EDTC 2011", those engaged as appointed or contract medical advisors for diving or tunneling operation however are focused on the last two items here above, in addition to the competence in the other items. This means, occupational medicine is a major part of the competence (either in form of a certificate of basic competence or full specialty) and they need to be familiar with the commercial diving equipment, procedure and epidemiology of health impacts. We therefore call them "Diving Medical Advisors DMA".

The competence described here is limited to compressed air or oxygen enriched oxygen mixtures (Nitrox) and oxygen decompression. Advanced modules, not included in the frame of the DMA certificate, may lead to higher level of specific competences like pre-hospital emergency cardiac and trauma management, saturation exposures, tunneling operations, deep-diving using mixed gas and rebreathers.

Conditions for certification

The recognition of Level 2D competence as DMA is based on the following:

- Diploma of a Level 2D course (diving medicine (see 3.1).
- Practical experiences from commercial diving (excl. saturation, see appendix 1)
- Practical training in onsite treatment of DCI (see appendix 2)
- Basic knowledge of occupational medicine (see appendix 3)
- Final summative assessment passed (see chap. 3.3)

4.3 Advanced proficiency in occupational diving medicine

Reference to the medical training standards of ECHM-EDTC 2011

In analogy to "Consultants" as they are usually working in clinical settings, recognition of advanced proficiency of diving and hyperbaric physicians as a "level 3" is suggested by the "Educational Standards ECHM/EDTC 2011":

"The experience needed to get a Level 3 competence cannot be learned from a course. The candidate must prove that he/she has acquired expert knowledge, skills and experience in this field. Candidates should already be accredited and board certified in a medical specialty, the diving/hyperbaric Level 3 status corresponds to a postgraduate specialization."

Diving medicine as a specialization is partly research oriented, partly health and safety oriented assessing work with special risks, specific for the technology and work site. This latter kind of diving medicine is mainly an occupational medical approach, dealing with prevention and emergency management in hyperbaric/diving work situations (including trauma, intoxication or other work and environmental incidences). Diving medical advisors mostly work by mandates of a limited time or in an offshore or military employment charged with special diving related tasks. So they will generally not easily match the conditions for the above mentioned level 3.

Advanced knowledge and experience will always result in a certain degree of specialization. However we will not formally define a "level 3" for DMAs.

Consultant status

Consultant status is to be recognized for those who have successfully passed a medical specialization in diving and hyperbaric medicine (4-5 years of training) resulting in a board certification by an appropriate medical competence approval body. This is only available in a small number of countries.

Advanced competence and networking

Specialization in certain working techniques or hyperbaric operations like mixed gas diving, high pressure compressed air work in tunneling, diving in extreme environments, military diving etc

can be achieved by a learning process on the job eventually in special training modules. Such advanced competence can be recognized by the certifying board on a peer recognition basis and published on the online-registry of DMAs.

A status of expert would thus not represent reality. Networking however is important in managing diving or compressed air operations and therefore build-up of a panel of specialized DMAs and medical specialists of all medical specialties with a special interest in diving medicine is recommended.

5 Documentation

This section identifies the records that need to be maintained and the other documentation that is required 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 organization 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.

Identification will normally be achieved by photographic means. It is suggested that the Certifying Board should confirm at the start of any 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 Certifying Board 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 assessment taking place, 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 assessment.

A typical routine would be for the individual to be asked to send copies of their qualifications, certificates and log books (as relevant) to the organization carrying out the 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 Certifying Board would then place a copy of these documents in to the individual's records, duly validated by the responsible person.

5.3 Documentation issued

Upon the completion of any assessment based on the competencies 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 competencies assessed with results and comments may accompany the certificate.

5.4 Record keeping

The establishment that carries out assessment in line with this document would normally be expected to operate its management, control and documentation systems in line with a recognized standard. 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 item, where and when this was done, how the assessment was carried out and the result.

5.5 Tests and examination

In the case of written tests or examinations, the answer sheet from the individual, duly corrected and marked, should be placed in to 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.

6 References

- ECHM-EDTC Educational and training standards for physicians in diving and hyperbaric medicine 2011: link for download
- Diving Medical Advisory Committee, DMAC Guidance 29, Approval of Diving Medicine courses: <http://www.dmac-diving.org/guidance/>
- International Diving Medical Expert Board IDMEB: www.edmd.eu
- EDTC Fitness to dive standards: link at edtc.org
- International Tunneling Association ITA: Guidelines for Good Work Practice In High Pressure Compressed Air, March 2018. link for download from ita-aites.org
- HSE (UK): Medical surveillance of workers undertaking work in compressed air 2017. publication MS35 rev1: link for download from hse.gov.uk
- BTS (British Tunneling Association): A Guide to the Work in Compressed Air Regulations 1996 (ed 2012), appendices 5 and 6: link for download from britishtunnelling.org.uk

7 Definitions

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

- CAW** Compressed air work. This was originally the job of caisson workers, actually mostly tunnelling with a compressed air shield. Compressed air workers have to enter the working chamber using an entrance lock for compression, after work they exit through the lock being decompressed according to agreed decompression tables. Oxygen decompression has become routine. In case of decompression sickness after exiting the tunnel, a recompression chamber will normally be onsite available.
- DMA** Diving medical advisor. The way to be recognised as competent in such a function is described in this standard. DMAs will normally work as contract or appointed medical doctor for a diving operator or a tunnel constructing company using CAW.
- DMP** Diving medicine physician. DMPs are physicians having passed a training course in diving medicine to the Level 2D, as described in the ECHM-EDTC Educational and Training Standards for Physicians in Diving and Hyperbaric Medicine 2011 (see references). This training does not include experience and practical skills in commercial and other occupational diving procedures and compressed air operations.
- MED** Medical examiner of divers. Physicians who perform the medicals for fitness to dive are called Medical examiner of divers, however MED as used in this document means physicians who have passed a diving medical training to the Level 1 according to the ECHM-EDTC Educational and Training Standards for Physicians in Diving and Hyperbaric medicine 2011. In some countries they need to be accredited or approved by national authorities. Those who follow a continuous professional development program may apply to be designated at the international diving medical registry.

- NC** National Coordinator. The certifying board IDMEB acts in cooperation with a network of national coordinators. These are persons of confidence with an appropriate background in occupational diving medicine, and they know national regulations and training providers of diving medical courses and the diving and hyperbaric medicine doctors of their country. NC assess applications to the international diving medical registry.
- Occupational diving** This includes all types of diving for reward. Full time or part time occupation as commercial divers in civil engineering, offshore, inshore and inland, fish farming, shell fishing, military police and coast guards diving, scientific diving, photography and media diving and instruction of recreational divers. Hazards and risks vary considerably between these activities, a good reason for the need of a basic understanding of occupational medical principles for physicians advising such divers.
- SSSA Pisa** Scuola Superiore Sant'Anna di Pisa. This is an advanced postgraduate study university in Pisa, hosting the international diving medical registry and the certifying board IDMEB.

8 Appendices

These mini-modules will be offered individually by appropriate institutions, can be planned over a certain time so as to serve as well as CME credits for other specialties. The logbook is the basis for collecting all these experiences. Each mini-module must contain detailed training objectives, a clear syllabus and a method to assess the candidates, to be approved by the IDMEB and published on the edmd.eu website.

8.1 Appendix 1

Practical experience from commercial diving (for DMA)

As experience that would result in competency to manage professional diving operations and emergencies cannot be achieved by in-house training like for instance in clinical hyperbaric medicine, such trainings shall be achieved on an individual basis, be it through occupational work in a professional diving setting, be it by performing more training modules that are defined in this section as follows:

Practical module: Surface oriented diving and professional techniques

This is a one or few-day practical course in a diving company to be addressed individually, including creation of a risk assessment and safety plan (a list of such companies or diving schools will be provided on the website). During this stage the company should provide:

- demonstration of the supervisor's tasks and working environment.
- participation to a diving operation using surface supplied technique with communication, as an observer.
- explaining and demonstrating provision of breathing gas and its redundancies and bailout calculations.
- explaining the maintenance of the equipment, in particular the helmet.
- demonstration of salvage procedures for an unconscious diver from the water, and explaining the emergency management of diving accidents.
- practical experience being immersed in a professional diving equipment including communication.
- the candidate will then perform a risk analysis of the diving operation and write a report proposing eventually further control measures or contingency plans (as practical part of the occmed module). This report is then evaluated by a delegate of the IDMEB.

Practical module: Nitrox and oxygen decompression techniques

This mini-module may be a one-day course with preparation by e-learning, in particular to introduce the calculations and safety gas management and oxygen toxicity management. The following items must be covered:

- demonstration of the production of nitrox and of its analysis and markings.
- demonstration of oxygen decompression tables, dive-computer solutions and planning software for oxygen decompression.
- calculation of the best mix for various diving depths and durations.
- calculation of oxygen toxicity units (OTU and CNS) for typical longer dives incl repetitive ones in order to determine the limits of safe work conditions.
- perform a dive with scuba gear, performing oxygen decompression.
- demonstration of the O₂ decompression technique used in surface supplied diving and in open bells.

8.2 Appendix 2

Practical training in onsite treatment of DCI (for DMA)

The aim of such training is to be able to supervise an onsite recompression treatment for DCI. For candidates who have no chance to get this experience in an occupational setting, participation to a practical skills module is suggested.

Practical module: Onsite treatment of DCI

A one-day course using an onsite recompression chamber of a professional diving school or a diving company will be optimal. Preparation may be by e-learning. As decompression accidents are extremely rare in professional diving real cases may not be experienced, however training for treatment decisions may be achieved using accident scenarios. The following steps should be performed:

- demonstration of a small multiplace chamber typically used on diving sites. In particular the various gas supplies and dumps, electricity, communication possibilities, fire extinction system and heat & noise control systems.
- calculation of gas to be available for routine use, contingencies and in particular for the case of extensions in DCI treatments.
- demonstration of gas purity control (in order to comply with the respective ISO norm)
- discussing the various possibilities of treatment extensions and changes and their indications and limitations.
- Playing at least 4 accident scenarios with the candidate's involvement as treating doctor.

8.3 Appendix 3

Basic proficiency of occupational medicine (for MEDs and DMAs)

Prerequisites:

Diving medicine Level 1

Aim:

To provide medical examiners of divers and diving medical advisors (who do not have a formal qualification in occupational health) with the necessary competencies (knowledge and skills) to effectively facilitate an appropriate occupational health service to professional divers or diving companies, or (if legally allowed) to provide such a service themselves.

Program outcomes (learning objectives):

After successful completion of this module, the candidate will be able to:

- Be aware of the principles and concepts of the international legal context of Occupational Health and Safety as found across the globe (including directives from e.g. Europe, ILO & the WHO)
- Be able to identify, access, and apply legal directives in the countries he or she would likely perform medical examinations on divers and/ or support diving operations
- Describe and discuss the principles, ethics and scope and duties of Occupational Medicine as applied to diving operations and related activities
- Identify workplace health and safety hazards, analyze and evaluate such hazards to determine the health risks associated with the hazards, and apply risk mitigation strategies (using appropriate hierarchies of control) to manage or prevent injuries and/or occupational diseases
- Appropriately manage diving related occupational health and safety issues
- Understand the compensation systems applicable to their practice location(s) and be able to properly manage divers presenting with work related injuries/ diseases
- Apply relevant disability legislation to persons involved in diving operations, including the facilitation of appropriate reintegration into the workplace
- Manage health data related to diving projects, perform basic calculations that describe workplace health and safety measures, and set up basic descriptive studies, such as transversal and longitudinal studies *
- Knowledge of travel medicine and marine toxicology *
- Familiar with first aid prevention and medivac issues *

* These items should normally be covered by a Level 2D course already