

**Code of Practice for
The Initial and Periodic
Examination, Testing and
Certification of Diving
Plant and Equipment**



The International Marine Contractors Association (IMCA) is the international trade association representing offshore, marine and underwater engineering companies.

IMCA promotes improvements in quality, health, safety, environmental and technical standards through the publication of information notes, codes of practice and by other appropriate means.

Members are self-regulating through the adoption of IMCA guidelines as appropriate. They commit to act as responsible members by following relevant guidelines and being willing to be audited against compliance with them by their clients.

There are two core activities that relate to all members:

- ◆ Competence & Training
- ◆ Safety, Environment & Legislation

The Association is organised through four distinct divisions, each covering a specific area of members' interests: Diving, Marine, Offshore Survey, Remote Systems & ROV.

There are also five regional sections which facilitate work on issues affecting members in their local geographic area – Asia-Pacific, Central & North America, Europe & Africa, Middle East & India and South America.

IMCA D 018 Rev. I

This revision was prepared for IMCA, under the direction of its Diving Division Management Committee, by Crawford W Logan.

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Code of Practice for The Initial and Periodic Examination, Testing and Certification of Diving Plant and Equipment

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I Introduction

I.1 General

In the UK sector of the North Sea, diving regulations were introduced during the 1970s which required diving plant and equipment to be examined and tested at set intervals and certificates produced to verify that this work had been carried out correctly. Other countries, particularly in the North Sea area, produced their own regulations but always with a similar theme.

In 1981 diving regulations were produced in the UK which laid down these requirements in more detail but many of the requirements were not specific and were, therefore, open to misinterpretation.

In order to give some guidance to the offshore industry, AODC produced a document reference AODC 041 in May of 1986 which sought to clarify any interpretations necessary and to identify a common standard which could be applied by all parties. This followed a workshop organised by AODC and attended by approximately 200 representatives of diving contractors, ship owners, equipment manufacturers, oil companies, classification societies and government departments.

AODC 041 was intended for use offshore in the UK sector of the North Sea but in the absence of other guidance it became a standard reference in many parts of the world, particularly where there were no specific national regulations.

After it had been in use for some years it was realised that AODC 041 needed to be expanded and revised and the Technical Committee of AODC carried out this task, publishing the new document AODC 056, which also incorporated the requirements of the main certifying authorities, in December 1991.

Again this document (AODC 056) was intended for use in the UK sector of the North Sea but was adopted by many clients and diving contractors for use world-wide.

With the increasingly international nature of the offshore diving industry, IMCA members considered that the code of practice needed to be further revised and republished such that it reflected established good practice world-wide rather than the specific regulatory requirements of any one country. This revised document was published in February 1999 as IMCA D 018.

As part of a review of the DESIGN documents (IMCA D 023, 024, 037, 040) in 2013/14, it was decided to review and update as necessary the criteria contained in IMCA D 018 which has resulted in this present document.

I.2 Status of the Code

This code offers examples of good practice. It gives advice on ways in which inspection and testing can be carried out safely and efficiently.

The code has no direct legal status, but many courts, in the absence of specific local regulations, would accept that a company carrying out diving operations in line with the recommendations of this code, was using safe and accepted practices.

Any company which wishes to do so is free to carry out its operations in ways which do not comply with the recommendations in this code, but in the event of an accident or incident it may be asked to demonstrate that the methods or practices that it used were at least as safe as if it had followed the advice of this code.

It is also recognised that other codes or standards exist. In the absence of specific local regulations, companies carrying out diving operations are free to use this IMCA code or any other suitable standard as the basis for their activities.

I.3 Work Covered by the Code

This code addresses the initial and periodic examination, testing and certification of all diving plant and equipment as utilised within the offshore diving industry.

The aim of the code is to provide a comprehensive reference source addressing the philosophy of the competent person and the examination, test and certification requirements necessary to meet agreed industry practice. This will apply anywhere in the world being:

- ◆ outside the territorial waters of most countries (normally 12 miles or 19.25 kilometres from shore);

or

- ◆ inside territorial waters where offshore diving, normally in support of the oil & gas or renewable/alternative energy industries, is being carried out. Specifically excluded are diving operations being conducted in support of civil, inland, inshore or harbour works or in any case where operations are not conducted from an offshore structure, vessel or floating structure normally associated with offshore oil & gas or renewable/alternative energy industry activities.

This document is intended to assist the following, among others:

- ◆ manufacturers and suppliers of diving plant and equipment;
- ◆ diving contractors commissioning new build diving systems;
- ◆ personnel involved in diving operations;
- ◆ staff involved in the maintenance, repair, test or certification of plant and equipment;
- ◆ client and contractor representatives;
- ◆ vessel owners and marine crews involved with diving operations;
- ◆ all personnel involved in quality assurance (QA) and safety;
- ◆ diving system auditors.

IMCA has included recommendations in areas where there is a difficult balance between commercial considerations and safety implications. It is recognised, however, that safety must never be compromised for any reason.

1.4 National and Other Regulations

A number of countries in the world have national regulations which apply to offshore diving operations taking place within waters controlled by that country. In such cases national regulations **must** take precedence over this code and the contents of this code should be used only where they do not conflict with the relevant national regulations.

Any person carrying out offshore diving operations should establish whether there are any national regulations applying in the area that diving will take place, remembering that a number of countries have regulations which apply anywhere in the world to diving taking place from vessels registered in that country (the flag state).

There may also be international regulations, codes or standards (such as International Maritime Organization (IMO) documents) that diving contractors either have to comply with or take serious note of.

1.5 Layout of Document

The information is presented in the form of detail sheets each of which specifies the requirements for a generic item of plant or equipment, or a group of items, which are covered by the same criteria. This is the basis of the certification which the diving contractor normally maintains in a plant and equipment register, or records in the planned maintenance system.

Only generic items of diving plant and equipment are addressed and the detail sheets do not include information on constituent parts of ancillary equipment.

I.6 Implementation

Very little in this document is new, rather it is a revision to recognise changes in good practice which have evolved over the years and thus it should be possible to implement the requirements of the code as soon as possible after publication.

I.7 Updating Arrangements

This code is a dynamic document and the advice given in it will change with developments in the industry. It is intended to review this code and make any necessary improvements on a regular basis.

Any person with suggested improvements is invited to forward these, in writing, to IMCA (imca@imca-int.com).

2 Glossary

BCD	Buoyancy compensation device
BIBS	Built-in breathing system
FEA	Finite element analysis
HRU	Hyperbaric rescue unit
IMO	International Maritime Organization
LARS	Launch and recovery system
LP	Low pressure
LSS	Life support supervisor
LST	Life support technician
MBF	Minimum breaking force
MOC	Management of change
NDE	Non-destructive examination
PMS	Planned maintenance system
PVHO	Pressure vessel for human occupancy
QA	Quality assurance
SCUBA	Self-contained underwater breathing apparatus
SOLAS	International Convention for the Safety of Life at Sea
SPHL	Self-propelled hyperbaric lifeboat
SWL	Safe working load
USCG	United States Coast Guard

3 Certification and Classification

3.1 General

Confusion has arisen in the past over the relationship between the requirements of regulations and those of insurance companies and classification societies. The position is unambiguous – **if there is a legal requirement then this cannot be varied by any classification or insurance society.**

Earlier revisions of this code contained considerable detail on the requirements of the main classification societies. However, this revision does not do so for a number of reasons:

- ◆ Ongoing changes in requirements by a classification society would require further revisions of this code;
- ◆ Many of the requirements of such bodies rely on the discretion of their surveyors and thus can vary considerably in practice;
- ◆ Most of the requirements are related to diving equipment which is classified. This is normally only the case with large saturation systems permanently installed in ships and may not be relevant to surface supplied, smaller or portable systems;
- ◆ The requirements of the main societies vary considerably and it can be confusing if two societies require quite different tests.

3.2 Certification

Diving plant and equipment must be certified that it complies with any relevant statutory requirements of the national authority of the country in which, or the flag state of the vessel or floating installation on which, it is being operated. Such certificates need to be issued by a competent person.

Certification confirms that a particular test or examination has been carried out at an identified time on a specific piece of equipment. It does not, in itself, confirm that a piece of equipment is fit for purpose or safe to use but it records what examination and testing has been carried out which is a major part of any assessment of the suitability and safety of a piece of equipment.

3.3 Classification

Diving plant built in accordance with a classification society's own rules, can, at the owner's request, be assigned a class. Each classification society's rules include its own requirements for the initial and periodic testing and examination of the plant and equipment as being in compliance with its rules. Classification will continue as long as the plant is found, upon examination at the prescribed surveys, to be maintained in accordance with the society's own rules.

Where a diving system is built to a classification society's rules, maintenance of class is often conditional upon compliance with any relevant statutory requirements of the national authority of the country in which, or the flag state of the vessel or floating installation on which, the diving plant is installed.

3.4 Classification Society Information

There are a number of international classification societies who publish specific rules for diving equipment.

The requirements of the classification societies for design, construction, initial and periodic testing of each item of plant or equipment group are given in detail within their own individual rules.

There are, however, a number of common requirements among the societies:

- ◆ Before construction of new equipment or major modifications can commence, all relevant plans and drawings must be stamped and dated as approved by the classification society concerned;
- ◆ After major system modification a classification society may require its initial/as-new tests to be repeated;

- ◆ Periodic recertification can be carried out on a continuous or distributed basis as agreed with the society concerned;
- ◆ The annual survey will include checking of maintenance records, in addition to any other requirements;
- ◆ All surveys after the annual survey will normally also include the requirements of the annual survey;
- ◆ Where a system has been classed prior to the latest revision of any rules, the rules used for the original classification still apply and the system need not be amended to meet the latest revision.

Most societies lay down their own testing standards for pressure vessels but at least one states that testing should be carried out in accordance with the national code or standard to which the pressure vessel was designed and constructed. Definitive test pressures are therefore not given.

3.5 United States Coast Guard

The United States Coast Guard (USCG) is in a somewhat unusual position. It is a government-run body which enforces diving regulations within the USA and its territories, but at other times it can act in a role very similar to that of a classification society.

IMCA wishes to make it clear that any certificate issued or endorsed by USCG has at least equal status to anything issued by a classification society.

4 The Competent Person

4.1 General

From the inception of occupational health and safety law, there has existed the problem of how to apply constraints that are sufficient to protect persons at work but that are not so restrictive as to render them impracticable. For any given activity the level of risk can vary widely according to individual circumstances and, in many situations, it would be unnecessarily burdensome to apply the same limitations to operations at the lower end of the risk scale as for those at the higher end. This is very much the case in the field of plant inspection and maintenance.

Over the years legal drafters have evolved the concept of 'the competent person' to allow a flexible response according to the prevailing circumstances. There are many examples of its use in health and safety legislation.

Legally, the term 'competent person' can refer to an individual, partnership, company or other form of organisation.

4.2 Application of the Philosophy of 'The Competent Person'

In the field of plant and equipment examination, test and certification, the alternative to using the concept of the competent person would be to specify precisely the qualifications, training and experience of persons undertaking any of these tasks, as well as exactly what has to be done on each occasion.

The difficulty of drawing up such detailed requirements would lead to a grave mismatch between the written requirements and what is required to secure adequate health and safety. In addition the end result would lack the flexibility to allow work to continue broadly in the form in which it is known today. The concept of the competent person avoids this problem.

The normally accepted definition of a competent person, with regard to plant and equipment examination and test, without the requirement for maintenance is:

“Someone who by virtue of their training or experience, or a combination of both, has such practical and theoretical knowledge and actual experience of the plant which has to be examined or tested as will enable him to detect defects or weaknesses which it is the purpose of the examination or test to discover and to assess their importance in relation to the safety of the plant.”

The competent person should have the maturity to seek such specialist advice and assistance as will be required to enable him to make necessary judgements and must be a sound judge of the extent to which he can accept the supporting opinions of other specialists.

4.3 Types of Competent Person

In some cases, this code requires the competent person to certify the design, construction and suitability of diving plant and equipment before it is put to use for the first time. That requires a high level of engineering expertise which will probably involve persons of chartered/professional engineer status (CEng/PE) or equivalent, combined with a knowledge of diving techniques and practices and the environment in which the plant will be used. Availability of, or access to, adequate test facilities may also be necessary to be able to satisfy these competent person requirements.

Other parts of the code require a competent person to issue a certificate lasting for a period stating that the plant or equipment has been examined and tested and may be safely used. The competent person for these purposes should specialise in relevant aspects of the work and may be an employee of an independent company or an employee of the owner of the equipment, unless a specific legal requirement says this can not be the case. If employed by the owner of the equipment, however, his duties should include this type of work on a regular basis, and his responsibilities enable him to act independently and in a professional manner. There may also be a need for him to have undergone specific training.

The competent person should be active in his trade or profession and be capable of making an independent judgement on the safety of what is being tested or examined or the activity that is being supervised.

For the more straightforward tests or examinations, this level of competence would normally be met by a technician specialising in this type of work (IMCA category 2) and in some cases may be met by the diving supervisor or the life support supervisor (IMCA category 1). For more complex tests and examinations the competent person may be required to possess specific academic or trade qualifications, to have access to specialised equipment, or to have undergone specific training (IMCA categories 3 and 4).

There are some circumstances however where diving plant and equipment is owned by the owner of an offshore installation or diving support vessel and national regulations may require that examination and testing of the associated lifting appliances and equipment (or other parts of the diving equipment) must be carried out by a competent person who is neither the owner of the installation nor his employee.

Good practice requires that the diving plant and equipment is examined and sometimes functionally tested within a short period immediately before commencement of a dive. The competent person for this work should have an understanding of the application of the plant and equipment to the diving operation. This would normally be the diving or life support supervisor or suitable persons under his control.

4.4 Appointment of a Competent Person

No official body appoints competent persons for the purpose of examining and testing diving plant and equipment. This is entirely a matter to be decided by the person or organisation which wishes to obtain the certification. The competence of any particular individual or organisation may, however, be challenged by any relevant national authority in its enforcement role.

4.5 Categories of Competent Person in this Code

Four categories of competent person are referred to in this code. Within the detail sheets in the appendix, the category of person considered competent to carry out the examination and test is identified.

Category 1

A diving or life support supervisor duly appointed by the diving contractor.

Such an individual will be competent to carry out or supervise a number of types of examination and test, but may not be appropriate for other tests unless he has had additional specific training.

A diving supervisor (qualified in line with the IMCA scheme) is regarded as being competent to carry out certain tests e.g. pressure leak tests on pressure vessels, which may also be performed by any other competent person specialising in such work. This level of competence is justified by the supervisor's knowledge and experience of the sophisticated diving techniques used, together with the variety of plant and equipment necessary to implement them.

A life support supervisor (LSS) is also considered competent to carry out certain tests as defined in the detail sheets in the appendix. To be eligible for promotion to LSS, a life support technician (LST) should be qualified in accordance with the IMCA scheme. He will be appointed in writing by his company and will have specific responsibility for the control of the saturation complex. Dependent on the offshore structure of the company, he may be subject to direct supervision by a more senior person.

Category 2

A technician or other person specialising in such work who may be an employee of an independent company, or an employee of the owner of the equipment (unless specific legal

restrictions apply), in which case his responsibilities should enable him to act independently and in a professional manner.

Category 3

A classification society or insurance company surveyor, or Chief Engineer certificated in accordance with [IMCA C 002](#) – *Guidance document and competence tables: Marine Division* (Job Category A06) but who may also be an ‘in-house’ chartered engineer or equivalent (unless specific legal restrictions apply), or person of similar standing.

Category 4

The manufacturer or supplier of the equipment, or a company specialising in such work which has, or has access to, all the necessary testing facilities. This may also be a technician employed by the owner of the equipment provided that he has been fully trained and certified for the specific operation and has access to all necessary equipment and facilities.

5 Responsibilities

5.1 The Diving Contractor

The diving contractor is required to ensure that all plant and equipment necessary for the safe conduct of a diving operation is available for immediate use. This also applies to all facilities provided on a standby or reserve basis which should also be available for immediate use.

In both cases this means that the items must be examined, tested and certified as suitable for use as necessary.

5.2 The Competent Person

The competent person has two main responsibilities.

Firstly he must satisfy himself that he is indeed competent to carry out the examinations and tasks that he is being asked to do.

Secondly he must carry out his duties diligently and thoroughly. His decisions can have serious safety implications for those who subsequently use the equipment or plant as they are heavily reliant on the competent person identifying any faults or problems.

5.3 The Diving or Life Support Supervisor

The diving or life support supervisor must ensure that in-date certificates are available for plant and equipment and that the latter has been examined to the extent required within the designated period prior to commencement of a dive. With regard to this, the supervisor should confirm that these checks have been carried out and are recorded in the diving operations logbook under an appropriate signature.

6 Documentation

6.1 General

It is evident that all examinations and tests carried out need to be documented in order to demonstrate in the future exactly when they were carried out, by whom and exactly what work was carried out.

6.2 Major Test or Examinations

This refers to the sort of tests carried out at extended intervals such as annual wire rope tests or five yearly pressure tests. These will in most cases be carried out or witnessed by a third party who will issue a formal certificate often authenticated with a stamp or similar marking.

6.3 Regular Examinations and Test

This refers to those tests and examinations carried out at regular intervals (normally six months or less) and which may often be carried out by the diving or life support supervisors or one of the technicians employed by the diving contractor.

In the case of lifting equipment and appliances, depth gauges and compressor purity tests, there must be a certificate signed by a competent person.

For all other equipment however there can be either a certificate signed by a competent person or a record of the examination by a competent person in the planned maintenance system. Where the PMS is computer-based and no signature is possible then provided the programme is only accessible by password, an entry on the computer by the competent person is adequate and no paper certificate is required.

6.4 Certification Register

All certificates issued under the requirements of this code should be retained in a register for a minimum period of two or five years depending on the item of equipment and its application. This includes the six-monthly certificates which should be retained for two years.

It is important that more than one copy of the certificates exists. In normal circumstances this will mean that the original of a certificate is retained in the onshore offices of the diving contractor with a valid copy of the certificate offshore along with the equipment. In some circumstances, however, this may be reversed with the original offshore and a copy onshore. In either case the original of the certificate should be available (either physically or electronically) for inspection, either onshore or offshore as the case may be, by any relevant authority or client.

For practical purposes the 'when new' certificates would normally be retained within the owner's/diving contractor's technical records onshore.

Although not a requirement of this code for most items, the owner/diving contractor should consider retaining all past certificates, or incorporate the information into a database, thus maintaining a comprehensive history of each item of equipment. This historical record would normally be retained in the owner's/diving contractor's technical records onshore.

7 Planned Maintenance Systems (PMS)

7.1 General

It is a basic requirement of safety that plant and equipment used in diving operations must be properly maintained in order to ensure that it is safe while being used. Whilst this document does not specify what sort of planned maintenance programme should be employed to ensure conformance, experience has shown that such a system is the best way to achieve systematic and effective maintenance.

It needs to be understood that PMS refers to the regular and planned maintenance of items of equipment and not just to their inspection, testing and certification – although this may also be required as part of the PMS.

7.2 Planned Maintenance Programmes

These may be prepared in different formats such as:

- ◆ a series of notebooks or files etc., one being provided for each major item of equipment;
- ◆ a card index system;
- ◆ a computer program, backed up by a hard or non-corruptible copy. The intent of this is to ensure that it is impossible to erase all of the records inadvertently.

Whichever system is used provision must be made for the following:

- ◆ inclusion of manufacturers' recommendations and manuals, where appropriate;
- ◆ compliance with the requirements of this document where some types of certification is achieved by means of the PMS;
- ◆ a record of planned work to be kept showing each item of maintenance and the interval at which it should be maintained, i.e. daily, weekly, monthly, yearly, etc.;
- ◆ a record of unplanned work, including repairs;
- ◆ traceability to the person who carried out the work as recorded on an item of equipment whether manual or computer systems are employed;
- ◆ records to be kept logically. There should be no doubt on which day maintenance has been carried out and by whom;
- ◆ ensuring that maintenance which has been delayed on a particular piece of equipment for any reason, is carried out at the first available opportunity to avoid a hazardous situation arising;
- ◆ availability of adequate spares to permit routine and non-routine replacement as necessary.

7.3 Relevance of PMS

While this code is not directly concerned with the planned maintenance system, it is unlikely that a diving system would be able to meet the requirements of the periodic examination, testing and certification advice contained in this code unless an adequate PMS existed. In this respect, the PMS would normally be one of the matters considered by the competent person when deciding on the level of test and examination required in relation to any specific piece of plant and equipment.

A PMS normally includes the daily/weekly/monthly examinations, tests, maintenance, etc. required for the safe and efficient on-going operation of the equipment. This will typically be based on manufacturers' recommendations and the requirements of the diving contractor's own procedures.

8 Explanation Of This Document

8.1 General

Since this document is produced to give guidance and to minimise confusions, it is necessary to elaborate on a number of terms used in the document and also to explain the way in which it is intended that the document will be used.

8.2 Examination

This term is used to indicate where a competent person is required to look at a piece of plant or equipment in order to establish whether it is in a suitable condition, but is not required to subject it to any tests.

The word 'examination' or 'visual examination' refers to the situation where a competent person (often without the use of tools) will look closely at the item to establish if it is in good condition, free from obvious defects, apparently in working order and not subject to excessive corrosion or wear. He may then decide if any further, more detailed examination, or indeed testing, is required before issuing his certificate.

The competent person will issue his certificate after examination taking in to account any damage that has occurred and the likely future deterioration due to wear and tear, bearing in mind the age, condition, and foreseeable circumstances of use of equipment within the validity period of the inspection carried out.

If the competent person believes that an item of plant may become unsafe for use during the normal period of validity, then a shorter validity period can be specified.

8.3 Function Test

This refers to the requirement that the competent person will carry out a simple test of operability on a piece of plant or equipment. He need not test it over the full range of movement/loading/pressure/ etc. to which it can be subjected but should test it under the typical conditions in which it will operate for most of the time.

This is very much a 'does it work properly or not' type of test rather than simulating extremes of operation.

8.4 Testing

In the detail sheets there are requirements for the competent person to carry out certain tests. These are normally specified such as 1.1 times maximum working pressure or 1.5 times safe working load. If they are not specified then they will be at the discretion of the competent person.

One area where specific values are normally not given is in the overpressure testing of cylinders, chambers, pressure vessels etc. This is because different national regulations, certification authorities and international standards can require different levels of test. The competent person will need to establish whether he is being asked to test and certify the item in accordance with such a requirement and if so that may dictate the level of overpressure to be applied.

The test medium will also affect the level of overpressure as it is normal to use a smaller overpressure for pneumatic or gas testing than if fluid or hydraulic testing is to be carried out. In normal circumstances the level of testing where an overpressure test is required will be at least 10% above the maximum normal safe working pressure for pneumatic testing and 25% above if hydraulic testing is carried out. The final decision, however, will always be that of the competent person carrying out the test and issuing the certificate.

8.5 Extension of Validity Periods

This document gives maximum validity periods for each certificate. However, it is obvious that an item with a validity on the certificate of 12 months does not become unsafe at 12 months and 1 day if it was safe at 11 months and 29 days.

This code recognises that diving plant and equipment often operates in remote locations where it is difficult to carry out the required testing. This may also be the case because of operational reasons where the equipment is in constant use.

Diving contractors are encouraged to plan ahead in order that certificates can be renewed in time however if, due to operational circumstances, a certificate cannot be renewed within the prescribed period then an extension of up to a *maximum* of 30 days can be issued if the diving or life support supervisor operating the equipment confirms, in writing, that it is operating satisfactorily and appears in good condition. Where there is one or more qualified equipment technicians, whose duties include maintaining this equipment, then they should also all confirm the equipment is satisfactory before such an extension is issued.

The issue of any such extension will need to follow the diving contractor's management of change (MOC) procedure.

It must be clearly understood that the extension period referred to here is only in respect of compliance with this document. It does not provide extension where a government regulation may prescribe validity periods nor does it vary any requirements of a classification society. Similarly an agreement by a classification society or government body to extend a validity period of their certification does not alter the requirements of this document.

Any piece of plant or equipment whose certification validity has expired (subject to the possible 30 day extension above) should not be used again until it has undergone the necessary examination and testing by a competent person as laid out in this document.

8.6 When New and When in Service

'When new' is intended to cover brand new equipment when it is first put in to service and is primarily intended to ensure that the equipment is properly designed and fit for the purpose for which it will be used. The 'When in Service' requirements must also be met by the equipment.

Note: When equipment is first installed at a particular location, even if it has already been used elsewhere, it must meet the same standards as if it was new. This means that all of the 'When in Service' requirements need to be met as well as the 'When New' requirements.

'When in service' refers to the situation where diving equipment is in service on an ongoing project or is about to be put in to service.

If equipment is moved from one location to another during the validity period of a 'when in service' certificate then consideration will need to be given to whether the equipment needs re-examination, testing and certification. This will normally be where the equipment has been disassembled and physically moved from one work site to another. It does not refer to situations where equipment is moved from one location to another at the same site or where equipment which is intended to be mobile is moved.

This requirement will have to be interpreted on a case by case basis which will consider the type of handling experienced by the equipment during the move, the likelihood of such movement materially affecting the status of its original certification and therefore the likely need for retesting.

8.7 Periods of Non-Use

In the case of permanently installed equipment during periods of non-use, in-date certification need not be maintained. If the validity of the certification has lapsed, however, examination, test and recertification of the equipment in compliance with all of the requirements of the 'when in service' section of the detail sheets would be required prior to it being put to work.

In the case of portable or demobilised systems, in-date certification need not be maintained during periods of demobilisation. When remobilised, examination, test and recertification of the equipment in compliance with the 'when new' section of the detail sheets as well as all of the requirements of the 'when in service' section would be required. However, this will only apply insofar as such demobilisation and reinstallation would have materially affected any item and, therefore, the status of its original certification.

In all cases of plant or equipment which has not been in use, the competent person should take in to account the level of maintenance applied to the units during the period of non-use, before deciding on the detailed extent of examination and testing he will require.

8.8 Pre-Dive Checks

While the detail sheets in this document do not specify any pre-dive checks, it is normal practice to carry out visual and functional examination as appropriate of the equipment within a short period prior to commencement of a diving operation.

In the case of diving chambers and other support systems, these tests should be carried out prior to placing divers in the chamber under pressure. In the case of the diving bell, appropriate examinations should be conducted both prior to first pressurisation and prior to each deployment into the sea.

Such examinations will normally be conducted in accordance with pre-established dive checklists appropriate to each site, and recorded in the diving operations logbook.

Pre-dive checks are not a substitute for the regular (normally six-monthly) examination and test requirements within this code.

8.9 Modifications

It is clear that modifications made to items of plant and equipment during the period of validity of a certificate can have an effect on the validity of the certificate.

Since there can be many different types of modification it is not possible to give specific guidance on what will and what will not affect the certification.

Replacement of the termination on a wire rope used for man carrying will certainly require a retest and recertification whereas replacing a small fitting on an LP air line with an identical fitting would be regarded as maintenance and would not normally affect the validity of the certification.

As a guide, however, replacement of one item with an identical or near identical item would not normally require full recertification although simple tests such as a function test or leak test would typically be required – but even this will depend on the exact circumstances.

As a matter of good operating practice, any modifications made to, work carried out on or replacement parts fitted to diving plant and equipment should be recorded in a formal manner (such as using a management of change procedure) and details passed to the owner's/diving contractor's onshore offices unless this is part of the routine maintenance required under the PMS when the actions will only require to be recorded within the PMS records.

It must be left up to the competence and judgement of the person carrying out the modifications and of the supervisor using the plant or equipment after modification as to whether full or partial recertification is considered necessary.

9 Index to Detail Sheets

9.1 General

This index should allow easy location of the correct detail sheet. Most commonly used terms in offshore diving are listed alphabetically with the appropriate detail sheet number identified.

It must be remembered however that many items of plant or equipment are covered on more than one detail sheet. For example, a decompression chamber is a pressure vessel, contains viewports, has pipework, contains electrical equipment and contains BIBS – plus it may have other items in it such as a fire extinguisher. In that case, reference needs to be made to all of the relevant detail sheets. All possible component parts are listed against the main items but only those which are relevant need apply and those which do not apply should be ignored.

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Disposable Tube Type Gas Analysers (including hand operated pumps)

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Examination and function test of pump plus check expiry date of tubes	6 months	1, 2 or 4

Analysers, Electrically Powered (battery or mains)

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Examine, confirm working properly and recalibrate to agreed specification in situ	6 months	1, 2 or 4
Note: Analysers are normally calibrated on a much more frequent basis but are not recertified each time	Ongoing	Normally 1 or 2

Note:

- ◆ Portable analysers can, by definition, be moved around without affecting the validity of their certification.
- ◆ The examination of any analyser should also cover the integrity of any pipework connected to the analyser and providing the sample to it.

Man-Riding Basket/Bell (structure and lift point(s) only)

Note: This can be a dive basket, stage, gondola, inflatable boat lifting cradle, wet bell, closed diving bell, etc.

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for. For any system manufactured after 1 January 2014, documentation should be available showing clearly the designed SWL	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination of lifting points and main structure for damage/corrosion Note: If damage/corrosion is identified this may indicate that other testing may be required	6 months	1, 2, 3 or 4
Load test of lifting points (this also applies to secondary lift points) at 1.5 times SWL with NDE of lifting points or pad eyes before and after test where appropriate Note: It is <i>not</i> a requirement that the basket/bell be connected to the LARS during the test and the testing may be carried out in a number of ways (a pad eye puller is one)	12 months	2, 3 or 4

Non-Man-Riding Basket (structure and lift point only)

Note: This can be a cargo or tool basket, control van, container, etc.

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination of lifting points and main structure for damage/corrosion Note: If damage/corrosion is identified this may indicate that other testing may be required	6 months	1, 2, 3 or 4
Load test of lifting point at 1.1 times SWL with NDE of lifting points or pad eyes before and after test where appropriate		
Units not immersed in sea water	2 years	2, 3 or 4
Units (such as tool/work baskets) that are routinely immersed in sea water	1 year	2, 3 or 4

Note:

- ◆ In many parts of the world there are specific requirements for examination and testing of containers which exceed the standards above.
- ◆ There is no requirement to have a valid certificate for an item of equipment that it is not intended to lift during the project, for example a control van that is present but is not going to be moved. The item will, however, require testing and certification prior to being lifted.

Personal Breathing Apparatus (not used under water)

Note: This includes BA sets, smoke hoods, etc., but does not include the cylinders or any supply system pipework

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test (including communications if fitted). Check to be made that cylinder (where appropriate) is fully charged	6 months	1, 2, 3 or 4

Personal Breathing Apparatus (BIBS)

Note: This does not include the supply system pipework pressure testing

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test (including communications if fitted)	6 months	1, 2, 3 or 4

Personal Breathing Apparatus (used under water)

Note: This does not include the supply system pipework pressure testing or the cylinder

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test at atmospheric pressure (including communications)	6 months	1, 2, 3 or 4
Carry out inspection and testing in line with manufacturer's recommendation	12 months	4

Video and Communications Equipment

Note: This includes through water emergency, hard wire primary and sound powered secondary communications equipment, diver mounted video equipment and audio/video recording equipment

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Examination and function test. Check condition of batteries (if applicable) Note: The individual items tested should be listed on any certificate	6 months	1, 2, 3 or 4
Note: Batteries are normally checked on a more frequent basis but do not need recertified each time	Ongoing	1, 2 or 4

Reference:

- ◆ IMCA D 008 – *Testing of through water communications*
- ◆ IMCA D 045 – *Code of practice for the safe use of electricity under water*
- ◆ IMCA D 046 – *Guidance on operational communications*

Note:

- ◆ While all diving systems require audio equipment, not all will be fitted with video equipment

Compressors, Boosters and Filtration Units used for Gas Transfer at both High and Low Pressures

Note: This excludes receivers, volume tanks, storage bottles or cylinders, supply system pipework and ancillary systems

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test (including any safety devices other than PRVs)	6 months	1, 2, 3 or 4
Check delivery rate and pressure	6 months	1, 2, 3 or 4
Check gas purity as appropriate	6 months	1, 2 or 4

Reference:

- ◆ DMAC 19 – *The effects of water vapour on diver physiology*

Note:

- ◆ The amount of water vapour allowed in an air or gas sample in many international standards is related to air or gas which is to be stored at high pressure. This is done to reduce the problems of condensation and freezing of regulators. Such restrictions do not need to apply when samples of LP air or gas are analysed and the competent person can allow a higher water vapour content.

Cranes

See note below

When new

Examination/Test	Category of Competent Person
No specific requirements (see note below)	

When in service

Examination/Test	Validity Period	Category of Competent Person
No specific requirements (see note below)		

Reference:

- ◆ AODC 018 – *Attachment of loads to lifting hooks during diving operations*

Note:

- ◆ If the crane is only used for deployment of plant and equipment in support of the diving operation then there are no specific requirements associated with diving and **what applies will be the requirements of the ship or installation's certifying authority**. The diving contractor need only ensure that relevant certification exists for the crane and is in date.
- ◆ If the crane is to be used for man-riding in support of the diving operation then it should meet the requirements of detail sheets 22.1, 22.2 and 29.1.

Seamless Gas Cylinders and Pressure Vessels not taken under water – Dry Internal Service

*Note: This includes both fixed and transportable gas storage cylinders and tubes and filter housings.
It does not include welded pressure vessels or pressure vessels for human occupancy
If the cylinders are composite material use detail sheet 10.2*

When new

Examination/Test	Category of Competent Person
Manufactured in accordance with a recognised international code or standard and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
External visual examination	6 months	1, 2, 3 or 4
Thorough external visual examination and gas leak test to maximum working pressure	2½ years	3 or 4
Thorough internal and external visual examination and gas leak test to maximum working pressure. If the competent person deems it necessary, an overpressure test and/or NDE may be required, followed by a gas leak test to maximum working pressure (Also see special situation below)	5 years	3 or 4

Special situation when in service

In certain very special circumstances (it is likely that only large specialised gas supply companies will be able to comply with these) the five-yearly internal examination above can be substituted by ultrasonic testing only with a validity of 10 years. The circumstances are:

- ◆ The cylinder must be within its 2½ yearly test validity listed above.
- ◆ The cylinder must not have been used for compressed air storage, due to inherent moisture.
- ◆ The cylinder must be connected to a residual pressure valve (RPV) while in service. In the event that the RPV fails to retain pressure or has visible signs of tampering, an internal visual examination in line with the five-yearly examination will be required.
- ◆ Moisture readings taken upon filling and return of the cylinder demonstrate that levels within the cylinder have not exceeded 25ppm (-46°C at 1013 mbar) whilst in service. If the moisture level is found to have exceeded 25ppm, an internal visual examination in line with the five-yearly examination will be required.

Examination/Test	Validity Period	Category of Competent Person
Ultrasonic testing of the gas cylinder as an alternative to the 5-yearly internal inspection. The ultrasonic testing system used must conform to the requirements of ISO 6406:2005, section 11.4	10 years	3 or 4

Reference:

- ◆ ISO 6406:2005, Gas cylinders – Seamless steel gas cylinders – Periodic inspection and testing, International Organization for Standardization (ISO) 2005

Note:

- ◆ In many countries there are detailed national regulations concerning gas cylinders, particularly if these are transportable. Such regulations must be complied with, even if they conflict with or are more onerous than the recommendations given above.
- ◆ Hydraulic testing of large storage tubes subject to dry internal service is not recommended as it introduces moisture in to the system which may prove difficult to remove. In such cases pneumatic or gas overpressure testing may be substituted.
- ◆ If testing is not hydraulic and the competent person requires it then other testing such as wall thickness measurement or acoustic emission testing may also be required.
- ◆ Some national regulations, certifying authorities or gas cylinder codes may give no option but to apply hydraulic overpressure testing.
- ◆ In all types of overpressure testing suitable safety precautions must be taken to ensure the safety of all testing personnel and others.
- ◆ If a hydraulic test has been carried out, it is important that confirmation is received that all moisture has been removed prior to the unit being put back into service.

Seamless Gas Cylinders and Pressure Vessels not taken under water – Wet Internal Service

*Note: This includes driers, filter housings, gas recovery volume tanks, sanitary and shower tanks, cylinders used for hyperbaric fire extinguishers
If the cylinders are composite material use detail sheet 10.2*

When new

Examination/Test	Category of Competent Person
Manufactured in accordance with a recognised international standard and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
External visual examination	6 months	1, 2, 3 or 4
Thorough internal and external visual examination and gas leak test to maximum working pressure	15 months	3 or 4
Thorough internal and external visual examination and overpressure test to 1.5 times the maximum working pressure (or the factor required by the design code or standard if different) followed by gas leak test to maximum working pressure	5 years	3 or 4

Note:

- ◆ In many countries there are detailed national regulations concerning gas cylinders, particularly if these are transportable. Such regulations must be complied with, even if they conflict with or are more onerous than the recommendations given above.
- ◆ Hydraulic testing in situ may be impractical or undesirable. In such cases pneumatic or gas overpressure testing may be substituted.
- ◆ If testing is not hydraulic and the competent person requires it then other testing such as wall thickness measurement or acoustic emission testing may also be required.
- ◆ Some national regulations, certifying authorities or gas cylinder codes may give no option but to apply hydraulic overpressure testing.
- ◆ In all types of overpressure testing suitable safety precautions must be taken to ensure the safety of all testing personnel and others.

Seamless Gas Cylinders taken under water

*Note: This category includes bail-out bottles, BCD inflation bottles, cylinders fitted to baskets/wet bells/externally on closed bells plus filter housings and any other small pressure vessels taken under water to any appreciable depth
If the cylinders are composite material use detail sheet 10.2*

When new

Examination/Test	Category of Competent Person
Manufactured in accordance with a recognised international code or standard and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
External visual examination	6 months	1, 2, 3 or 4
In addition, bail out bottles and suit/BCD inflation bottles should also have an internal visual examination	6 months	2 or 4
Thorough internal and external visual examination and gas leak test to maximum working pressure. If the competent person deems it necessary, a hydraulic overpressure test may be required	2 years	3 or 4
Hydraulic overpressure test to 1.5 times maximum working pressure (or the factor required by the design code or standard if different) plus the 2 yearly tests above	4 years	3 or 4

Reference:

- ◆ AODC 037 – *Periodic examination of bail-out bottles*

Note:

- ◆ In many countries there are detailed national regulations concerning gas cylinders, particularly if these are transportable. Such regulations must be complied with, even if they conflict with or are more onerous than the recommendations given above.
- ◆ Some national regulations, certifying authorities or gas cylinder codes may give no option but to apply hydraulic overpressure testing.
- ◆ If a hydraulic test has been carried out, it is important that confirmation is received that all moisture has been removed prior to the unit being put back in service.
- ◆ In all types of overpressure testing suitable safety precautions must be taken to ensure the safety of all testing personnel and others.
- ◆ The most recent test of the cylinder must be within two years previous to it being put to use under water.

Composite Gas Cylinders

Note: This detail sheet refers to either a hoop wrapped or fully wrapped composite transportable gas cylinder with aluminium, steel or non-metallic liner or of linerless construction, intended for compressed, liquefied or dissolved gases under pressure

When new

Examination/Test	Category of Competent Person
Manufactured in accordance with a recognised international code or standard and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
External visual examination, particularly for abrasion and impact damage, delamination and any other damage	6 months	2, 3 or 4
In addition, composite cylinders taken under water (bail out bottles and suit/BCD inflation bottles for example) should also have an internal visual examination	6 months	2 or 4
Thorough internal visual examination and gas leak test to maximum working pressure. If the competent person deems it necessary, a hydraulic overpressure test may be required	12 months	3 or 4
Hydraulic proof pressure test to the pressure marked on the cylinder OR volumetric expansion test as appropriate to the design of the cylinder. In either case plus the 6 and 12 monthly tests above	5 years	3 or 4

Reference:

- ◆ EN ISO 11623:2002 Periodic inspection and testing of composite gas cylinders

Note:

- ◆ In many countries there are detailed national regulations concerning gas cylinders, particularly if these are transportable. Such regulations must be complied with, even if they conflict with or are more onerous than the recommendations given above.
- ◆ Some national regulations, certifying authorities or gas cylinder codes may give no option but to apply hydraulic overpressure testing.
- ◆ After a hydraulic test has been carried out, it is important that confirmation is received that all moisture has been removed prior to the unit being put back in service.
- ◆ In all types of overpressure testing suitable safety precautions must be taken to ensure the safety of all testing personnel and others.
- ◆ The most recent internal and external examination plus gas leak test of the cylinder must be within 12 months previous to it being put to use for this application.

Seamless Gas Cylinders Subject to Extreme Exposure or Normally in very Damp Conditions

Note: This category applies to cylinders, filter housings and any other small pressure vessels which are subject to extreme exposure or normally very damp conditions although they may not be taken underwater to any appreciable depth. Examples would be cylinders or pressure vessels mounted externally on a hyperbaric evacuation system, mounted inside the hull of an SPHL or used in a small boat as part of a portable surface supplied system (SCUBA-replacement or daughtercraft), whether built-in or not. If the cylinders are composite material use detail sheet 10.2

When new

Examination/Test	Category of Competent Person
Manufactured in accordance with a recognised international code or standard and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
External visual examination	6 months	1, 2, 3 or 4
Thorough external visual examination and gas leak test to maximum working pressure. If the competent person deems it necessary, a hydraulic overpressure test may be required Note: Particular care should be taken in inspecting the areas under clamps or where the cylinder rests on a support	2 years	3 or 4
Thorough internal visual examination plus hydraulic overpressure test to 1.5 times maximum working pressure (or the factor required by the design code or standard if different) plus the 2 yearly tests above	4 years	3 or 4

Note:

- ◆ In many countries there are detailed national regulations concerning gas cylinders, particularly if these are transportable. Such regulations must be complied with, even if they conflict with or are more onerous than the recommendations given above.
- ◆ Some national regulations, certifying authorities or gas cylinder codes may give no option but to apply hydraulic overpressure testing.
- ◆ After a hydraulic test has been carried out, it is important that confirmation is received that all moisture has been removed prior to the unit being put back in service.
- ◆ In all types of overpressure testing suitable safety precautions must be taken to ensure the safety of all testing personnel and others.
- ◆ The most recent external examination and gas leak test of the cylinder must be within two years previous to it being put to use for this application.

Electrical Equipment

Note: This does not include equipment such as lighting or power sockets which form part of a vessel or platform electrical system

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination, function test of unit (including protective devices) plus continuity and resistance testing of any cables Note: Any certificate issued should clearly identify the various sub-systems and items included in the test	6 months	2, 3 or 4

Reference:

- ◆ IMCA D 045 – *Code of practice for the safe use of electricity under water*

Diving Bell Emergency Location System

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Physical examination for damage or deterioration and function test including check of battery condition	6 months	1, 2, 3 or 4

Reference:

- ◆ AODC 019 – *Emergency procedures – provisions to be included for diving bell recovery*
- ◆ Supplement to the IMO Code of Safety for Diving Systems – IMO Resolution A583(14)

Environmental Control Unit (integral test only)

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test. (This may require recalibration of the control system)	6 months	1, 2, 3 or 4

Note:

- ◆ If the unit has been moved from one area to the other such that environmental conditions (heat, cold, etc.) are very different, then the function test may need to be repeated before the six month validity has expired.

External Regeneration Unit (integral test only)

Note: This excludes the pressure testing of the housing and pipework

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test. (This may require recalibration of the control system)	6 months	1, 2, 3 or 4
Function test of satisfactory operation of flow fuses	12 months	1, 2, 3 or 4

Note:

- ◆ If the unit has been moved from one area to the other such that environmental conditions (heat, cold, etc.) are very different, then the function test may need to be repeated before the six month validity has expired.

Fixed Firefighting Systems Internal or External (integral test only)

Note: This excludes the supply system pipework and any ancillary equipment

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4
Full function test	1, 2, 3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination of nozzles, valves, pipework, etc	6 months	1, 2, 3 or 4
Function test to demonstrate operation of the system	12 months	1, 2, 3 or 4
or		
Simulated test using air or gas as the test medium	6 months	1, 2, 3 or 4
If an automatic detection/activation system is fitted then a function test to demonstrate correct operation	12 months	1, 2, 3 or 4

Portable Firefighting Systems and Extinguishers

Note: This does not include pressure testing the cylinder

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
External visual examination plus check that any indicating device is reading within the acceptable range	6 months	1, 2, 3 or 4

Note:

- ◆ Part of the visual examination is to confirm that any security tag or similar is unbroken.
- ◆ When on board a ship or installation the normal hand held portable extinguishers are the responsibility of the vessel owner and will have to meet different requirements to those above. These will normally be the requirements of the marine legislation of the flag state.
- ◆ When specialised hyperbaric portable extinguishers are used inside deck chambers then the pressure cylinders will need to meet the requirements for wet internal service (see detail sheet 9.2).

Gas Reclaim System, Gas Mixer and Gas Blenders

Note: This covers the integral test only and does not include any cylinders, the supply system pipework testing or the divers' breathing apparatus

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test (including any safety devices other than PRVs)	6 months	1, 2 or 4

Depth Gauges including Caisson Gauges if used to control decompression

Note: This refers only to gauges used to measure divers' depth accurately in order to provide information essential for decompression, saturation storage and transfer within a diving system

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Checked for accuracy against a certified test instrument to an accuracy of $\pm 0.25\%$ of maximum scale value at a minimum of 5 points within the scale	6 months	2, 3 or 4
Visual examination and function test in situ	6 months	1, 2, 3 or 4

Reference:

- ◆ AODC 059 – *Pressure gauges and other forms of pressure monitoring equipment used in conjunction with diving operations*

Note:

- ◆ Gauges which do not meet the required accuracy should be adjusted or replaced as necessary.
- ◆ The certificate issued should list the actual readings taken at each point, the gauge under test and details of the test instrument.
- ◆ The checking (or calibration) of these gauges may have taken place onshore or offshore and the certificate remains valid irrespective of the present location of the gauge.

Life Support Gauges including Caisson Gauges if used only to indicate depth to the divers

*Note: This refers to gauges which read pressures critical to the life support function.
Such gauges are bell and bail out charging panel and the last gauge monitoring pressure to the divers' breathing apparatus (including BIBS)*

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and check by comparison only against a certified test instrument to an accuracy of $\pm 2.5\%$ of maximum scale value at a minimum of 4 points within the scale	6 months	1, 2, 3 or 4

Reference:

- ◆ AODC 059 – *Pressure gauges and other forms of pressure monitoring equipment used in conjunction with diving operations*

Note:

- ◆ For such gauges, there can be a certificate signed by a competent person or a record in the planned maintenance system stating details of the gauge tested and the test instrument plus confirmation that the gauge was found to be within the required accuracy.

Indicating Gauges

Note: This refers to gauges whose purpose is to show if pressure is present in a supply system and, if so, the approximate magnitude of the pressure. They are neither depth gauges nor life support gauges (as in detail sheets 18 and 19)

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination for physical condition and function test throughout normal operating range	6 months	1, 2, 3 or 4

Reference:

- ◆ AODC 059 – *Pressure gauges and other forms of pressure monitoring equipment used in conjunction with diving operations*

Note:

- ◆ These types of gauges will not normally require any certification. Instead it will be acceptable to record the checks and the results in the planned maintenance system.
- ◆ Gauges which are inaccessible (such as inside the diving bell) may be checked by a diver under the supervision of a competent person.

Diver Heating Systems (integral test only)

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test If the unit is electrically powered then continuity and resistance testing should be carried out	6 months	1, 2, 3 or 4

Lifting Appliances and Equipment used for Man-Riding

Note: This includes bell or basket launch and recovery systems, winches, structures and heave compensators

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination for damage/corrosion. Function test at maximum SWL. Independent static load test on each brake system at 1.25 times maximum SWL	6 months	2, 3 or 4
Independent static load test on each brake system at 1.5 times maximum SWL	12 months	2, 3 or 4
Dynamic test of system at 1.25 times maximum SWL (NDE to be carried out afterwards on critical areas)	12 months	2, 3 or 4

Note:

- ◆ Testing of lifting appliances and equipment is normally carried out as part of the integral system. If individual components have to be replaced such as strops or shackles then this does not require retesting provided the change is done on a like-for-like basis and the new component is supplied with its own relevant examination and proof load test certificate.
- ◆ If the equipment is moved as a complete unit within the validity of the test certificate, then retesting may be limited to seafastenings or similar.

Hydraulic Power Unit for Lifting Appliances used for Man-Riding (integral test only)

When new

Examination/Test	Category of Competent Person
Visual examination, function test and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test as an integral part of the overall lifting system	6 months	2, 3 or 4
Intercooler/heater (if fitted) checked for function and flow	6 months	2, 3 or 4
Hydraulic fluid/oil analysis carried out or replacement of fluid/oil	12 months	2, 3 or 4

Note:

- ◆ Significant water ingress into non-water-based hydraulic fluid systems will increase the likelihood of internal corrosion and increased wear. If there is evidence of such water ingress then steps should be taken to eradicate the water and any pressurised components within the hydraulic circuit such as rams, accumulators, tanks etc. should be tested as if subjected to wet internal service.
- ◆ The analysis of hydraulic fluid/oil is carried out partly to identify any metallic particles which could indicate excessive wear in some components. If the fluid/oil is replaced then it must be remembered that this check will not be available.

Lifting Appliances and Equipment (not used for Man-Riding)

Note: This includes winches and tuggers plus associated rigging

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination for damage/corrosion. Function test (including brakes) at maximum SWL	6 months	2, 3 or 4
Winches to have a static load brake test at 1.5 times maximum SWL	12 months	2, 3 or 4
Dynamic test of system at 1.25 times SWL (NDE to be carried out afterwards on critical areas)	12 months	2, 3 or 4

Note:

- ◆ Testing of lifting appliances and equipment is normally carried out as part of the integral system. If individual components have to be replaced such as strops or shackles then this does not require retesting provided the change is done on a like-for-like basis and the new component is supplied with its own examination and proof load test certificate.

Pipework Systems, Valves, Regulators and Relevant Fittings

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for purpose it will be used for	3 or 4
Internal pressure test to 1.5 times maximum working pressure of the system plus gas leak test at maximum working pressure of the system	3 or 4
Verify internal cleanliness appropriate to intended duty	2, 3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination	6 months	1, 2, 3 or 4
Gas leak test at maximum working pressure of the system	2 years	1, 2, 3 or 4

Note:

- ◆ It may not be appropriate in some cases to conduct the initial testing of a complete panel or assembly at 1.5 times maximum system working pressure. In such circumstances a suitable test protocol should be agreed with the competent person to verify the integrity of the components making up the panel or assembly.
- ◆ If a valve, regulator, fitting or similar is changed out on a like-for-like basis then no overpressure test is required and a gas leak test at maximum working pressure is sufficient. Consideration will need to be given to whether internal cleanliness appropriate to the intended duty has been maintained.
- ◆ If a piece of pipework is replaced or the system is modified then an overpressure test to 1.5 times maximum working pressure of the relevant part(s) of the system is required. This may be a bench test or may be carried out in situ. In all cases this will be followed by a gas leak test in situ at maximum working pressure of the system. Consideration will need to be given to whether internal cleanliness appropriate to the intended duty has been maintained.

Oxygen System Pipework, Valves and Relevant Fittings

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for purpose it will be used for	3 or 4
Internal pressure test to 1.5 times maximum working pressure of the system plus gas leak test at maximum working pressure of the system	3 or 4
Verify internal cleanliness to oxygen standards	2, 3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination	6 months	1, 2, 3 or 4
Gas leak test at maximum working pressure of the system	2 years	1, 2, 3 or 4

Reference:

- ◆ IMCA D 012 – *Stainless steel in oxygen systems*
- ◆ IMCA D 030 – *Surface supplied mixed gas diving operations*
- ◆ IMCA D 031 – *Cleaning for oxygen service: Setting up facilities and procedures*
- ◆ IMCA D 048 – *Surface supplied diving operations using nitrox*

Note:

- ◆ It may not be appropriate in some cases to conduct the initial testing of a complete panel or assembly at 1.5 times maximum system working pressure. In such circumstances a suitable test protocol should be agreed with the competent person to verify the integrity of the components making up the panel or assembly.
- ◆ If a valve, regulator, fitting or similar is changed out on a like-for-like basis then no overpressure test is required and a gas leak test at maximum working pressure is sufficient. Consideration will need to be given to whether internal cleanliness to oxygen standards has been maintained.
- ◆ If a piece of pipework is replaced or the system is modified then an overpressure test to 1.5 times maximum working pressure of the relevant part(s) of the system is required. This may be a bench test or may be carried out in situ. In all cases this will be followed by a gas leak test in situ at maximum working pressure of the system. Internal cleanliness to oxygen standards will need to be verified.

Relief Valves

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination	6 months	1, 2, 3 or 4
Function test at required relief setting followed by leak test to maximum working pressure (normally integral with equipment to which valve is fitted)	2½ years	2, 3 or 4

Bursting Discs

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination	6 months	1, 2, 3 or 4
Gas leak test to maximum working pressure (normally integral with equipment to which disc is fitted)	2½ years	1, 2, 3 or 4
Complete renewal	10 years	not applicable

Pressure Vessels for Human Occupancy

Note: This includes any spool pieces, medical or equipment locks, trunkings and clamps connected to such vessels

When new

Examination/Test	Category of Competent Person
Manufactured in accordance with a recognised international standard and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination	6 months	1, 2, 3 or 4
Thorough internal and external visual inspection plus a gas leak test at full working pressure	2½ years	1, 2, 3 or 4
Internal overpressure test (or other testing as agreed by an international classification society) plus a gas leak test at full working pressure	5 years	3 or 4

Note:

- ◆ As an alternative to hydraulic or overpressure testing some international classification societies accept engineering investigations (such as FEA) supplemented by specialised NDE. In such a case the resultant certification from the classification society will comply with the five-yearly test requirements above.
- ◆ In the case of diving bells which are to be used in either observation or bounce mode, an external pressure test has to be applied every 5 years.
- ◆ Hydraulic testing is not required for overpressure testing as pneumatic or gas overpressure testing may be substituted. If testing is not hydraulic and the competent person requires it then other testing such as wall thickness measurement or acoustic emission testing may also be required.
- ◆ In all types of overpressure testing suitable safety precautions must be taken to ensure the safety of all testing personnel and others.
- ◆ Some national regulations, certifying authorities or pressure vessel standards may give no option but to apply hydraulic overpressure testing.

Viewports used in Pressure Vessels for Human Occupancy

When new

Examination/Test	Category of Competent Person
Manufactured in accordance with a recognised international code or standard and fit for the purpose it will be used for	3 or 4
Overpressure tested to 1.25 times maximum rated working pressure or other testing to establish structural integrity as required by the ASME PVHO standard	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination in situ	6 months	1, 2, 3 or 4
Gas leak test as an integral part of the PVHO to which it is fitted	2½ years	1, 2, 3 or 4
Internal overpressure test plus a gas leak test as an integral part of the PVHO to which it is fitted (or other testing to establish structural integrity as required by the competent person)	5 years	3 or 4
Complete renewal	10 years (from the date of fabrication)	not applicable

Reference:

- ◆ IMCA D 047 – *Acrylic plastic viewports*

Welded Pressure Vessels (not for Human Occupancy)

Note: This includes air receivers, filter housings, gas storage containers (but not gas cylinders), sanitary and shower tanks, volume tanks and submerged pressure housings

When new

Examination/Test	Category of Competent Person
Manufactured in accordance with a recognised international code or standard and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination	6 months	1, 2, 3 or 4
Thorough internal and external visual inspection plus a gas leak test at full working pressure	2½ years	2, 3 or 4
or		
Internal overpressure test plus a gas leak test at full working pressure	2½ years	2, 3 or 4

Note:

- ◆ Vessels which form an integral part of a chamber complex may be tested integrally with it.
- ◆ If the pressure housing is exposed to external pressure (such as a bell battery pack) and is not pressure compensated then the competent person may also require an external pressure test.
- ◆ Hydraulic testing of large storage tubes or vessels subject to dry internal service is not recommended as it introduces moisture in to the system which may prove difficult to remove. In such a case pneumatic or gas overpressure testing may be substituted.
- ◆ If testing is not hydraulic and the competent person requires it then other testing such as wall thickness measurement or acoustic emission testing may also be required.
- ◆ In all types of overpressure testing suitable safety precautions must be taken to ensure the safety of all testing personnel and others.

Sanitary Systems (integral test only)

Note: Excludes pressure vessels and any supply system pipework

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test	6 months	1, 2, 3 or 4

Note:

- ◆ Part of the function test should be to confirm that the interlock operates correctly.

Umbilicals – Hose Components only including End Terminations and Fittings but excluding Electrical Components

Note: This includes excursion, main bell, wet bell and surface dive umbilicals plus deck hoses and flexible whips

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4
Hydraulic overpressure test at 1.5 times maximum rated working pressure or as recommended in manufacturing code or standard	2, 3 or 4
Pressure leak test then verify internal cleanliness as appropriate to the intended duty	1, 2, 3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test	6 months	1, 2, 3 or 4
Pressure leak test to maximum rated working pressure	2 years	1, 2, 3 or 4

Note:

- ◆ If an umbilical hose has an end fitting changed or replaced then that hose requires retesting under the 'when new' category.
- ◆ If excursion, surface dive or gas supply umbilicals are stored for more than six months they should be flushed prior to being re-used.
- ◆ In the case of hoses which are likely to be subjected to external pressure (for example gas recovery hoses) then the above internal pressure tests are adequate to test the integrity of end fittings provided the hose was originally designed and type tested to withstand external pressure.

Wire Rope and Terminations (Man-Riding)

Note: Davit launching systems for hyperbaric lifeboats have different requirements (see detail sheet 32)

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4
Sample tested to destruction to provide a baseline for future monitoring. The sample tested to destruction should prove an adequate safety factor exists. This is normally 8 times safe working load	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Static test at 1.25 times SWL plus function test at SWL as an integral part of the lifting system	6 months	3 or 4
Visual examination of visible section	6 months	3 or 4
Cut back a length of wire rope and test to destruction to prove an adequate safety factor (see notes below)	12 months	3 or 4
Reterminate and apply static load test at 1.5 times SWL	12 months	3 or 4

Reference:

- ◆ IMCA SEL 022/M 194 – *Guidance on wire rope integrity management for vessels in the offshore industry*

Note:

- ◆ There have been a number of problems in the past with high tensile bell wire ropes which appear to lose strength even when properly stored. For this reason a test to destruction should be carried out when any high tensile bell wire rope is first put in to service to establish the actual minimum breaking force of the wire at that time. Provided the test result does not fall below the manufacturer's MBF, future destructive test results should be compared to that original figure (the base value), rather than to any claim (or test certificate) provided by the manufacturer.
- ◆ If the test to destruction when the wire is first put in to service does indicate an MBF below that of the manufacturer, then the manufacturer's MBF should always be adopted as the base value against which to monitor future deterioration in breaking force. However if the result falls 10% below the MBF then the rope should be discarded.
- ◆ There should be an annual removal of a length of wire rope from just beyond the first sheave from the bell termination with the bell below the surface, allowing for swell, to be discarded. A length sufficient to provide test samples for two tensile tests should be cut from the bell end adjacent to the termination. In certain circumstances the competent person may waive the recommendation to cut all the way back to the first sheave. In systems where there is a single vertical fall directly from the winch to the bell it will be necessary to cut right back to the winch.

- ◆ A sample should be tested to destruction to verify that the required factor of safety is maintained. Should the test prove unsatisfactory due to problems with test procedures or where the wire rope fails within a length equal to six wire rope diameters (6d) from the base of the socket or cone, a second test may be carried out. This alternative test should not be used as a way of avoiding discard where a valid test is performed which indicates low strength.
- ◆ The ultimate strength test to be carried out on a sample from the part subject to the most severe dynamic loading will be used to verify that a factor of safety of 8:1 is still being maintained and if not the wire rope should be discarded. Even if the factor of safety is being maintained but the result falls 10% below the base value adopted following the test carried out when the rope was first put into service, it should be discarded.
- ◆ One of the tensile test samples should be dismantled and the internals examined.

Wire Rope and Terminations (Non-Man-Riding)

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Function test at SWL as an integral part of the lifting system	6 months	3 or 4
Visual examination of visible section	6 months	3 or 4
Apply static load test at 1.5 times SWL	12 months	3 or 4

Bell Ballast Release Systems

Note: This also includes lift wire, guide wire and umbilical release systems

When new, following a major refit or a material or design change which could affect the ballast release system

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4
Release systems should be function tested in air	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination and function test of all mechanisms	6 months	2, 3 or 4
Overload test to 1.5 times the static load of the ballast weight in air. NDE carried out on all critical items	12 months	3 or 4
Dry function test of all components and release mechanisms	12 months	3 or 4
Test bell positive buoyancy and confirm this is in line with original requirement	12 months	3 or 4

Reference:

- ◆ AODC 061 – *Bell ballast release systems and buoyant ascent in offshore diving operations*

Note:

- ◆ This reference should be consulted as it contains explanations in detail of some of the above test, which are only summarised here.

Underwater Air Lift Bags

Note: This includes both parachute and totally enclosed type

When new

Examination/Test	Category of Competent Person
Manufactured in accordance with a recognised code or standard or to manufacturer's standard specification and fit for the purpose it will be used for	3 or 4
Function test at SWL	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Thorough visual examination of body and strops, check integrity of shackles and master links, check operation of dump, relief and inlet valves, inverter and hold-back lines	6 months	1, 2, 3 or 4
Load test to maximum safe working load	12 months	2, 3 or 4
or		
Detailed visual inspection of canopy, lifting accessories and structure plus inflation test on canopy		4

Reference:

- ◆ IMCA D 016 – *Underwater air lift bags*

Note:

- ◆ Both types of bags should be inflated for the 12-monthly inspection, using a test plug for the parachute type. Care should be exercised during this exercise.
- ◆ Testing of lifting appliances and equipment is normally carried out as part of the integral system. If individual components have to be replaced such as strops or shackles then this does not require retesting provided the change is done on a like-for-like basis and the new component is supplied with its own examination and proof load test certificate.

Hyperbaric Evacuation Launch Systems

Note: This refers to SOLAS-type or specially designed and dedicated launch systems

When new

Examination/Test	Category of Competent Person
Manufacture to SOLAS requirements or with specified and approved deviations. Fit for the intended purpose	3 or 4
Overload test in installation in accordance with IMO guidance at full outboard position	3 or 4

Note: The above requirements have an indefinite validity unless the system has been modified.

When in service

Examination/Test	Validity Period	Category of Competent Person
Thorough visual examination for deterioration	6 months	2, 3 or 4
Practice deployment	6 months	2, 3 or 4
Function test	12 months	2, 3 or 4
Falls should be replaced	5 years	2, 3 or 4

Reference:

- ◆ IMCA D 004 – *The initial and periodic examination, testing and certification of hyperbaric evacuation launch systems*
- ◆ Note: The above reference should be consulted as it contains considerably more detail on special situations than can be given here.

Note:

- ◆ When carrying out practice deployments, the HRU chamber should be pressurised and unmanned.
- ◆ As far as possible any practice should simulate operational conditions.
- ◆ Practice deployments should normally only be carried out in sheltered calm waters.
- ◆ If the practice deployment stops short of sea level, then the lift wire release mechanism must be demonstrated by other means.
- ◆ Where a secondary means of launch is provided (such as stored energy) then practical deployment of the HRU using the secondary system must be carried out under the same conditions and frequency as the primary system.

Hyperbaric Evacuation Launch Systems

Note: This refers to non-dedicated launch systems

When new

Examination/Test	Category of Competent Person
Manufactured to a recognised international code or standard or built in accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Thorough visual examination and static load test at 1.25 times maximum safe working load	6 months	2, 3 or 4
Function test at SWL	6 months	2, 3 or 4
Practice deployment	6 months	2, 3 or 4
Static load test at 1.5 times maximum SWL plus NDE of critical items	12 months	2, 3 or 4

Reference:

- ◆ IMCA D 004 – *The initial and periodic examination, testing and certification of hyperbaric evacuation launch systems*
- ◆ The above reference should be consulted as it contains considerably more detail on special situations than can be given here.

Note:

- ◆ When carrying out practice deployments, the HRU chamber should be pressurised and unmanned.
- ◆ As far as possible any practice should simulate operational conditions.
- ◆ Practice deployments should normally only be carried out in sheltered calm waters.
- ◆ If the practice deployment stops short of sea level, then the lift wire release mechanism must be demonstrated by other means.
- ◆ Where a secondary means of launch is provided (such as stored energy) then practical deployment of the HRU using the secondary system must be carried out under the same conditions and frequency as the primary system.
- ◆ 'Once only' systems or systems which require the replacement of major components after use need not be practised at the intervals given above but evidence should be available that a practice deployment has taken place within the previous five years.

Emergency Survival Packs and Passive Scrubbers

This refers to units used in diving bells and in hyperbaric evacuation systems

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination for water ingress and integrity of packaging or container Check condition of passive scrubber charge	6 months	1, 2 3 or 4
Diving bell survival packs should be unpacked, checked and repacked or returned to the suppliers for overhaul	12 months	2, 3 or 4
Hyperbaric evacuation system survival packs should be unpacked, checked and repacked or returned to the suppliers for overhaul	3 years	2, 3 or 4

Reference:

- ◆ IMCA D 017 – *Lost bell survival*

Equipment Not Specifically Covered by other Detail Sheets

This refers to any equipment which forms part of the diving system but does not have a specific sheet detailing its requirements

When new

Examination/Test	Category of Competent Person
In accordance with manufacturer's specification and fit for the purpose it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
Visual examination for damage or deterioration	6 months	1, 2 3 or 4
Function check to ensure correct operation	6 months	1, 2 3 or 4

Note:

- ◆ If the equipment is used for emergency back-up, then part of the function check should include the adequacy of such equipment to provide the necessary level of back-up.

Diver Harnesses

This refers to individual harnesses worn by divers for use during emergency recovery and rescue

Note: Each harness should be individually traceable by means of a unique identifier. The date first put into service should also be recorded

When new

Examination/Test	Category of Competent Person
Manufactured to an appropriate national or international standard and fit for the purpose for which it will be used for	3 or 4

When in service

Examination/Test	Validity Period	Category of Competent Person
As with all personal dive equipment, a thorough pre-dive and post-dive visual examination, with particular reference to the single lift point visual inspection including supporting webbing and stitching	One dive	1, 2, 3 or 4
In-use discard criteria*	5 years	1, 2, 3 or 4
Shelf life, regardless of use*	10 years	1, 2, 3 or 4

Note:

- * More stringent criteria may be recommended in the manufacturer's instructions or deemed appropriate by the diving company due to the conditions of use.