Diving Equipment Systems
Inspection Guidance Note

DESIGN for Mobile/Portable Surface Supplied Systems

International Marine
Contractors Association

www.imca-int.com

IMCA D 040 Rev. 1
July 2015

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 040 Rev. 1

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

Equivalent DESIGN volumes exist as follows:
- IMCA D 023 for Surface Orientated (Air) Diving Systems
- IMCA D 024 for Saturation (Bell) Diving Systems
- IMCA D 037 for Surface Supplied Mixed Gas Diving Systems
- IMCA D 053 for the Hyperbaric Reception Facility (HRF) forming part of a Hyperbaric Evacuation System (HES)

www.imca-int.com/diving

DESIGN for Mobile/Portable Surface Supplied Systems

IMCA D 040 Rev. 1 – July 2015

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1 Introduction

1.1 Background

In the early 1980s, in order to give some guidance to the offshore industry, IMCA's predecessor the Association of Offshore Diving Contractors (AODC) started to produce a number of reference documents, standards and guidance notes. This process continued through the 1980s. It was clear, however, that there was still considerable confusion with some diving systems being 'audited' several times a year by different clients, each of whose representatives had slightly different interpretations as to what was required.

AODC published document reference AODC 052 – *Diving Equipment Systems Inspection Guidance Note (DESIGN)* – in February 1989 that sought to clarify any interpretations necessary and to identify a common standard that could be applied by all parties during an inspection. It 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.

Subsequently AODC expanded and revised the document which was re-issued as Rev. 1 in February 1995. This more comprehensive document covered both air and saturation diving systems. It was still based on the requirements of the UK sector of the North Sea but was adopted by many clients and diving contractors world-wide. Some users, however, found it to be complex and difficult to use.

With the increasingly international nature of the offshore diving industry, IMCA revised AODC 052 Rev. 1 in order to simplify it, clarify any anomalies which had shown up and adapt it for international use, rather than restrict it to North Sea use. It was also decided to split it into separate documents, one for surface diving (IMCA D 023 published 2000) and the other for saturation diving (IMCA D 024 published 2001). Subsequently documents were issued in 2006 for surface supplied mixed gas diving (IMCA D 037) and mobile/portable surface supplied diving (IMCA D 040) and in 2014 for hyperbaric reception facilities (IMCA D 053).

IMCA D 024 for saturation diving systems was revised and updated to Rev. 1 in 2013 and to Rev. 2 in 2014. IMCA D 023 was revised and updated to Rev. 1 in 2014.

This document is an adaptation of D 023 modified to specifically cover mobile/portable surface supplied diving equipment.

1.2 Current Version of IMCA D 040

IMCA D 040 for mobile/portable surface supplied diving equipment has now been revised and updated to incorporate equipment improvements and changed operating practices since its first publication in 2006. In particular it has been enlarged to recognise the increased use of specially designed small vessels with the diving equipment permanently installed (daughtercraft) in addition to the simple versions of this type of equipment which are commonly referred to as 'SCUBA-replacement'. The format has also been changed slightly to improve ease of use and provide better referencing.

It is intended that this document should be used in conjunction with IMCA D 018 – *Code of practice on the initial and periodic examination, testing and certification of diving plant and equipment*. Cross-references to this Code are provided where appropriate (see 6.5.2).

1.3 Status of the Document

This document offers examples of good practice. It gives advice on aspects of a diving system that should be configured in certain ways in order to provide a safer system of working. It also identifies how inspection and testing can be carried out safely and efficiently.

The document 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 document 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 document 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 document.

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 document or any other suitable standard as the basis for their activities.

1.4 Work Covered by the Document

This document addresses various aspects of a mobile/portable surface supplied diving system as utilised within the offshore diving industry.

The aim of the document is to provide a comprehensive reference source addressing the philosophy of what equipment and layout is required for a safe diving operation plus 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.

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;
- vessel owners and marine crews involved with diving operations;
- staff involved in the maintenance, repair, test or certification of plant and equipment;
- client and contractor representatives;
- diving system auditors;
- all personnel involved in quality assurance (QA) and safety;
- concession holders or operators who have a duty of care.

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.

1.5 National and Other Regulations

A number of countries in the world have national regulations that apply to offshore diving operations taking place within waters controlled by that country. In such cases national regulations must take precedence over this document and the contents of this document 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 into consideration.

1.6 Layout of Document

The information is presented in the form of sets 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.

The testing requirements identified will normally correspond with the certification that the diving contractor 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.

1.7 Implementation

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

1.8 Updating Arrangements

This document is a dynamic document and the advice given in the published version will be reviewed periodically by IMCA and any necessary improvements incorporated, in the light of further experience gained. Any person with suggested improvements is invited to forward these, in writing, to IMCA (imca@imca-int.com).

1.9 Classification Societies

A number of classification societies publish rules for diving equipment. These normally require similar standards to this document; however it needs to be understood that the requirements of a particular classification society may not be the same as the requirements of this document. Compliance with one does not mean automatic compliance with the other.

1.10 Use of the Completed Document

A completed and up to date version of this document should be available for a mobile/portable surface supplied diving system prior to diving operations commencing.

The relevant item line in the document then needs to be updated each time a test becomes due or when a replacement certificate is issued.

It is intended that the overall document for a particular mobile/portable surface supplied diving system will be re-completed no more frequently than annually (unless the system is moved from one vessel to another, for example) and that at other times, such as a change of client or jurisdictional location, all that is normally required is a check on the completed document, possibly supported by a small number of spot checks of equipment or certificates.

1.11 Annual Auditing of Diving Systems

IMCA guidance document IMCA D 011 – *Annual auditing of diving systems* – explains how IMCA's DESIGN audit documents can be used as the basis for an annual audit.

2 List of Acronyms

AODC	Association of Offshore Diving Contractors
BA	Breathing apparatus
DESIGN	Diving Equipment Systems Inspection Guidance Note
DMAC	Diving Medical Advisory Committee
FMEA	Failure modes and effects analysis
fsw	Feet of seawater
HAZOP	Hazard and operability study
HP	High pressure
IMCA	International Marine Contractors Association
IMO	International Maritime Organization
LP	Low pressure
MOC	Management of change
msw	Metres of seawater
NDE	Non-destructive examination
PDF	Portable document format
PMS	Planned maintenance system
PPE	Personal protective equipment
PRV	Pressure relief valve
psi	pounds per square inch
QA	Quality assurance
RA	Risk assessment
SWL	Safe working load
UPS	Uninterruptible power supply

3 The Competent Person

3.1 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 diving equipment, plant and components.

Over the years legislators 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.

3.2 Application of the Philosophy of 'The Competent Person'

In the field of plant and equipment examination, test and certification, the alternative to the use of the concept of the competent person would be to specify precisely the qualifications, training and experience of persons undertaking any of these, 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 (rather than someone involved with 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 may 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.

3.3 Types of Competent Person

In some cases this document requires the competent person to satisfy themselves that the design or construction of diving plant and equipment makes it suitable for use. That requires a high level of diving expertise which will involve persons with a detailed knowledge of diving techniques and practices and the environment in which the plant will be used.

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.

The competent person should also 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 D 018 category 2) and in some cases may be met by the diving supervisor or the life support supervisor (IMCA D 018 category 1). For more complex tests and examinations the competent person may require to possess specific academic or trade qualifications or to have access to specialised equipment (IMCA D 018 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 specific items such as pressure vessels, lifting appliances and other parts of the diving equipment is to be carried out by a competent person who is neither the owner of the installation nor his employee.

3.4 Categories of Competent Person

IMCA D 018 identifies in detail the various categories of competent person who are able to issue certificates confirming that plant and equipment has been examined and tested in line with the recommendations contained therein.

IMCA issues guidance on the assessment of competence, particularly for category 1 and 2 personnel (IMCA C 003 – *Guidance document and competence tables: Diving Division*).

3.5 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.

3.6 Completing this Document

The completion of this document may be carried out by more than one person. In that case each person should be knowledgeable and experienced in the areas which they are completing.

The document may be completed entirely by employees of the owner of the diving plant or equipment or may be completed entirely by a specialist working for a client or third party. It may also be a combination of these. If the person completing the document is an employee of the diving contractor then they would normally have no involvement in the day to day operation of that particular diving system.

In all cases the person(s) completing the document should have the necessary competence to form sensible judgements on the matters contained within it.

4 Responsibilities

4.1 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.

It is normally the responsibility of the diving contractor to ensure that a completed copy of this document is prepared for any individual diving system and is updated at regular intervals (normally as each certificate is renewed).

4.2 The Person Completing this Document

The person completing this document has two main areas of responsibility.

Firstly he must satisfy himself that he has the necessary knowledge and experience and is indeed competent to carry out the checks, 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 person identifying any faults, omissions or problems.

More detailed guidance on the system of auditing, types of auditors, etc. is contained in IMCA D 011

5 Planned Maintenance Systems (PMS)

5.1 General

It is a basic requirement 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.

5.2 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 or for assemblies of equipment;
- 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;
- a card index system.

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 are 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;
- any maintenance to be delayed on an item that is considered 'safety critical' should be formally risk assessed prior to the delay (this may require the use of an MOC procedure);
- availability of adequate spares to permit routine and non-routine replacement as necessary.

5.3 Relevance of PMS

While this document 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 IMCA D 018 unless an adequate PMS existed. In this respect the PMS would normally be one of the matters considered by the person when deciding on the level of test and examination required by IMCA D 018 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.

6 Key Features of this Document

6.1 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.

6.2 Meaning of Terms Used

Within IMCA D 018 various terms are used extensively such as 'examination', 'visual examination', 'function test' and 'test'. Detailed explanations of what these terms mean are included within the preamble to IMCA D 018 and should be referred to by the person completing this document in order to understand what any particular certificate actually shows.

6.3 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 document 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. If, however, 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 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) procedures.

The person completing this document should not themselves make the decision to extend validity periods but should, if relevant, establish if a written agreement exists as described above.

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.

6.4 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 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 re-certification although simple tests such as a function test would typically be required – but even this will depend on the 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). Details should be passed to the owner's/diving contractor's onshore offices unless this is part of the routine maintenance required under the PMS when then 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 re-certification is considered necessary.

6.5 Layout of Detail Sheets

6.5.1 Item Column

This column gives each piece of equipment, test or item a unique number for ease of identification. These numbers have no technical significance.

6.5.2 Description Column

This column gives a short description of the item for ease of identification. Where testing is required, a reference is given to the relevant section in IMCA D 018 – *Code of practice on the initial and periodic examination, testing and certification of diving plant and equipment.*

6.5.3 Requirement Column

This describes exactly what the person completing this document needs to check for each item.

6.5.4 Need Column

This column identifies the importance given to each requirement.

A This signifies that the requirement is necessary and must be met. Only in the most unusual circumstances would a diving system be considered safe to use if a requirement with an A need had not been met.

B This also signifies a requirement which is considered as necessary but there may be other ways of meeting the requirement than the method identified in the 'Requirement' column. It is left up to the discretion of the person completing this document as to whether the requirement is being suitably met.

C This refers to a requirement which is optional.

6.5.5 Response Column

This is where the person completing this document will write their comments and observations. It will be used to answer any questions asked in the 'Requirements' column (see 7.4 for details).

6.5.6 Certificate Issued Date Column

Where a certificate is required, the date of its issue should be entered here. The relevant part of the column is shaded if no certificate is required.

7 Completing the Document

7.1 Electronic/Paper

The document is available in two formats, hard (paper) copy and electronically. The paper version is perfectly acceptable and may often be used during inspections and checks.

It is anticipated, however, that most users will prepare and maintain the document electronically as it is intended that it will be a dynamic document that is regularly updated as tests and examinations are carried out and certificates reissued.

7.2 Format

The document is available using Microsoft Word, making extensive use of tables, and Microsoft Excel. These optimised versions are made available for electronic completion and delivery of the document by users.

A protected PDF version of this document as-published is also available.

7.3 Variations

The document has deliberately been made as flexible as possible, particularly when used electronically. If more space is needed in the 'Response' column then it can easily be created.

If there is more than one of the same item on a particular dive system then the section or part of a section should be duplicated and repeated. This means, for example, that if there are six diving helmets, then the part on diving helmets would be completed six times within the overall section.

It is recommended that items not required for a particular system are not deleted but rather are marked as 'not applicable'. This will ensure that the tables in the various sections look similar to a master copy of the blank document, which may make it easier for an subsequent person to check.

7.4 Phraseology

It is obviously a matter for the person(s) completing the document as to exactly what they wish to say in the 'Response' column but some form of explanation should be written down.

Single words or short phrases such as 'acceptable', 'suitable', 'adequate', 'yes', 'meets the requirement' or similar should not be used as these provide no useful information to anyone reading the completed document. As a minimum, enough information should be given to allow a person reading the document to understand why the person completing it considers the 'Requirement' for a particular item to have been met.

Equally where items of plant or equipment have unique serial numbers then it is recommended that these be inserted in the 'Response' column.

In recent years some persons completing this document have used a number of photographs embedded electronically in the document as well as an explanation to demonstrate compliance and assist in a subsequent review of the document by others. It is certainly not a requirement that photographs are used but it may assist in cutting down long explanations or clearly illustrating a variation, deviation, non-compliance or non-conformance.

7.5 Variations/Deviations from Requirements

The person completing this document should prepare a list identifying any items which do not fully meet the requirements of this document. This will assist in making sure these items are dealt with speedily.

If the item in question has a C in the 'Need' column then the variation/deviation does not signify a non-conformance. However if the item is present but is not correct then it should be placed on the variation/deviation list.

7.6 Close Out

To assist in subsequent checking of this document a list should be available detailing how and when any variations, deviations or non-conformances have been closed out and completed. This list should form part of the document available to any client or other interested party for checking.

8 References

The following documents are referred to in this document or are otherwise relevant. Further details on all IMCA/AODC/DMAC publications and their latest revisions are available from the IMCA website (www.imca-int.com). They are available as free downloads.

Association of Offshore Diving Contractors (AODC)

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

Diving Medical Advisory Committee (DMAC)

DMAC 15 *Medical equipment to be held at the site of an offshore diving operation*

IMCA

IMCA D 009 *Protective guarding of gas cylinder transport containers (quads)*

IMCA D 011 *Annual auditing of diving systems*

IMCA D 015 *Mobile/portable surface supplied systems*

IMCA D 018 *Code of practice on the initial and periodic examination, testing and certification of diving plant and equipment*

IMCA D 023 *DESIGN – Diving equipment systems inspection guidance note for surface orientated (air) systems*

IMCA D 024 *DESIGN for saturation (bell) diving systems*

IMCA D 031 *Cleaning for oxygen service: Setting up facilities and procedures*

IMCA D 037 *DESIGN for surface supplied mixed gas diving systems*

IMCA D 039 *FMEA guide for diving systems*

IMCA D 043 *Marking and colour coding of gas cylinders, quads and banks for diving applications*

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

IMCA D 048 *Surface supplied diving operations using nitrox*

IMCA D 050 *Minimum quantities of gas required offshore*

IMCA C 003 *Guidance document and competence tables: Diving Division*

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DESIGN for Mobile/Portable Surface Supplied Systems

Record Sheets

International Marine
Contractors Association

www.imca-int.com

IMCA D 040 Rev. 1 – Part 2

Record of Inspections

Name of vessel/installation: .....

Brief description of diving system: .....

.....

.....

.....

Last Audit/Inspection

Carried out by: .....

Date: .....

Location: .....

Non Conformances/Points Noted	**Date Resolved**
1	.....
2	.....
3	.....
4	.....
5	.....
6	.....

Index to Detail Sheets

Note:

A mobile/portable/daughtercraft surface supplied system, simple versions of which are commonly referred to as 'SCUBA-replacement' equipment, can in certain circumstances, be used in place of a complete surface supplied diving system where access for a full system is restricted or not possible.

Such systems are limited in the supply of breathing air (or gas) available. In general this technique is used when diving from a small vessel with a suitably equipped support vessel (known as the mothercraft) in the vicinity.

It may also be used on a large barge or platform to allow diving from the deck in a location remote from the main diving area. In such cases, the requirements relating to a separate small vessel obviously do not apply.

Section 1 – General Safety

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**Classification**				
1.1	General	If the diving equipment is mounted in a vessel of the daughtercraft type then it (and the vessel) may or may not be classified by a recognised classification society. Note: The next two points will only apply if the system is classified			
1.2	Conditions	If there are any conditions attached to the classification these should be clearly identified to those operating the diving equipment and the small vessel	A		
1.3	Close-out	Any conditions attached to classification should be closed out (if relevant) or have an agreed close-out period with the classification society	A		
2	**System Assessment**				
2.1	General	A systematic assessment of the diving equipment should be available confirming that the equipment provided for the diving operation is both adequate and fit for its intended use. This assessment may take the form of a HAZOP, FMEA or detailed project risk assessment. Note: The auditor is not being asked to confirm the adequacy of this assessment, only that it has been carried out	A		
2.2	Site Risk Assessment	A risk assessment should be carried out to identify the site specific hazards and to evaluate their risks. Mobile/portable/daughtercraft surface supplied systems should only be used if the results of the risk assessment indicate this is a safe method of operation	A		
2.3	Sea State	Limits should be established for weather and sea state conditions that are appropriate to the sea-keeping capabilities of the small vessel. This should take account of both ease of recovery of the diver from the water (including emergency recovery of an unconscious diver) and the launch/recovery of the small vessel by the mothercraft	A		
2.4	Decompression	All diving should be planned to avoid the need for decompression	A		
3	**Procedures**				
3.1	General	Dive system operating and emergency procedures should be available at the work site. These would typically comprise generic diving procedures supplemented by project specific addendums. Note: The auditor is not being asked to confirm the adequacy of these procedures, merely that they are present	A		
4	**General System Safety**				
4.1	General Access	There must be a level of access available around any system used to launch/recover the small vessel; the diving equipment, and any other working areas, sufficient to allow operational personnel to safely and efficiently carry out their duties	A		
4.2	Stretcher Access	There must be clear access on the mothercraft to allow a casualty on a stretcher to be moved from the recovery position of the small vessel to the surface compression chamber and from the surface compression chamber to any onboard medical facility (such as a sick bay, hospital, etc.)	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
4.3	Safety of Access	Consideration shall be given to the safety of personnel operating around the launch/recovery position and on the small vessel in terms of such things as slip and trip hazards, access steps, hand rails, etc.	A		
4.4	Signs	Safety warning signage (such as electrical hazard, use of PPE, etc.) must be clearly displayed at all relevant locations; the signage shall comply with international/national safety signs requirements	A		
4.5	Sea Fastening (Design)	All items of diving plant on board the mothercraft should be appropriately sea fastened and there should be supporting documentation available from a competent person attesting that the necessary calculations and checks have been completed. Note: This requirement may be different for a fixed installation Note: The auditor is not being asked to confirm the adequacy of these calculations and checks, only that they have been carried out	B		
4.6	Sea Fastening (Installation)	If the sea fastening required any welded fixtures then there should be NDE reports available confirming these welds were satisfactorily tested by a competent person	A		
5	**Lighting**				
5.1	General	There must be a level of lighting available at all times around the launch/recovery system, the diving equipment and any other working areas sufficient to allow personnel to safely and efficiently carry out their duties	A		
5.2	Emergency Lighting	Automatic emergency lighting should be available in all critical areas to allow personnel to move around safely Note: This only applies if lighting is required as per IMCA D 015	B		
6	**Marine Compliance**				
6.1	Marine Audit	The small diving vessel should have been subject to a suitable marine audit/inspection using the IMCA Common Marine Inspection Document for small vessels (IMCA M 189) or similar	A		
6.2	Non-conformances	Confirmation should be available that any non-conformances or deviations have been corrected	A		
7	**Medical Equipment**				
7.1	Provision	There should be a list in place detailing where and what type of medical equipment is available. As a minimum this should meet the requirements of DMAC 15 (or as agreed with company medical adviser) unless local regulations prohibit any of the contents Note: The majority of this equipment will normally be located on the mothercraft	B		
7.2	Container	The equipment should be in a suitable protective container clearly marked with a white cross on a green background	B		
7.3	Medical Equipment Validity	The equipment must have been checked for integrity within the last 6 months with the date the next check is due clearly marked on it	A		
7.4	First Aid	A basic first aid kit, sufficient to provide short term emergency aid, packed in a waterproof container and clearly marked should be available in the small vessel	A		
7.5	First Aid Kit Validity	The basic first aid kit must have been checked for integrity within the last 6 months with the date the next check is due clearly marked on it	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
7.6	Oxygen	An oxygen administration set should be provided in the small vessel to aid in transport of an injured diver to the mothercraft	B		
7.7	Oxygen Set Validity *D 018, Sheet 34*	The oxygen administration set must have been checked for integrity within the last 6 months with the date the next check is due clearly marked on it	A		
7.8	Cylinder Testing – Seamless Cylinders *D 018, Sheet 9.1*	Visual examination in the last 6 months	A		
7.9		Thorough external examination and gas leak test to maximum working pressure in the last 2½ years	A		
7.10		Internal and external visual examination of cylinder plus gas leak test to maximum working pressure in the last 5 years (possible overpressure test)	A		
8	**Marine Arrangements**				
8.1	Second Craft	A second recovery craft (such as a fast rescue craft) should be identified, and operational at the mothercraft to assist the small vessel in an emergency	A		
9	**Mothercraft Equipment**				
9.1	Chamber Requirement	A suitable two compartment compression chamber should be available on the mothercraft and kept in readiness for immediate use during diving operations. This chamber should comply with the requirements laid down in section 3 of IMCA D 023 and a copy of this section, fully completed and audited, should be available	A		
9.2	Access to Chamber	There should be a designated route from the point where the small vessel is recovered to the chamber. This route should be kept unobstructed at all times when diving is taking place and the route should be such that an injured diver can be recovered from the small vessel and taken to the chamber in a reasonably short time period. This should form part of the emergency plans	A		
9.3	HP Gas Storage	If HP gas or air is stored on the mothercraft then it should comply with the requirements laid down in section 12 of IMCA D 023 and a copy of this section, fully completed and audited, should be available	A		
9.4	Compressors	Any diving compressors used on the mothercraft should comply with the requirements laid down in section 11 of IMCA D 023 and a copy of this section, fully completed and audited, should be available	A		
10	**Maintenance**				
10.1	Requirement	A system should be in place whereby all items of plant and equipment are subject to regular maintenance	A		
10.2	Schedule	A schedule should exist indicating the frequency and content of each task. This should take into account the manufacturer's instructions and it should also meet the requirement of the relevant IMCA D 018 detail sheet	A		
10.3	Records	Records (written or electronic) should be available demonstrating that the plant and equipment has been subject to regular planned maintenance	A		

Section 2 – Small Vessel

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**Suitability**				
1.1	General	The small vessel must be suitable for the purpose. It must be able to accommodate the number of personnel required plus the portable or built-in diving system and still allow free movement around the vessel	A		
1.2	Propulsion	The small vessel should be fitted with an appropriate means of propulsion that will allow it to return to the support vessel in any reasonably foreseeable weather conditions in a time not exceeding 15 minutes	A		
1.3	Intake Protection	Any intakes for cooling water or other items that may be running during diving should be fitted with suitable guards to prevent accidental injury to a diver in the water or damage to his equipment	A		
2	**Diver Access**				
2.1	Safety	Divers (including the surface standby diver) must be able to enter and leave the water safely and in a controlled manner. This should be possible in all normal circumstances	A		
2.2	Standby Diver Location	The standby diver must be protected from weather and other elements (including dropped objects) which may affect his concentration. This also means he must be kept suitably warm (or cool)	A		
2.3	Emergency Recovery	Arrangements must be in place to recover an injured or unconscious diver from the water to the deck of the small vessel	A		
2.4	Injured Person Transport	A means should be available of removing an injured person from the small vessel once it has been recovered on board the mothercraft. This may be a stretcher, basket or similar device and will normally be stored on the mothercraft	A		
3	**Emergency Electrical Power** – *Note: This section only applies if the diving equipment requires electrical power to operate*				
3.1	Schematic	Diving system electrical schematics (if relevant) should be available onboard the small vessel	A		
3.2	Primary Power Requirements	An assessment is required to identify the electrical power (if any) required by all electrically powered equipment forming part of the diving equipment in normal operational mode	A		
3.3	Back-up Power Requirements	An assessment is required to identify the electrical power for the diving equipment (if any) needed for the safe recovery of the divers to the deck if the primary power fails	A		
3.4	Emergency Power Requirements	Any equipment identified as necessary to satisfy the above condition must be able to continue operating in the event of loss of primary power. This may be by the use of batteries, stored energy (hydraulic or air power), connection to an emergency generator, etc. If a UPS is used as emergency support for low powered electrical apparatus (such as computers and monitoring equipment), an assessment should be available detailing its duration under load against the time necessary to provide emergency power	A		
3.5	Testing *D 018, Sheet 34*	A test should have been carried out within the last 6 months to demonstrate the functioning and adequacy of emergency electrical power supplies. The testing should include checks that power continues to be supplied in normal circumstances even if a UPS fails and that the visual indication of such failure works correctly	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
4	**Diving Signal**				
4.1	General	The small vessel should have the ability to display the international signal(s) that diving is under way. This will typically be the flag Alpha, suitable lights (if relevant), etc.	A		

Section 3 – Control Position

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Location	The diving supervisor must be protected from weather and other elements (including dropped objects) which may affect his concentration. This also means he should be kept suitably warm (or cool)	B		
1.2	Access	The diving supervisor needs good access to all relevant areas of control and must be able to read all gauges and displays without difficulty	A		
1.3	Lighting	The dive control position and its controls must be adequately illuminated	A		
1.4	Emergency Lighting	If artificial lighting is required to comply with the above point then there must be sufficient self-contained emergency lighting units in the dive control area to allow the supervisor and any other personnel to operate safely in an emergency	A		
1.5	Operating Procedures	Copies of relevant parts of the diving contractor's manuals and diving rules must be available at the control position. These should be protected in a waterproof container or kept in a dry area. Note: The auditor is not being asked to confirm the adequacy of these manuals and rules, merely that they are present	A		
1.6	Emergency Procedures	Emergency procedures must be readily available at the control position. These would typically comprise generic emergency procedures supplemented by project specific addendums. They should be protected in a waterproof container or kept in a dry area. Note: The auditor is not being asked to confirm the adequacy of these manuals and rules, merely that they are present	A		
1.7	Recording Documents	Diving logs or pre-printed sheets and other relevant documentation must be available at the control position. These may be hard copy or electronic	A		
2	**Communications**				
2.1	Mothercraft	If diving is taking place from a small vessel then as a minimum there should be reliable and continuous communication between the supervisor on the small vessel and the dedicated lookout on the mothercraft. If this involves battery powered equipment then spare batteries or a second unit should be available to both parties	A		
2.2	Divers	Two way voice communications with each diver in the water and the standby diver must be provided	A		
2.3	Back-up	These facilities should be fitted with a back up power source, such as batteries	B		
2.4	Recording	A recording system must be fitted to record all communications between divers and supervisor. There should be a means of playing back the recording after the dive in order to check satisfactory quality	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
2.5	Back-up	This recording system should be fitted with a back-up power source, such as batteries to ensure continued operation for at least 30 minutes in the event of loss of main power	A		
2.6	Retention	Provision must be made for retention of recordings for 24 hours after the dive is over	A		
2.7	Other Areas	The diving supervisor must have voice communication with all personnel on board the small vessel. This may be unaided or may require the use of communications equipment	A		
2.8	Testing *D 018, Sheet 6*	All communications links must have been examined and function tested in the last 6 months, in addition to any standard pre-dive checks	A		
3	**Air Supplies** – *Note: Nitrox may be used in place of air in certain circumstances. If this is being used, then substitute 'Nitrox' for the word 'air' in the following sections.*				
3.1	Sources	Sufficient sources of air, of breathing quality, must be available and suitably arranged so that if the on line source to the diver fails, an alternative source can be switched on Note: Minimum quantity of gas required is identified in IMCA D 015 for the small vessel and in IMCA D 050 for the chamber	A		
3.2	Adequacy	Each of the sources should be able to provide adequate pressure and flow rates to all divers that they may be required to supply at the maximum depth of the intended diving operation	A		
3.3	Working Diver(s) Surface Sources	There should be a primary air source for each working diver plus a secondary source. Note: The diver's bail-out is not the secondary source	A		
3.4	One Working Diver	For one diver working in the water this requires two sources, one connected as a primary source for the diver and the other as an independent and separate secondary source	A		
3.5	Two Working Divers	For two divers working in the water at the same time this requires three sources, connected either as a separate primary source for each diver with a common secondary or else a common primary source feeding both divers but with independent and separate secondary source to each diver	A		
3.6	To the Diver	The air supply to each diver must be arranged such that if one line fails then this does not interfere with the supply to another diver	A		
3.7	Surface Standby Diver Main Source	There must be a primary air source to the standby sufficient to allow him to rescue an injured diver and arranged to be separate from the main and secondary sources to the working diver(s)	A		
3.8	Surface Standby Diver Secondary Source	There must be a secondary source for the standby diver but this may be common with the working diver(s) secondary source, provided it is protected from any malfunctions	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
3.9	Pressure Reduction	High pressure gas from the storage cylinders should be passed through suitable high pressure reducers	A		
3.10	Cross-over Valves	If cross-over valves are fitted (such as one to allow either diver or standby to be supplied by the same cylinder or source) then they should indicate very clearly what supply they are providing to where	A		
4	**Monitoring**				
4.1	Monitoring	If using any breathing gas other than compressed natural air, there must be an oxygen analyser with an audio/visual hi/lo alarm fitted in line on the downstream gas supply to each working and standby diver(s)	A		
4.2	Control Area Ambient Atmosphere	If using any breathing gas other than compressed natural air, and the dive control area is enclosed (such as inside the cabin of a daughtercraft) then an oxygen analyser with audio/visual alarm must be sited in the dive control area to warn the occupants of any rise of oxygen levels outside pre-set parameters due to gas leakage in to the area	A		
4.3	Analyser Testing *D 018, Sheet 2*	Analysers should be examined, function tested and calibrated in situ within the last 6 months	A		
5	**Gauges**				
5.1	General	The diving supervisor must have available to him enough suitable gauges so that he is aware of the depth of each diver and of the supply pressures of each main and secondary breathing supply	A		
5.2	Gauge Protection	A pressure limiting device may be fitted to avoid gauges being over pressurised	C		
5.3	Cross-over Valves	Great care must be taken if cross-over valves are fitted with the result that any gauge can possibly read more than one thing. Cross-over valves should either be fixed in one position (the handles may be removed to avoid accidental changes) or should indicate very clearly which source they are connected to. In any event any gauge fitted with a cross-over valve must indicate very clearly at all times exactly what it is reading. This is particularly important if one gauge can show the depth or more than one diver	A		
5.4	Depth	These are gauges used to provide information for operational and decompression control. The scale must be appropriate to the duty i.e. large enough to be read easily and accurately. They should normally operate in the range 25-75% of full scale deflection although they will need to operate in the 0-25% range if used for decompression. If used for the final stages of decompression they must have scale divisions of no more than 0.5 msw/2 fsw	A		
5.5	Unit Marking	All depth gauges should be marked in the same unit system (imperial or metric). Dual scale marking is acceptable	A		
5.6	Contractor's Tables	The unit marking system of the gauges (imperial or metric) should correspond to the units used in the contractor's diving tables	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
5.7	Digital Gauges	If the gauge is digital then the display must be large and clear enough to be read in all conditions. It must be clearly marked on the unit whether it reads in feet or metres and it should display the reading to one decimal point. (For further information, refer to AODC 059)	A		
5.8	Air Supply	These are gauges that indicate pressure but are not directly used for life support. They may be used for life support purposes or may only be indicating gauges. They must be positioned to show the line pressure of sources coming in to the panel and also of any supplies leaving the panel. A system must be in place to ensure that incorrect readings cannot happen in certain valve positions	A		
5.9	Scale Divisions	They must meet the requirements for depth gauges above except that they may be much smaller and with larger scale divisions. They are not calibrated as depth gauges	A		
5.10	Unit Marking	All gas source/supply gauges should be marked in the same unit system (imperial or metric). Dual scale marking is acceptable	A		
5.11	Supply Gauge Isolation	It is normal practice to have an indicating gauge showing the supply pressure to the diver as the supply leaves the panel. This is a single point of failure if the gauge is dislodged or damaged. It is acceptable to fit an isolation valve to the gauge providing that: ♦ Closing the valve does not interfere with the diver's supply ♦ The handle on the valve clearly indicates whether it is open or closed ♦ The handle is secured in the open position using light wire, tape or similar such that it cannot be inadvertently closed Alternatively a flow restrictor can be fitted to limit air losses in the event of gauge failure, instead of an isolation valve. If a flow restrictor is fitted then it should be clearly marked on the panel/schematic	B		
5.12	Gauge Calibration *D 018, Sheets 18, 19 & 20*	All gauges must have been visually examined, function tested in situ, calibrated and/or tested (as relevant) to the required accuracy in the last 6 months	A		
6	**Pipework and Valves**				
6.1	General	All valves must be free of corrosion and should operate easily	A		
6.2	Oxygen Service	All valves and pipework must be cleaned for oxygen service when used for gas mixes containing more than 25% oxygen. This may be demonstrated by means of a suitable procedure to ensure cleanliness which is applied when any components are new or after there has been any significant alteration	A		
6.3	Marking	The function of all valves must be clearly marked	A		
6.4	Quarter Turn Valves	Valves carrying oxygen (or mixtures containing over 25% oxygen) at a pressure higher than 15 bar must not be quarter turn	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
6.5	Quarter Turn Valves and Nitrox	Normal practice is that quarter turn valves should not be used if gas containing more than 25% oxygen is at a pressure higher than 15 bar. There are safety benefits in having quarter turn valves on the diver's gas control panel as this allows the diving supervisor to easily identify if a particular valve is open or closed and also to isolate a leak quickly. When diving using nitrox the gas supply to the diver(s) may require to be up to 20 bar in order to provide sufficient pressure to the helmet at deeper depths. If quarter turn valves are to be used on the control panel then a risk assessment should have been carried out to consider the desirability of having them set against the small increase in risk of fire and explosion at this pressure	A		
6.6	Exhausts	Exhaust pipework must not vent into an enclosed space. Note: Panel PRVs and sampling for analysis do not constitute exhaust pipework	A		
6.7	Accessibility	Gas pipework, particularly in panels and at connection points, must be easily accessible for maintenance and repair	B		
6.8	Pipework Testing *D 018, Sheets 24.1 & 24.2*	Internal pressure test of all valves, pipework, fittings etc. to 1.5 times maximum working pressure when new	A		
6.9		Valves and pipework need visually examined in the last 6 months	A		
6.10		Valves and pipework need a gas leak test to maximum working pressure in the last 2 years	A		
6.11	Relief Valves	Pressure relief valves may or may not be fitted within the control area. If they are fitted then they should comply with the testing requirements detailed below			
6.12	Relief Valve Testing *D 018, Sheet 24.3*	Visual examination in the last 6 months	A		
6.13		Function test at required relief setting followed by leak test at maximum working pressure in the last 2½ years	A		
7	**Electrics**				
7.1	General	All electrical equipment must be securely installed with all power leads and wiring secured in such a way that it is protected from accidental damage	A		
7.2	Suitability	All electrical equipment should be suitable for the location in terms of protection against moisture, dust, etc.	B		
7.3	Hazard Signs	Electrical hazard warning signs should be displayed on all relevant panels and equipment	B		
7.4	Testing *D 018, Sheet 11*	All electrical equipment should have been visually examined and function tested in the last 6 months. Cables should have continuity and resistance tests	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
8	**Breathing Apparatus**				
8.1	Provision	If the diving control area is situated in an enclosed area (such as the cabin of a daughtercraft) then emergency breathing apparatus fitted with communications must be available for the supervisor (and coxswain if relevant) so that he may perform his duties in a smoky or polluted atmosphere	A		
8.2	BA Testing *D 018, Sheets 5.1 & 9.1*	Visual examination and function test (including communications) in the last 6 months. Check made at same time that cylinder is fully charged	A		
8.3		External visual examination of cylinder plus gas leak test to maximum working pressure in the last 2½ years	A		
8.4		Internal and external visual examination of cylinder plus gas leak test to maximum working pressure in the last 5 years. (Possible overpressure test)	A		

Section 4 – Divers' Umbilicals

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Construction	Each umbilical should be suitable for the tasks intended. They should be robust and made up from components designed for use in an umbilical	A		
1.2	Stowage	Adequate umbilical stowage should be provided. This should allow the umbilical to be coiled up away from risk of damage and such that minimum bend radius of components is not compromised	B		
1.3	Marking	Umbilicals should be marked for length at least every 5 metres (16 feet) using a system which allows easy visual identification of the length paid out	A		
1.4	Marking System	Details of this recognised system should be displayed at the umbilical tending point on a board or other readily readable means	B		
1.5	Security	The diver's end of the umbilical should be fitted with a means which allows it to be securely fastened to the diver's safety harness without putting any strain on the individual whip ends	A		
1.6	Inboard End	The system end of both diver's and standby's umbilical should be fitted with a means which allows them to be securely fastened to a strong point without putting any strain on the individual whip ends	A		
1.7	High Oxygen Content Marking	Any hoses carrying oxygen in greater concentration than 25% must be identified as oxygen clean and be oxygen compatible	A		
1.8	Oxygen Service	All hoses must be cleaned for oxygen service when used for gas mixes containing more than 25% oxygen. This may be demonstrated by means of a suitable procedure to ensure cleanliness which is applied when any components are new or after there has been any significant alteration	A		
2	**Length**				
2.1	Record of Length	The length of the diver's umbilical which it is permissible to pay out will normally be dictated by some outside factor such as the bail-out endurance (depending on depth/distance). This maximum length should be clearly identified for each diving operation and arrangements should preferably be made to ensure that this is the maximum length of umbilical which can be paid out	A		
2.2	Standby Diver Umbilical Length	The standby diver's umbilical should be 2 metres (6½ feet) longer than the working diver(s)' umbilical	B		
3	**Testing**				
3.1	Electrical Components *D 018, Sheet 11*	Visual examination, function test, continuity and resistance testing carried out in the last 6 months	A		
3.2	Hose Components *D 018, Sheet 28*	When new, hydro test to 1.5 times maximum working pressure or as recommended	A		
3.3		Visual examination and function test in the last 6 months	A		
3.4		Pressure leak test to maximum working pressure in the last 2 years	A		

Section 5 – Divers' Personal Equipment

Note: This section covers divers' helmets (or masks), bail-out bottles and other parts of the diver's emergency breathing supply. It does not cover other items such as suits, harnesses, gloves, etc. which should meet normal standards for personal protective equipment.

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**Quantity**				
1.1	Overall	There must be a complete set of diver's equipment for each working diver and the standby comprising, as a minimum, a diving helmet or full face mask, communications set providing two-way communications with the supervisor, umbilical, diver's personal equipment (suit, boots, etc.) and an appropriate harness to allow safe recovery of the diver	A		
2	**Helmets (or Masks)**				
2.1	Marking	Each helmet (or mask) should be indelibly marked with a unique serial number	B		
2.2	Condition	All helmets (or masks) should be in good condition with no obvious defects	A		
2.3	Type	The helmet (or mask) must be of a type which is suitable for the intended diving operation	A		
2.4	Safety	Helmets must be fitted with a means to stop them becoming detached from their clamp while in use and this means should be manufacturer approved. Similarly masks should be fitted with a means to stop the hood becoming detached from the face plate while in use (in addition to the normal clamp) and this means should be manufacturer approved	B		
2.5	Maintenance	Each helmet (or mask) must be subject to regular planned maintenance and a record of such maintenance should be available	A		
2.6	Impact Protection	Divers working in the splash zone, or close to the surface, who are NOT wearing a rigid helmet should be provided with head protection. This will also apply to the standby	A		
2.7	Testing *D 018, Sheet 5.3*	Visual examination and function test at atmospheric pressure in the last 6 months	A		
2.8		Inspected and tested in line with manufacturer's recommendations in the last 12 months	A		
3	**Emergency Gas Supply (Bail-Out) Cylinders**				
3.1	Provision	Every diver, including the standby, must be provided with a reserve supply of air carried in a bail-out cylinder or similar	A		
3.2	Endurance	The cylinder(s) must have sufficient endurance to allow the diver to return to the surface. This will normally mean that a calculation should be available showing that the capacity of the cylinder(s) at the depth of diving will allow breathing air for 1 minute for every 10 metres horizontal excursion plus 1 minute for every 10 metres of depth. This calculation should be carried out using 40 l/min as a minimum consumption	A		
3.3	Marking	Each cylinder should be correctly colour coded and marked with the name of the contents	A		
3.4	Test Date	The last test date stamp on each cylinder should be painted over with a small patch of distinctive colour paint to aid location. If this is inaccessible then the cylinder serial number should be visible or else stencilled in a visible location	B		

Item	Description	Requirement	Need	Response	Certificate Issue Date
3.5	Cylinder Testing – Seamless Cylinders *D 018, Sheet 10.1*	External and internal visual examination in the last 6 months	A		
3.6		External and internal visual examination plus gas leak test to maximum working pressure in the last 2 years (possible overpressure test)	A		
3.7		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, in the last 4 years	A		
3.8	Cylinder Testing – Composite Cylinders *D 018, Sheet 10.2*	External and internal visual examination in the last 6 months	A		
3.9		External and internal visual examination plus gas leak test to maximum working pressure in the last 12 months (possible overpressure test)	A		
3.10		Hydraulic proof pressure test to the pressure marked on the cylinder OR volumetric expansion test as appropriate to the design of the cylinder in the last 5 years. In either case plus the 6 and 12 monthly tests above	A		
4	**Whips and Connectors** – *The above two sections cover the mask/helmet and the bail-out cylinder. This section covers the connections between these items and other parts of the divers emergency breathing system.*				
4.1	Provision	Suitable connections, fittings, etc. must be provided to allow the bail-out cylinder to supply emergency breathing air to the diver's mask/helmet if needed	A		
4.2	Contents Gauge	It should be fitted with a contents gauge (indicating type only) and a first stage regulator	A		
4.3	Condition	All whips, hoses, gauges, fittings, etc. must be in good condition with no obvious defects	A		
4.4	Type	All hoses, fittings, whips, gauges, etc. must be of a suitable type and pressure rating for the purpose. In particular, care should be taken to ensure that items of lower pressure rating than required are not used. This is particularly important for the first stage regulator	A		
4.4	Maintenance	All items forming part of the diver's emergency air supply system should be subject to regular inspection and maintenance. Records of such maintenance should be available	A		
4.6	Testing *D 018, Sheet 28*	Visual examination and function testing at full working pressure in the last 6 months	A		
4.7		Pressure leak test to maximum rated working pressure in the last 2 years	A		
4.8	Gauge Testing *D 018, Sheet 20*	Visual examination and function test of pressure indicating gauge in the last 6 months	A		
4.9	Pipework Testing *D 018, Sheet 24.1*	Internal pressure test of all valves, pipe work, fittings, etc. to 1.5 times maximum working pressure when new	A		
4.10		Visual examination of pipework/fittings in the last 6 months	A		
4.11		Gas leak test of pipework and fittings at maximum working pressure in the last 2 years	A		
4.12	Relief Valves	Pressure relief valves may or may not be fitted to any first stage regulators. If they are fitted then they should comply with the testing requirements detailed below			
4.13	Relief Valve Testing	Visual examination in the last 6 months	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
4.14	*D 018, Sheet 24.3*	Function test at required relief setting followed by leak test at maximum working pressure in the last 2½ years	A		
5	**Divers' Harnesses**				
5.1	Requirement	Each diver (including the standby) should be provided with a suitable safety harness. This should be manufactured to an appropriate national or international standard and be fit for the purpose it will be used for	A		
5.2	Marking	Each harness should be permanently marked with a unique reference number for ease of identification. The date of manufacture and the date first put in to service should be readily identifiable	B		
5.3	Discard Criteria *D 018, Sheet 35*	Harnesses should be discarded 5 years from the time first put in to service, or sooner if recommended by the manufacturer or deemed appropriate by the diving contractor due to conditions of use	A		
5.4		Even if in service for less than 5 years, harnesses should be discarded 10 years from the date of manufacture or sooner if recommended by the manufacturer or deemed appropriate by the diving contractor due to conditions of use	A		

Section 6 – High Pressure Air and Gas Storage

Note: This section refers to any bulk high pressure gas or air storage which forms part of the diving system on the small vessel. This includes both built-in and portable HP air (or nitrox) storage banks or quads.

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Quantity	There must be sufficient sources available to comply with the requirements of IMCA D 050	A		
1.2	Minimum Storage	There must be at least three cylinders, normally mounted horizontally, each with a minimum floodable volume of 46 litres and a working pressure of not less than 150 bar	A		
1.3	Location	All HP storage should be located in a suitable place where there is a minimal risk of damage occurring. The valves, pipe work and fittings should be protected as far as possible from physical damage caused by the movement of personnel or equipment around the system	B		
1.4	Oxygen	Oxygen (or mixes containing over 25% oxygen) must be stored in the open and well clear of any fire hazards. It is recognised that daughtercraft often have their stored gas contained in cylinders which are built in to the small vessel. In such cases the enclosed area that the cylinders are in should be well ventilated and unmanned at all times	A		
1.5	Marking	Cylinders must be colour coded and marked with the name and chemical symbol of the contents in accordance with IMCA D 043	A		
1.6	Test Date	The last test date stamp on each cylinder should be painted over with a small patch of distinctive coloured paint to aid location. If this is inaccessible then the cylinder serial number should be visible or else stencilled in a visible location	B		
1.7	Condition	Each cylinder should be in good condition and free from serious corrosion	A		
1.8	Gas Supply Hose Restraints	All gas supply hoses (HP and LP) must be secured at the connection point with whip check devices attached to a secure fixed point. The type of whip checks will differ depending on the pressure of gas. A tie-back needs to be considered for its length, material and security	B		
2	**Testing**				
2.1	Cylinder Testing – Seamless Cylinders *D 018, Sheet 10.3*	External visual examination in the last 6 months	A		
2.2		Thorough external visual examination and gas leak test to maximum working pressure in the last 2 years (possible over pressure test)	A		
2.3		Thorough internal visual examination plus hydraulic over pressure test to 1.5 times max working pressure (or the factor required by the design code or standard if different) plus the 2 yearly tests above in the last 4 years	A		
2.4	Cylinder Testing – Composite Cylinders *D 018, Sheet 10.2*	External and internal visual examination in the last 6 months	A		
2.5		External and internal visual examination plus gas leak test to maximum working pressure in the last 12 months (possible overpressure test)	A		
2.6		Hydraulic proof pressure test to the pressure marked on the cylinder OR volumetric expansion test as appropriate to the design of the cylinder in the last 5 years. In either case plus the 6 and 12 monthly tests above	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
2.7	Pipe Work Testing *D 018, Sheets 24.1 & 24.2*	Pressure test to 1.5 times maximum working pressure when new	A		
2.8		Internal cleanliness verified to appropriate standard	A		
2.9		Visual examination in the last 6 months	A		
2.10		Gas leak test at maximum working pressure in the last 2 years	A		
2.11	Relief Valves	Pressure relief valves may or may not be fitted to any gas or air storage. If they are fitted then they should comply with the testing requirements detailed below			
2.12	Relief Valve Testing *D 018, Sheet 24.3*	Visual examination in the last 6 months	A		
2.13		Function test at required relief setting followed by leak test at maximum working pressure in the last 2½ years	A		
3	**Contents Status**				
3.1	Status	A record must be kept in a designated place of the contents and pressure of each cylinder or bank of cylinders	A		
3.2	Minimum Quantities	This record should also show clearly the minimum quantities required as in IMCA D 050	B		
3.3	Pressure Indication	There should be a mechanism such that the supervisor is able to establish the pressure in each HP cylinder or bank of cylinders supplying gas to the diver(s)	B		
4	**Gas Mixes with Over 25% Oxygen**				
4.1	Content	Any nitrogen and oxygen mixture containing over 25% oxygen must be treated as if it was pure oxygen	A		
4.2	Signs	Fire hazard warning signs should be erected in the vicinity of any gas mixes containing over 25% oxygen	A		
4.3	Pressure	The pressure of such high oxygen content mixtures should be regulated down at or close to the cylinder to a maximum of 40 bar (600 psi)	B		
4.4	Pipework	High oxygen content mixtures should be hard piped wherever possible. Only flexibles compatible with oxygen should be used and they should be kept as short as possible Note: Refer to section 5.6 of IMCA D 048 for guidance on the use of flexibles for charging of storage cylinders in a daughtercraft	B		