Diving Equipment Systems Inspection Guidance Note – DESIGN for Hyperbaric Rescue Unit (HRU) Life Support Packages (LSP)

IMCA D 063
December 2021

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IMCA D 063

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IMCA D 063 – Version History

Date	Reason	Revision
December 2021	Initial publication	

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Part 1: Guidance

Part 2: Detail Sheets

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 (DESIGN for surface orientated (air) diving systems (IMCA D 023), published 2000) and the other for saturation diving (DESIGN for saturation (bell) diving systems (IMCA D 024), published 2001). Subsequently documents were issued in 2006 for surface supplied mixed gas diving (DESIGN for surface supplied mixed gas diving systems (IMCA D 037)) and mobile/portable surface supplied diving (DESIGN for mobile/portable surface supplied systems (IMCA D 040)). In 2014 a further DESIGN document for hyperbaric rescue facilities (DESIGN for the hyperbaric reception facility (HRF) forming part of a hyperbaric evacuation system (HES) (IMCA D 053)) was published.

IMCA D 024 for saturation diving systems was revised and updated in March 2013. At that time, it was recognised that it was no longer adequate to simply have a small section in this document to cover hyperbaric evacuation.

IMCA D 024 was revised again in 2014. That revision included sections for the hyperbaric rescue unit (HRU), its launch system and its interfaces with the saturation diving system as well as the life support package (LSP). However, it was recognised that any hyperbaric reception facility (HRF) forming part of the hyperbaric evacuation system (HES) would be likely to be in a different physical location to the equipment covered by IMCA D 024 and would thus need a separate DESIGN document. This led to the publication of IMCA D 053 in 2014.

It has now also been recognised that the HRU LSP will be in a different physical location to the equipment covered by IMCA D 024. Therefore Section 16 of IMCA D 024 has been removed and used as the basis for the preparation of this new separate document *DESIGN for Hyperbaric Rescue Unit Life Support Packages* (IMCA D 063).

IMCA DESIGN documents are periodically updated to clarify any anomalies and bring the guidance into alignment with the latest industry good practice.

1.2 IMCA D 063

IMCA D 063 replaces IMCA D 024, Section 16 and brings IMCA's guidelines on *DESIGN* requirements for hyperbaric rescue unit life support packages into alignment with current industry good practice.

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

1.3 Status of the Document

This document offers examples of good practice. It gives advice on aspects of an HRU LSP 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 an HRU LSP 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 HRU LSP system 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 nautical miles or 22.22 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;

- vessel owners and marine crews involved with diving operations;
- staff involved in the maintenance, repair, testing 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 where 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.

1.6 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.

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 Transition Period for Implementation

This document represents a revision of IMCA D 024, Section 16 to recognise changes in good practice which have evolved over the years, and to present IMCA's guidelines on *DESIGN* requirements for hyperbaric rescue unit life support packages as a separate DESIGN document.

For a period of one year following the publication of this revised DESIGN document (IMCA D 063), IMCA Members may, if they wish, observe the requirements of the previous version of the document (IMCA D 024 Rev. 2, Section 16). This is to allow IMCA Members the time to make any necessary adjustments to their diving plant and equipment and/or company management arrangements before fully implementing the requirements of the revised document.

In view of this, IMCA will continue to publish IMCA D 024 Rev. 2 alongside IMCA D 063 for a period of one year, after which period of time IMCA D 024 Rev. 2 will be withdrawn.

1.8 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.

1.9 Use of the Completed Document

A completed and up to date version of this document should be available for an HRU LSP 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 HRU LSP 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.

1.10 Annual Auditing of Diving Systems

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

2 List of Acronyms

Note: The Glossary (Appendix 2) of IMCA D 052 gives the meaning of the phrases below that are specific to hyperbaric evacuation.

AODC	Association of Offshore Diving Contractors
ASME	American Society of Mechanical Engineers
BA	Breathing apparatus
BIBS	Built-in breathing system
CCTV	Closed circuit television
DESIGN	Diving Equipment Systems Inspection Guidance Note
DMAC	Diving Medical Advisory Committee
DP	Dynamic positioning
ECU	Environmental control unit
FMEA	Failure modes and effects analysis
fsw	Feet of seawater
HAZOP	Hazard and operability study
HES	Hyperbaric evacuation system
HP	High pressure
HRF	Hyperbaric reception facility
HRU	Hyperbaric rescue unit
IMCA	International Marine Contractors Association
IMO	International Maritime Organization
LP	Low pressure
LSP	Life support package
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
PVHO	Pressure vessels for human occupancy
QA	Quality assurance
RA	Risk assessment
ROV	Remotely operated vehicle
SPHL	Self-propelled hyperbaric lifeboat
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 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 (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 cannot 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 (Guidance on competence assurance and assessment: Diving Division (IMCA C 003)).

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 that 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 HRU LSP 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 need to be examined, tested and certified as suitable for use as necessary.

It is normally the responsibility of the diving contractor to ensure that a complete copy of this document is prepared for any individual HRU LSP 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 completing this document identifying any faults, omissions or problems.

More detailed guidance on the system of auditing, types of auditors, etc. is contained in Guidance on auditing of diving systems (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;
- 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 an HRU LSP 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 completing this document 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 confusion, 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 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 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) 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 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 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 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 and the absence of which would still allow the diving equipment to be used safely.

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 'Requirement' column (see 7.4 for details).

6.5.6 Certificate Issue 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 (see section 7.3, however, regarding detail sheet section 11).

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 re-issued.

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 two surface compression chambers then that section would be completed twice, once for each chamber. Similarly, if there were, for example, six diving helmets, then the part on diving helmets would be completed six times within the overall section.

Detail Sheet section 11 is different from the others in that it is intended that the two columns on the right side ('Response' and 'Certificate Issue Date') should be repeated for each compressor, pump, ECU etc. This will mean extending section 11 to the right by several more columns, depending on the number of compressors, pumps etc. involved. It is therefore likely that detail sheet section 11 will require to be prepared and maintained in an electronic format.

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 a 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 these should 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. Further details on all IMCA/AODC/DMAC publications and their latest revisions are available from the IMCA website (www.imca-int.com).

Association of Offshore Diving Contractors (AODC)

Emergency procedures – provisions to be included for diving bell recovery (AODC 19)

Bell ballast release systems and buoyant ascent in offshore diving operations (AODC 61)

Diving Medical Advisory Committee (DMAC)

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

The provision of emergency medical care for divers in saturation (DMAC 28)

IMCA

Guidance on competence assurance and assessment: Diving Division (IMCA C 003)

Battery packs in pressure housings *(*IMCA D 002)

The initial and periodic examination, testing and certification of hyperbaric evacuation launch systems *(*IMCA D 004)

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

Guidance on auditing of diving systems (IMCA D 011)

Code of practice for the initial and periodic examination, testing and certification of diving plant and equipment (IMCA D 018)

DESIGN for surface orientated (air) diving systems (IMCA D 023)

DESIGN for surface supplied mixed gas diving systems (IMCA D 037)

FMEA guide for diving systems (IMCA D 039)

DESIGN for mobile/portable surface supplied systems (IMCA D 040)

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

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

Acrylic plastic viewports (IMCA D 047)

Minimum quantities of gas required offshore (IMCA D 050)

Hyperbaric evacuation systems (HES) interface recommendations (IMCA D 051)

Guidance on hyperbaric evacuation systems (IMCA D 052)

DESIGN for the hyperbaric reception facility (HRF) forming part of a hyperbaric evacuation system (HES) (IMCA D 053)

Pressure gauges and other forms of pressure monitoring equipment used in conjunction with diving operations (IMCA D 062)

Wire rope integrity management for vessels in the offshore industry (IMCA LR 001, IMCA SEL 022, IMCA M 194)

Diving Equipment Systems Inspection Guidance Note – DESIGN for Hyperbaric Rescue Unit (HRU) Life Support Packages (LSP)

IMCA D 063 Part 2
December 2021

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

Section 1 – Life Support Package (LSP)

The life support package is an emergency facility that functions in a similar manner to the overall life support system on an offshore saturation system. The exact detail of the LSP will be dependent on the planning and risk assessment for the method of recovering the HRU and carrying out the decompression. In some circumstances the LSP may be already built into a specialised recovery vessel and in other cases may be needed only to provide support during transport of the HRU from the recovery site to a nominated HRF

The LSP needs to be capable of providing all necessary life support and control for the period of time taken to locate the HRU and LSP to an HRF or if required, to carry out a full decompression. It should therefore meet the requirements detailed below, subject to variations due to its type as mentioned above

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**Classification Society**				
1.1	General	The LSP may or may not be certified by a recognised classification society Note: The next point will only apply if the LSP is certified			
1.2	Conditions	If there are any conditions attached to the certification associated with the LSP then these should be clearly identified to those operating the system	A		
2A	**LSP System Assessment - General**				
2A.1	General (Refer to IMCA D 039 for full guidance).	A systematic assessment of the LSP system should be available to demonstrate that the equipment provided for the diving operation is both adequate and fit for its intended use. This assessment must include an FME(C)A. Notes: 1. Procedures for all operating states of the equipment (i.e. normal, maintenance and testing modes) should be available. 2. IMCA D 039 provides guidance on compiling a suitable FME(C)A. 3. The auditor is not being asked to confirm the adequacy of the assessment, only that it has been carried out.	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
2B	**LSP System Assessment - Automated Control Systems**				
2B.1	Identification of Automated Control Systems. (Refer to IMCA D 069 for full guidance).	A systematic assessment of the LSP system should be available to identify automated control systems that contain automated functions. Notes: 1. Automated control system descriptions can be found in the relevant OEM and/or operator manuals, which may be referenced. 2. The auditor is not being asked to confirm the adequacy of the exercise, only that it has been carried out.	A		
2B.2	Categorisation of Automated Control Systems. (Refer to IMCA D 069 for full guidance).	All identified automated control systems within the LSP system should be categorised as either safety critical or as non-safety critical. Notes: 1. Automated control systems may rely upon PLCs, PACs, logic relay units etc. 2. Data gathering or datalogging is one example of an automated system that may not require any detailed assessment. 3. The categorisation of automated control systems as safety-critical may already be defined as a result of an FME(C)A or similar (see Item 2A.1). 4. The auditor is not being asked to confirm the adequacy of the exercise, only that it has been carried out.	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
2B.3	Assessment of Safety Critical Automated Control Systems. (Refer to IMCA D 069 for full guidance).	A systematic assessment of the safety critical automated functions within the LSP system should be available to demonstrate that the risk of an automated control system failure will be reduced to a level as low as reasonably practicable (ALARP). The assessment should also demonstrate that arrangements are in place for the maintenance of the identified safety critical automated control systems. Notes 1. Procedures for all operating states of the safety critical automated control systems (i.e. normal, maintenance, and testing modes) should be available. 2. Where a Safety Integrity Level (SIL) is required, a SIL assessment should be available. 3. IMCA D 069 provides guidance on the systematic assessment of control systems in automated diving plant and equipment. 4. The auditor is not being asked to confirm the adequacy of the assessment, only that it has been carried out.	A		
3	**Documentation** – *The following documentation should be available as part of the LSP*				
3.1	Load Out List	A load-out list to check that all components/supplies are present	A		
3.2	Manuals	All relevant manuals including as a minimum, diving and equipment normal and emergency operating procedures, decompression tables and contacts list Note: The auditor is not being asked to confirm the adequacy of these procedures, merely that they are present	A		
3.3	Tapping Code	A tapping code card	A		
3.4	Quick Start Guide	A quick start guide – typically two pages on how to get the unit running quickly	B		
3.5	Valve Check Lists	Valve check lists for the LSP	A		
4	**General Safety**				
4.1	General Access	There must be a level of access available around the LSP and its components sufficient to allow operational personnel to safely and efficiently carry out their duties	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
4.2	Safety of Access	Consideration shall be given to the safety of personnel operating around the LSP in terms of such things as slip and trip hazards, access steps, handrails, etc. Consideration should also be given to adjacent activities and equipment which could interfere with the LSP or HRU	B		
4.3	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		
4.4	Sea Fastening (Design of)	If mounted on a vessel, the LSP 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	A		
4.5	Sea Fastening (Installation)	If sea fastening is required, any welded fixtures should have 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 within and around the LSP sufficient to allow personnel to safely and efficiently carry out their duties. This should have both primary and secondary power supplies for these lights	A		
5.2	Emergency Lighting	Automatic emergency lighting should be available in all internal critical areas to allow personnel to move around safely	B		
5.3	External Lighting	For an LSP that is not situated in a well-lit area, portable external lighting for night working should be available. This should include a facility for emergency lighting (battery powered) in the event of power failure	B		
6	**Electrical Power**				
6.1	Schematic	Electrical schematics for the LSP should be available	A		
6.2	Power Requirements	An assessment is required to identify the electrical power required by the LSP in normal operational mode	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
6.3	Primary Power	Primary power supply is assumed to be by connecting to vessel or shore based main supply. This connection should be by isolating transformer	B		
6.4	Emergency Power Requirements	The LSP must be able to continue operating in the event of loss of primary power. This will normally be by connection to an emergency generator. If a UPS is used as emergency support for critical low powered electrical apparatus (such as communications and analysis equipment), an assessment should be available detailing its duration under load against the time necessary to provide emergency power	A		
6.5	Transformers	Two transformers with variable input and providing outputs of 220/110V ac and 24/12V dc should form part of the LSP	A		
6.6	Supply Points	As a minimum there should be electrical supply points inside the container (or control area) available for 4 off 110V ac, 1 off 32A 3-phase and 1 off 16A single phase	A		
6.7	Electrics	All electrical equipment must be securely installed with all power leads and wiring secured (as far as is practical in the circumstances) in such a way that it is protected from accidental damage	B		
6.8	Protection	A certificate should be available confirming that RCDs are fitted wherever possible to protect against electrical failures and that all components and any containers are correctly earthed	A		
6.9	Electrical Testing *D 018, Sheet 11*	Visual examination, function test (including protective devices) plus continuity and resistance tests of all cables and electrical equipment within the last 6 months OR in accordance with a detailed electrical testing schedule prepared by a competent person	A		
6.10	Emergency Power Testing *D 018, Sheet 37*	A test should have been carried out within the last 12 months to demonstrate the functioning and adequacy of emergency electrical power supplies.	A		
6.11	UPS Testing *D 018, Sheet 37*	UPS Testing – Where a UPS is fitted, a test should have been carried out within the last 12 months to check power continues to be supplied in normal circumstances, through bypassing the UPS, in the event of a UPS failure, and that the visual and/or audio indication of such failure functions correctly.	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
7	**Container** – *Note: The section below applies where the LSP uses container(s) to house the control area and equipment. If the LSP is permanently built into a ship or similar, then this section does not apply*				
7.1	Rating	Containers should be suitable for offshore use in terms of lifting arrangements, strength, etc. Unless intended for use within a 'zoned' area they do not need to meet offshore electrical zoning requirements Note: If the LSP is not intended to go on a vessel or offshore then it does not need to meet this requirement	A		
7.2	Dividing Wall	If the control area and machinery are in the same container a dividing wall between them is not necessary as long as there are noise reduction measures in place for the safe operation of the system e.g. enclosing of machinery, use of comms headsets etc.	B		
7.3	Insulation	There should be thermal and sound insulation on walls and roof in the control area	B		
7.4	Access Door	The access door to the control area should be capable of being opened from both sides	A		
7.5	Penetrator Panel	Penetrator panel for incoming/outgoing electrical and other supplies should not be sited in the immediate vicinity of the regular access door	A		
7.6	Heating	Where ambient temperatures are likely to be low there is a need to have heating inside the container. This will provide suitable and stable temperatures for the equipment/machinery and also a suitable working environment for the control area	A		
7.7	Cooling	Where ambient temperatures are likely to be high, there is a need to have cooling inside the container. Again, this will provide suitable and stable temperatures for the equipment/machinery and also a suitable working environment for the control area	A		
8	**Control Area** – *Note: The following section will apply to the control area whether inside a container or permanently built into a ship or similar*				
8.1	Heating	Where ambient temperatures are likely to be low there is a need to have heating inside the control area	A		
8.2	Cooling	Where ambient temperatures are likely to be high, there is a need to have cooling inside the control area	B		

Item	Description	Requirement	Need	Response	Certificate Issue Date
8.3	Breathing Apparatus - Provision	Emergency breathing apparatus (umbilical supplied or self-contained) fitted with communications must be available for the life support personnel so that they may perform their duties in a smoky or polluted atmosphere. Any storage cylinders or self-contained breathing apparatus (SCBA) set(s) should be of suitable capacity and endurance	A		
8.4	Umbilical Supply	If emergency air for the life support personnel is umbilical supplied, it should be fed from cylinder stored compressed air. The cylinder stored compressed air source for the umbilical supplied surface breathing apparatus should be separate to any compressed air sources intended for HRU chamber use. SCBA with suitable capacity and endurance should also be available in case of umbilical supply failure or to allow escape	A		
8.5	BA Testing *D 018, Sheet 5.1 & 9.1*	Visual examination and function test (including communications) in the last 6 months. Check made at the same time that cylinder is fully charged	A		
8.6		External visual examination of cylinder plus gas leak test to maximum working pressure in the last 2½ years	A		
8.7		Internal and external visual examination of cylinder plus gas leak test to maximum working pressure in the last 5 years (possible overpressure test)	A		
8.8	HRU Communications	There must be two-way hard-wired voice communications between the divers inside the chamber and those outside at the LSP control point. This should include a helium unscrambler	A		
8.9	Secondary Communications	A secondary (back up) communication system (such as a sound powered phone) should exist between the divers inside the chamber and those outside at the LSP control point	B		
8.10	Communication 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. Check condition of batteries (if applicable)	A		
8.11	Control Point	The life support personnel must be provided with a control panel (or similar) to allow them to properly control and monitor the conditions inside the pressurised chamber	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
8.12	Gauges	Life support personnel must have available to them enough suitable gauges so that they are aware of the depth of the chamber and of the supply pressures of each main or back-up breathing supply	A		
8.13	Pressure Limiting	A pressure limiting device may be fitted to avoid gauges being over pressurised	C		
8.14	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 to 75% of full-scale deflection although they will need to operate in the 0 to 25% range during decompression. If used for the final stages of decompression, they must have scale divisions of no more than 0.5msw/2 fsw	A		
8.15	Unit Marking	All depth gauges should be marked in the same unit system (imperial or metric). Dual scale marking is acceptable	A		
8.16	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		
8.17	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. (If further information is required, refer to IMCA D 062)	A		
8.18	Gas Source/Supply	These are gauges that indicate pressure but are not directly used for life support			
8.19	Gauge Position	They must be positioned to show the line pressure of sources coming into 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		
8.20	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		

Item	Description	Requirement	Need	Response	Certificate Issue Date
8.21	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. This is particularly the case if a depth gauge can read the depth of more than one compartment. Cross-over valves should either be fixed in one position (the handles may be removed to avoid accidental changes) or should indicate very clearly what supply 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	A		
8.22	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 Note: The frequency and nature of the calibration of pressure sensors and gauges integral to automated functions may be defined in a scheme prepared by a competent person.	A		
8.23	General	The life support personnel must be provided with sufficient valves and fittings to allow gas and exhaust control plus make up of metabolic oxygen	A		
8.24	Ease of Operation	All valves must be free of corrosion and should operate easily	A		
8.25	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		
8.26	Valve Marking	The function of all valves must be clearly marked	A		
8.27	Quarter Turn Valves	Valves carrying oxygen (or mixes containing more than 25% oxygen) at a pressure higher than 15 bar must not be quarter turn Note: Due to the depths involved in saturation diving, the pressure of such gases will often require to be above 15 bar	A		
8.28	Exhaust Venting	Exhaust pipework must not vent into an enclosed space. Typically, the exhaust should be piped to vent to atmosphere Note: Panel PRVs, medical lock vents and sampling for analysis do not constitute exhaust pipework	A		
8.29	Accessibility	Gas pipework, particularly in panels and at connection points, must be accessible for maintenance and repair	B		

Item	Description	Requirement	Need	Response	Certificate Issue Date
8.30	O_2 Make Up	There must be a flow indicator at the control point on the downstream side of the chamber O_2 make-up line to indicate that O_2 is flowing into the chamber.	B		
8.31	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		
8.32		Visual examination of all pipework, valves, fittings, etc. within the last 6 months	A		
8.33		Valves and pipework need to have had a gas leak test to maximum working pressure in the last 2.5 years	A		
8.34	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			
8.35	Relief Valve Testing *D 018, Sheet 24.3*	Visual examination in the last 6 months	A		
8.36		Function test at required relief setting followed by leak test at maximum working pressure in the last 2½ years. Normally the leak test is carried out integral with the pipework	A		
8.37	Electrics	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		
8.38	Electrical Testing *D 018, Sheet 11*	Visual examination, function test (including protective devices) plus continuity and resistance tests of all cables and electrical equipment within the last 6 months OR in accordance with a detailed electrical testing schedule prepared by a competent person	A		
8.39	Emergency Power Testing *D 018, Sheet 37*	A test should have been carried out within the last 12 months to demonstrate the functioning and adequacy of emergency electrical power supplies.	A		
8.40	UPS Testing *D 018, Sheet 37*	UPS Testing – Where a UPS is fitted, a test should have been carried out within the last 12 months to check power continues to be supplied in normal circumstances, through bypassing the UPS, in the event of a UPS failure, and that the visual and/or audio indication of such failure functions correctly.	A		
8.41	Surveillance	The life support personnel must be able to have sight of the divers inside the HRU chamber. If this is not possible through an easily accessible viewport, then a CCTV system must be provided	B		

Item	Description	Requirement	Need	Response	Certificate Issue Date
8.42	Environmental Control	There must be a means of measuring the various environmental parameters inside the chamber. In the case of some parameters this requires both primary and secondary (back up) capabilities. The parameters to be monitored are:	A		
8.43	Oxygen Primary	Oxygen – Primary analysis	A		
8.44	Oxygen Secondary	Oxygen – Secondary analysis	B		
8.45	CO_2 Primary	Carbon dioxide – Primary analysis	A		
8.46	CO_2 Secondary	Carbon dioxide – Secondary analysis	B		
8.47	Temperature	Temperature	A		
8.48	Humidity	Humidity	A		
8.49	Control Point Analysis	An oxygen analyser with high and low alarm should be fitted to detect changes in the oxygen level ambient to the control point as a result of possible gas leaks	A		
8.50	Analyser and Alarm Testing *D 018, Sheets 2 & 34*	Analysers must have been examined, function tested and calibrated in situ within the last 6 months	A		
8.51		Alarms must have been function tested within the last 6 months	A		
8.52	Chamber Temperature Control	A means should be available to allow the life support personnel to control the temperature inside the chamber	B		
8.53	Chamber Humidity Control	A means may be available to allow the life support personnel to control the humidity inside the chamber	C		
8.54	VHF Radios	A minimum of four hand-held VHF radios should be available for use by the LSP personnel	A		
8.55	Phone	A mobile phone working on the local system (if applicable) or a permanent land line should be available Note: If the LSP is onboard a vessel then the communications systems onboard that vessel would normally be sufficient	B		
8.56	Satellite Phone	Dependent on location and difficulty of local communications, it may be useful for a satellite phone to be available	C		

Item	Description	Requirement	Need	Response	Certificate Issue Date
8.57	Function Testing *D 018, Sheet 34*	Any item above that is not subject to a specific testing regime should have been examined and function tested within the last 6 months, unless a sealed unit subject to regular manufacturer servicing	A		
9	**HRU Chamber Environment Heating and Cooling**				
9.1	Provision	The LSP should be able to provide the level of flow and temperature of coolant and heating effect required by the HRU as demonstrated during the thermal balance testing. This should be adequate from the likely environmental parameters to be encountered and both the minimum and maximum number of divers that could be evacuated	B		
9.2	Redundancy	The system comprising the LSP and the HRU should have sufficient backup for heating and cooling arrangements to ensure the safety of the divers This may be achieved by a variety of means e.g. use of an LSP fitted with two complete heating and cooling systems; use of two LSPs each fitted with a single complete heating and cooling system; use of the heating and cooling systems fitted to an SPHL (either alone or in conjunction with an LSP fitted with a single heating and cooling system) etc. **Note:** If the hyperbaric evacuation plan involves transporting an HRU from a quayside to an inland HRF it may be acceptable, subject to the findings of a robust project-specific risk assessment, to use an LSP fitted with a single complete heating and cooling system for short land transits. In some circumstances the use of an LSP for short land transits may not be needed at all. The safety of the divers is of paramount importance at all times	B		
9.3	Function Testing *D018, Sheet 13*	Visual examination and function test within the last 6 months (this may require recalibration of the control system) should have been carried out	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
10	**Gas Sources/Supplies and Consumables**				
The gas mixes and volumes required will be entirely dependent on a number of factors such as the depth of the saturated divers; their number; and the designated use of the LSP within the Hyperbaric Evacuation Plan (HEP). It may be that the LSP will only be required to extend the autonomy of the HRU for a short period e.g. to provide support while the HRU is being used as a temporary safe haven or during the period when it is being moved to an HRF. On the other hand, the LSP may have to support the HRU for an extended period of time e.g. where it is intended to carry out full decompression of the divers inside the HRU. A list of detailed requirements will need to be prepared for each specific work site. Further guidance can be found within IMCA D 050. *It may not be practical or possible for the LSP to contain all of the required gas and consumables for a full decompression, or for unforeseen events. In such a circumstance, part of the planning should include details of nearby locations which could supply additional gas and consumables, including details of the transport arrangements and likely timescales required to move these to the LSP location.*				
10.1	Quantities	Exact quantities and composition of gas required (including back-up and spare) should be specified in the diving contractor's site-specific procedures Note: The auditor is not being asked to confirm the adequacy of what is specified, only that they are specified	A		
10.2	HRU Chamber Gas	A minimum of one dedicated HRU chamber blowdown/exhaust gas supply.	A		
10.3	Oxygen Supply	A minimum of one dedicated oxygen supply	A		
10.4	BIBS Supply	A minimum of one dedicated supply for BIBS	A		
10.5	Calibration Gas	Suitable calibration gas available	A		
10.6	Sodasorb	A minimum quantity of sodasorb or similar calculated on the basis of a usage of 6Kg of sodasorb per man per day and the length of time anticipated for LSP support	A		
10.7	Extra Supplies	If there are not sufficient consumables or gas present at the LSP to cover the full intended duration of its use, are details of nearby locations which could supply extra consumables, details of the transport requirements to move these to the LSP and a likely timescale available	A		
11	**Supplies to the LSP** – *The following list of minimum supplies required is prepared assuming an LSP which is not permanent or built into a ship. For permanent or built in LSPs, some of the following will not be relevant*				
11.1	Pressure Reduction	Ability to reduce pressure before control panel (normally at quads) if required by the specific HRU. This will require a minimum of five gas regulators which should all be suitable for oxygen or high oxygen mixes. That is one each for main gas/BIBS mix/O_2 and two spares to be carried in the LSP for fitting to gas quads	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
11.2	Gas Hoses	Five hoses (three for gas and two for O_2, which gives one spare of each type) to connect to the gas quads. Minimum length 15 metres (5 metres for oxygen hoses) but risk assessment should identify possible distance to quads if this may be greater. Hoses to be ½" diameter with No 8 JIC end fittings. Hoses to be O_2 cleaned as required. Hoses to be correct type for the service, i.e. if for O_2, then should be specific O_2 hoses	A		
11.3	Main Power Cable	A minimum 20m length of main power cable capable of being connected to a supply from shore/ship/generator. Detail of connections should be available from the planning process	A		
11.4	Water Connection	Sufficient hoses and connectors to connect LSP to water supply. Detail should be available from the planning process and may need to include a submersible pump and filter if water is to be sourced from a harbour or similar	B		
11.5	Hose Component Testing *D 018, Sheet 28*	When new, hydro test to 1.5 times maximum working pressure or as recommended	A		
11.6		Visual examination and function test in the last 6 months	A		
11.7		Pressure leak test to maximum working pressure in the last 2 years	A		
12	**Umbilical for Connection to HRU**				
12.1	Umbilical	The normal means of connecting the HRU to the LSP will be by the use of an umbilical between the two. This may be a composite umbilical or a taped up bundle	B		
12.2	Length	Minimum length of 50 metres	A		
12.3	End Fittings	Hoses and cable ends to have the correct fittings and plugs to connect to the standard IMCA panel as detailed in IMCA D 051	A		
12.4	Water Hoses	Normally only two water hoses being an inlet and outlet as these can be used for either hot or cold water	A		
12.5	Extra Hoses	Separate hot and cold-water hoses (i.e. four in total) may be provided	C		
12.6	Electrical Component Testing *D 018, Sheet 11*	Visual examination, function test (including protective devices) plus continuity and resistance tests of all cables and electrical equipment within the last 6 months OR in accordance with a detailed electrical testing schedule prepared by a competent person	A		
12.7		When new, hydro test to 1.5 times maximum working pressure or as recommended	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
12.8	Hose Component Testing *D 018, Sheet 28*	Visual examination and function test in the last 6 months	A		
12.9		Pressure leak test to maximum working pressure in the last 2 years	A		
13	**HRU Handling**				
13.1	Lifting Plan	A lifting plan should be available detailing how the HRU is to be lifted and handled if it is to be removed from the water. This should identify any rigging, spreader beam or other lifting equipment needed	A		
13.2	Lifting Equipment	The rigging, spreader beam or other lifting equipment identified in the lifting plan should be available	A		
13.3	Support	If the HRU is to be lifted out of the water, a means should be available of safely supporting it while connected to the LSP. Normally this will be a custom designed cradle or similar	B		
14	**Firefighting**				
14.1	Availability	Suitable firefighting arrangements must be made for the LSP and surrounding area. Such equipment must be available inside the control area as well as outside. This may be by means of permanent equipment or by means of portable extinguishers etc. It should be capable of dealing with any type or size of foreseeable fire hazard	A		
14.2	Firefighting Testing *D 018, Sheet 15 & 16*	Whether fixed or portable it should be in accordance with manufacturer's specification and fit for the purpose it will be used for	A		
14.3		If it is a portable system, then it must have had an external visual examination and check that any indicating device reads within the acceptable range within the last 6 months	A		
14.4		If this is a fixed system then the nozzles, valves, pipework, etc. must have been visually examined in the last 6 months	A		
14.5		If this is a fixed system, it must be function tested to demonstrate operation of the system OR had a simulated test using air or gas as the test medium in the last 12 months	A		
14.6		If an automatic detection/activation system is fitted, then a function test to demonstrate correct operation must have been carried out in the last 12 months	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
15	**Pressure Relief Valves**				
15.1	Identification	It must be possible to identify all PRVs for the unit serial number, unit location, set pressure, reset pressure; the date last tested/due test date	A		
16	**Medical Equipment**				
16.1	Provision	There should be a list in place detailing what type of medical equipment is available with the LSP. As a minimum this should comply with the requirements of DMAC 15 (or as agreed with company medical adviser) unless local regulations prohibit any of the contents	B		
16.2	First Aid	There should be facilities available for the provision of treatment of minor injuries. This may be by means of a local first aid kit, a nearby sick bay, or similar	B		
16.3	Medical Container	The medical equipment should be in a suitable protective container clearly marked with a white cross on a green background	B		
16.4	Content Checking	This equipment should have been checked for integrity within the last 6 months with the date the next check is due clearly marked on it	A		
17	**Maintenance**				
17.1	Requirement	A system should be in place whereby all items of plant and equipment are subject to regular maintenance	A		
17.2	Schedule	A schedule should exist indicating the frequency and content of each task. This should take into account the manufacturers' instructions and it should also meet the requirement of the relevant IMCA D 018 detail sheet	A		
17.3	Records	Records (written or electronic) should be available demonstrating that the plant and equipment has been subject to regular planned maintenance	A		