Diving Equipment Systems
Inspection Guidance Note

DESIGN for Surface Supplied Mixed Gas Diving Systems

International Marine
Contractors Association

www.imca-int.com

IMCA D 037
January 2006

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 037

This document was prepared for IMCA, under the direction of its Diving Division Management Committee, by a workgroup chaired by Crawford W Logan and comprising representatives of the IMCA Americas Deepwater, Asia-Pacific and Europe & Africa Sections.

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 040 for Mobile/Portable Surface Supplied Diving Systems (currently in preparation)

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DESIGN for Surface Supplied Mixed Gas Diving Systems

IMCA D 037 – January 2006

1 Introduction

This document sets out equipment requirements for surface supplied mixed gas diving systems.

It is intended that the document is used in conjunction with IMCA's *Code of Practice on the Initial and Periodic Examination, Testing and Certification of Diving Plant and Equipment* (IMCA D 018 dated February 1999). Cross-references to this code are provided where appropriate (see 5.5.2).

1.1 Background

Regulations were introduced in some countries during the 1970s and 1980s which required diving plant and equipment to be examined and tested at set intervals and certificates produced to verify that this work had been carried out correctly. The regulations also required certain minimum amounts of equipment to be provided and laid down various other parameters required for a diving system. Although the various regulations were not identical, there was a similar theme. Many of the requirements however were not specific and were, therefore, open to varying interpretations.

In order to give some guidance to the offshore industry, AODC (which later merged to form IMCA) produced a number of reference documents, standards and guidance notes. It was clear, however, that there was still considerable confusion with some diving systems being 'audited' several times each year by different clients, each of whose auditors had slightly different interpretations of what was required.

Document AODC 052 was published in February 1989, seeking to clarify any interpretations necessary and to identify a common standard which could be applied by all parties during an audit. After it had been in use for some years it was realised that AODC 052 needed to be expanded and the AODC 052 Rev. 1 was published in February 1995. This was a much more comprehensive document which covered both air and saturation diving systems.

With the increasing international nature of the offshore diving industry, it was decided in 1998 to revise AODC 052 Rev. 1 in order to simplify it, clarify any anomalies which had shown up and adapt it for wider use. It was also decided to split it in to two separate documents – one for air diving and another for saturation diving.

The two replacement documents, IMCA D 023 (for surface orientated (air) diving systems) and D 024 (for saturation (bell) diving systems) were published in 2000 and 2001 and have been used successfully world-wide. This document is an adaptation of IMCA D 023, modified to specifically cover surface supplied mixed gas diving equipment.

1.2 Status of the Document

This document offers examples of good practice. It gives advice on aspects of a diving system which 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.

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

1.3 Work Covered by the Document

This document addresses various aspects of a surface supplied mixed gas 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 diving is being carried out in support of the oil and gas industry and the diving operation is not classed as civil, inland or inshore work.

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

- personnel involved in diving operations;
- client staff involved in the maintenance or repair of plant and equipment;
- client and contractor representatives;
- vessel owners and marine crews involved with diving operations;
- all personnel involved in QA and safety.

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

1.4 National and Other Regulations

A number of countries in the world have national regulations which apply to offshore diving operations taking place within waters controlled by that country. In such cases national regulations must take precedence over this 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 IMO (International Maritime Organization) documents) that diving contractors either have to comply with or take note of.

1.5 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. This is the basis of the certification which the diving contractor normally maintains in a plant and equipment register, or records in the planned maintenance system.

Only generic items of diving plant and equipment are addressed and the detail sheets do not include information on constituent parts of ancillary equipment such as tools and divers' personal equipment, the only exception being the diver's underwater breathing apparatus.

1.6 Implementation

This document set out current good practice which have evolved over the years and thus it should be possible to implement the requirements of this document soon after publication.

1.7 Updating Arrangements

This document is a dynamic document and the advice given in it will be reviewed periodically 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).

2 The Competent Person

2.1 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.

2.2 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 the individual 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 mis-match between the written requirements and what is required to secure adequate health and safety. In addition the end result would lack the flexibility to allow work to continue broadly in the form in which it is known today. The concept of the competent person avoids this problem.

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

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

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

2.3 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 document require a competent person to issue a certificate lasting for a specified 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. He 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. This level of competence would normally be met by a technician specialising in this type of work and in some cases may be met by the diving supervisor or the life support supervisor.

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

2.4 Appointment of a Competent Person

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

2.5 Categories of Competent Person in this Document

IMCA D 018[1] 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.

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

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

3 Responsibilities

3.1 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.

3.2 The Competent Person

The competent person has a number of responsibilities.

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

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

4 Planned Maintenance Systems (PMS)

4.1 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 needed to achieve systematic and effective maintenance.

4.2 Planned Maintenance Programmes

These may be prepared in different formats such as:

- a series of notebooks or files etc., one being provided for each major item of equipment;
- a card index system;
- a computer program, backed up by a hard or non corruptible copy.

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

- inclusion of manufacturers' recommendations and manuals, where appropriate;
- compliance with the requirements of this document where some types of certification is achieved by means of the PMS;
- a record of planned work to be kept showing each item of maintenance and the interval at which it should be maintained i.e. daily, weekly, monthly, yearly etc.;
- a record of unplanned work, including repairs;
- traceability to the person who carried out the work as recorded on an item of equipment whether manual or computer systems are employed;
- records to be kept logically. There should be no doubt in the completed document as to the date on which 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.

4.3 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 this document unless an adequate PMS existed. In this respect the PMS would normally be one of the matters considered by the competent person when deciding on the level of test and examination required in relation to any specific piece of plant and equipment.

5 Key Features of this Document

5.1 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.

5.2 Meaning of Terms Used

5.2.1 Examination

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

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

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

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

5.2.2 Function Test

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

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

5.2.3 Testing

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

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

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

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

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.

5.4 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.

Replacement of the termination on a man carrying wire rope 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 effect the validity of the certification.

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.

As a guide, replacement of one item with an identical or near identical item would not normally require re-certification, 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, apart from routine maintenance activities, should be recorded in a formal manner and details passed to the owner's/diving contractor's onshore offices.

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 re-certification is considered necessary.

5.5 Layout of Detail Sheets

5.5.1 Item

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

5.5.2 Description

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 the IMCA *Code of Practice on the Initial and Periodic Examination, Testing and Certification of Diving Plant and Equipment* (IMCA D 018, dated February 1999).

5.5.3 Requirement

This column describes exactly what the inspector needs to check for each item.

5.5.4 Need

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 signifies a requirement which is considered as necessary but can be met in more than one way. It is left up to the discretion of the competent person as to whether the requirement is being suitably met.

C This refers to a requirement which is optional.

5.5.5 Response

This column is where the person completing the document will write their comments and observations. It will be used to answer any questions asked in the requirements column.

5.5.6 Certificate Issued Date

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

6 Completing the Document

6.1 Electronic/Paper

The document is available in two formats, hard (paper) copy and electronically. It is anticipated that most users will handle the document electronically since it is a dynamic document which will need to be continually updated as certificates expire and are renewed. The paper version is perfectly acceptable and may often be used during audits and checks.

6.2 Format

The document was prepared using Microsoft® Word, making extensive use of tables. This optimised Word version is made available for electronic completion and delivery of the document by users.

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

6.3 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. Similarly if there is more than one item on a particular dive system then the requirement can be duplicated and repeated.

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 auditor to check.

6.4 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 it is recommended that some form of explanation is written down rather than simply saying "yes", "confirmed" or similar.

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

Diving Equipment Systems
Inspection Guidance Note

DESIGN for Surface Supplied Mixed Gas Diving Systems

Record Sheets

International Marine
Contractors Association

www.imca-int.com

IMCA D 037 – 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

1 General Safety

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**Access to Water**				
1.1	Safety	Divers must be able to enter and leave the water safely and in a controlled manner. This should be possible in all normal and reasonably foreseeable circumstances.	A		
1.2	DP Vessels	When diving from a vessel on DP, the divers access to the water must be in an area which is a suitable distance away from any thruster or other object likely to cause problems. Note: The requirement for a distance away from a thruster only applies if position is being maintained by DP. It does not apply to moored ships, barges etc or to fixed platforms.	A		
		The prime responsibility while diving from a vessel on DP is that the diver, his umbilical and his equipment are physically restrained from coming in to contact with any thruster or obstruction. This normally means restricting umbilical lengths. Due to the depths involved with surface supplied mixed gas diving, it is unlikely that umbilicals from the surface will be suitable for either working or standby diver. A record should be made of any such restrictions.	A		
1.3	Diving Ladder	For surface mixed gas diving, the preferred method of deployment and recovery for the diver(s) is a wet bell from deck back to deck. In certain circumstances however it is acceptable to keep the wet bell in the water at a shallow depth with the diver entering the water from the surface then descending in the wet bell. On recovery the wet bell brings the diver close to the surface but he actually exits the water using a short diving ladder.	B		
		If a ladder is to be used as a means of access to/from the water then it should be securely mounted, extend at least 2 metres (6 feet) below the water and have sufficient hand holds above water to allow the diver to step easily on to the deck.	A		
		A ladder should not be the primary means of exit from the water if the deck on to which the diver has to climb is more than 2 metres (6 feet) above the water surface	A		
1.4	Emergency Recovery	Arrangements must be in place to recover an injured or unconscious diver from the water to the deck	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
1.5	Surface Decompression	There must be clear and easy access to the recompression chamber from the point where the diver surfaces. This must allow the diver to be inside the chamber and under pressure within the maximum time allowed by the tables in use.	A		
1.6	Documentation	Documentation should exist showing that a risk assessment has been carried out for the planned work and that it has concluded that surface supplied mixed gas diving is a suitable technique for the situation.	A		
2	**Emergency Power**				
2.1	General	A documented assessment should be available showing which diving equipment is needed for the safe completion of a dive if the vessel power fails.	A		
2.2	Power Supply	Any equipment identified as necessary must be able to continue operating in the event of loss of the vessels primary power. This may be by the use of batteries, stored energy (hydraulic or air power), connection to an emergency generator etc.	A		

2 Dive Control

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Location	Dive control should be easily accessible from the diving site	A		
		The Diving Supervisor 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		
		The Diving Supervisor needs good access to all relevant areas of control and should be able to read all gauges and displays without difficulty.	A		
		Dive control and its controls should be adequately illuminated for operations at night (if relevant) or at all times if in an enclosed area.	A		
1.2	Fire fighting	Suitable fire fighting arrangements must be near to dive control	A		
	Testing *D 018, Sheet 15, 16*	If a fixed system then function test needed in last six months, if portable a visual examination and check of fill level needed	A		
1.3	First aid	First aid equipment to the standard required by the diving contractors manuals should be provided.	A		
		This should have been checked within the last six months for completeness and expiry dates	A		
		The first aid equipment should be in clearly marked container(s)	A		
1.4	Documentation	Copies of the diving contractor's manuals and diving rules should be available in dive control	A		
		Emergency procedures should be readily available	A		
		Diving logs and other relevant documentation should be maintained	A		
		If the vessel operates on DP then a diagram of all thrusters and other obstructions should be displayed in dive control. There should also be a diagram of the maximum permitted lengths of divers umbilical for each depth for the specific dive station position(s) onboard Note: This requirement does not apply to moored ships, barges etc.	A		
1.5	Breathing apparatus	Emergency breathing apparatus fitted with comms must be available for the Diving Supervisor so that he may perform his duties in a polluted atmosphere.	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
	Testing *D 018, Sheet 5.1, 9.1*	Visual examination and function test (including comms) in last 6 months. Check made at same time that cylinder is fully charged	A		
		External visual examination of cylinder plus gas leak test to max. working pressure in last 2½ years	A		
		Internal and external visual examination of cylinder plus gas leak test to max. working pressure in last 5 years. (Possible overpressure test)	A		
2	**Communications**				
2.1	Bridge	If diving is taking place from a vessel then there should be both primary and secondary means of communication between dive control and the bridge.	A		
		If the vessel is operating on DP then the primary link must be hard wire and dedicated. Note: This requirement does not apply to moored ships, barges etc.	A		
2.2	Divers	Two way voice communications with each diver and the standby diver should exist. These should include a suitable means of unscrambling helium speech distortion.	A		
		These facilities should be fitted with a back up power source, such as batteries.	B		
		A recorder (tape, video, DVD or CDR) must be fitted to record all communications between divers and supervisor. There should be spare tapes to allow for retention for 24 hours after the dive is over. There should be a means of playing back the recording after the dive	A		
2.3	Chamber	If chamber is remote from dive control (and is to be used while diving is taking place) then there should be communications between the two areas.	A		
2.4	Launch and recovery point	The Diving Supervisor should have verbal communications with the winch operator. Where practical this should be hard wired	A		
2.5	Other areas	The Diving Supervisor should have voice communication with other areas, if relevant. This may include machinery operators, crane drivers etc.	A		
2.6	ROV	If an ROV is in use in conjunction with diving operations then there must be a dedicated hard wire communications link between the Diving Supervisor and the ROV operator.	A		
2.7	Testing *D 018, Sheet 6*	All communications links should have been examined and function tested in the last 6 months	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
3	**Surveillance**				
3.1	ROV	If an ROV is in use in conjunction with diving operations, the Diving Supervisor must have a monitor in dive control showing him the same picture as the ROV operator.	A		
3.2	Working Areas	The Diving Supervisor should be able to see (directly or by video link) the launch/recovery area, the chamber and any working areas which are appropriate.	A		
4	**Alarms**				
4.1	DP	If diving is being carried out from a vessel operating on DP then an audio/visual alarm activated by the DP operator must be fitted in dive control to inform the supervisor of the DP status. It should be tested before each dive when operating on DP. Note: This requirement does not apply to moored ships, barges etc.	A		
4.2	General emergency	The vessel or installation general alarm must be linked in to dive control (or sited close by) so that the supervisor is aware of it.	A		
		Any audio (bell, klaxon etc) must be capable of being muted or cancelled to allow the supervisor to hear his other communications	A		
5	**Gas Supplies** – *Note: Use of the word 'gas' refers to any breathable mixture, whether air, nitrox, heliox or other mix*				
5.1	Sources	Sufficient sources of the various gases in use including air, of breathing quality, must be available and suitably arranged so that if the on line supply to the diver fails, an alternative supply can be immediately switched on.	A		
		There should be a means to ensure that it is not possible to switch on an unsuitable supply accidentally (e.g. air if the diver is at depth)	A		
	Crossover valves	Great care should be taken if cross over valves are fitted with the result that any line can possibly carry more than one specific supply gas. 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 lines fitted with crossover valves must indicate very clearly at all times exactly what they are supplying.	A		
5.2	To the diver	The gas 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		

Item	Description	Requirement	Need	Response	Certificate Issue Date
5.3	Surface standby diver	There must be a primary supply of each of the relevant gases to the standby sufficient to allow him to rescue an injured diver and arranged to be separate from the main supply to the working diver(s).	A		
		There must be a secondary back up supply to the standby diver but this may be common with the working diver(s) main supply, provided it is protected from any malfunctions	A		
5.4	In-water standby diver	If an in water standby diver is used (such as in a wet bell) then his supplies must meet the same criteria as those for the surface standby above, save that his primary supply may come from the cylinders on the wet bell.	A		
5.5	Monitoring	There must be an oxygen analyser with an audio/visual hi/lo alarm fitted in line on the downstream gas supply to the diver(s)	A		
		If Dive Control is in an enclosed area then there must be an oxygen analyser with an audio/visual hi/lo alarm fitted to warn the occupants of any rise or fall of oxygen levels outside pre-set parameters due to gas leakage in the area.	A		
	Testing *D 018, Sheet 2*	Analysers should be examined, function tested and calibrated within the last 6 months	A		
5.6	Dive Panel	A dive panel that has been purpose designed for surface supplied mixed gas diving and is clearly marked to provide for suitable diver and (surface or in-water) standby diver supply and control (including the proper switching of gases) must be provided	A		
5.7	Oxygen	Pure oxygen (or mixes with over 25% oxygen) must be supplied in such a way that they cannot be turned on at the control panel accidentally.	A		
		All pipe work and systems exposed to pure oxygen (or mixes with over 25% oxygen) should be cleaned to a suitable standard.	A		
6	**Gauges**				
6.1	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 back up breathing supply.	A		
		A pressure limiting device may be fitted to avoid gauges being over pressurised	C		
6.2	Depth	*These are gauges used to provide information for operational and decompression control.*			

Item	Description	Requirement	Need	Response	Certificate Issue Date
		The scale should be appropriate to the duty i.e. large enough to be read easily and accurately. They should normally operate in the range 0 to 75% of full scale deflection and should have scale divisions of no more than 0.5msw/2 fsw	A		
		If the gauge is digital then the display should 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 AODC 059)	A		
6.3	Gas supply	*These are gauges which indicate pressure but are not directly used for life support*			
		They should be positioned to show the line pressure of supplies coming in to the panel and also of any supplies leaving the panel	A		
		They should 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		
6.4	Calibration *D 018, Sheet 18, 19, 20*	All gauges should have been calibrated to the required accuracy in the last 6 months	A		
6.5	Crossover valves	Great care should 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 what supply they are connected to. In any event any gauge fitted with a crossover valve must indicate very clearly at all times exactly what it is reading	A		
7	**Pipework and Valves**				
7.1	General	All valves should be free of corrosion and should operate easily	A		
		The function of all valves should be clearly marked	A		
		Valves carrying oxygen (or mixes of over 25% oxygen) at a pressure higher than 15 bar should not be quarter turn.	A		
		Exhaust pipework should not vent in to an enclosed space.	A		
	Testing *D 018, Sheet 24.1, 24.2*	Valves and pipework need visually examined in last six months	A		
		Valves and pipework need a gas leak test to maximum working pressure in last 2 years.	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
8	**Electrics**				
8.1	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 by personnel moving around	A		
8.2	Electrical diagram	An electrical diagram or other suitable mechanism should be available for the system to allow safe operation.	B		
8.3	Emergency lighting	If diving is conducted during the hours of darkness, there must be sufficient self contained emergency lighting units in dive control to allow the supervisor and any other personnel to operate safely in an emergency	A		
8.4	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		

3 Twinlock Chamber

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Location	A suitable two-compartment chamber must be easily accessible from the diving site. Trip hazards should be removed where possible or highlighted.	A		
		Provision must be made to combat extremes in temperature for the chamber, its occupants and the operator. Chamber and operator must also be protected from any other elements (including dropped objects) which may affect operations	A		
		Operator needs good access to all relevant areas of chamber	A		
		The chamber, its general area and controls should be adequately illuminated for operations at night.	B		
1.2	Communications	If chamber is remote from dive control there must be a suitable means of communication between the two locations.	A		
	Testing *D 018, Sheet 6*	Communications (if fitted) must be examined and function tested in last six months	A		
1.3	Fire fighting (external to the chamber)	Suitable fire fighting arrangements must be near to the chamber	A		
	Testing *D 018, Sheet 15, 16*	If a fixed fire fighting system then a function test is needed in the last six months, if portable a visual examination and check of fill level needed	A		
1.4	First aid	First aid equipment to the standard required by the diving contractors manuals should be provided.	A		
		This should have been checked within the last six months for completeness and expiry dates	A		
		The first aid equipment should be in clearly marked container(s)	A		
1.5	Minimum diameter	If only one diver in the water and only one diver planned to be requiring decompression at one time, the minimum internal diameter of the chamber should be 1.37 metres (54")	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
		If more than one diver in the water and more than one diver planned to be requiring decompression at one time, the minimum internal diameter of the chamber should be 1.5 metres (60")	A		
2	**Chamber External**				
2.1	Pressure hull	Manufactured to a recognised standard	A		
	Testing *D 018, Sheet 25.1*	Visual examination within last six months	A		
		Gas leak test at full working pressure in last 2½ years	A		
		Internal overpressure test in last five years	A		
2.2	Viewports	Manufactured to a recognised standard, tested to 1.25 max. pressure, less than 10 years old.	A		
	Testing *D 018, Sheet 25.2*	Visual examination every six months, checked for scratches, cracks and discolouration.	A		
		Gas leak test at full working pressure in last 2½ years as part of the chamber	A		
		Internal overpressure test in last five years as part of chamber	A		
2.3	Paintwork	In good condition and free from corrosion	B		
		Any chamber insulation should be in good condition	B		
2.4	Medical lock	Medical lock fitted to the main lock of the chamber	A		
		The external door must be fitted with an interlock device to stop opening while under pressure and to prevent pressurisation if not properly closed.	A		
		Seals and sealing faces must be in good condition, free of corrosion and lightly greased with a suitable compound	A		
2.5	Lighting	If external lights are used to illuminate the chamber internally, they should be sited such that they do not expose the viewports to undue heat	A		
	Testing *D 018, Sheet 11*	Any lights and cables should have a visual examination and function test in the last six months	A		
2.6	Penetrations	All gas or liquid penetrations must be fitted with a valve or other similar device close to the hull to stop sudden pressure loss.	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
		Electrical penetrations must be certified as fit for purpose by a competent person for this application	A		
		All penetrations should be clearly marked to show their function	A		
2.7	Pressure relief valve	The chamber should be fitted with an overpressure relief valve rated to a suitable pressure (normally full working pressure)	A		
	Testing *D 018, Sheet 24.3*	The pressure relief valve should be visually examined in the last six months	A		
		The pressure relief valve should be function tested at the required setting and then gas leak tested along with the chamber in the last 2½ years.	A		
2.8	Valves and pipework	All valves should be free of corrosion and should operate easily	A		
		The function of all valves should be clearly marked	A		
		Valves carrying oxygen (or mixes of over 25% oxygen) at a pressure higher than 15 bar should not be quarter turn.	A		
		Exhaust pipework (particularly overboard dumps) should vent into a well ventilated area and not into an enclosed space.	A		
	Testing *D 018, Sheet 24.1, 24.2*	Valves and pipework need visual examination within last six months	A		
		Valves and pipework need a gas leak test to maximum working pressure in last 2 years.	A		
3	**Chamber Internal**				
3.1	Paintwork	In good condition and free from corrosion	B		
3.2	Doors	All doors must move freely through their full range of movement and be able to be secured open	B		
		Doors must be able to be opened from either side	A		
		Where appropriate doors should have an equalising valve.	A		
		Seals and sealing faces must be in good condition, free of paint or corrosion and lightly greased with a suitable compound	A		
3.3	Viewports *D 018, Sheet 25.2*	Visual examination every six months, checked for scratches, cracks and discolouration.	A		
3.4	Penetrations	All gas or liquid penetrations must be fitted with a valve or other similar close to the hull to stop catastrophic pressure loss.	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
		All penetrations should be clearly marked to show their function	A		
		Inlet penetrations should be fitted with silencers or diffusers	A		
		Exhaust penetrations (including medical lock) should be fitted with diffusers or guards to stop trapping of fingers or equipment	A		
3.5	Valves and pipework	All valves should be free of corrosion and should operate easily	A		
		The function of each valve should be clearly marked	A		
		Valves carrying oxygen (or mixes of over 25% oxygen) at a pressure higher than 15 bar should not be quarter turn.	A		
	Testing *D 018, Sheet 24.1, 24.2*	Valves and pipework need visually examined in last six months	A		
		Valves and pipework need a gas leak test to maximum working pressure in last 2 years.	A		
3.6	Communications	There should be a system in each compartment for two way audio communication between chamber occupants and outside.	A		
		A secondary or back up system should be provided	A		
	Testing *D 018, Sheet 6*	Communications should be examined and function tested in the last six months	A		
3.7	Lighting	Lighting sufficient to illuminate both compartments internally should be provided	A		
	Testing *D 018, Sheet 11*	Any lights and cables should have a visual examination and function test in the last six months	A		
3.8	BIBS	A system should be fitted to allow occupants of both compartments to breathe a gas other than ambient atmosphere.	A		
		In each compartment there should be one set of pipework and a mask for each occupant plus one spare	A		
		In the main compartment, exhaust gas should be dumped outside the chamber	B		
	Testing *D 018, Sheet 5.2*	The system should have been examined and function tested in the last six months	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
3.9	Comfort	There should be facilities in the main compartment for two divers to lie down comfortably. As a minimum there should be one mattress such that an injured diver can be given medical treatment while lying prone in the main compartment.	A		
		In a 1.5 metre diameter (or larger) chamber there must also be at least one fixed bunk a minimum of 1.8 metres long.	A		
		Any bunks fitted should be securely mounted	A		
		Sanitary arrangements may be supplied, depending on the length of time it is intended the occupants will be inside.	C		
		An interlock must be fitted to any sanitary facility venting outside	A		
	Testing *D 018, Sheet 27*	If a sanitary system is fitted, it should have been examined and function tested in the last six months	A		
3.10	Fire fighting	A means of fire fighting must be available inside the main compartment.	B		
	Testing *D 018, Sheet 15 & 16*	If a fixed fire fighting system then function test needed in last six months, if portable a visual examination and check of fill level needed	A		
3.11	Instrumentation	A gauge indicating internal pressure of the main compartment to the occupants is needed	A		
	Calibration *D 018, Sheet 18, 19, 20*	Such a gauge must have been examined and compared with a test instrument in the last six months.	A		
3.12	Atmosphere control	A scrubber may be fitted to remove CO_2 from the atmosphere	C		
		A means of heating/cooling the chamber may be fitted	C		
	Testing	If fitted, any scrubber should be function tested in the last six months	A		
		If fitted, any means of heating/cooling should be function tested in the last six months	A		
4	**Control Panel**				
4.1	General	The main controls for the chamber should be grouped together, located at a convenient place.	B		
4.2	Breathing apparatus	Breathing apparatus (BA) fitted with communications should be available for the operator in the event of fire or fumes.	A		
	Testing *D 018, Sheet 5.1*	BA sets to be examined and function tested in the last six months	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
4.3	Gauges	Suitable gauges should be provided to indicate the pressure inside each compartment. Gauges should also indicate incoming gas supply pressures	A		
	Calibration *D 018, Sheet 18 & 19*	Gauges should be examined and calibrated in the last six months	A		
4.4	Analysis	A means should be available of analysing the oxygen and carbon dioxide content of the ambient atmosphere in each compartment. This may be chemical tubes for the CO_2 analysis.	A		
	Testing *D 018, Sheet 1 & 2*	Suitable analysers should have been calibrated in the last six months. The pump for disposable tube types should be tested in the last six months.	A		
4.5	Pipework, valves and regulators	Valves and regulators to be free of corrosion and operate easily	A		
		The function of all controls (valves, regulators etc.) should be clearly marked for function	A		
		Valves carrying oxygen (or mixes of over 25% oxygen) at a pressure higher than 15 bar should not be quarter turn.	A		
	Testing *D 018, Sheet 24.1, 24.2*	Valves and pipework need to be visually examined in last six months	A		
		Valves and pipework need a gas leak test to maximum working pressure in last 2 years.	A		

4 Diver Launch and Recovery System

Note: This section should be considered along with the section on Wet Bells as there is an interface point between the sections.

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Weight	The weight of the wet bell in air, fully equipped with equipment and divers is … kg.			
1.2	Marking	The Safe Working Load (SWL) must be clearly marked on every winch and on the A frame or similar.	A		
1.3	Suitability	Each of these SWLs must be greater to or equal the weight of the fully equipped wet bell in air.	A		
2	**Man-Riding Winches**				
2.1	Suitability	Only winches deemed suitable for man riding by the manufacturer (or a competent person) should be used	A		
2.2	Operating lever	The winch raise/lower control must be designed to return to the neutral position when released by the operator.	A		
2.3	Marking	The raise, lower and neutral positions of the operating lever must be clearly marked	A		
2.4	Main brake	An automatic brake must be fitted which will come on when the operating lever is returned to the neutral position or if there is a loss of power to the winch.	A		
2.5	Secondary brake	A secondary braking system must also be fitted for use in case the main brake fails	A		
2.6	Clutch	If any sort of clutch mechanism is fitted to the winch, there must be a positive means of preventing it becoming disengaged during operation.	A		
2.7	Operating instructions	A notice giving the operating instructions for the winch, including the actions necessary if power is lost, should be displayed where the winch operator can see it.	A		
2.8	Secondary power	An independent (secondary) power source must be available in case of failure of the primary power.	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
2.9	Drum capacity	The winch drum must be able to accept the full length of wire being used. Unless special guards are in use, this means that there should be a clear space between the outside of the top layer of wire and the edge of the drum flange of at least 2.5 times the wire diameter	A		
2.10	Guarding	Unless access is physically restricted, guards should be fitted to the winch and drum to stop anything (clothing, fingers etc) being drawn in to the machinery.	B		
2.11	Breathing apparatus	Emergency breathing apparatus, fitted with communications, must be available for the winch driver. If umbilical supplied, any air intakes for the supplying compressor must be in a pollution free area.	A		
	Testing *D 018, Sheet 5.1, 9.1*	Visual examination and function test (including comms if fitted) in last 6 months. Check made at same time that cylinder is fully charged	A		
		External visual examination of cylinder plus gas leak test to max. working pressure in last 2½ years	A		
		Internal and external visual examination of cylinder plus gas leak test to max. working pressure in last 5 years. (Possible overpressure test)	A		
3	**Main Lift Wire**				
3.1	Type	The lift wire should be non-rotating	A		
3.2	Connection	The connection of the wire to the wet bell must be of a suitable type. It should have two retaining means (such as castellated nut locked with split pin) for the removable pin	A		
3.3	Lubrication	Unless the wire is to be renewed every two years, it should be pressure lubricated every 6 months	B		
3.4	Marking	A means should be available to allow the winch operator to know how much wire has been paid out. This can be a wire counter, physical markings on the wire or similar.	B		
3.5	Testing *D 018, Sheet 29.1*	Static test at 1.25 times SWL plus function test at SWL in last 6 months. Visual examination of visible section at same time	A		
		Cut back rope beyond first sheave and test to destruction to prove safety factor in last 12 months	A		
		Reterminate and apply static load test at 1.5 times SWL in last 12 months	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
4	**Secondary Recovery**				
4.1	Provision	There must be a secondary means of recovering the wet bell to the surface and bringing it on board. This must be independent of the main recovery system	A		
4.2	SWL	The secondary recovery system must have a certified SWL which is at least equal to the weight of the fully loaded wet bell in air (see 1.1 above) or in water if it is only used to bring the wet bell to the surface.	A		
		If the secondary recovery system has another use (for example guide weight deployment) then it must have a certified SWL covering at least the weight required above PLUS its main task.	A		
4.3	Man riding	Where a winch is used for secondary recovery to the deck it must meet all of the man riding requirements given in 2.1 to 2.11 above	A		
		Where a wire rope is used for secondary recovery to the deck, it must meet the requirements of the main lift wire in 3.1 to 3.4 above. (note, certain configurations, such as double reeving through a guide weight, may not require the use of non rotating wire)	A		
5	**Communication**				
5.1	General	The Diving Supervisor must have a means of verbal communication to/from the winch driver. Where practical this should be hard wired	A		
5.2	Testing *D 018, Sheet 6*	The communications must have been function tested in the last 6 months	A		
6	**Overall Testing**				
6.1	General	It is normal that the launch/recovery system is load tested as a complete unit rather than as individual units. This should happen at the intervals given below but also if the unit is relocated or any of the major components are replaced, altered or repaired. The certificate for the overall test should state clearly all the component parts which were tested.			
6.2	Testing *D 018, Sheet 22.1*	Visual examination and function test of complete system at maximum SWL. Independent static load test on each brake system at 1.25 times max. SWL in last 6 months	A		
		Independent static load test on each brake system at 1.5 times max. SWL followed by NDT of critical areas in last 12 months	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
	D 018, Sheet 22.2	Hydraulic fluid/oil analysis carried out OR fluid/oil replaced in last 12 months. (if system is hydraulically operated)	A		
7	**Standby Diver**				
7.1	General	A surface standby diver must be provided with a suitable means of entry to and exit from the water in the event that he is required to perform a rescue. If this involves the use of a mechanical handling system, basket etc. then the system for the standby diver must meet the same requirements as that for the working diver.	A		

5 Wet Bell

Note: This is required equipment for surface supplied mixed gas diving.

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Location	The wet bell must be located such that it is easy for the diver(s) to get in and out as well as to remove an unconscious diver from the wet bell to the deck.	A		
		If diving is to take place at night, the deck and launching area in the vicinity of the wet bell must be well illuminated	A		
1.2	Structure	Paint work should be in good condition	B		
		The structure should be free from excess corrosion	A		
		Should be able to carry at least two divers in an uncramped position	A		
		Should have a gate or chain to prevent divers falling out	A		
		Must be fitted with suitable internal hand holds for divers	A		
		Needs a suitable means for supporting an unconscious diver with his head in the air space	A		
1.3	Lifting	There must be a suitable secure point to attach the lift wire to. This can be a pad-eye, a shackling point, a captive ring or similar.	A		
		There must be a suitable place to attach a secondary lift wire if the main lift point fails. (The secondary lift wire does not need to be fitted)	A		
1.4	Testing *D 018, Sheet 3*	Visual examination of Structure and Lift Point in last six months for damage/ corrosion	A		
		Load test at 1.25 times SWL with MPI of lifting point or pad eyes after test in last 12 months	A		
		The SWL (maximum weight in air of the wet bell fully outfitted and with divers) should be clearly marked on the wet bell	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
2	**Gas Cylinders**				
2.1	Gas cylinders	As a minimum there should be 7m3 of both bottom mix and compressed air for each diver at the maximum depth planned. This should be contained in two (or more) cylinders fitted to the wet bell and securely mounted	A		
		The cylinders should be suitably colour coded for the contents, have the contents permanently marked on it and have the last test date stamp marked with a small patch of distinctive colour to aid its location	A		
2.2	Testing *D 018, Sheet 10*	Cylinder external visual examination in last 6 months	A		
		Internal and external examination plus gas leak test to maximum working pressure in last 2 years	A		
		Hydraulic overpressure test to 1.5 times maximum working pressure followed by the 2 yearly tests above, within the last 4 years	A		
3	**Gas Supplies**				
3.1	Sources	Sufficient sources of gas including air of breathing quality must be available and suitably arranged so that if the on line supply to the diver fails, an alternative supply can be immediately switched on	A		
3.2	To the diver(s)	The gas 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		
3.3	In-water standby diver	There must be a primary supply of the relevant gases to the in water standby sufficient to allow him to rescue an injured diver and arranged to be separate from the main supply to the working diver(s). This may come from the cylinders on the wet bell.	A		
		There must be a secondary back up supply to the standby diver but this may be common with the working diver(s) main supply, provided it is protected from any malfunctions	A		
4	**Outfitting**				
4.1	Pipework	Cylinders should be valved and connected up in such a way that this onboard gas supply is available to the divers as back-up or for blowdown of the enclosed top section.	A		
		The system should be fitted with a contents gauge(s) (indicating type only)	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
4.2	Testing *D 018, Sheet 20* *D 018, Sheet 24.1*	Visual examination and function test of pressure indicating gauge in last 6 months	A		
		Visual examination of pipework/fittings in last 6 months	A		
		Gas leak test of pipework and fittings at maximum working pressure in last 2 years	A		
4.3	Lighting	Should be fitted with sufficient lighting to allow the divers to see and operate all controls	B		
	Testing *D 018, Sheet 11*	Lights, cables etc. have had visual examination, function test plus continuity and resistance tests in last 6 months	A		
4.4	Gauges	If the wet bell is used for decompression then a suitable depth gauge should be provided	B		
	Testing *D 018, Sheet 18 or 19 (as appropriate)*	Visual examination and calibration of any gauge to the required standard in the last 6 months	A		
5	**Main Umbilical**				
5.1	Fitting	The wet bell should be fitted with a main supply umbilical carrying all necessary gas/comms/ power/etc. to the bell. (see separate section for details of umbilical system).	A		

6 Wet Bell Main Umbilical

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Suitability	The umbilical must be suitable for the intended use. This means it must be robust and able to be handled by the intended deployment system. It must also contain a sufficient number and diameter of hoses and cables to provide all supplies safely at the maximum depth to which it will be used.	A		
1.2	Handling	The deployment system should be able to handle the umbilical in such a way that it is not exposed to damage	A		
1.3	Marking	In order to avoid excessive umbilical being paid out, a means should be available to allow the supervisor to know how much umbilical has been paid out in relation to the depth of the wet bell. Suitable means are a line counter on the winch (if one is being used) or else the umbilical should be marked for length at least every 10 metres using a system which allows easy visual identification of the length paid out	B		
2	**Fitting**				
2.1	Attachment	The umbilical should be securely attached to the wet bell by means of a strength member or strain relief fitting so that the individual connections are not subject to load	A		
		The leads of the hoses and cables at the wet bell end should be arranged to avoid chafing or kinking	A		
3	**Umbilical Winch**				
3.1	Braking system	If an umbilical winch is used then it should be fitted with a mechanical braking system to stop the umbilical paying out under load when the winch motor is in use (over running), in neutral or at rest.	B		
4	**Testing**				
4.1	Electrical components *D 018, Sheet 11*	Visual examination, function test, continuity and resistance testing carried out in last 6 months	A		
4.2	Hose components *D 018, Sheet 28*	When new or first installed, hydro test to 1.5 times max. working pressure or as recommended	A		
		Visual examination and function test in last 6 months	A		
		Pressure leak test to max. working pressure in last 2 years	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
5	**Spare**				
		If a spare umbilical is carried offshore then it should be:			
		Tested and certified as in 4 above	A		
		Stored offshore in suitable conditions, normally as per the manufacturer's instructions	B		
		Pressure leak tested (and flushed through if necessary) before use	A		
6	**Secondary Recovery**				
		The umbilical should only be used as a means of secondary recovery if it is specifically designed for that purpose. If so it must be tested in line with the requirements in the handling system section.	A		

7 Diver Heating System

Note: It is self evident that this section will only apply to a diving system that uses hot water for diver heating. For deeper diving using surface mixed gas techniques, consideration must be given to the fact that the water temperature at depth may be lower than near the surface. It must also be remembered that a diver breathing a helium and oxygen mixture will lose heat much more rapidly than if they were breathing compressed air.

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Suitability	The equipment used to generate and supply the hot water to the diver should be suitable for the purpose	A		
2	**Redundancy**				
2.2	Requirement	Whether there is a need for back-up power and hot water will depend on whether the diver can be safely recovered to the surface in the event of loss of heating. This should be stated in the diving contractor's operating procedures	B		
		If redundancy is required, there must be two alternative sources for supplying heat to the diver	A		
		If redundancy is required, and if electricity is required to generate heating or pump it to the diver then there should be a back-up system in the event of primary failure.	A		
3	**Temperature**				
3.1	Monitoring	The Diving Supervisor must have a display showing the temperature of the water being supplied to the diver	A		
3.2	Alarm	A Hi-Lo temperature alarm must be fitted to alert the Diving Supervisor of pre-set upper and lower limits are exceeded	A		
4	**Oil-Fired Heaters**				
4.1	Location	Oil fired heaters should be located such that they present no risk to the dive system in the event of fire	A		
		Their position should also present no risk in terms of pollution or contamination of air supply intakes	A		
4.2	Spill tray	They should be fitted with a spill tray which drains off to a safe area (to reduce risk of fire or pollution)	A		
4.3	Fuel supply	Where possible the fuel supply should be hard piped	B		

Item	Description	Requirement	Need	Response	Certificate Issue Date
		The local tank filler should be fitted with a dead-mans handle or automatic shut off valve which closes when the tank is full	B		
		The local tank must be fitted with an overflow system with a capacity greater than the filling supply system (ie capable of allowing a rate of overflow greater than the filling rate)	A		
		The overflow system must dump to a safe area	A		
5	**Fire Fighting**				
5.1	Provision	All hot water machines need to have suitable provision of fire fighting equipment in their vicinity. This may be the normal ships or platforms equipment or dedicated equipment. The type must be suitable, it must be easy to access and large enough to be sufficient	A		
5.2	Fire detection	If any hot water machines are situated in enclosed and unmanned areas then consideration should be given to fitting a fire detection system	C		
5.3	Testing *D 018, Sheet 15 & 16*	Examination and test of fire fighting equipment as appropriate in last 6 months	A		
6	**Testing**				
6.1	Function test of hot water system *D 018, Sheet 21*	Visual examination and function test in last 6 months	A		
6.2	Pipework *D 018, Sheet 24.1*	Pressure test to 1.5 times maximum working pressure when first installed	A		
		Visual examination in last 6 months	A		
		Gas (or fluid) leak test at maximum working pressure in last 2 years	A		
6.3	Gauges *D 018, Sheet 20*	Visual examination and function test of any indicating gauges in last 6 months	A		
6.4	Electrical *D 018, Sheet 11*	Visual examination, function test, continuity and resistance tests of all electrics in last 6 months	A		
6.5	Pressure vessels seamless *D 018, Sheet 9.2*	External visual examination in last 6 months	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
		Internal and external examination plus gas (or fluid) leak test to maximum working pressure in last 15 months	A		
	or	Internal and external examination plus over pressure test to 1.5 times maximum working pressure plus gas (or fluid) leak test to maximum working pressure in last 5 years	A		
	Pressure vessels welded *D 018, Sheet 26*	Visual examination in last 6 months	A		
		Thorough internal and external visual inspection plus gas (or fluid) leak test at full working pressure in last 2½ years OR	A		
		Internal over pressure test plus gas (or fluid) leak test at full working pressure in last 2½ years	A		

8 Divers' Umbilicals

Note: This section applies to both excursion umbilicals used with a wet bell and to surface diving umbilicals but does not apply to a wet bell main umbilical, which has its own separate section.

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Construction	The umbilical(s) 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 10 metres using a recognised system which allows easy visual identification of the length paid out	A		
1.4	Security	The divers 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		
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) or the distance to the nearest thruster on a DP vessel. 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		
		The standby divers umbilical should be 2 metres (6 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 last 6 months	A		
3.2	Hose components *D 018, Sheet 28*	When new or first installed, hydro test to 1.5 times max. working pressure or as recommended	A		
		Visual examination and function test in last 6 months	A		
		Pressure leak test to max. working pressure in last 2 years	A		

9 Divers' Personal Equipment

Note: This section covers diver's 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	**Helmets (or Masks)**				
1.1	Marking	Each helmet (or mask) should be indelibly marked with a unique serial number	B		
1.2	Condition	All helmets (or masks) should be in good condition with no obvious defects	A		
1.3	Type	The helmet (or mask) should be of a type which is suitable for the intended diving operation	A		
1.4	Safety	Helmets must be fitted with a means to stop them becoming detached from their clamp while in use	B		
1.5	Maintenance	Each helmet (or mask) must be subject to regular planned maintenance and a record of such maintenance should be available	A		
1.6	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		
1.7	Testing *D 018, Sheet 5.3*	Visual examination and function test at atmospheric pressure in last 6 months	A		
2	**Bail-Out Cylinders**				
2.1	Provision	Every diver, including the standby, must be provided with a reserve supply of breathing gas carried in a bail-out cylinder	A		
2.2	Endurance	The cylinder(s) must have sufficient endurance to allow the diver to return to a place of safety. 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 of a suitable gas for 1 minute for every 10 metres horizontal excursion in order to return to the wet bell.	B		
2.3	Marking	Each cylinder should be correctly colour coded and marked with the name of the contents.	A		
		The last hydraulic test date stamp should be highlighted with a small patch of distinctive colour paint	B		

Item	Description	Requirement	Need	Response	Certificate Issue Date
2.4	Testing *D 018, Sheet 10*	External and internal visual examination in last 6 months	A		
		External and internal visual examination plus gas leak test to maximum working pressure in last 2 years	A		
		Hydraulic overpressure test to 1.5 times maximum working pressure in last 4 years	A		
3	**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.*				
3.1	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. This includes any fittings necessary if the provision of emergency breathing supplies at the wet bell requires the use of quick connect type fittings.	A		
3.2	Condition	All whips, hoses, gauges, fittings etc. must be in good condition with no obvious defects	A		
3.3	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		
3.4	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		
3.5	Testing *D 018, Sheet 28*	Visual examination and function testing at full working pressure in the last six months	A		
		Pressure leak test to maximum rated working pressure in last 2 years	A		

10 Compressors

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Location	All compressors should be located in a suitable area. This means that any personnel working on the compressor should not be exposed to any hazard while doing so.	A		
		Similarly the compressor itself should be protected from obvious physical damage.	A		
		The intakes of all compressors should be sited in an area where they are not exposed to any pollution – particularly exhaust fumes.	A		
1.2	Access	The compressor should be easily accessible to diving personnel, both for routine maintenance and in an emergency	A		
1.3	Suitability	Each compressor must be suitable for the purpose it will be used for.	A		
1.4	Instructions	Detailed operating instructions for each compressor should be available	A		
		Where possible these should be visible beside each compressor	C		
1.5	Signs	If appropriate, there should be warning signs stating that a compressor may start or blow down automatically and care should be taken	B		
2	**Maintenance**				
2.1	Planned maintenance	Each compressor should have a detailed planned maintenance schedule showing what work has to be done at which intervals	A		
2.2	Records	Detailed records should be kept of all maintenance activities	A		
2.3	Filters	All filters should be checked at regular intervals and either cleaned or replaced.	A		
		The date of the last inspection of each filter should be clearly visible on it along with the date when its next service is due.	B		
3	**Fire Fighting**				
3.1	Provision	All compressors need to have suitable provision of fire fighting equipment in their vicinity. This may be the normal ships or platforms equipment or dedicated equipment. The type must be suitable, it must be easy to access and large enough to be sufficient	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
3.2	Fire Detection	If any compressors are situated in enclosed and unmanned areas then consideration should be given to fitting a fire detection system	B		
3.3	Testing *D 018, Sheet 15 & 16*	Examination and test of fire fighting equipment as appropriate in last 6 months	A		
4	**Safety Devices**				
4.1	Solenoid switches	Solenoid switches may be fitted to automatically stop the compressor if it overheats. An alarm for this may be fitted in dive control.	C		
4.2	Cracked plate detector	A diaphragm type compressor should be fitted with a cracked plate detector which will automatically stop the compressor in the event of failure	A		
4.3	Relief valves testing *D 018, Sheet 24.3*	A relief valve should be fitted to any pressure container (e.g. an air receiver) if it could be over pressured	B		
		Visual examination in last 6 months	A		
		Function test at required relief setting followed by gas leak test at maximum working pressure in last 2½ years	A		
5	**Pipework**				
5.1	Suitability	All pipe work (rigid or flexible), valves, fittings etc should be suitable for the purpose, properly installed and protected from damage.	A		
5.2	Testing *D 018, Sheet 24.1*	Pressure test to 1.5 times maximum working pressure when first installed	A		
		Visual examination in last 6 months	A		
		Gas leak test at maximum working pressure in last 2 years	A		
6	**Air Receivers**				
6.1	Suitability	All air receivers must have been manufactured to a recognised international code or standard and be fit for the purpose they will be used for.	A		
6.2	Testing *D 018, Sheet 26*	Visual examination in last 6 months	A		
		Internal and external inspection plus gas leak test to full working pressure OR Internal overpressure test plus gas leak test to full working pressure in last 2½ years	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
7	**Electrics**				
7.1	Integrity	All electrical supplies should be properly connected using suitable equipment	A		
7.2	Testing *D 018, Sheet 11*	Visual examination, function test plus continuity and resistance tests in last 6 months	A		
8	**Operational Testing**				
8.1	General *D 018, Sheet 7*	Visual examination and function test of compressor in last 6 months	A		
8.2	Output *D 018, Sheet 7*	Check of delivery rate and pressure in last 6 months	A		
8.3	Purity *D 018, Sheet 7*	Check of output purity in last 6 months	A		

11 HP Air and Gas Storage

Note: This section refers to any bulk high pressure gas or air storage which forms part of the diving system. This will include banks, quads or cylinders used for storage of HP air, HP mixed gas, HP oxygen or any treatment gas. As virtually all gases used during a surface mixed gas diving operation are capable of being breathed safely at atmospheric pressure no requirements are listed below to cover the eventuality of leakage in to a closed environment.

Item	Description	Requirement	Need	Response	Certificate Issue Date
1	**General**				
1.1	Quantity	There must be sufficient supplies available to comply with the requirements of AODC 014. This requirement must be based on the various mixes required for the tables in use on the planned dives.	A		
1.2	Location	All HP storage should be located in a suitable place where there is a minimal risk of damage occurring.	A		
		Oxygen (or mixes containing over 25% oxygen) must be stored in the open and well clear of any fire hazards	A		
1.3	Marking	Cylinders and quads must be colour coded and marked with the name and chemical symbol of the contents in accordance with AODC 016 (Rev. 1)	A		
		The latest test date stamped on the cylinders should be highlighted with a small patch of distinctive colour	B		
1.4	Condition	Each cylinder should be in good condition and free from serious corrosion	A		
2	**Testing**				
2.1	Cylinders *D 018, Sheet 9.1*	External visual examination in last 6 months	A		
		External visual examination and gas leak test to maximum working pressure in last 2½ years	A		
		Internal and external visual examination and gas leak test to maximum working pressure in last 5 years (possible over pressure test to 1.1 times max working pressure)	A		
2.2	Pipework, valves etc *D 018, Sheet 24.1, 24.2*	Pressure test to 1.5 times maximum working pressure when first installed	A		
		Internal cleanliness verified to appropriate standard	A		
		Visual examination in last 6 months	A		
		Gas leak test at maximum working pressure in last 2 years	A		

Item	Description	Requirement	Need	Response	Certificate Issue Date
2.3	Lifting equipment (quad slings, etc.) *D 018, Sheet 23*	Visual examination in last 6 months	A		
		Load test at 1.5 times maximum SWL in last 12 months	B		
3	**Fire Fighting**				
3.1	Provision	All HP gas or air storage needs to have suitable provision of fire fighting equipment in the vicinity. This may be the normal ships or platforms equipment or dedicated equipment. The type must be suitable, it must be easy to access and large enough to be sufficient	A		
3.2	Fire detection	If any HP gas or air storage is situated in enclosed and unmanned areas then consideration should be given to fitting a fire detection system	C		
3.3	Testing *D 018, Sheet 15 & 16*	Examination and test of fire fighting equipment as appropriate in last 6 months	A		
4	**Gas Content Status**				
4.1	State Boards	A record should be kept in a designated place of the contents and pressure of each cylinder or quad. These records should be updated daily when the system is in use.	A		
		This record should also show clearly the minimum quantities required from 1.1 above	B		
5	**Oxygen** – *NB Any gas mix containing 25% or more of oxygen should be treated as pure oxygen*				
5.1	Signs	Fire hazard warning signs should be erected in the vicinity of any stored oxygen	A		
5.2	Pressure	The pressure of oxygen should be regulated down at the quad or cylinder to a maximum of 50 bar (750 psi)	B		
5.3	Pipework	Oxygen should be hard piped wherever possible. Only flexibles compatible with oxygen should be used and they should be kept as short as possible	B		
5.4	Cleaning	All pipe work and systems exposed to oxygen should be cleaned to a suitable standard.	A		