Stichting Werken onder Overdruk

SWOD

Working under Hyperbaric Conditions

System- and Maintenance Requirements

WOD-SOE

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Stichting Werken onder Overdruk SWOD

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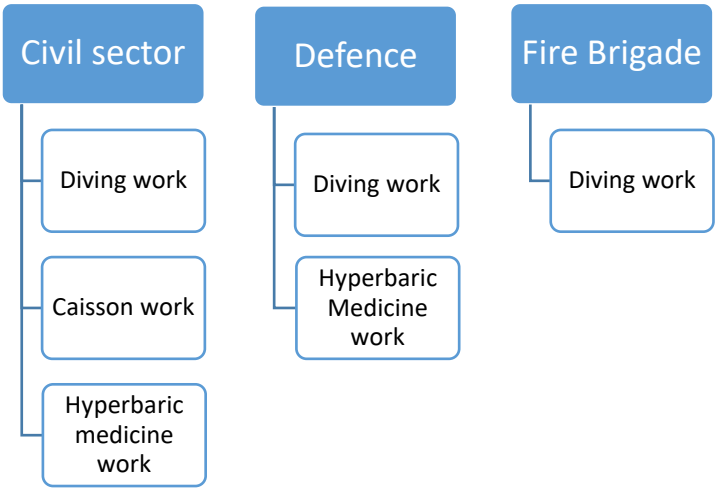
PREFACE

The Foundation Working under Hyperbaric Conditions (SWOD) represents the three areas of work: diving work, caisson work and hyperbaric medicine work within the three subsectors of Defence, Fire Brigade and Civil sector in the field of Working Conditions.



The WOD-SOE is an annex of the Working conditions Catalogue Working under Hyperbaric Conditions. This version was approved on 3 December 2024 by the SWOD Central College of Experts (CCvD) and is in force from 1 February 2025.

Disclaimer
Although the Working under Hyperbaric Conditions System- and Maintenance requirements (WOD-SOE) has been made with the greatest possible care, the Foundation Working under Hyperbaric Conditions, nor the website manager, nor the author assume no liability for any incorrect information, the possible causes and the possible consequences thereof.

If any questions arise concerning the accuracy of the requirements in the WOD-SOE, please refer to the Dutch version of the document, which is the official version.

Project group Working Conditions Catalogue Working under Hyperbaric Conditions

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Changes 2024 update compared to the 2023 version

Nr	Location of change	Description of change
1.	Page with 2024 changes	New.
2.	Index	Updated.
3.	Chapter 1 Introduction	1.2 'Scope of the WOD-SOE' changed to 'Scope of application of the WOD-SOE.
4.	Chapter 2 Terms and definitions	• Removed gaspressure test. • Definition SCUBA with a provision of breathing air from the surface (OLV) and SSE changed in accordance SWOD registration scheme. • Oxygen clean and Hyperbaric treatment chamber (1 compartment). New.
5.	Chapter 3 Maintenance system requirements	3.3.8 Diving materials out of use. New
6.	Chapter 4 Minimum system requirements	**4.1.2, 4.2.1 en 4.3.1 Safety requirements when using oxygen enriched breathing gases**
		3. More than 40% oxygen Added in line with a relevant industry standard and a number of standards
		4.1.4 Surface Supplied Equipment (SSE)
		4.1.4.1 Requirements breathing gas supply: • Requirements adjusted such that there is no longer a distinction between breathing gas supply for Mining/Energy related work under hyperbaric conditions and other work under hyperbaric conditions; • Adapted to the current state of the art (IMO 2023 Diving Code and IMCA).
7.	Chapter 5 Detail sheets	1.1 Compressors and boosterpumps Added NEN-EN 12021.
		2.2 Pressure vessels gas, dry Relocation Note: Pressure vessels with air till 2500 litres.
		2.4.H Pressure vessel for human occupancy Changing Directive to new Regulation.
		3.1 Umbilicals – Hose components only Changed testing and competency level.
		3.2 Pipework systems, reducers etc Changed testing and competency level
		6.2 Lifting system for the transportation of divers inclusive winches. Changed Category and Remarks

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1 INTRODUCTION

1.1 GENERAL

The System- and Maintenance requirements (WOD-SOE) have been drawn up by the Project group Working Conditions Catalogue Working under Hyperbaric Conditions.

The management of the Foundation Working under Hyperbaric Conditions (SWOD) has approved the Working Conditions Catalogue Working under Hyperbaric Conditions including the System- and Maintenance requirements (WOD-SOE) on 3 December 2024 .

In the Working Conditions Decree (Article 6.15 paragraph 1 sub b) is defined that, when carrying out work under hyperbaric conditions, sound equipment which is in a good condition must be provided to the employees.
In order to comply with the above mentioned article the equipment, which is used during work under hyperbaric conditions, must as a minimum comply with the System- and Maintenance requirements (WOD-SOE).
When complying with the WOD-SOE, the inspection obligations mentioned in Article 7.4a paragraphs 3, 4, 5 and 6 of the Working Conditions Decree are also properly fulfilled.

The WOD-SOE consists of the following chapters:

- Maintenance system requirements;
- Minimum system requirements;
- Detail sheets.

1.2 SCOPE OF APPLICATION OF THE WOD-SOE

The WOD-SOE is applicable according to the Working Conditions Act:

1. On Dutch territory.

2. Within the boundary of the exclusive economic zone of the Netherlands. The boundaries coincide with:
   a. the boundary of the territorial sea of the Netherlands, referred to in Article 1, first paragraph, of the Dutch territorial sea boundaries Act and
   b. the boundaries of the part of the continental shelf allocated to the Netherlands.

3. On sea going ships registered in the Netherlands.
4. This also applies to permanently installed platforms and FPSOs operating within the boundaries of the exclusive economic zone of the Netherlands.

1.3 MAINTENANCE SYSTEM REQUIREMENTS

In the maintenance system the requirements are defined for :

- Management;
- Competence;
- Execution and registration of maintenance.

(See Chapter 3)

1.4 MINIMUM SYSTEM REQUIREMENTS

This contains the minimum requirements of systems in relation to:

- Diving work;
- Caisson work and other work under hyperbaric conditions;
- Hyperbaric treatment chamber.

See Chapter 4)

1.5 DETAIL SHEETS

In the Detail sheets the minimum requirements regarding equipment are defined. These minimum requirements consist of:

- Product requirements and examination/ testing requirements when new, installed first time and following modification;
- Examination/ testing requirements when in use.

(See Chapter 5)

2 TERMS AND DEFINITIONS

Below are mentioned the Terms and Definitions which are used in the Maintenance system requirements, Minimum System requirements and the Detail sheets.

Breathing air	:	Compressed air and contains 21% oxygen gas, at least 78% nitrogen gas and a maximum of 1% other gases. Breathing air complies with the requirements referred to in NEN-EN-12021.
Breathing gas	:	Breathing gas is a collective name for gas mixtures that vary in composition depending on the nature, duration and pressure (including breathing air). Breathing gases are suitable for use in breathing apparatus and the composition meets the requirements referred to in NEN-EN-12021.
BIBS	:	Built In Breathing System in a compression chamber for the purpose of supplying breathing gas other than the breathing gas which is in the chamber.
Caisson	:	A structural construction which by means of excavation of soil on the underside is moved to a deeper level or by means of immersion in open water is placed on the bottom.
Certificate	:	A document that confirms that a particular test or examination has been carried out or witnessed at an identified time on a specific piece of equipment or system by a competent person.
Calibration	:	Calibration (i.e. examination, adjustment if necessary and as proof thereof marking) of graduations on measuring instruments.
Classification	:	A Diving system built in accordance with a classification society's own rules, can, at the owner's request, be assigned a class by the classification society and a certificate of classification be issued. Classification will continue as long as is established during periodic surveys that the system is maintained in accordance with the prescribed own rules of the classification society.
Classification society	:	A classification society which is a member of the International Association of Classification Societies (IACS) and with general recognised standards and rules for design, construction and initial and periodic testing of systems used during Working under Hyperbaric Conditions.
Competence	:	Demonstrated ability to apply knowledge and skills and, where relevant, demonstrated personal qualities, as defined in the maintenance system schedule.
Competent person	:	Person in charge of examination, assembling, maintenance, repair, modification, testing or cleaning of work equipment, the use of which may pose a specific danger to the safety of the user (s) and who has a specific competence and experience to be capable to carry this out. A distinction is made in the following categories:

Category 0:
The user of the relevant equipment. This person is authorised to carry out the appropriate visual examinations and function tests of the equipment to be used by him;

Category 1:
A by the employer appointed diving supervisor or other person with proven sufficient general technical and specific training and experience in this field. This person is authorised to carry out those tests for which he possesses proven specific knowledge;

Category 2:
A competent person with proven specific knowledge in the relevant field of work, employed by an independent company, or employed by the employer, but in such a position that he can carry out his work in an independent manner;

Category 3:
A classification society;

Category 4:
A specialised company, independent competent person or organisation with proven specific knowledge in the relevant field of work and with access to the necessary test facilities;

Category 5:
NL-CBI.

Component	:	The part of a system for which a Detail sheet is drawn up.
Compression chamber or tank	:	A compression chamber is a pressure vessel suitable for human occupancy in support of diving- and work under hyperbaric conditions, both for controlled decompression as for treatment of decompression symptoms and/or hyperbaric trauma's, not being a hyperbaric treatment chamber.
Control room	:	A space in which operation, control and monitoring takes place of the entire or partial system of locks, working chambers and air pressure station.
Control panel hyperbaric treatment chamber	:	The combination of operations equipment, measuring instruments, indicator equipment, visual monitoring equipment and communications equipment needed to operate a hyperbaric treatment chamber in an appropriate manner.
Declaration	:	The EC Declaration of type examination or EC Declaration of Conformity as referred to in the Machinery directive or any other EU product directive.
Diving cage	:	A submersible open cage construction, intended for the transport of divers between the underwater located workplace and the surface, suitable for use for in-water decompression.
Diving panel	:	Operating panel for control and monitoring of the breathing gas supply,

		communication and depth reading of the diver.
Dry diving bell (Closed bell)	:	A submersible chamber, including its direct attachments up to the connections with other equipment, lockable by means of one or two doors, intended for the transport of divers between the underwater located workplace and the surface or the surface-based compression chamber.
Energy generation installation related to working under hyperbaric conditions	:	Diving work, caisson work and other work under hyperbaric conditions which takes place for the construction, use, maintenance and removal of installations intended for the generation of energy by making use of environmental friendly energy sources such as wind and water.
Equipment transfer lock	:	By a shaft with a working chamber connected space, in which equipment can be transferred to or from that working chamber without influencing the prevailing pressure in the working chamber.
Entry lock	:	A pressure vessel connected to the personnel transfer lock of the caisson intended to transfer individual persons in and / or out of the personnel transfer lock of the caisson.
EU-CBI	:	EU Conformity Assessment Body (Previously notified designated inspection body, AAKI). This inspection body is an independent expert body, designated as such by a Member State and notified to the European Commission
Function test	:	A simple operational test of the equipment (or part of it). This is not about testing the whole range of motion/load/pressure etc. where the equipment may be subjected to, but only to the conditions under which it for most of the time will be used. This test is about whether the material is functioning correctly or not.
Gas leak test	:	An operational examination of a vessel, whereby this is filled with gas to a pressure corresponding to the maximum allowable working pressure. The purpose of this test can be twofold: a. For storage of hazardous gases must be determined if there is no measurable leakage taking place; b. For pressure vessels filled with non-hazardous gases must be determined whether any gas leaks do not have a negative influence on the functionality and the gas pressure can be kept easily on the set level.
Habitat	:	A mobile working chamber underwater with open access underwater which can only be entered by means of diving.
HES	:	Hyperbaric Evacuation System (HES). This term covers a system that allows divers under pressure to be safely evacuated from a ship or (floating) construction to a place where the decompression can be performed.

High pressure	:	High pressure is > 50 bar above atmospheric pressure.
Hydrostatic test	:	An overpressure test, whereby liquid is the medium with which the test is carried out.
Hyperbaric treatment chamber (2 or more compartments)	:	A in a hospital or medical facility permanent installed compression chamber, intended for treatment of patients under overpressure in accordance with a treatment protocol prescribed by a physician.
Hyperbaric treatment chamber consisting of 1 compartment	:	A treatment chamber (also called mono place) which does not comply with the Working Conditions Decree Article 6.18 Compression chamber diving work as there is only one compartment.
Inspection	:	Periodical examination/testing and if applicable (re-) inspection of components. The inspection must be performed by a competent person.
Life Support Package (LSP)	:	A system to which an HES can be coupled and in which decompression and possible treatment are carried out after a hyperbaric evacuation.
Low pressure	:	Low pressure is ≤ 20 Bar above atmospheric pressure.
MBF	:	Minimum breaking force.
Middle pressure	:	Pressure of > 20 Bar < 50 Bar above atmospheric pressure.
Mining related working under hyperbaric conditions	:	Diving work, caisson work and other work under hyperbaric conditions which takes place in support of the construction, the use, maintenance and the removal of: a. Mining installations as referred to in article 1, under o, of the Mining Act; b. Pipelines and cables as referred to in article 92, under a and b, of the Mining Decree.
Modification	:	Change to a component which is not in accordance with the manufacturer's specifications, which may affect the safe operation of the work equipment.
NLA	:	Netherlands Labour Authority.
NL-CBI	:	NL Conformity assessment body (Previously designated inspection body AKI). This inspection body is an independent expert inspection body, designated as such by Ministry SZW.
Open diving bell (Wet bell)	:	Half open Diving Bell which is equipped with a dry space filled with breathing gas which can (in case of emergency) be used for breathing.
Overpressure	:	A pressure of at least 0.1 bar above atmospheric pressure.
Overpressure space for underground construction	:	A dry space below ground level or water level, whereby inflow of the surrounding water is prevented by means of air overpressure. The construction to make this possible is in most cases built of concrete or steel, and at least open on one side.
Overpressure test	:	A test of a vessel, whereby this is filled with gas or a liquid to a defined value, higher than the maximum allowable working pressure. The purpose of this test is to test the strength and stiffness of the vessel and

		the associated fittings and connections.
Oxygen clean	:	Components or systems cleaned in accordance with a relevant industry standard as defined by IMCA D031, EIGA DOC33/18 or ASTM G93-03 or a demonstrably similar procedure.
Personnel transfer lock	:	A pressure vessel suitable for human occupancy, not being a compression chamber, intended to be used to bring personnel working under hyperbaric conditions in a controlled manner to and from a higher pressure than the atmospheric pressure.
Pneumatic caisson	:	A caisson whereby by means of air overpressure under the construction a dry working chamber is created, in which the excavation process is carried out.
PRD	:	Practice rules for Pressure equipment. Contains technical standards when assessing the pressure equipment in the user phase.
Pressure vessel	:	A housing consisting of one or more compartments, which is designed and manufactured for substances under pressure, including its direct attachments up to the connections with other equipment (Commodities Act Decree pressure equipment article 1f).
Saturation work	:	Work under overpressure whereby, related to time and depth, the body tissues are saturated with inert gas.
SCUBA	:	SCUBA, for every deployed diver equipped with a high-pressure air supply from the surface. A compact, self-contained diving equipment suitable for light work in the A category.
SCUBA with Surface Air Supply (OLV)	:	SCUBA with for each diver also a separate high pressure air supply from the surface. This is not a substitute for SSE diving. When using SCUBA with OLV, the contents of the SCUBA breathing gas cylinder(s) used is leading in determining the planned maximum dive time.
Shaft	:	Pressure vessel, being a connection corridor between two pressure containing compartments, intended for transferring persons and or goods, not intended for occupancy of personnel.
Shuttle	:	Shuttle is a chamber for transport of personnel working under hyperbaric conditions from saturation system to working chamber, vice versa.
SSE	:	Surface Supplied Equipment, being a collective name for diving systems which are equipped as standard with breathing gas supply from the surface, where one or more divers are connected to a diving panel and which are suitable for heavy-duty work in category B
SWL	:	The safe workload (SWL) is the maximum permissible workload for which a hoisting device has been certified. Sometimes the safe workload (SWL) is also called the maximum safe workload (WLL).
SWOD	:	Foundation Working under Hyperbaric Conditions.
Testing	:	Testing equipment or tools with a test load which is generally greater

		than the workload. This is intended as a means to uncover any errors or defects.
Tunnel boring machine (TBM)	:	Boring- or digging machine for digging or boring of pipes and tunnels of relative large dimensions without excavation from ground level. The bore front is a closed system, in which, when required, maintenance- and repair work under hyperbaric conditions must be carried out by divers or personnel working under hyperbaric conditions, whom for this purpose transfer from the pipe or tunnel through a transfer lock into the bore front.
Underwater lift bag open and closed	:	A lift bag is a lifting device that underwater, by means of an upward force, loads can move/position and/or upwards can support when moving loads horizontally. The upward force is obtained by introducing air into the lift bag.
Visual inspection	:	Examination where by means of observation of the equipment is determined whether it is in good condition, free of any visible defects, evidently in workable condition and not subject to exceptional corrosion or wear.
Working chamber	:	Space under overpressure, in which personnel carry out work. The working chamber may consist of multiple compartments.
WLL	:	See SWL.

3 MAINTENANCE SYSTEM REQUIREMENTS

3.1 GENERAL

In order to comply with the requirement in the Working Conditions Decree Article 6.15 paragraph1 sub b, that the employer provides to the employees sound equipment which is in good condition the employer must be able to demonstrate a functioning maintenance system.
This chapter contains requirements that a functioning maintenance system must comply with:

- requirements concerning management of the organisation;
- requirements concerning management of resources;
- requirements concerning management of personnel;
- requirements concerning self supervision.

3.2 REQUIREMENTS CONCERNING MANAGEMENT OF THE ORGANISATION

The employer takes care of the maintenance and proper functioning of all equipment to be used for the work. The handling of the maintenance of the equipment is laid down in a description of a quality system.

The description includes as a minimum:

1. rolls and responsibilities of the employees concerned with regard to the equipment;
2. the method of communicating with the personal involved with the maintenance of the diving equipment;
3. process of actualisation of the description of the maintenance system and recording the maintenance in writing.

3.3 REQUIREMENTS CONCERNING MANAGEMENT OF RESOURCES

3.3.1 Registration of equipment

The employer must ensure that all equipment is identifiable and uniquely registered.

3.3.2 Minimum System and equipment requirements

The equipment provided, as referred to in Article 6.15 paragraph 1 sub b in the Working Conditions Decree, must at least meet the:

- Minimum System requirements which are mentioned in Chapter 4;
- Product and examination/ testing requirements when new, installed first time or following modification, which are mentioned in the Detail sheets in Chapter 5;
- Examination/ testing requirements when in use, which are mentioned in the Detail sheets in Chapter 5.

In addition for all equipment applies:

- It must be designed and manufactured in accordance with accepted standards;
- It must be suitable for the purpose for which it will be used.

- The system and equipment must be inspected, with tests carried out as necessary, whenever exceptional events have occurred which may have a detrimental effect on the safety of the work equipment. Exceptional events shall in any case include: natural phenomena, changes to the work equipment, accidents to the work equipment and long-term decommissioning.

3.3.3 Maintenance procedures

The maintenance of the equipment must be carried out in accordance with the requirements set for the:

- competencies of the maintenance personnel;
- method of examination and testing;
- period of validity of the examinations and tests.

The requirements regarding the maintenance procedures are included in the Detail sheets which are included in Chapter 5.

3.3.4 Maintenance registration

The employer shall have a maintenance system in which all certificates and tests are recorded, indicating the type of inspection and personal details and category of the competent person by whom the inspection has been carried out. Written/digital evidence of the inspections carried out must be present at the workplace and must be shown on request during inspection by the Netherlands Labour Authority (NLA).

3.3.5 Written instructions

The employer must ascertain that written work instructions / checklists are present and used for all tests to be carried out by or on behalf of the employer on the equipment. These instructions / checklists may be provided to the employee either in digital and in hard copy form and must be shown to the Netherlands Labour Authority on request.

3.3.6 Dealing with rejected equipment

The employer must record and demonstrate how he deals with equipment of which the certificate has expired or equipment which has been rejected.

3.3.7 Extension of the validity period of certificates

Certificates have a predetermined period of validity. An employer has the responsibility to take into account the period of validity of the certificates and the planned work to be carried out. This does not mean that if this period is exceeded, the material will immediately become unsafe.

In certain situations, an employer may extend the certificates by a maximum of 30 days:

- Diving work takes place in remote areas where (re)certification is not possible at that time;
- Continuous use of the materials so that exchange is not possible in the interim;

- Restrictive measures are in force, due to an extraordinary national/international situation (such as a COVID-19 pandemic), which do not allow in the normally planned periods to extend the validity period of certificates.

Extension is only possible if all of the following conditions are met:

- The normal maintenance system (PMS) to be performed is demonstrably present and up to date;
- The extension is recorded in writing, in the maintenance system, after a visual inspection followed by a function test, carried out by a competent person or in consultation with a competent person;
- If the 30-days extension is exceeded, the material may no longer be used and must be inspected in accordance with the instructions in this document;
- Materials that are legally subject to inspection by an NL-CBI such as gas cylinders must be agreed in writing with the NL-CBI for extension.

3.3.8 Diving equipment out of use

Of portable or demobilised diving equipment, the validity of certification need not be maintained during an out of service period.

If the validity of the certification has expired and the diving equipment is put back into service, it must be inspected, tested and re-certified in accordance with the requirements in the Detail sheets in the 'Requirements when in use' section.

After an out of service period where a possible deterioration of the diving equipment has occurred due to the method of storage and/or duration, it must be inspected, tested and certified in accordance with the hydrostatic testing and testing in the Detail sheets in the section 'Requirements when new, installed for the first time or after modification' and with all the requirements in the section 'Requirements when in service' before being put back into service. Depending on the possible deterioration, consideration should be given to having the diving equipment checked and (re)certified by a specialised company, independent expert or institution with demonstrable specific knowledge in the relevant field and with the necessary test facilities.

In all cases for diving equipment that has not been in use, a competent person with demonstrable specific knowledge must take into account the level of maintenance applied to the diving equipment during the period of out of use, method of storage and possible deterioration.

In the case of pressure equipment, the Commodities Act Decree on Pressure Equipment and the requirements set by the NL CBI must be complied with.

3.4 REQUIREMENTS CONCERNING MANAGEMENT OF PERSONNEL

The employer may choose to outsource all the maintenance and inspections to third parties or to have this all or partly carried out in-house. In order to guarantee a minimum level of quality requirements have been set regarding the competency of the competent person and for the maintenance of the equipment.

The maintenance system schedule distinguishes the following categories with regard to the

competences of the competent person who is in charge of the maintenance of the equipment:

Category 0: The user of the relevant equipment. This person is authorised to carry out the appropriate visual examinations and function tests of the equipment he is using;
Category 1: A by the employer appointed diving supervisor or other person with demonstrable sufficient general technical and specific training in this field. This person is authorised to carry out those tests for which he demonstrable possesses specific knowledge;
Category 2: A competent person with demonstrable specific knowledge in the relevant field of work, employed by an independent company, or employed by the employer, but in such a position that he can carry out his work in an independent manner;
Category 3: A classification society;
Category 4: A specialised company, independent competent person or organisation with proven specific knowledge in the relevant field of work and with (access to) the necessary test facilities;
Category 5: NL-CBI

The employer must ensure that the person, who carries out work in connection with the maintenance of the equipment, meets the qualification- and training requirements defined in this directive. Assurance of the qualification of the competent person shall be demonstrated by means records of assessments in practice.

The employer must be able to demonstrate the following:
1. An overview of the competent persons in the categories 0, 1 and 2 with name and position and corresponding qualifications;
2. The demonstrable registration of the qualifications (including practical and theoretical knowledge);
3. In case of outsourcing of work an overview of organisations to which this work has been outsourced including a by those organisations issued written declaration of conformity to this directive.

3.5 REQUIREMENTS CONCERNING SELF SUPERVISION

For the purpose of the self supervision of the safety of the equipment, the maintenance system must describe in which way and by whom within its own the organisation the controls takes place of:
1. Inspection registrations;
2. Certificates and reporting;
3. Maintenance planning;
4. Use of calibrated equipment.

4 MINIMUM SYSTEM REQUIREMENTS

This Chapter contains minimum requirements for equipment to be provided to employees as referred to in Article 6.15 paragraph 1 sub b in the Working Conditions Decree.

The Systems must comply with the current state of technical and scientific developments and the Dutch law and regulations, including the Working Conditions Decree, Chapter 7 Work equipment and Specific activities and the Commodities Act Decree and the regulations for Machinery, Pressure vessels and Personal protective equipment and inspection obligations when a system is put into service for the first time and after installation at a new location.

An exception is that permanently installed diving systems on sea-going vessels registered in the Netherlands are not subject to the Commodities Act decrees and regulations. Permanently installed systems are defined as diving systems that have been on board for more than 12 months, making them part of the ship and subject to classification bureau requirements.

4.1 DIVING WORK

Diving systems should at least have and or meet the requirements below.

4.1.1 Breathing gas

It is considered there is sufficient breathing gas flow when a diver at work has the following available:

a. During normal work 35 l/min breathing gas flow;
b. In case of emergency 62.5 l/min breathing gas flow.

Breathing gas shall comply with the requirements stated in NEN-EN 12021.

4.1.2 Safety requirements when using oxygen enriched breathing gasses

1. Less than 25% oxygen

For systems which are used with breathing gasses which contain less than 25% oxygen no additional safety measures are required.

2. Between 25% - 40% oxygen

In systems which are used with breathing gasses which contain between 25% and 40% oxygen the components must be cleaned of visible dirt, grease and oil in accordance with the Working Conditions Catalogue.

3. More than 40% oxygen

Systems, which are used with breathing gasses, which contain more than 40 % oxygen, must be specifically made suitable for use with high oxygen percentages (oxygen service).

This means:

a. Applied materials must be suitable for use with oxygen (oxygen compatible) and the components must have been specifically cleaned for use with oxygen (oxygen clean in accordance with a relevant industry standard such as the IMCA D031, EIGA DOC33/18 or ASTM G93-03 or a demonstrably comparable procedure) and are also kept oxygen clean;
b. At a pressure above 15 bar valves, carrying oxygen or mixtures containing more than 40% oxygen, shall not be a ball valve but a valve must be used that slowly builds up the pressure, such as a needle valve.

With an increased oxygen percentage (above 25%), the relief valves on the pipe work on the diving panel must be provided with an outlet outside the room where the pipework is located to prevent increase of the oxygen percentage in case of leakage.

4.1.3 SCUBA

4.1.3.1 SCUBA (inclusive rebreather)

	Description	Detailsheet
a.	A provision which during diving work supplies breathing gas to the diver, as a minimum consisting of a breathing gas cylinder and demand valve.(See also 4.1.1 Breathing gas)	2.1 5.1, 5.3, 5.5
b.	A diving mask.	5.4
c.	A provision whereby the diving supervisor and the diver or the divers in between themselves can communicate with each other .	
d.	A provision whereby the diving supervisor and/ or the diver can continuously be aware at which depth the diver is located.	3,5
e.	A provision which allows the diver, if required, to float on the surface.	

4.1.3.2 Surface Air Supply (OLV) as a Supplement to a SCUBA Diving System

	Description	Detailsheet
a.	A Surface Air Supply (OLV) system that consists as a minimum of: A surface control unit, high pressure cylinders for breathing gas supply, connecting hoses between the cylinders and control unit, a high pressure umbilical and a SCUBA diving apparatus. (See also 4.1.1 Breathing gas)	2.2, 3.2, 3.4, 3.1
b.	The SCUBA diving apparatus is equipped with full face mask including fixed or wireless voice communication.	4.2, 4.4, 5.4
c.	For the diver, an optical or audible signal as an advance warning for the switching on of the reserve air supply at a cylinder pressure of at minimal 80 bar of the SCUBA diving system.	
d.	For the diver a warning when is switched over to the reserve air supply which takes place at minimal 60 bar cylinder pressure of the SCUBA diving system.	
e.	When the OLV fails, the air supply to the diver automatically switches to the SCUBA dive system. In this case, the minimum allowable middle pressure in	

	the dive system must be maintained to prevent moisture getting in the dive system.	
f.	The OLV control unit on the surface gives at a minimal pressure of 50 bar an acoustic warning signal, which at all times is clearly audible and cannot be switched off.	
g.	On the surface two separate high pressure breathing gas facilities where in case of failure or imminent shortage of the primary system immediately can be switched to the secondary system.	2.2
h.	The OLV umbilical is attached to the diving harness, trim vest or surface life vest in such a way that there is no tension on the individual components.	3.1, 5.6, 5.7
i.	There must be a provision to stowe the OLV umbilical such that it avoids kinking.	
j.	The standby diver has his own OLV diving system and an umbilical that can come at least two meters further than the umbilical of the diver, at all times it must be ensured that the diver stays within reach of the standby diver.	3.1
k.	Arrangement of the surface control unit in such a way that it is clearly laid out	
l.	Clear marking of the routing of the breathing gas (open/closed) on the surface control unit.	
m.	The surface control unit shall be equipped with a pressure gauge indicating the cylinder pressure in the OLV system.	3.4

4.1.4 Surface Supplied Equipment (SSE)

When using surface supplied equipment applies that all components of which the safety of the diver and/or worker under hyperbaric conditions directly depends on, must be arranged in such a manner that in case of failure of one single component the safety of the diver remains guaranteed (no single point failure principle).

4.1.4.1 General

As a minimum the following must be available:

	Description	**Detailsheet**
a.	A helmet or mask for the diver that gives enough breathing gas. (See also 4.1.1 Breathing gas)	5.2
b.	An independent emergency breathing gas supply (bailout) to which the diver can switch by himself.	2.1
c.	A facility that allows the diver to float on the surface if necessary.	
d.	A diver harness/ vest	5.7
e.	A provision whereby the diving supervisor and the diver under all circumstances can verbally communicate with each other.	4.2

<table>
<tr><th></th><th>Description</th><th>Detailsheet</th></tr>
<tr><td>f.</td><td>Breathing gas supply must meet at least the requirements in the table:
<table>
<tr><th>Diver(s) and standby diver breathing gas supply</th><th>Primary breathing gas supply</th><th>Independent secondary breathing gas supply</th></tr>
<tr><td>One working diver</td><td>One supply</td><td>One supply</td></tr>
<tr><td>Two working divers. Option 1</td><td>One supply per diver</td><td>One supply per two divers</td></tr>
<tr><td>Two working divers Option 2</td><td>One supply per two divers</td><td>One supply per diver</td></tr>
<tr><td>Surface standby diver</td><td>One supply (separate from working diver(s))</td><td>One supply (may be common with the primary or secondary breathing gas supply of the working diver(s)</td></tr>
</table>
Another possibility is a independent primary and secondary breathing gas supply for every diver(s) and standby diver.

• The emergency breathing gas supply (bailout) to which the diver can switch by himself is not included in the secondary breathing gas supply.
• The breathing gas supply to a diver must be arranged so that in case a breathing gas supply line or regulator becomes damaged/defective that it does not affect the breathing gas supply of any other diver or the standby diver;
• Each of the breathing gas supplies must be able to deliver sufficient pressure and breathing gas flow (normal work 35 l/min and in case of emergency 62.5 l/min) at the maximum water depth at which the diving operation is to be conducted.</td><td>1.1, 2.2</td></tr>
</table>

4.1.4.2 Diver umbilical

	Description	Detailsheet

a.	The umbilical must be suitable for the purpose for which it is used. It must be robust and made of components designed for use in an umbilical.	3.1, 3.8
b.	An attachment in such a way to the diver harness that no tension is applied on the individual components.	
c.	A provision such that the umbilical of the standby diver is always minimal two meters longer than the umbilical of the diver.	
d.	Hoses used with an oxygen mixture greater than 40% must be oxygen clean and suitable for oxygen (See also 4.1.2 Safety requirements for the use of oxygen-enriched breathing gases).	

4.1.4.3 Diving panel

	Description	**Detailsheet**
a.	The panel must be arranged in such a way that everything is clearly laid out.	
b.	Clear marking of the routing of the breathing gas per diver.	
c.	Clear marking of all breathing gas pipework, valves and pressure gauges.	3.2
d.	A device indicating the pressure of the breathing gas supplies.	3.4
e.	Depth gauges on which the supervisor can read the depth at which the diver is located.	3.3

4.1.4.4 Control room

	Description	**Detailsheet**
a.	Clear marking of all breathing gas pipework and -valves and pressure gauges;	3.2
b.	In case the dive control room is an enclosed space, arrangements in such a way that in case of calamities the diving supervisor is protected in such a way that he can complete the dive in a safe manner.	
c.	Firefighting system.	
d.	In case of Mining/ energy generation related work under hyperbaric conditions a means which records the communication between the diving supervisor and diver on commonly used video- and/ or voice recorders. These video- and /or voice recordings must be saved for a minimum of 24 hours.	4.2, 3.8
e.	A provision which allows the volume of general alarm systems, for example vessel, platform or construction location to be arranged in such a way that the communication with the divers is not disturbed, but cannot be switched off.	
f.	Lighting and emergency lighting.	3.8

4.1.4.5 Compression chamber

	Description	Detailsheet
a.	A main chamber which provides space for at least two persons, of which as a minimum one person must be able to lay down and one person must be able to sit.	2.4
b.	A medicine lock in the main chamber.	
c.	A personnel transfer lock (This does not apply during transport in an emergency situation provided the transportable chamber complies with a.).	
d.	Doors which can be opened from both sides.	
e.	In case a door can be opened outward; an arrangement which prevents that the door can be opened while the relevant space is under pressure.	
f.	An overpressure protection.	3.9
g.	A viewport for the observation of the occupants, in the main chamber as well as in the personnel lock.	3.6
h.	The following minimum requirements apply to the breathing air facilities: • Two independent breathing air facilities where in case of failure of the primary system it is possible to switch immediately to the secondary system; • The primary and secondary breathing air facilities must be arranged so that in the event of failure of one, the other is not affected; • Each of the breathing gas supplies must be capable of providing sufficient pressure and breathing gas flow for the maximum depth of a potential decompression treatment (normally 50 metres); • Primary and secondary breathing air supplies must only be used for the compression chamber.	1.1, 2.2
i.	An oxygen supply for treatment of divers in decompression or with decompression illness	3.2, 4.1
j.	All valves and pipework used for oxygen must meet the safety requirements when using oxygen-enriched breathing gases (See also 4.1.2 Safety requirements when using oxygen-enriched breathing gases).	3.2
k.	In the main chamber as well as in the personnel transfer lock a BIBS and for each occupant one BIBS mask and one spare.	4.1
l.	An overboard dump for the BIBS.	
m.	Lighting and emergency lighting.	3.7, 3.8
n.	A provision in the main chamber to maintain the temperature within acceptable limits.	3.8
o.	A depth indication gauge in the main chamber on which the occupants can read the depth.	3.5
p.	Two way voice communication, inclusive back-up for the main chamber and personnel transfer lock.	4.3

	Description	Detailsheet
q.	Oxygen percentage in the main chamber and personnel transfer lock must be able to be kept under 23%.	4.5
r.	A firefighting system of sufficient capacity and suitable for use in hyperbaric conditions in the main chamber. This may be a hyperbaric fire extinguisher instead of a stationary fire extinguishing system.	4.6, 4.7

4.1.4.6 Control panel compression chamber

	Description	Detailsheet
a.	Such a provision that in case of calamities the operator is protected in such a way that he can complete the dive or treatment in a safe manner.	
b.	Two-way verbal communication, including emergency provision for the main chamber and personnel lock.	4.3
c.	Provisions which indicate the pressure or depth in the main chamber and personnel lock.	3.3
d.	A provision which indicates the pressure of the breathing gas supplies.	3.4
e.	A provision to be able to measure the oxygen percentage in the main chamber and the personnel lock.	4.5
f.	Based on a RI&E carry out carbon dioxide measurement. This may be a test tube system.	4.5
g.	Clear marking of all breathing gas pipework, -valves and pressure gauges.	3.2
h.	All valves and pipework used for oxygen must meet the safety requirements when using oxygen-enriched breathing gases (See also 4.1.2 Safety requirements when using oxygen-enriched breathing gases).	3.2

4.1.4.7 Lifting system for transport of divers

4.1.4.7.1 General

	Description	Detailsheet
a.	Documentation indicating: • according to which design standard it has been built and a declaration of conformity with this design standard; • suitability for personnel transport; • the safe working load (SWL); • maximum wave conditions for which the system is designed.	
b.	The safe working load (SWL) of the system must be greater than or equal to the weight of the diving cage or open diving bell (wet bell), guide weight plus the weight fully manned and equipped + weight of wire. For the calculation of the weight of a fully equipped diver, must at least be based on 150 kg.	

	Description	Detailsheet
c.	The safe working load (SWL) must be mentioned on the winches and on the diving cage or open diving bell (wet bell), in addition the weight of the diving cage or open diving bell (wet bell) (tara weight) and the maximum load capacity (payload) must be mentioned.	
d.	Must be certified as being suitable for personnel transport and must at least comply with a relevant design standard (such as for example used by classification society) for the lifting system for the transport of divers.	
e.	Meeting the requirements for the maximum significant wave height in which the structure is used.	
f.	An inspection procedure must be present with a detailed description of the examinations / tests of the components.	
g.	A manual plus emergency procedures must be present.	
h.	If a second lifting system for the standby diver is used, this must meet the same requirements.	
i.	Lighting of the lifting location when diving during darkness.	

4.1.4.7.2 Wires ropes for transport divers

	Description	Detailsheet
a.	Selection of wires ropes for transport of divers. It is strongly recommended to use galvanized wires ropes because they are better suited in seawater against degradation than non-galvanized wire ropes. The zinc not only gives more resistance to the steel against general corrosion but it also slows down corrosion fatigue and corrosion damage.	
b.	Documentation which indicates: • Type and construction of the wire rope; • Length and diameter of the wire rope; • The minimal breaking strength (at purchase) or breakings strength from test; • The safe working load (SWL).	6.3
c.	Must be non-rotating. This also applies to a second independent facility to bring the diving cage or open diving bell (wet bell) to the surface, however, in cases of a double reeved wire rope through a guide weight, a non-rotation wire rope is not required.	
d.	Breaking strength of minimal 8 times the safe working load (SWL) based on maximum seastate 4 This applies to the main system and the second independent facility. When the lifting system is used at conditions higher than seastate 4, this safety factor must be increased in accordance with a relevant design standard (such as for instance used by classification societies) for the lifting system for the transport of divers.	6.3

4.1.4.7.3 Diving cage

	Description	Detailsheet
a.	Documentation indicating: • according to which design standard it has been built and a declaration of conformity with this design standard; • suitability for personnel transport; • the safe working load (SWL); • weight of the diving cage; • the maximum load capacity. This must also be indicated on the diving cage.	6.1
b.	A construction in which the diver can stand upright.	
c.	A device that prevents the diver from falling out of the cage.	
d.	On the inside suitable handles to which the diver can safely hold.	
e.	A means to support an unconscious diver.	
f.	A lifting point and a secondary lift point on the cage.	
g.	A safeguard against spinning and swinging.	
h.	At the top a protection against falling objects.	
i.	Safe access of the diving cage.	
j.	During offshore related work an emergency breathing gas supply must be present (with emergency breathing gas supply is not meant a bail-out of the diver).	2.1
k.	For diving activities from Dynamically Positioned (DP) vessels, the umbilical must enter the cage through a guiding construction, which is constructed in such a way that it stops the stopper on the umbilical of the diver (s). The stopper on the umbilical is to prevent the diver (s) from coming too close to amongst others propellers, thrusters and inlets. In case of emergency, it must be possible for the diver to detach his umbilical from the guiding construction and free himself from the diving cage.	

4.1.4.7.4 Open diving bell (wet bell)

	Description	Detailsheet
a.	Documentation indicating: • according to which design standard it has been built and a declaration of conformity with this design standard; • suitability for personnel transport; • the safe working load (SWL); • weight of the open diving bell (wet bell); • the maximum load capacity. This must also be indicated on the open diving bell (wet bell).	6.1
b.	A construction in which two divers can stand upright.	
c.	A device that prevent the divers from falling out of the diving bell.	
d.	On the inside provisions to which the divers can safely hold.	
e.	A means to support an unconscious diver.	
f.	Safe access of the open diving bell.	
g.	A lifting point and a secondary lift point on the diving bell.	
h.	A safeguard against spinning and swinging.	
i.	If the dome is of an acrylic type, there must be protection on the outside to prevent breakage of the dome and injury to the divers in the event of an object falling or a collision.	
j.	A breathing gas supply and an emergency breathing gas supply (with emergency breathing gas supply is not meant a bailout of the diver).One of the aforementioned breathing gas supplies must be separate for each diver.	2.1
k.	Lighting and emergency lighting in the diving bell.	3.8
l.	Communication and emergency communication.	4.2, 4.4
m.	When using a main umbilical it must be suitable for the intended use. This means that it must be robust and suitable to be used by the system with which the main umbilical is lowered and raised. It must also contain a sufficient number and diameter hoses and cables for the supplies necessary at the maximum depth at which it is used.	3.1, 3.8
n.	If a main umbilical winch is used, it must be fitted with a braking system that controls paying out of the umbilical.	
o.	If the main umbilical is used as secondary independent system to bring the diving bell to the surface, then it must be suitable and tested.	
p.	A means with which the excursion umbilical can be stowed in the open diving bell.	3.1, 3.8
q.	A means that guarantees the calculated maximum safe excursion distance. This to prevent that the diver (s) can come too close to amongst others propellers, thrusters and inlets.	

4.1.4.7.5 Lifting system for diving cage/ open diving bell (wet bell)

	Description	Detailsheet
a.	Winches suitable for personnel transportation, with documentation indicating • according to which design standard it has been built and a declaration of conformity with this design standard; • suitability for personnel transport; • the safe working load (SWL).	6.2
b.	Clear marking of functions on the control panel.	
c.	An automatic brake on the winches that come into operation when the system is not being operated.	
d.	If the first brake fails a second automatic or manual brake for both winches.	
e.	The capacity of the winch drum must be sufficient to be able to store the full length of the wire rope with the free drum flange height being at least 2.5 x the wire diameter.	
f.	There must be a method whereby the operator of the winch can see how much of the lifting wire has been paid out from the winch. This also applies for the main umbilical of the open diving bell (wet bell).	
g.	The wire rope must during use remain at least 3 wrap on the drum.	
h.	Connection with the diving cage or open diving bell must be suitable and the pin double secured.	
i.	A second independent system to bring the cage or open diving bell to the surface.	
j.	An independent second power source for the winch must be available in case of a defect with the main power source.	
k.	The SWL diving cage / open dive bell winch is the weight of the diving cage or open diving bell (tara weight) + max. load capacity + weight of wire.	
l.	The SWL guide weight winch is the weight of the diving cage or open diving bell (tara weight) + max. load capacity + guide weight + weight of wire. If double reeved, divide the safe work load (SWL) by two.	
m.	The diving supervisor must be able to communicate at all times with the operator of the winch.	4.2, 4.4
n.	Emergency breathing apparatus with voice communication provision for the operator of the winch, so that he can bring the divers to safety in case of calamities. This may be a breathing air provision consisting of an umbilical with fixed communication or a breathing air cylinder and wireless communication.	2.2, 3.1, 4.2, 4.4, 5.1, 5.3, 5.4

4.1.5 Saturation system diving work

	Description	Detailsheet
a.	An emergency power source (such as batteries, high pressure cylinders, emergency generator, etc.). The capacity must be such that in case of failure of the main power supply all equipment can remain operational, which is required for: • safe completion of the dive; • to return the diving bell to the compression chamber system.	
b.	Life support and lighting for the divers in the compression chamber system.	3.7, 3.8
c.	In case of emergency a provision to be able to bring divers from the surface to the diving bell.	

4.1.5.1 Control room saturation system

	Description	Detailsheet
a.	Lighting and emergency lighting.	3.8
b.	Two way voice communication between the control room of the saturation system and: • all compartments in the system; • the control room of the diving bell; • the outside of all food and/or medical locks; • the launching location of the hyperbaric evacuation system.	4.2, 4.3
c.	Sufficient suitable gauges to read the: • depth in each compartment; • supply pressures of the main- and back-up breathing gas supply to each chamber.	3.3, 3.4, 3.5
d.	Clear marking of all breathing gas pipework, -valves and pressure gauges.	3.2
e.	Such a provision that in case of calamities the diving operations can be terminated in a safe manner.	
f.	A firefighting system.	
g.	A provision by which alarm systems of, for example vessel, platform or construction location, are clearly audible in the control room. The volume must be adjustable in such a way that the communication with the divers is not disturbed, but it should not be possible to switch it off.	
h.	The diving supervisor must be able to see the divers in each compartment, either by means of a view port, or a TV camera.	3.6
i.	Provisions for monitoring of: • Oxygen; • Carbon dioxide; • temperature; • humidity.	4.5

	Description	Detailsheet
j.	The provision for measuring of oxygen must be fitted with an acoustic and visual alarm, which immediately sounds an alarm in case of a deviation from the required oxygen percentage.	
k.	There should be a facility (repeater) to warn the personnel in the control room saturation system if the gas storage O2 alarm is activated.	

4.1.5.2 Compression chamber saturation system

	Description	Detailsheet
a.	Sufficient space for the number of divers.	2.4
b.	Sufficient personnel-, medical- and food locks.	
c.	Lighting and emergency lighting.	3.7, 3.8
d.	A depth indication gauge on which the occupants can read the depth.	3.5
e.	A firefighting system suitable for use under hyperbaric conditions.	4.6, 4.7
f.	For each compartment, independent from the diving bell as well as the divers in the water: a main- and back up breathing gas supply.	1.1, 2.2
g.	For each compartment, a separate breathing gas supply for (re) compression and for each occupant at least one BIBS mask, and one spare BIBS mask.	4.1
h.	An overboard dump.	
i.	For each compartment an overpressure protection.	3.9
j.	Clear marking of all breathing gas pipework, -valves and pressure gauges.	3.2
k.	Doors which: • can be opened from both sides. Doors which open outwards are provided with a safety arrangement which prevents that the door can be opened while the system is under pressure; • are marked with an individual number; • can be secured in the open position.	
l.	A safety interlock system on the outside door of the medical/ equipment lock, which prevents that the door can be opened while the system is under pressure and which makes it impossible to pressurise the lock when the door is not properly closed.	
m.	Two way voice communication: • between the outside of the food-, medical- and the equipment locks and the control room; • between divers and the control room.	4.2, 4.3
n.	Provisions to monitor and control: • Oxygen; • Carbon dioxide; • temperature; • humidity.	4.5, 7.5

	Description	Detailsheet
o.	A bunk for each diver that should be wide and long enough for a normal person to lay down comfortably.	
p.	Sufficient toilet provision. In case the toilet provision is fitted with a flush type system, than a safety arrangement has to be place such that it cannot be flushed while being used.	
q.	In each compartment a viewport for observation of the occupants.	3.6
r.	Provisions to use one chamber of the compression chamber system for treatment under hyperbaric conditions of a wounded diver	

4.1.5.3 Diver heating system

	Description	Detailsheet
a.	A main and backup system to supply the diver with heat of the correct temperature. The backup system must be able to function for as long as it takes to bring the divers to safety.	7.2

4.1.5.4 Gas storage

	Description	Detailsheet
a.	When storing gas under pressure in an enclosed space and other locations where accumulation can take place: • An oxygen meter; • An overpressure protection with overboard dump.	4.5, 3.9

4.1.5.5 Diver breathing gas reclaim system

	Description	Detailsheet
a.	Specifically for that purpose designed diving helmets.	5.2
b.	A breathing gas reclaim control panel in the control room, in such a way that the diving supervisor can properly view and operate the panel. This panel must be provided with an acoustic and visual alarm which gives a warning when one of the reclaim compressors is not functioning properly.	7.6
c.	Oxygen injection restrictions with a provision that the restrictions close in case of a power failure.	
d.	On the diving control panel: • A provision to measure the oxygen percentage in the last part of the supply to the diving bell umbilical, with acoustic and visual alarm; • A provision to measure the carbon dioxide percentage in the last part of the supply to the diving bell umbilical, with acoustic and visual alarm.	4.5

4.1.5.6 Compression chamber breathing gas reclaim system and purification

	Description	Detailsheet
a.	A breathing gas reclaim control panel provided with an acoustic and visual alarm which gives a warning when one of the reclaim compressors is not functioning properly.	7.6
b.	Oxygen injection restrictions with a provision that the restrictions close in case of a failure of the power source.	
c.	A suitable provision to monitor the amount of gas in the gas bag.	
d.	An overpressure protection with over board dump on the gas bag.	3.9
e.	Clear marking of all breathing gas pipework and -valves and pressure gauges.	3.2

4.1.5.7 Hyperbaric evacuation system (HES)

	Description	Detailsheet
a.	A hyperbaric lifeboat which complies with SOLAS requirements.	7.7
b.	A compression chamber for human occupancy, with sufficient capacity for the maximum number of divers under pressure.	2.4
c.	Emergency provisions for at least 72 hours consisting of: • a sufficient quantity oxygen for a consumption of 0.5 litres per diver per minute; • gas supply to compensate gas consumption and losses; • a means to maintain the diver's body temperature in thermal balance , independent from the surface; • a means to control the carbon dioxide percentage; • a toilet facility.	7.1, 7.2
d.	One safety belt per occupant.	
e.	A safety system fitted to the connection between the HES and the compression chamber, such that it is impossible to open the connection when the system is still under pressure, and it is impossible to pressurise the system when the connection is not properly closed.	
f.	A hyperbaric firefighting provision must be present in the compression chamber.	4.6, 4.7
g.	Provisions hyperbaric lifeboat for: • towing; • lifting out of the water with a single point lifting system. This may be a single point lifting beam or lifting bridle. • connecting to another compression chamber or on a Life Support Package (LSP).	

4.1.5.8 Lifting system for the transport of divers

4.1.5.8.1 General

	Description	Detailsheet
a.	Documentation indicating: • according to which design standard it has been built and a declaration of conformity with this design standard; • suitability for personnel transport; • the safe working load (SWL); • maximum wave conditions for which the system is designed.	
b.	The safe working load (SWL) of the system must be greater than or equal to the weight of the diving bell, guide weight plus the weight fully manned and equipped + weight of wire. For the calculation of the weight of a fully equipped diver, must at least be based on 150 kg.	
c.	The safe working load (SWL) must be mentioned on the winches and on the diving bell, in addition the weight of the diving bell (tara weight) and the maximum load capacity (payload) must be mentioned.	
d.	Must be certified as being suitable for personnel transport and must at least comply with a relevant design standard (such as for example used by classification society) for the lifting system for the transport of divers.	
e.	Meeting the requirements for the maximum significant wave height in which the structure is used.	
f..	An inspection procedure must be present with a detailed description of the examinations / tests of the components.	
g.	A manual plus emergency procedures must be present.	
h.	If a second lifting system for the standby diver is used, this must meet the same requirements.	
i.	Lighting of the lifting location when diving during darkness.	

4.1.5.8.2 Wires ropes for transport divers

	Description	Detailsheet
a.	Selection of wires ropes for transport of divers; It is strongly recommended to use galvanized wires ropes because they are better suited in seawater against degradation than non-galvanized wire ropes. The zinc not only gives more resistance to the steel against general corrosion but it also slows down corrosion fatigue and corrosion damage.	
b.	Documentation which indicates: • Type and construction of the wire rope; • Length and diameter of the wire rope; • The minimal breaking strength (at purchase) or breakings strength from test; • The safe working load (SWL).	6.3

	Description	Detailsheet
c.	Must be non-rotating. This also applies to a second independent facility to bring the diving bell to the surface, however, in cases of a double reeved wire rope through a guide weight, a non-rotation wire rope is not required.	
d.	Breaking strength of minimal 8 times the safe working load (SWL) based on maximum sea state 4 This applies to the main system and the second independent facility. When the lifting system is used at conditions higher than sea state 4, this safety factor must be increased in accordance with a relevant design standard (such as for instance used by classification societies) for the lifting system for the transport of divers.	6.3

4.1.5.8.3 Dry diving bell (closed bell)

	Description	Detailsheet
a.	Documentation indicating: • according to which design standard it has been built and a declaration of conformity with this design standard; • suitability for personnel transport; • the safe working load (SWL); • weight of the dry diving bell (closed bell); • the maximum load capacity. This must also be indicated on the dry diving bell (closed bell).	6.1
b.	Adequate space for at least two divers as well as for the storage of the excursion umbilicals of the divers.	
c.	Excursion umbilical of the bellman: • If it is stored on the outside the diving bell then the bellman must be able to release it by himself in case of an emergency; • If it is stowed on the outside of the diving bell, no damage to the umbilical may occur during lifting; • If it is stowed on the outside of the dive bell, it must be connected toe. the dive mask / helmet before the diver exits the diving bell and then tested.	
d.	A volume of at least 1,5 m3 per diver.	
e.	A protection against spinning and swinging.	
f.	A stand-off or ballast release system.	7.4
g.	The main umbilical must be suitable for the purpose for which it is used. This means that it must be robust and suitable to be used by the system for lowering and lifting of the main umbilical. It must also contain a sufficient number and diameter of hoses and cables for the provisions necessary at the maximum depth at which it is used.	3.1, 3.8

	Description	Detailsheet
h.	If a main umbilical winch is used, it must be fitted with a braking system that controls the paying out of the main umbilical.	
i.	If the main umbilical is used as the second independent facility to bring the diving bell to the surface, then it must be suitable and tested.	6.3
j.	Wireless voice communication and fixed communication plus emergency provision.	4.2, 4.4
k.	Communication between the diver and the diving supervisor as well as between the divers.	4.2, 4.4
l.	A seat for the bellman.	
m.	Safety belts / harness for all occupants.	
n.	Lighting and emergency lighting in the diving bell.	3.7, 3.8
o.	Gauges in the diving bell on which the divers can read internal and external pressure.	3.5
p.	A facility to heat the diving bell and / or the divers if necessary.	7.2
q.	At a dive depth below 150 meters, a means to heat the breathing gas.	
r.	On the outside of the diving bell parallel connected lighting.	3.8
s.	Viewports in the lower half of the diving bell, which are protected on both the inside and the outside. Other viewports only need protection on the outside.	3.6
t.	Doors that: • can be opened both from the inside and the outside; • can be locked in the open position; • are provided with a means with which the pressure on both sides of the door can be equalized; • sealing in case of pressure from inside as well as from outside in accordance with classification societies requirements.	
u.	A method to bring an injured or unconscious diver into the diving bell.	
v.	A manifold on the outside of the diving bell to be able to supply breathing gas and hot water in case of emergency.	3.2
w.	All penetrations must have protection valves or other devices to prevent catastrophic pressure loss.	
x.	Emergency facilities for at least 24 hours consisting of: • a sufficient amount of oxygen with a consumption of 0,5 litres per diver per minute; • a means to maintain the body temperature of the diver in thermal balance, independent from the surface; • a means to control the carbon dioxide percentage.	7.2
y.	For the purpose of locating the diving bell, on the outside of the diving bell: • a high-intensity strobe light; • a transponder that broadcasts on 37,5 Khz.	7.3

	Description	Detailsheet
z.	A safety arrangement on the connection between the diving bell and the compression chamber, such that it is impossible to open the connection when the system is still under pressure, and it is impossible to pressurize the system when the connection is not properly closed.	
aa.	A provision which allows the excursion umbilical to be stowed in the diving bell.	
bb.	A provision that guarantees the calculated maximum safe excursion distance is not exceeded. This is to prevent the diver (s) from getting too close to amongst others propellers, thrusters and inlets.	

4.1.5.8.4 Lifting system diving bell

	Description	Detailsheet
a.	Winches suitable for personnel transport.	6.2
b.	Clear marking of functions on the control panel.	
c.	An automatic brake on the winches that come into operation when the system is not being operated.	
d.	If the first brake fails a second automatic or manual brake for both winches;	
e.	The capacity of the winch drum must be sufficient to be able to store the full length of the wire rope with the free drum flange height being at least 2.5 x the wire diameter.	
f.	A lifting point and a secondary lifting point on the diving bell.	
g.	A second independent system to bring the diving bell to the surface.	
h.	An independent second power source for the winch must be available in case there is a defect with the main power source.	
i.	For the winches used to lift the diving bell (including the cursor winches), a second engine must also be present. This requirement does not apply to the second independent system.	
j.	The wire rope must during use remain at least 3 rapes on the drum.	
k.	There must be a method whereby the operator of the winch can see how much of the lifting wire has been paid out from the winch. This also applies for the main umbilical.	
l.	Wire rope for lifting of personnel must be non- rotating with exception of a double reeved wire of, for example, a guide weight.	
m.	Connection with the diving bell must be suitable and the pin must be double secured.	
n.	The SWL diving bell winch is the weight of the diving bell (tara weight) + max. load capacity + weight of wire.	

	Description	Detailsheet
o.	The SWL guide weight winch is the weight of the diving bell (tara weight) + max. load capacity + guide weight + weight of wire. If double reeved, divide the safe work load (SWL) by two.	
p.	The diving supervisor must be able to communicate with the winch operator at all times.	4.2, 4.4
q.	Emergency breathing apparatus with voice communication provision for the operator of the winch, so that he can bring the divers to safety in case of calamities. This may be a breathing air provision consisting of an umbilical with fixed communication or a breathing air cylinder and wireless communication.	2.2, 3.1, 4.2, 4.4, 5.1, 5.3 5.4
r.	A safety arrangement on the connection between the diving bell and the compression chamber, such that it is impossible to open the connection when the system is still under pressure, and it is impossible to pressurize the system when the connection is not properly closed.	

4.1.5.8.5 Control room diving bell

	Description	Detailsheet
a.	Sufficient lighting and emergency lighting.	3.8
b.	Such provisions that in case of calamities the diving supervisor is protected in such a way that he can complete the dive in a safe manner.	
c.	Clear marking of all breathing gas pipework and -valves and pressure gauges;	3.2
d.	A photographic overview of all diving bell external- and internal valves, to allow, in case of emergency, the diving supervisor to give directions to the divers in the diving bell.	
e.	Communication: • between the control room and the bridge; • between the control room and the winch operator; • between the control room and the diving bell; • between the control room and the divers; • when an ROV (Remotely Operated Vehicle) is used: between the control room and the ROV supervisor.	4.2, 4.3, 4.4
f.	A means which records the communication between the diving supervisor and diver on commonly used video- and/ or voice recorders. These video- and /or voice recordings must be saved for a minimum of 24 hours.	
g.	A provision by which alarm systems of, for example vessel, platform or dynamic position (DP status) are clearly audible and visible in the control room. The volume must be adjustable in such a way that the communication with the divers is not disturbed, but it should not be possible to switch it off.	
h.	Clear marking of all breathing gas pipework and -valves and pressure gauges.	3.2

	Description	Detailsheet
i.	A provision to measure the oxygen percentage in the last part of the supply to the umbilical of the diving bell, with an acoustic and visual alarm.	4.5
j.	In case use is made of a so called “gas reclaim” system, a provision to measure the carbon dioxide percentage in the last part of the supply to the umbilical of the diving bell, with an acoustic and visual alarm.	4.5
k.	A provision to read the percentage of oxygen and carbon dioxide in the diving bell.	4.5
l.	A provision to measure the oxygen percentage in the control room, with an acoustic and visual alarm.	
m.	The electrical supply to the bell must be fitted with an earth leakage detection system.	3.8
n.	A temperature meter in the water supply to the diving bell, with acoustic and visual alarm when the pre-set minimum or maximum temperature is exceeded.	7.2

4.2 CAISSON WORK AND OTHER WORK UNDER HYPERBARIC CONDITIONS

Systems for caisson work and other work under hyperbaric conditions should have and or meet at least the requirements below.

4.2.1 Safety requirements when using oxygen enriched breathing gasses

1. Less than 25% oxygen

For systems which are used with breathing gasses which contain less than 25% oxygen no additional safety measures are required.

2. Between 25% - 40% oxygen

In systems which are used with breathing gasses which contain between 25% and 40% oxygen the components must be cleaned of visible dirt, grease and oil in accordance with the Working Conditions Catalogue.

3. More than 40% oxygen

Systems, which are used with breathing gasses, which contain more than 40 % oxygen, must be specifically made suitable for use with high oxygen percentages (oxygen service).

This means:

a. Applied materials must be suitable for use with oxygen (oxygen compatible) and the components must have been specifically cleaned for use with oxygen (oxygen clean in accordance with a relevant industry standard such as the IMCA D031, EIGA DOC33/18 or ASTM G93-03 or a demonstrably comparable procedure) and are also kept oxygen clean;
b. At a pressure above 15 bar valves, carrying oxygen or mixtures containing more than 40% oxygen, shall not be a ball valve but a valve must be used that slowly builds up the pressure, such as a needle valve.

With an increased oxygen percentage (above 25%), the relief valves on the pipe work on the diving panel must be provided with an outlet outside the room where the pipework is located to prevent increase of the oxygen percentage in case of leakage.

4.2.2 Caisson, underground overpressure spaces and Tunnel Boring Machine (TBM) work

4.2.2.1 General

	Description	Detailsheet
a.	The spaces where work is carried out (the working chambers) must, in case these cannot be tested with overpressure, by means of calculations be demonstrated that they are sufficient stable, strong and air and watertight.	
b.	In case of tunnel boring machines (TBM) with open drilling front, specific attention needs to be paid to the stability of this drilling front in relation to risks of ground rupture, blow-out, disturbance by the work activities, etc..	

	Description	Detailsheet
c.	The working chambers must, with the exception of temporary situations (for example at the start), have such dimensions that the employees have sufficient working space and preferably can move around in an upright position. In case work needs to be carried out at several height levels, adequate provisions have to be present regarding work platforms, stairs and lifting points;	
d.	On a caisson or a system of underground overpressure spaces are minimal two separate personnel transfer locks present unless there is too little space. If only one personnel transfer lock can be connected, than it should always be fitted with an ante chamber. In case two personnel transfer locks have been installed, at least one of these locks must be fitted with an ante chamber;	
e.	For personnel and equipment are separate transfer locks and separate shafts required unless the employer demonstrates that in the working chamber only light tooling is required. In that case the tools may be transferred in and out of the working chamber via the personnel transfer lock;	
f.	Working chambers and personnel transfer locks are by means of telephone or another acoustic system in connection with the supervisors whom are on the outside of those spaces. Also needs to be provided a 2nd independently operating (emergency) communication facility;	4.2, 4.3, 4.4
g.	Working chambers, personnel transfer locks and personnel shafts must be lit by means of permanent installed equipment. Also needs to be provided a 2nd independently operating (emergency) provision. The employees working under hyperbaric conditions are provided with adequate emergency lighting, or these are available in a waterproof constructed case (s) in the working chamber(s) with inside a minimum of three pieces.	3.7, 3.8

4.2.2.2 Control panel

	Description	Detailblad
a.	Such provisions that in case of calamities the operator can terminate the work under hyperbaric conditions in a safe manner.	
b.	Provisions which indicate the pressure or depth in the working chamber, personnel transfer lock and ante room of the lock.	3.3
c.	A provision which indicates the pressure of the supplied breathing gasses.	3.4
d.	A provision to measure the oxygen percentage in the personnel transfer lock and the ante chamber of the lock.	4.5
e.	Clear marking of all breathing gas pipework and -valves and pressure gauges.	3.2

4.2.2.3 Breathing gas supply

	Description	Detailsheet
a.	The breathing gas supply must be arranged in such a way that in case of failure of a single component the breathing gas supply to the overpressure spaces remains guaranteed.	1.1, 2.2
b.	The composition of the breathing gas in the overpressure spaces must be permanently monitored, as well as an alarm system must be installed that a deviation from the composition immediately report.	4.5
c.	The amount of breathing gas which is supplied to a working chamber must be ventilated in such a way that the concentrations of pollutants can be controlled. To this end, ventilation facilities of sufficient capacity must be present for flushing. As a guideline for the ventilation required by compressed air a minimum flushing amount applies, measured at atmospheric pressure, of: • 35 m3/hour per person at an overpressure of less than 0,5 bar and • 45 m3/hour per person at an overpressure of 0.5 bar or higher.	

4.2.2.4 Overpressure provision

	Description	Detailsheet
a.	The installation intended for the build- up and maintaining of the overpressure, and for the ventilation is present in duplicate. The second installation must be ready for immediate use if the first one fails;	1.1, 2.2
b.	Pipes under pressure which can cause a significant pressure change must be equipped with a provision with which the pressure change can be avoided where the pipes enter an overpressure space;	3.2
c.	On an easily accessible place is a safety valve situated which ensures that the air pressure in the working chamber does not exceed the required overpressure by more than 0.5 bar;	
d	An independent emergency power supply provision is available which under all circumstances allow the work under hyperbaric conditions to be terminated in a safe manner;	
e.	Pipes from and to the overpressure spaces shall not be used for other purposes apart for the work under hyperbaric conditions.	3.2

4.2.2.5 Personnel- and equipment transfer locks

	Description	Detailsheet
a.	Automatic recording devices which record the gradient of the overpressure in a personnel transfer lock.	
b.	There is equipment present that can heat the space, as soon as it can be used for the transfer of personnel.	7.5

	Description	Detailsheet
c.	The construction of the doors is basically such that they can only open to the side of the highest pressure. If another construction is chosen, it must be protected by a provision which prevents that the door can be opened while the system is under pressure.	
d.	An overpressure protection.	3.9
e.	A viewport or any other provision for observation of the occupants, both in the main chamber as in the ante chamber.	
f.	In the space is a sealed emergency arrangement that allows the occupants in emergency situations to lock-out themselves.	
g.	In the personnel transfer lock are available a decompression table, a clock and a depth indication gauge on which the occupants can read the depth.	3.5
h.	In case of work with foreseeable decompression must in the personnel transfer lock be available a separate breathing gas supply for decompression with for each of the occupants at least one BIBS mask.	4.1
i.	A firefighting provision suitable for use under overpressure.	4.6, 4.7

4.2.2.6 Shafts as connection for personnel and equipment between transfer locks and working chambers

	Description	Detailsheet
a.	In the personnel shaft is a hoist installation available with which a wounded person on a stretcher or in a lifting suit can be brought outside via the transfer lock.	

4.2.3 Saturation system working under hyperbaric conditions

4.2.3.1 General

	Description	Detailsheet
a.	An independent emergency power supply (emergency power – generator) is available in order to be able, under all circumstances, to terminate the work under hyperbaric conditions in a safe manner.	
b.	Such provisions that in case of calamities the work under hyperbaric conditions can be terminated in a safe manner.	

4.2.3.2 Control room saturation system working under hyperbaric conditions

	Description	Detailblad
a.	At all times there must be an open two-way voice communication, including back-up, with the personnel working under hyperbaric conditions. In addition there must be a back-up power source, such as batteries.	4.2, 4.3
b.	All communication with the personnel working under hyperbaric conditions must be recorded and this must be retained till 48 hours after completion of the decompression.	

	Description	Detailblad
c.	The person who is responsible for the connection and operation of the shuttle must during the connection of the shuttle onto the system and during transport be able to communicate with the responsible operator.	4.2, 4.3, 4.4
d.	The breathing gas quality in the system must be monitored by an oxygen analyser, with an audible and visible high/ low oxygen percentage alarm.	4.5
e.	When a scrubber system is used than also a carbon dioxide analyser with an audible and visible alarm for high carbon dioxide percentage must be installed.	4.5
f.	There must be a provision which allows the operator to observe the oxygen- and carbon dioxide percentage in the shuttle.	4.5
g.	There must be a provision installed in the control room to warn for changes of the oxygen percentage (oxygen analyser with audible and visible high/ low alarm).	4.5
h.	The function of all control equipment (valves, reducers, etc.) must be clearly indicated.	3.2
i.	Electricity to the system and the shuttle must be provided with an earth leakage system. It is recommended to install an earth leakage system with a pre-alarm.	3.8

4.2.3.3 Control room (Life support) working under hyperbaric conditions

	Description	Detailsheet
a.	There must be a hard-wire two-way voice communication system including an emergency provision between the Life support control room and personnel in each compartment of the chamber(s).	4.3, 4.4
b.	There must a hard-wire two-way voice communication system between the Life support control room and control room.	4.3, 4.4
c.	There must a hard-wire two-way voice communication system between the Life support control room and the outside of each transfer lock fitted on the chamber system which is used for food transfer.	4.3, 4.4
d.	Life support personnel must have sufficient suitable pressure gauges such that they are informed about the overpressure in each compartment of the chamber system and of the supply pressures to each chamber from the main- and back-up breathing gas supply to each chamber.	3.3
e.	The function of all control equipment (valves, reducers, etc.) must be clearly indicated.	3.2
f.	The Life support personnel must be able to see in each compartment the person working under hyperbaric conditions, either by means of a viewport or a camera system.	3.6

	Description	Detailsheet
g.	The general alarm system of the work location must be connected with the Life support control room, such that it can be heard clearly by the Life support personnel.	
h.	It must be possible that the volume of each audible alarm (bell, claxon etc.) can be turned down or switched off, in case it hampers the Life support personnel from hearing their other communication.	
i.	An oxygen analyser fitted with an audible and visual high/ low alarm must be installed in the Life support control room.	4.5
j.	Provisions for monitoring of: • Oxygen; • Carbon Dioxide; • temperature; • humidity.	4.5, 7.5

4.2.3.4 Compression chamber working under hyperbaric conditions

	Description	Detailsheet
a.	Door and spaces are provided with individual coding.	
b.	The function of all valves must be clearly marked.	3.2
c.	There must be a system with which an alternative breathing gas can be supplied to the BIBS of personnel working under hyperbaric conditions.	1.1, 2.2
d.	In the main compartment must be available one BIBS mask for each person working under hyperbaric conditions. In addition for each three persons working under hyperbaric conditions must be available one spare BIBS mask.	4.1
e.	One overboard dump for the BIBS.	
f.	A bunk must be available for each person working under hyperbaric conditions,	
g.	Suitable toilet provision fitted with a safety arrangement such that it cannot be flushed while being used.	
h.	In each compartment must be present a depth indication gauge on which the occupants can read the depth.	3.5
i.	Provisions for monitoring and controlling of: • Oxygen - percentage; • Carbon dioxide- percentage ; • temperature; • humidity.	4.5, 7.5
j.	In one compartment of the system provisions must be available for treatment (under pressure) of a patient.	
k.	Oxygen percentage in the main chamber and personnel transfer lock must be able to be kept under 23%.	4.5

4.2.3.5 Shuttle for working under hyperbaric conditions

	Description	Detailsheet
a.	There must a second independent provision to retrieve the shuttle.	
b.	A safety system fitted to the connection between the shuttle and the compression chamber, such that it is impossible to open the connection when the system is still under pressure, and it is impossible to pressurise the system when the connection is not properly closed.	
c.	There must be a suitable firefighting provision for the transport system of the shuttle.	4.6, 4.7
d.	Viewports in the shuttle must on the inside as well as on the outside be protected against mechanical damages.	3.6
e.	Doors must be able to be opened from the inside as well as from the outside.	
f.	Doors must be able to be secured in the open position.	
g.	Doors must be provided with a means to equalise the pressure on both sides of the door.	
h.	A shuttle must as a minimum have space for two occupants and also have a volume of at least 1,5m3 per occupant.	
i.	Sufficient emergency supply of breathing gas must be available to bring the personnel working under hyperbaric conditions to safety.	2.2
j.	A seating arrangement provided with a safety belts for each occupant;	

4.2.3.6 Breathing gas reclaim system and purification for working under hyperbaric conditions

	Description	Detailsheet
a.	A breathing gas reclaim control panel provided with an acoustic and visual alarm which gives a warning when one of the reclaim compressors is not functioning properly.	7.6
b.	Oxygen injection restrictions with a provision that the restrictions close in case of a failure of the power source.	
c.	A suitable provision to monitor the amount of gas in the gas bag.	
d.	An overpressure protection with over board dump on the gas bag.	3.9
e.	Clear marking of all breathing gas pipework and -valves and pressure gauges.	3.2

4.2.3.7 Hyperbaric evacuation system (HES) for working under hyperbaric conditions

	Description	Detailsheet
a.	A compression chamber for human occupancy, with sufficient capacity for the maximum number of personnel under pressure.	1.1, 2.2
b.	Emergency provisions for at least 12 hours consisting of: • a sufficient quantity oxygen for a consumption of 0.5 litres per minute per person working under hyperbaric conditions; • a means to maintain the body temperature of a person working under hyperbaric conditions in thermal balance, independent from the surface; • a means to control the carbon dioxide percentage.	
c.	One safety belt per occupant.	

	Description	Detailsheet
d.	A safety system fitted to the connection between the HES and the compression chamber, such that it is impossible to open the connection when the system is still under pressure, and it is impossible to pressurise the system when the connection is not properly closed.	
e.	A hyperbaric firefighting provision must be present in the compression chamber.	4.6, 4.7
f.	A possibility to connect onto another compression chamber (in case of emergency) and/ or external life support provisions.	

4.3 HYPERBARIC TREATMENT CHAMBER

A Hyperbaric Treatment chamber should at least have and or meet the requirements below.

4.3.1 Safety requirements when using oxygen enriched breathing gasses

1. Less than 25% oxygen

For systems which are used with breathing gasses which contain less than 25% oxygen no additional safety measures are required.

2. Between 25% - 40% oxygen

In systems which are used with breathing gasses which contain between 25% and 40% oxygen the components must be cleaned of visible dirt, grease and oil in accordance with the Working Conditions Catalogue.

3. More than 40% oxygen

Systems, which are used with breathing gasses, which contain more than 40 % oxygen, must be specifically made suitable for use with high oxygen percentages (oxygen service).

This means:

a. Applied materials must be suitable for use with oxygen (oxygen compatible) and the components must have been specifically cleaned for use with oxygen (oxygen clean in accordance with a relevant industry standard such as the IMCA D031, EIGA DOC33/18 or ASTM G93-03 or a demonstrably comparable procedure) and are also kept oxygen clean;
b. At a pressure above 15 bar valves, carrying oxygen or mixtures containing more than 40% oxygen, shall not be a ball valve but a valve must be used that slowly builds up the pressure, such as a needle valve.

With an increased oxygen percentage (above 25%), the relief valves on the pipe work on the diving panel must be provided with an outlet outside the room where the pipework is located to prevent increase of the oxygen percentage in case of leakage.

4.3.2 General

A hyperbaric treatment chamber must as a minimum consist of:

	Description	Detailsheet
a.	A main chamber which provides space for at least two persons, of which as a minimum one person must be able to lay down and one person must be able to sit.	H/2.4
b.	A personnel lock.	
c.	Doors which can be opened from both sides.	
d.	An overpressure protection.	3.9
e.	In case a door can opened outward: an arrangement which prevents that the door can be opened while the relevant space is under pressure.	

	Description	Detailsheet
f.	A viewport for the observation of the occupants, in the main chamber as well as in the personnel lock.	3.6
g.	Clear marking of all pipework and valves, operating systems, pressure gauges and equipment.	3.2
h.	Two independent breathing gas supplies.	1.1, 2.2
i.	In the main chamber as well as in the lock a BIBS and for each occupant one BIBS mask.	4.1
j.	An overboard dump for the BIBS.	
k.	Lighting and emergency lighting.	3.7, 3.8
l.	Two way voice communication, inclusive back-up, for the main chamber and personnel transfer lock.	4.2, 4.3
m.	A depth indication gauge in the main chamber and the personnel transfer lock.	3.5
n.	A portable fire extinguisher, suitable for use under hyperbaric conditions, in the main chamber and the personnel lock.	4.6
o.	Integrated internal firefighting system in the main chamber which can be activated internally and externally.	4.7
p.	A provision to control the temperature in the main chamber.	7.5
q.	A medical lock in the main chamber.	
r.	Equipment to allow in the main chamber breathing of breathing gas via a free flow system and a system for artificial respiration.	
s.	Oxygen percentage in the main chamber and personnel transfer lock must be able to be kept under 23%.	4.5

4.3.3 Control panel

	Description	Detailsheet
a.	Provisions which indicate the pressure or depth in the main chamber and the personnel lock.	3.3
b.	A provision which indicates the pressure of the breathing gasses supply.	3.4
c.	A provision to be able to measure the oxygen percentage in the main chamber and the personnel lock.	4.5
d.	Clear marking of all breathing gas pipework and -valves and pressure gauges.	3.2
e.	Such provisions that in case of calamities the operator is protected in such a way that the work under hyperbaric conditions can be completed in a safe manner.	
f.	Equipment to register the pressure variations and time durations of a treatment.	
g.	A provision to measure the carbon dioxide percentage in the main chamber or the amount of flushing air which is coming out of the chamber.	4.5

5 DETAIL SHEETS

5.1 FORMAT

The equipment is classified in the following categories:

1. Compressors;
2. DDC's, pressure vessels, cylinders;
3. Pipework, gauges and the like;
4. Other related equipment;
5. Diver's personal equipment;
6. Lifting- and hoisting equipment;
7. Saturation equipment.

5.2 COMMENTS

5.2.1 Product requirements

For all equipment applies:

a. It has to be designed and manufactured in accordance with accepted standards;
b. Suitable for the purpose for which it will be used.

5.2.2 Medical institutions

Detail sheets that start with H, apply to hyperbaric treatment chambers in medical institutions.

5.3 INDEX DETAIL SHEETS

3.8 Electrical equipment and cables
3.9 Relief valve

4 Other related equipment
4.1 BIBS
4.2 Communication - hard wire
4.3 Communication in working chambers and pressure vessels for human occupancy, hard wire connection
4.4 Communication - wireless
4.5 Gas analyser
4.6 Firefighting system, portable, hyperbaric
4.7 Firefighting system, fixed, hyperbaric

5 Diver's personal equipment
5.1 First stage
5.2 Helmets, band masks and full face masks – SSE
5.3 Demand valve – SCUBA
5.4 Full face mask, SCUBA
5.5 Rebreather (closed and semi-closed)
5.6 Buoyance control device
5.7 Diver harness/ vest

6 Lifting- and hoisting equipment
6.1 Diving cage or diving bell for transportation of divers
6.2 Lifting system for transport of divers including winches
6.3 Wire ropes for transportation of divers
6.4 Underwater lifting bags

7 Saturation equipment
7.1 Survival suits
7.2 Diver heating systems
7.3 Emergency location system diving bell
7.4 Ballast release system dry diving bell (closed bell)
7.5 Climate control of a compression chamber
7.6 Gas reclaim system including external regeneration unit
7.7 Hyperbaric evacuation launch system - SOLAS

1.1 Compressors, booster pumps

Detail sheet 1.1	Revision 4 dated October 2024
Description	**Compressors, booster pumps and filtration units for breathing gases** Exclusive receivers, pressure vessels, pipework and the like.

Requirements when new, installed first time and following modification

Product requirements	
• Must deliver correct quality breathing gas, which complies with NEN EN 12021 • Comply with NEN EN 12021 when air is used as breathing gas or as part of a mixture.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	Validity period	Competence level
• Visual examination and function test. • Check delivery rate and pressure. • Check correct quality breathing gas.	6 months	1, 2, 4
• Maintenance and testing in accordance specifications manufacturer.	1 year	2, 4

References:
1. NEN EN 12021 2. DMAC 019

Comments:
Filter and oil change based on lifetime and hours record, whichever applies first. Ensure oxygen cleanliness in case increased oxygen percentage breathing mixtures (see minimum system requirements).

2.1 Pressure vessels gas, wet

Detail sheet 2.1	Revision 3 dated June 2020
Description	**Pressure vessels for storage of gas for use in a liquid.** This includes SCUBA cylinders, bail out cylinders, cylinders in a diving cage and diving bell (steel, aluminium and composite)

Requirements when new, installed first time and following modification

Product requirements	
• Manufactured in accordance the Commodities Act Decree pressure equipment.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer. • Composite cylinders comply with specific test requirements for use underwater and marked with “UW”	2, 3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• External visual inspection	6 months	1, 2, 3, or 4
• Internal and external visual examination including the thread and valve, followed by a gas leak test to the maximum working pressure. • Conform requirements manufacturers user manual	2 ½ years	2, 4
• Hydrostatic test to 1.5 times the maximum working pressure, internal and external visual inspection, including the thread and valve, followed by a gas leak test to the maximum working pressure and requirements Commodities Act Decree/ Regulation pressure equipment.	5 years	5

References:
1. Commodities Act Decree/ Regulation pressure equipment; 2. NEN-EN 1968 3. NEN_EN 1803 4. NEN-EN 12245 5. NEN-EN 12257 6. NEN-EN-ISO 11623 7. NEN-EN-ISO 13769

8. IMCA D 064

Comments:
1. Depending on the use and the possibility of water being present in the pressure vessel and when damaged additional inspection must be considered; 2. In case the hydrostatic pressure test is harmful or not possible, other tests can be applied, of which the value is recognised. For other tests than the hydrostatic pressure test must, before these tests are carried out, additional measures be taken such as non-destructive testing or other equivalent methods. The next re-examination year (validity period) for the hydrostatic test will be recorded in the statement of re-examination, which will be issued on the basis of it and requirements of the Commodities Act Decree/ Regulation pressure equipment; 3. Check that the thread of the cylinder and the thread of the valve are exactly the same type. 4. Commodities Act Decree/ Regulation pressure equipment examinations are only allowed to be carried out by NL- Conformity Assessment Bodies (NL-CBI) or user inspection services designated as such by the Minister of Social Affairs and Employment (SZW).

2.2 Pressure vessels gas, dry

Detail sheet 2.2	Revision 4 dated October 2024
Description	**Pressure vessels for storage of breathing gas not used in a liquid.** This includes permanently installed pressure vessels and transportable cylinders

Requirements when new, installed first time and following modification

Product requirements	
• Manufactured in accordance the Commodities Act Decree pressure equipment.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 3, 4
• In accordance Commodities Act Decree/ Regulation pressure equipment.	5

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• External visual inspection	6 months	1, 2, 3, or 4
• External visual examination inclusive the visible thread and valve, followed by a gas leak test to the maximum working pressure. (See also remark 2)	**Permanently installed pressure vessels** 2 years after the commissioning examination. Dependent use, age and condition, maximum every 3 years thereafter **Transportable cylinders** 2 ½ years	2, 3, 4 2, 3, 4

Examination / testing	Validity period	Competence level
• Hydrostatic test to 1.5 times the maximum working pressure, internal and external visual inspection, including the thread and valve, followed by a gas leak test to the maximum working pressure and requirements Commodities Act Decree/ Regulation pressure equipment. •	**Permanently installed pressure vessels** 4 years after the commissioning examination. Dependent use, age and condition, maximum every 6 years thereafter **Transportable cylinders** 5 years **Note:** Pressure vessels with air with a volume up to 2,500 litres and a maximum allowable pressure PS up to a maximum of 30 bar (See also comment 4.)	5 5 3, 4

References:
1. Commodities Act Decree/ Regulation pressure equipment 2. NEN-EN 1968 3. NEN-EN 1803

Comments:
1. In case the hydrostatic pressure test is harmful or not possible, other tests can be applied, of which the value is recognised. For other tests than the hydrostatic pressure test must, before these tests are carried out, additional measures be taken such a non-destructive testing or other equivalent methods. 2. During the two and half yearly examination it is not necessary to remove the valve. 3. Commodities Act Decree/ Regulation pressure equipment examinations are only allowed to be carried out by NL- Conformity Assessment Bodies (NL-CBI) or user inspection services designated as such by the Minister of Social Affairs and Employment (SZW). 4. Pressure vessels with air with a volume up to 2,500 litres and a maximum allowable pressure PS up to a maximum of 30 bar are covered by the Working Conditions Decree article 7.4 a and no inspection by an NL-CBI is required. When such a pressure vessel is permanently installed and forms part of an assembly, for example a DDC or Hyperbaric treatment chamber, the inspection frequency of the assembly can be maintained.

2.3 Pressure vessels, above water, wet internal use

Detail sheet 2.3	Revision 3 dated June 2020
Description	**Pressure vessels filled with a liquid and which are not used in a liquid** Included are driers, filter housings, gas recovery volume tanks, sanitary- and shower tanks.

Requirements when new, installed first time and following modification

Product requirements	
• Manufactured in accordance the Commodities Act Decree pressure equipment.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 3, 4
• In accordance Commodities Act Decree/ Regulation pressure equipment.	5

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• External visual inspection	6 months	1, 2, 3 or 4
• Internal and external visual examination followed by a gas leak test to the maximum working pressure.	1 year	2, 3, 4
• In accordance requirements Commodities Act Decree/ Regulation pressure equipment.	4 years after the commissioning examination. Dependent use, age and condition, maximum every 6 years thereafter	5

References:
Commodities Act Decree/ Regulation pressure equipment.
Comments:
1. In case the hydrostatic pressure test is harmful or not possible, other tests can be applied, of which the value is recognised. For other tests than the hydrostatic pressure test must, before these tests are carried out, additional measures be taken such a non-destructive testing or other equivalent methods. 2. Commodities Act Decree/ Regulation pressure equipment examinations are only allowed to be carried out by NL- Conformity Assessment Bodies (NL-CBI) or user inspection services designated as such by the Minister of Social Affairs and Employment (SZW).

2.4 Pressure vessels for human occupancy

Detail sheet 2.4	Revision 3 dated June 2020
Description	**Pressure vessels for human occupancy** Including compression chambers, shuttles, dry diving bell and all associated spool pieces, locks and connection systems

Requirements when new, installed first time and following modification

Product requirements	
• In accordance specifications classification society and requirements Commodities Act Decree/ Regulation pressure equipment. • Comply with the WOD-SOE Minimum Systems requirements.	
Examination / testing	**Competence level**
• In accordance specifications classification society.	3
• Comply with Minimum Systems requirements	3, 4, 5
• In accordance Commodities Act Decree/ Regulation pressure equipment.	5

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination.	6 months	1, 2, 3, 4
• Extensive internal and external visual inspection • Gas leak test till the maximum working pressure. • In accordance requirements user manual manufacturer	1 year	2, 3, 4
• In accordance requirements Commodities Act Decree/ Regulation pressure equipment.	4 years after the commissioning examination. Dependent use, age and condition, maximum every 6 years thereafter	5

References:
1. Specifications classification societies. 2. Commodities Act Decree/ Regulation pressure equipment. 3. Practice rules for Pressure equipment.
Comments:
Commodities Act Decree/ Regulation pressure equipment examinations are only allowed to be carried out by NL- Conformity Assessment Bodies (NL-CBI) or user inspection services designated as such by the Minister of Social Affairs and Employment (SZW).

H/2.4 Pressure vessels for human occupancy

Detail sheet H/2.4	**Revision 3 dated October 2024**
Description	**Hyperbaric treatment chambers** Including all associated spool pieces, locks and connection systems

Requirements when new, installed first time and following modification

Product requirements	
• In accordance Commodities Act Decree/ Regulation pressure equipment. • Comply with the WOD-SOE Minimum Systems requirements. • Comply with NEN-EN 14931, NEN-EN 16081+A1, Regulation (EU) 2017/745.	
Examination / testing	**Competence level**
• In accordance NEN-EN 14931, NEN-EN 16081+A1, Regulation (EU) 2017/745.	3, 4
• Comply with the WOD-SOE Minimum Systems requirements	3, 4
• In accordance requirements Commodities Act Decree/ Regulation pressure equipment, inspection of commissioning.	5

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination.	6 months	1, 2, 3, 4
• In accordance specifications manufacturer and NEN-EN 14931.	1 year	3, 4
• In accordance requirements Commodities Act Decree/ Regulation pressure equipment.	4 years after the commissioning examination. Dependent use, age and condition, maximum every 6 years thereafter	5

References:
1. Commodities Act Decree/ Regulation pressure equipment. 2. NEN 14931, NEN-EN 16081+A1, Regulation (EU) 2017/745 . 3. Practice rules for Pressure equipment.

Comments:
Commodities Act Decree/ Regulation pressure equipment examinations are only allowed to be carried out by NL- Conformity Assessment Bodies (NL-CBI) or user inspection services designated as such by the Minister of Social Affairs and Employment (SZW).

3.1 Umbilicals- Hose components only

Detail sheet 3.1	Revision 4 dated October 2024
Description	**Diving umbilicals and umbilicals for dry and/ or wet diving bell and high-, medium- and low pressure hoses.** This is also applies to the couplings with exception of electrical components

Requirements when new, installed first time and following modification

Product requirements	
• An umbilical must be fitted with strain reliefs. • All high- and medium pressure hoses must be fitted with pressed-on couplings. • In case of oxygen hoses see comments" Safety requirements when using oxygen enriched breathing gasses" in Minimum System requirements.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer and product requirements.	2, 3, 4
• Hydrostatic test at 1.5 times the maximum working pressure.	2, 3, 4
• Gas leak test to maximum working pressure of the system in which the relevant component is used followed by checking of internal cleanliness.	1, 2, 3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination and function test, separate or as part of the complete system. **Note:** If damage or deviations are detected, than perform the hydrostatic test of 1.5 times the maximum working pressure .	6 months	1, 2, 3, 4
Umbilicals • Gas leak test or hydrostatic test at the maximum working pressure .	1 year	1, 2, 3, 4
High-, middle- and low pressure hoses (dedicated hose system) • Gas leak or hydrostatic test to the maximum working pressure of the system in which the relevant component is used.	2 years	1, 2, 3, 4

References:
1. IMCA D 031

2. NEN-EN 15333

Comments:
1. Umbilicals which have been stored longer than 6 months must before use be flushed with breathing gas and if following this the breathing gas is of insufficient quality, this is to say free of smell and taste, the umbilical must be flushed clean; 2. In case of hoses which are used as gas reclaim system the above mentioned tests are sufficient, based on the type of hose was designed and tested to withstand external pressure.

3.2 Pipework systems, reducers etc.

Detail sheet 3.2	**Revision 4 dated October 2024**
Description	**Pipework systems, valves, reducers, filling panel and relevant fittings**

Requirements when new, installed first time and following modification

Product requirements	
• Manufactured in accordance requirements Commodities Act Decree/ Regulation pressure equipment where applicable. • Must be suitable for the purpose it is intended to be used for. • In case of oxygen pipework see comments" Safety requirements when using oxygen enriched breathing gasses" in Minimum System requirements.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 3, 4
• In accordance Commodities Act Decree/ Regulation pressure equipment.	5
• Hydrostatic test to 1,5 times the maximum working pressure	2, 3, 4
• Gas leak test to the maximum working pressure of the system in which the relevant component is used followed by checking internal cleanliness.	1, 2, 3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination.	6 months	1, 2, 3, 4
• Gas leak test or hydrostatic test at maximum working pressure of the system.	Depending on the inspection period of the pressure equipment on which it is installed: 2.5 years Or 2 years after the commissioning examination. Dependent use, age and condition, maximum every 3 years thereafter	1, 2, 3, 4 1, 2, 3, 4

Examination / testing	Validity period	Competence level
• If applicable: Commodities Act Decree / Pressure Equipment Regulation inspections carried out by the Minister of SZW designated NL conformity body or users' inspection service.	4 years after the commissioning examination. Dependent use, age and condition, maximum every 6 years thereafter	5

References:
1. Commodities Act Decree/ Regulation pressure equipment.

Comments:
1. In case the hydrostatic pressure test is harmful or not possible, other tests can be applied, of which the value is recognised. For other tests than the hydrostatic pressure test must, before these tests are carried out, additional measures be taken such a non-destructive testing or other equivalent methods. 2. Detail sheet is applicable for all pipework (gas and liquid); 3. See also Detail sheet 3.1 for hoses of filling panel. 4. Commodities Act Decree/ Regulation pressure equipment examinations are only allowed to be carried out by NL- Conformity Assessment Bodies (NL-CBI) or user inspection services designated as such by the Minister of Social Affairs and Employment (SZW).

3.3 Depth gauges/ pressure precision gauges

Detail sheet 3.3	Revision 3 dated February 2023
Description	**Depth gauges/ pressure precision gauges** It concerns gauges used for diving work and work under hyperbaric conditions, in order to get accurate information which is essential for decompression, and to keep divers in saturation at the correct depth and during transport of divers under pressure inside the diving system.

Requirements when new, installed first time and following modification

Product requirements	
• The scale division must be suitable for the depth/ pressure for which it is used, in other words large enough to be read easily and accurately. • The maximum steps in the scale division must not be greater than 0.5 metres. • Digital gauges must have an independent separate energy supply. • Digital gauges must be readable minimal one number to the right of the decimal point. • The accuracy must be 0,25 % of the maximum scale value or more accurate on minimum 5 points within the scale ascending and descending. • The gauge shall have a scale division which under normal circumstances will be used in the range of 0% to 75%. • In accordance with specifications classification society.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer	3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination and calibration by means of comparison against a certified test instrument. The accuracy must be 0,25 % of the maximum scale value or more accurate on minimum 5 points within the scale ascending and descending.	6 months	2, 3, 4

References:
1. IMCA D 062
Comments:

3.4 Manometers

Detail sheet 3.4	Revision 3 dated February 2023
Description	**Manometers** This concerns gauges used to indicate with reasonable approximation how much pressure is present in the supply system or other components.

Requirements when new, installed first time and following modification

Product requirements	
• The scale division must be suitable for the pressure for which it is used, in other words large enough to be read easily and clearly. • The accuracy must suitable for the purposes for which it is used.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination general condition and a function test.	1 year	1, 2, 4

References:
1. IMCA D 062

Comments:

3.5 Life support gauge and depth indication gauge including wrist depth gauge

Detail sheet 3.5	Revision 4 dated February 2023
Description	Life support gauge and depth indication gauge including wrist depth gauge These are meters used as: 1. Depth indication gauge including wrist depth gauge 2. Life support gauges used to measure pressure in the dive bell and bail-out, and filling facilities and the last gauge measuring pressure to the diver's breathing apparatus (including BIBS)

Requirements when new, installed first time and following modification

Product requirements	
• The scale division must be suitable for the depth/ pressure for which it is used, in other words large enough to be read easily and accurately. • The maximum steps in the scale division must not be greater than 0.5 metres. • Digital gauges must be readable minimal one number to the right of the decimal point. • The digital meter must be provided with a battery level indicator. • The accuracy must be 2,5 % of the maximum scale value or more accurate at minimum 4 points within the scale ascending and descending. • The gauge shall have a scale division which under normal circumstances will be used in the range of 0% to 75%. • Where applicable comply with NEN-EN 13319	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	Validity period	Competence level
• Visual examination and calibration by means of a certified test instrument. • The accuracy must be 2,5 % of the maximum scale value or more accurate at minimum 4 points within the scale ascending and descending.	6 months	2, 4

References:

1. IMCA D 062 2. NEN-EN 13319

Comments:

3.6 Viewport, pressure vessel for human occupancy

Detail sheet 3.6	**Revision 2 dated March 2018**
Description	**Viewport used in pressure vessels for human occupancy**

Requirements when new, installed first time and following modification

Product requirements	
• Comply with industry standard.	
Examination / testing	**Competence level**
• Visual examination and a test to 1,25 times maximum working pressure.	2, 3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination.	6 months	1, 2
• Visual examination and a gas leak test to the maximum working pressure.	1 year	2, 3, 4
• Complete replacement, following replacement testing of the pressure vessel to 1,25 times the maximum working pressure.	10 years	2, 3, 4

References:
IMCA D 047

Comments:
Manufacturing date and serial number must be marked on the side.

3.7 Lighting for pressure vessels for human occupancy

Detail sheet 3.7	**Revision 2 dated March 2018**
Description	**Lighting for pressure vessels for human occupancy**

Requirements when new, installed first time and following modification

Product requirements	
• In case the lighting has been installed in the vicinity of viewports, these viewports must not overheat. • In case the lighting has been installed inside the chamber, the lighting must be pressure resistant.	
Examination / testing	**Competence level**
• Visual examination and function test.	1, 2, 3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Function test.	Before every use	1
• Visual examination and function test.	1 year	2, 4

References:

Comments:
Visual examination and function test: including cables insulation sheath, insulation transformers, earth leakage protection, overcurrent protection and other safety features.

3.8 Electrical equipment and cables

Detail sheet 3.8	**Revision 1 dated March 2018**
Description	**Electrical equipment and cables**

Requirements when new, installed first time and following modification

Product requirements	
• Must be suitable for the purpose it is intended to be used for.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination and function test of the equipment and cables (including earth leakage protection, overcurrent protection and other safety features). • Continuity and insulation resistance testing of all cables.	1 year	2, 3, 4

References:
IMCA D 045 Safe use of Electricity Under Water.

Comments:

3.9 Relief valve

Detail sheet 3.9	Revision 0 dated June 2020
Description	**Relief valve on pressure equipment**

Requirements when new, installed first time and following modification

Product requirements	
• Manufactured in accordance Commodities Act Decree/ Regulation pressure equipment. where applicable • Must be suitable for the purpose it is intended to be used for. • In case of oxygen pipework see comments" Safety requirements when using oxygen enriched breathing gasses" in Minimum System requirements.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 3, 4
• In accordance Commodities Act Decree/ Regulation pressure equipment and as part of the pressure equipment on which it is used	5

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination	6 months	1, 2, 3, 4
• A function test on the required overpressure setting followed by a gas leak test up to the maximum working pressure of the pressure equipment in which the pressure relief valve is used.	Depending on the inspection period of the pressure equipment on which it is installed: 2.5 years Or 2 years after the commissioning examination.	2, 3, 4, 5

References:
1. Commodities Act Decree/ Regulation pressure equipment 2. IMCA D 018

Comments:
1. Detail sheet is applicable for all pressure equipment (gas and liquid); 2. Commodities Act Decree/ Regulation pressure equipment examinations are only allowed to be carried out by NL- Conformity Assessment Bodies (NL-CBI) or user inspection services designated as such by the Minister of Social Affairs and Employment (SZW).

4.1 BIBS

Detail sheet 4.1	Revision 2 dated March 2018
Description	**BIBS (Built In Breathing System)**

Requirements when new, installed first time and following modification

Product requirements	
• Must be suitable for the type of breathing gas for which it is used.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Cleaning every time after use.		0, 1, 2
• Visual examination and function test and checking of cleanliness for oxygen use.	6 months	1, 2, 4

References:

Comments:

4.2 Communication – hard wire

Detail sheet 4.2	Revision 2 dated March 2018
Description	**Communication equipment – hard wire** Excluding working chambers and pressure vessels for human occupancy during work under hyperbaric conditions.

Requirements when new, installed first time and following modification

Product requirements	
• At all times there must open communication between the person working under hyperbaric conditions and the surface.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination and function test, including batteries and/or backup power supply when present.	Each time prior use	0, 1, 2
• Testing system in accordance specifications manufacturer. • If battery power is present test condition of battery(s)	6 months	2, 4

References:
1. IMCA D 002 Battery packs in pressure housing; 2. IMCA D 022 Guidance for Diving Supervisor. Chapter 5; 3. IMCA D 045 Safe use of Electricity Under Water.

Comments:

4.3 Communication in working chambers and pressure vessels for human occupancy, hard wire connection

Detail sheet 4.3	Revision 2 dated March 2018
Description	**Communication in working chambers and pressure vessels for human occupancy, hard wire**

Requirements when new, installed first time and following modification

Product requirements	
• At each compartment of a working chamber or pressure vessel for human occupancy a communication system must be present at all times for connection with minimal the personnel transfer lock and the control panel c.q. -room. If the access to the working chamber consists of a shaft connection communication equipment must be present on both sides of this shaft.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination and function test, including batteries and/or backup power supply when present.	Each time prior use	0, 1, 2
• Testing system in accordance specifications manufacturer. • If battery power is present test condition of battery(s).	6 months	2, 4

References:

Comments:

4.4 Communication - wireless

Detail sheet 4.4	Revision 2 dated March 2018
Description	**Communication equipment - wireless**

Requirements when new, installed first time and following modification

Product requirements	
• Diver must all times be able to communicate with the diving supervisor.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination and function test, including batteries and backup power supply.	Each time prior use	0, 1, 2
• Testing system in accordance specifications manufacturer. • If battery power is present test condition of battery(s)	6 months	1, 2, 4

References:
IMCA D 002 Battery packs in pressure housing

Comments:

4.5 Gas analyser

Detail sheet 4.5	Revision 2 dated March 2018
Description	**Gas analyser** Excluding hand pump and test tube systems

Requirements when new, installed first time and following modification

Product requirements	
• Must give a clear value reading.	
Examination / testing	**Competence level**
• Calibration. • General examination and function test and if present the alarm when exceeding the set minimum and maximum values. • In accordance specifications manufacturer.	2, 3, 4

Requirements when in use

Examination / testing	Validity period	Competence level
• General examination and function test and if present the alarm when exceeding the set minimum and maximum values.	6 months	1, 2, 4
• Calibration.	6 months	2, 4
• In accordance specifications manufacturer.	1 year	2, 4

References:

Comments:
Analysers are usually calibrated more often than every six months but in that case are not required to be certified.

4.6 Firefighting system, portable, hyperbaric

Detail sheet 4.6	Revision 2 dated March 2018
Description	**Firefighting system, portable, hyperbaric**

Requirements when new, installed first time and following modification

Product requirements	
• Must be suitable for use under hyperbaric conditions. • Fire extinguishing medium and propellant must not be harmful to health and must be suitable for use in a confined space. • Requirements Decree portable fire extinguishers 1997. • Requirements Commodities Act Decree/ Regulation pressure equipment as far as applicable.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	3, 4
• In accordance requirements Commodities Act Decree/ Regulation pressure equipment.	5

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination of the entire system including checking of the filling pressure.	When using the compression chamber	1, 2, 4
• In accordance specifications manufacturer inclusive checking internal and external.	1 year	2, 4
• Internal and external examination and an over pressure test of 1,5 times the maximum working pressure followed by a gas leak test to the maximum working pressure.	4 years, unless the manufacturer requirements are more stringent, in that case these must be followed.	5

References:
1. Commodities Act Decree/ Regulation pressure equipment 2. Decree portable fire extinguishers 1997

Comments:
1. Cylinder falls under Commodities Act Decree/ Regulation pressure equipment; 2. Commodities Act Decree/ Regulation pressure equipment examinations are only allowed to be carried out by NL- Conformity Assessment Bodies (NL-CBI) or user inspection services designated as such by the Minister of Social Affairs and Employment (SZW).

4.7 Firefighting system, fixed, hyperbaric

Detail sheet 4.7	**Revision 2 dated March 2018**
Description	**Firefighting system, portable, hyperbaric**

Requirements when new, installed first time and following modification

Product requirements	
• Must be fitted with level indicator and a manometer. • Fire extinguishing medium and propellant must not be harmful to health and must be suitable for use in a confined space. • Requirements Commodities Act Decree/ Regulation pressure equipment as far as applicable.	
Examination / testing	**Competence level**
• Complete function test. • In accordance specifications manufacturer.	3, 4
• In accordance requirements Commodities Act Decree/ Regulation pressure equipment.	5

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination of the entire system including checking of the filling pressure.	When using the compression chamber	1, 2, 4
• In accordance specifications manufacturer.	1 year	2, 4
• In accordance requirements Commodities Act Decree/ Regulation pressure equipment.	4 years after the commissioning examination. Dependent use, age and condition, maximum every 6 years thereafter	5

References:
1. Commodities Act Decree/ Regulation pressure equipment

Comments:
1. Pipework falls under Detail sheet 3.2 “Pipework systems, reducers etc.” and under Commodities Act Decree/ Regulation pressure equipment; 2. Cylinder falls under Commodities Act Decree/ Regulation pressure equipment. See Detail sheet 2.3 “Pressure vessels, above water, wet internal use”; 3. Commodities Act Decree/ Regulation pressure equipment examinations are only allowed to be carried out by NL- Conformity Assessment Bodies (NL-CBI) or user inspection services designated as such by the Minister of Social Affairs and Employment (SZW).

5.1 First stage

Detail sheet 5.1	Revision 3 dated February 2023
Description	**First stage – in combination with second stage of diving mask/ helmet**

Requirements when new, installed first time and following modification

Product requirements	
• Must be protected against overpressure. • Must be compatible with the cylinder, second stage and/or dive mask/helmet to which it will be connected. • Must be suitable for the type of breathing gas for which it is used. • Must provide sufficient breathing gas at the maximum depth it will be used, also in emergency situations.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual check, function test.	Each time prior use	0, 1
• Checking overpressure protection.	1 year	2, 4
• Maintenance and testing in accordance specifications manufacturer.	1 year	2, 4

References:
NEN-EN 250 BS 8574

Comments:
1. If the 1st stage is equipped with an extra 2nd stage (Octopus) which is meant to be used simultaneously by two divers in emergency situations, it must be suitable for this purpose. See NEN-EN 250 2. NEN-EN 250 is up to 50 meters. 3. BS 8574 is deeper than 50 meters

5.2 Helmets, band masks and full face masks - SSE

Detail sheet 5.2	Revision 3 dated February 2023
Description	**Helmets, band masks and full face masks – for use with SSE**

Requirements when new, installed first time and following modification

Product requirements	
• Must provide sufficient breathing gas at the maximum depth it will be used, also in emergency situations. • Must be suitable for the type of breathing gas for which it is used. • Must be constructed in such a way that in case of failure of the demand valve the breathing gas supply to the diver is guaranteed. (e.g. free flow). • Must be fitted with a second independent breathing gas supply. • Fitted with shatterproof safety glass or plastic. • Connection second stage must be able to withstand axial-and tensile force of at least 300N.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination and function test, including the communication.	Each time prior use	0, 1, 2
• Maintenance and testing in accordance specifications manufacturer.	1 year	2, 4

References:
1. NEN-EN 250 2. NEN-EN 15333 3. BS 8547

Comments:

5.3 Demand valve - SCUBA

Detail sheet 5.3	Revision 2 dated February 2023
Description	**Demand valve (second stage) – for use with SCUBA**

Requirements when new, installed first time and following modification

Product requirements	
• Must provide sufficient breathing gas at the maximum depth it will be used, also in emergency situations. • Must be suitable for the type of breathing gas for which it is used. • Must be compatible with the first stage.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual check and function test.	Each time prior use	0, 1, 2
• Maintenance and testing in accordance specifications manufacturer.	1 year	2, 4

References:
NEN-EN 250 BS 8574

Comments:

5.4 Full face mask, SCUBA

Detail sheet 5.4	Revision 1 dated March 2013
Description	**Full face masks – for use with SCUBA**

Requirements when new, installed first time and following modification

Product requirements	
• Must completely enclose eyes, nose and mouth. • Must be fitted with an inner mask or mouth piece • Fitted with shatterproof safety glass or plastic. • Frame must sufficiently protect the glass against breakage. • Connection second stage must be able to withstand axial-and tensile force of at least 300N.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual check and function test.	Each time prior use	0, 1, 2
• Maintenance and testing in accordance specifications manufacturer.	1 year	2, 4

References:
NEN-EN 250

Comments:

5.5 Rebreather (closed and semi-closed)

Detail sheet 5.5	**Revision 2 dated March 2018**
Description	**Rebreather (closed and semi-closed)**

Requirements when new, installed first time and following modification

Product requirements	
• The carbon dioxide absorption capacity must at least correspond with the endurance time of the breathing gas. • Breathing circuit must be fully separated from water . • A semi-closed system must be fitted with an overpressure protection in the breathing circuit. • Comply with the WOD-SOE Minimum Systems requirements.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Function test in accordance specifications manufacturer but at least vacuum test, wet test, check percentage O_2 and if required replace protosorb. • For a semi-closed system with constant flow, check of the flow.	Each time prior use	0, 1, 2
• Maintenance and testing in accordance specifications manufacturer.	2 years	2, 4

References:
NEN-EN 14143

Comments:
Watch out oxygen clean because increased oxygen percentage breathing gas mixtures (see Minimum System requirements)

5.6 Buoyancy control device

Detail sheet 5.6	Revision 1 dated March 2013
Description	**Buoyancy control device- not being a surface life jacket**

Requirements when new, installed first time and following modification

Product requirements	
• Must provide upward lift such that the diver at any depth can be weightless. • Must be inflatable both mechanically and with the mouth. • Must be fitted with pressure relief valve and fast venting.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual check. • Test pressure relief valve/ fast venting.	Each time prior use	0, 1
• Pressure test inflator hose and check mechanical inflation device. • Maintenance and testing in accordance specifications manufacturer.	1 year	2, 4

References:
1. NEN-EN 1809 2. NEN-EN 250 3. NEN 12628

Comments:

5.7 Diver harnass/ vest

Detail sheet 5.7	Revision 0 dated March 2018
Description	This concerns individual harnesses / vests worn by divers for hoisting in case of emergency and rescue. **Note:** Each harness / vest must be identifiable with a unique number: The date when first put into service must be recorded in the maintenance system.

Requirements when new, installed first time and following modification

Product requirements	
• Comply with NEN-EN 15333	
Examination / testing	**Competence level**
• In accordance requirements NEN-EN 15333 and specifications manufacturer.	3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual inspection prior to the dive and on completion of the: lifting points, webbing, stitchings and also checking that the harness / vest is complete.	Each dive	1, 2, 3, 4
• When in use, criteria for taking out of service.	5 years	1, 2, 3, 4
• Regardless of whether it has been used, criteria for taking out of service (shelf life)	10 years	1, 2, 3, 4

References:
NEN-EN 15333

Comments:
More stringent criteria can be recommended in the manufacturer's user manual or can be applied by a diving company because of the conditions of use.

6.1 Diving cage or diving bell for transportation divers

Detail sheet 6.1	Revision 2 dated March 2018
Description	**A Diving cage, open diving bell (wet bell), dry diving bell (closed bell)**

Requirements when new, installed first time and following modification

Product requirements	
• Comply with the WOD-SOE Minimum Systems requirements.	
Examination / testing	**Competence level**
• Static load test at 1,5 times the safe working load (SWL) of the lifting points. • Non-destructive examination of the lifting points and critical weld connections. • In accordance specifications manufacturer.	3, 4
• Issue of certificate of conformity with the WOD-SOE Minimum System requirements and with the above examination/ testing.	3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination.	Each time prior use	0, 1, 2
• Detailed visual inspection of the lifting points and the construction for damage / corrosion. **Note:** If damage or corrosion is detected, further tests must be carried out if necessary.	6 months	2, 3, 4
• Visual examination of the good condition of the construction as part of the entire lifting system for the transport of divers. • Static load test at 1,5 times the safe working load (SWL) of the lifting points (this also applies to secondary lifting points for attaching a lifting wire) with non-destructive testing of the lifting points and critical welds before and after the test where applicable.	1 year	3, 4

References:
1. IMCA D 023 2. IMCA D 024 3. IMCA D018 4. IMCA D 011

Comments:
1. Examination and testing are just the frame and the lifting points. 2. It is not necessary for the cage / diving bell to be attached to the lifting system for transport of divers during the test and the testing may be carried out in different ways.

6.2 Lifting system for transport of divers including winches

Detail sheet 6.2	Revision 3 dated October 2024
Description	**Lifting system for transport of divers (**including systems for lowering and lifting the diving cage, open diving bell (wet bell) and dry diving bell (closed bell), lifting frame construction, and heave compensators)

Requirements when new, installed first time and following modification

Product requirements	
• Comply with the WOD-SOE Minimum Systems requirements.	
Examination / testing	**Competence level**
• Independent static load test of the lifting system including the winches and brake systems at 1,5 times the safe working load (SWL). • Winches must undergo an independent static load test of each brake system at 1,5 times the safe working load (SWL) supplemented by a dynamic test at 1,25 times the safe working load (SWL). • On completion of testing non-destructive examination of all critical parts. • In accordance specifications manufacturer.	3, 4
• In accordance with the WOD-SOE Minimum System requirements and with the above examination/ testing.	3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination of all parts of the lifting system	Each time prior use	0, 1, 2
• Detailed visual inspection for damage/ corrosion. • Function test to safe workload (SWL). Independent static load test on each brake system at 1,25 times the safe working load (SWL).	6 months	2, 3, 4
• Examination of the good condition of the entire lifting system for the transport of divers • Independent static load test on each brake system of the lifting system including the winches at 1.5 times the safe working load (SWL).	1 year	3, 4

Examination / testing	Validity period	Competence level
• Dynamic test of the system at 1.25 times safe workload (SWL). • On completion of testing non-destructive examination of all critical parts.		
• Examination correct manner of installation and proper and safe functioning as part of the entire lifting system for the transport of divers.	After each assembly at a new location or a new site. (for exception see Comment 1.)	3, 4

References:

1. IMCA D 023
2. IMCA D 024
3. IMCA D 018
4. IMCA M 194
5. IMCA D 011

Comments:

1. When the equipment is moved as a complete system, within the validity period of the test certificate, re-testing can be limited to certification of that part what is needed for sea fastening of the complete system at the new location, such as a load test and NDE of the welds. This can be done by a Category 3 or 4 competence level.
2. Testing of lifting systems and equipment is normally carried out as part of the integral system. If individual components have to be replaced such as slings and shackles then this does not require re-testing provided the replacement is carried out on an equivalence basis and the new components have the relevant inspection and load test certificates.

6.3 Wire ropes, for transportation of divers

Detail sheet 6.3	Revision 2 dated March 2018
Description	**Wire ropes and terminations for transportation divers**

Requirements when new, installed first time and following modification

Product requirements	
• Comply with the WOD-SOE Minimum Systems requirements.	
Examination / testing	**Competence level**
The minimum breaking force must be minimal factor 8 of safe workload (SWL) or higher when working above sea state 4. The minimum breaking force (MBF) on the manufacturer's test certificate is the base value against which future deterioration in breaking strength must be checked. (See also Comments)	3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination. Special attention must be paid to the end connection of the wire to the diving cage or diving bell. (See also Comments).	Each time prior use	0, 1, 2
• Static load test up to 1.25 times the safe workload (SWL) and function test to the safe work load (SWL) as part of the entire lifting system. (see Detail sheet 6.2)	6 months	2, 3, 4
• Detailed visual inspection of the part being used and in particular the part near the socket and the part of the wire which is in contact with the sheave closest to the diving cage or diving bell when it enters the water. **Note:** If damage or corrosion is detected, further tests must be carried out if necessary. (See also Comments)	6 months	2, 3, 4
• Maintenance and lubrication of wire against corrosion according to manufacturer's requirements.	6 months	0, 1, 2, 4

Examination / testing	Validity period	Competence level
• Cut the wire rope behind the first sheave or wrap on the winch and test until the breaking point is reached to determine the breaking force and check for corrosion. The test must be performed at the location where the most dynamic load occurs on the wire. • After replacement of the end connection and prior to use, a static load test up to 1,5 times the safe work load (SWL) • Replacement of the wire must take place if the wire no longer meets the required minimum breaking force or if the breaking force result falls below 10% of the manufacturer's minimum breaking force (MBF). (See also comments)	1 year	3, 4

References:
1. IMCA D 023 2. IMCA D 024 3. IMCA D 018 4. IMCA M 194 section 13 Diving Bell Hoist Wire ropes

Comments:
1. A breaking force certificate has a validity of 12 months even if a wire is not used. If the wire is not used for a period of more than 12 months, prior first use a piece of the wire must be cut off and tested until the wire breaks to determine the breaking force. The piece of wire that has been cut off must also be inspected internally. 2. Replacement of the wire must take place if the wire no longer meets the minimum breaking force required or if the breaking force result falls below 10% of the manufacturer's minimum breaking force. 3. For installed equipment which is not used, must, when the period of non-use is longer than one month, the wire and end connection undergo a visual inspection externally and be checked for any corrosion or damage over the length from the winch drum to the diving cage, diving bell. 4. Non-rotating/ rotation resistant wires can have a characteristic of developing a considerable number of internal broken wires before they become visible on the outside, therefore special attention must be given to this during the visual inspections and tests. 5. For davits for launching of hyperbaric lifeboats other requirements apply.

6.4 Underwater lift bags

Detail sheet 6.4	Revision 1 dated June 2020
Description	**Underwater lifts bags** This includes open and closed lift bags.

Requirements when new, installed first time and following modification

Product requirements	
• Manufactured in accordance a recognised code or standard or the manufacturer's standard specification and must be suitable for the purpose for which it is used.	
Examination / testing	**Competence level**
• Function test to the safe working load.	3, 4

Requirements when in use

Examination / testing	Validity period	Competence level
• Visual examination of the lift bag and strops. • Check damage or wear and tear of the shackles and master link. • Check operation of relief valve, dump valve and inlet valve.	6 months	1, 2, 3 or 4
• Load test to maximum the safe working load.	1 year	3, 4

References:
IMCA D 016

Comments:
1. Both types of bags must be inflated before inspection, using a test plug for the parachute type. A risk analysis must be performed before this work is carried out; 2. Testing of lifting appliances and equipment is normally carried out as part of the whole system. If individual components have to be replaced such as strops or shackles then this does not require retesting provided the change is done on a "like for like" basis and the new component is supplied with its own examination and proof load test certificate; 3. The load test must be carried out by hanging the lift bag on a suitable lifting device and by filling it with water.

7.1 Survival suits

Detail sheet 7.1	Revision 2 dated March 2018
Description	**Survival suits and passive scrubbers** This includes units which are used in dry diving bells (closed bells) and in hyperbaric evacuation systems.

Requirements when new, installed first time and following modification

Product requirements	
• Comply with industry standard.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 4

Requirements when in use

Examination / testing	Validity period	Competence level
• Visual examination.	Before each diving operation	0, 1, 2
• Visual examination of the packaging of the survival suits. • Check of the condition of the passive scrubber.	6 months	1, 2, 4
• Visual examination of the diving bell - survival suits.	1 year	2, 4
• Visual examination of the HES – survival suits.	3 years	2, 4

References:
IMCA D 017 Lost Bell Survival

Comments:

7.2 Diver heating systems

Detail sheet 7.2	Revision 2 dated March 2018
Description	**Diver heating systems** This concerns the complete system, exclusive suits.

Requirements when new, installed first time and following modification

Product requirements	
• Must be fitted with audible and visual alarm for too high/too low temperature. • Comply with the WOD-SOE Minimum Systems requirements.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	3 or 4

Requirements when in use

Examination / testing	Validity period	Competence level
• Visual examination and function test. • If the system is electrically powered it must comply with NEN 1010.	6 months	2, 4

References:

Comments:

7.3 Emergency location system diving bell

Detail sheet 7.3	**Revision 1 dated March 2013**
Description	**Emergency location system dry diving bell (closed bell)**

Requirements when new, installed first time and following modification

Product requirements	
• Comply with industry standard.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	2, 3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination and function test.	6 months	1, 2, 4

References:
1. AODC 019 Emergency procedures – provisions to be included for diving bell recovery; 2. IMO, International Code of Safety for Diving Operations, 2023 (2023 Diving Code). 3. IMCA D 008 Testing of Through Water Communications.

Comments:

7.4 Ballast release system dry diving bell (closed bell)

Detail sheet 7.4	Revision 2 dated March 2018
Description	**Diving bell ballast release system, including the lift wire, guide wire and umbilical**

Requirements when new, installed first time and following modification

Product requirements	
• The ballast must be able to be decoupled from the inside. • The release mechanism must be protected in such a way that it cannot be released inadvertently.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer. • Above water function test of the release systems. • Check diving bell for positive buoyancy in accordance design.	3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination and dry function test of the release mechanism.	6 months	1, 2, 4
• A dry load test of the release mechanism to 1.5 times the static weight. • Followed by non-destructive testing of all critical items. • Check diving bell for positive buoyancy in accordance design	1 year	2, 3, 4

References:
AODC 061

Comments:

7.5 Climate control of a compression chamber

Detail sheet 7.5	**Revision 1 dated March 2013**
Description	**Climate control of a compression chamber**

Requirements when new, installed first time and following modification

Product requirements	
• Capacity must be adequate for climate control of the connected system.	
Examination / testing	**Competence level**
• Test of the complete system in accordance specifications manufacturer.	2, 3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination and function test.	6 months	1, 2, 4

References:

Comments:

7.6 Gas reclaim system including external regeneration unit

Detail sheet 7.6	Revision 2 dated March 2018
Description	**Gas reclaim system including external regeneration unit** Exclusive cylinders, pipework and diving equipment.

Requirements when new, installed first time and following modification

Product requirements	
• In accordance industry standard. • Comply with the WOD-SOE Minimum Systems requirements.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer.	3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Internal examination for cleanliness and bacteria growth.	3 months	1, 2, 4
• Visual examination and function test	6 months	1, 2, 4
• Pressure leak test to maximum working pressure. • Function test of the overpressure protection.	2 ½ years	1, 2, 4

References:
IMCA D 024

Comments:
Before the gas is re-used it must meet all the requirements for breathing gas quality.

7.7 Hyperbaric evacuation launch system - SOLAS

Detail sheet 7.7	Revision 2 dated March 2018
Description	**Hyperbaric evacuation launch system** This refers to the evacuation launch system which meets SOLAS *) or a specially designed hyperbaric evacuation launch system.

*) Safety of life at sea

Requirements when new, installed first time and following modification

Product requirements	
• In accordance with SOLAS requirements or by IMO accepted deviations.	
Examination / testing	**Competence level**
• In accordance specifications manufacturer. Following installation a load test at full outboard position, in accordance with IMO guidelines.	3, 4

Requirements when in use

Examination / testing	**Validity period**	**Competence level**
• Visual examination. • Function test dry.	6 months	2, 3, 4
• Function test wet.	1 year	2, 3, 4
• Falls must be turned end for end. Stainless steel falls need not be renewed unless there are signs of mechanical damage or deterioration. • Other falls must be replaced every 5 years or earlier if there are signs of deterioration of the condition.	2 ½ years	2, 3, 4

References:
1. IMCA D 004 2. IMCA D 027 3. IMCA D 051 4. IMCA D 052 5. IMO, International Code of Safety for Diving Operations, 2023 (2023 Diving Code)

Comments:
The above references must be consulted as they contain considerably more details on special situations than can be given here.

Space for Notes