



**BUREAU
VERITAS**

Rules for the Classification of Diving Systems

December 2018

**Rule Note
NR 610 DT R01 E**

**Bureau Veritas Marine & Offshore
8 Cours du Triangle - CS 50101,
92937 Paris La Defense Cedex - France
Tel: + 33 (0)1 55 24 70 00
<https://marine-offshore.bureauveritas.com>
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GENERAL CONDITIONS

1. INDEPENDENCE OF THE SOCIETY AND APPLICABLE TERMS

- 1.1 The Society shall remain at all times an independent contractor and neither the Society nor any of its officers, employees, servants, agents or subcontractors shall be or act as an employee, servant or agent of any other party hereto in the performance of the Services.
- 1.2 The operations of the Society in providing its Services are exclusively conducted by way of random inspections and do not, in any circumstances, involve monitoring or exhaustive verification.
- 1.3 The Society acts as a services provider. This cannot be construed as an obligation bearing on the Society to obtain a result or as a warranty. The Society is not and may not be considered as an underwriter, broker in Unit's sale or chartering, expert in Unit's valuation, consulting engineer, controller, naval architect, designer, manufacturer, shipbuilder, repair or conversion yard, charterer or shipowner; none of them above listed being relieved of any of their expressed or implied obligations as a result of the interventions of the Society.
- 1.4 The Society only is qualified to apply and interpret its Rules.
- 1.5 The Client acknowledges the latest versions of the Conditions and of the applicable Rules applying to the Services' performance.
- 1.6 Unless an express written agreement is made between the Parties on the applicable Rules, the applicable Rules shall be the Rules applicable at the time of entering into the relevant contract for the performance of the Services.
- 1.7 The Services' performance is solely based on the Conditions. No other terms shall apply whether express or implied.

2. DEFINITIONS

- 2.1 "Certificate(s)" means classification or statutory certificates, attestations and reports following the Society's intervention.
- 2.2 "Certification" means the activity of certification in application of national and international regulations or standards, in particular by delegation from different governments that can result in the issuance of a Certificate.
- 2.3 "Classification" means the classification of a Unit that can result or not in the issuance of a classification Certificate with reference to the Rules. Classification is an appraisalment given by the Society to the Client, at a certain date, following surveys by its surveyors on the level of compliance of the Unit to the Society's Rules or to the documents of reference for the Services provided. They cannot be construed as an implied or express warranty of safety, fitness for the purpose, seaworthiness of the Unit or of its value for sale, insurance or chartering.
- 2.4 "Client" means the Party and/or its representative requesting the Services.
- 2.5 "Conditions" means the terms and conditions set out in the present document.
- 2.6 "Industry Practice" means international maritime and/or offshore industry practices.
- 2.7 "Intellectual Property" means all patents, rights to inventions, utility models, copyright and related rights, trade marks, logos, service marks, trade dress, business and domain names, rights in trade dress or get-up, rights in goodwill or to sue for passing off, unfair competition rights, rights in designs, rights in computer software, database rights, topography rights, moral rights, rights in confidential information (including know-how and trade secrets), methods and protocols for Services, and any other intellectual property rights, in each case whether capable of registration, registered or unregistered and including all applications for and renewals, reversions or extensions of such rights, and all similar or equivalent rights or forms of protection in any part of the world.
- 2.8 "Parties" means the Society and Client together.
- 2.9 "Party" means the Society or the Client.
- 2.10 "Register" means the public electronic register of ships updated regularly by the Society.
- 2.11 "Rules" means the Society's classification rules and other documents. The Society's Rules take into account at the date of their preparation the state of currently available and proven technical minimum requirements but are not a standard or a code of construction neither a guide for maintenance, a safety handbook or a guide of professional practices, all of which are assumed to be known in detail and carefully followed at all times by the Client.
- 2.12 "Services" means the services set out in clauses 2.2 and 2.3 but also other services related to Classification and Certification such as, but not limited to: ship and company safety management certification, ship and port security certification, maritime labour certification, training activities, all activities and duties incidental thereto such as documentation on any supporting means, software, instrumentation, measurements, tests and trials on board. The Services are carried out by the Society according to the applicable referential and to the Bureau Veritas' Code of Ethics. The Society shall perform the Services according to the applicable national and international standards and Industry Practice and always on the assumption that the Client is aware of such standards and Industry Practice.
- 2.13 "Society" means the classification society 'Bureau Veritas Marine & Offshore SAS', a company organized and existing under the laws of France, registered in Nanterre under number 821 131 844, or any other legal entity of Bureau Veritas Group as may be specified in the relevant contract, and whose main activities are Classification and Certification of ships or offshore units.
- 2.14 "Unit" means any ship or vessel or offshore unit or structure of any type or part of it or system whether linked to shore, river bed or sea bed or not, whether operated or located at sea or in inland waters or partly on land, including submarines, hovercrafts, drilling rigs, offshore installations of any type and of any purpose, their related and ancillary equipment, subsea or not, such as well head and pipelines, mooring legs and mooring points or otherwise as decided by the Society.

3. SCOPE AND PERFORMANCE

- 3.1 Subject to the Services requested and always by reference to the Rules, the Society shall:
- review the construction arrangements of the Unit as shown on the documents provided by the Client;
 - conduct the Unit surveys at the place of the Unit construction;
 - class the Unit and enter the Unit's class in the Society's Register;
 - survey the Unit periodically in service to note whether the requirements for the maintenance of class are met.
- The Client shall inform the Society without delay of any circumstances which may cause any changes on the conducted surveys or Services.
- 3.2 The Society will not:
- declare the acceptance or commissioning of a Unit, nor its construction in conformity with its design, such activities remaining under the exclusive responsibility of the Unit's owner or builder;
 - engage in any work relating to the design, construction, production or repair checks, neither in the operation of the Unit or the Unit's trade, neither in any advisory services, and cannot be held liable on those accounts.

4. RESERVATION CLAUSE

- 4.1 The Client shall always: (i) maintain the Unit in good condition after surveys; (ii) present the Unit for surveys; and (iii) inform the Society in due time of any circumstances that may affect the given appraisalment of the Unit or cause to modify the scope of the Services.
- 4.2 Certificates are only valid if issued by the Society.
- 4.3 The Society has entire control over the Certificates issued and may at any time withdraw a Certificate at its entire discretion including, but not limited to, in the following situations: where the Client fails to comply in due time with instructions of the Society or where the Client fails to pay in accordance with clause 6.2 hereunder.
- 4.4 The Society may at times and at its sole discretion give an opinion on a design or any technical element that would 'in principle' be acceptable to the Society. This opinion shall not presume on the final issuance of any Certificate or on its content in the event of the actual issuance of a Certificate. This opinion shall only be an appraisal made by the Society which shall not be held liable for it.

5. ACCESS AND SAFETY

- 5.1 The Client shall give to the Society all access and information necessary for the efficient performance of the requested Services. The Client shall be the sole responsible for the conditions of presentation of the Unit for tests, trials and surveys and the conditions under which tests and trials are carried out. Any information, drawing, etc. required for the performance of the Services must be made available in due time.
- 5.2 The Client shall notify the Society of any relevant safety issue and shall take all necessary safety-related measures to ensure a safe work environment for the Society or any of its officers, employees, servants, agents or subcontractors and shall comply with all applicable safety regulations.

6. PAYMENT OF INVOICES

- 6.1 The provision of the Services by the Society, whether complete or not, involve, for the part carried out, the payment of fees thirty (30) days upon issuance of the invoice.

6.2 Without prejudice to any other rights hereunder, in case of Client's payment default, the Society shall be entitled to charge, in addition to the amount not properly paid, interests equal to twelve (12) months LIBOR plus two (2) per cent as of due date calculated on the number of days such payment is delinquent. The Society shall also have the right to withhold Certificates and other documents and/or to suspend or revoke the validity of Certificates.

- 6.3 In case of dispute on the invoice amount, the undisputed portion of the invoice shall be paid and an explanation on the dispute shall accompany payment so that action can be taken to solve the dispute.

7. LIABILITY

- 7.1 The Society bears no liability for consequential loss. For the purpose of this clause consequential loss shall include, without limitation:
- Indirect or consequential loss;
 - Any loss and/or deferral of production, loss of product, loss of use, loss of bargain, loss of revenue, loss of profit or anticipated profit, loss of business and business interruption, in each case whether direct or indirect.
- The Client shall defend, release, save, indemnify, defend and hold harmless the Society from the Client's own consequential loss regardless of cause.
- 7.2 Except in case of wilful misconduct of the Society, death or bodily injury caused by the Society's negligence and any other liability that could not be, by law, limited, the Society's maximum liability towards the Client is limited to one hundred and fifty per-cents (150%) of the price paid by the Client to the Society for the Services having caused the damage. This limit applies to any liability of whatsoever nature and howsoever arising, including fault by the Society, breach of contract, breach of warranty, tort, strict liability, breach of statute.
- 7.3 All claims shall be presented to the Society in writing within three (3) months of the completion of Services' performance or (if later) the date when the events which are relied on were first discovered by the Client. Any claim not so presented as defined above shall be deemed waived and absolutely time barred.

8. INDEMNITY CLAUSE

- 8.1 The Client shall defend, release, save, indemnify and hold harmless the Society from and against any and all claims, demands, lawsuits or actions for damages, including legal fees, for harm or loss to persons and/or property tangible, intangible or otherwise which may be brought against the Society, incidental to, arising out of or in connection with the performance of the Services (including for damages arising out of or in connection with opinions delivered according to clause 4.4 above) except for those claims caused solely and completely by the gross negligence of the Society, its officers, employees, servants, agents or subcontractors.

9. TERMINATION

- 9.1 The Parties shall have the right to terminate the Services (and the relevant contract) for convenience after giving the other Party thirty (30) days' written notice, and without prejudice to clause 6 above.
- 9.2 In such a case, the Classification granted to the concerned Unit and the previously issued Certificates shall remain valid until the date of effect of the termination notice issued, subject to compliance with clause 4.1 and 6 above.
- 9.3 In the event where, in the reasonable opinion of the Society, the Client is in breach, or is suspected to be in breach of clause 16 of the Conditions, the Society shall have the right to terminate the Services (and the relevant contracts associated) with immediate effect.

10. FORCE MAJEURE

- 10.1 Neither Party shall be responsible or liable for any failure to fulfil any term or provision of the Conditions if and to the extent that fulfilment has been delayed or temporarily prevented by a force majeure occurrence without the fault or negligence of the Party affected and which, by the exercise of reasonable diligence, the said Party is unable to provide against.
- 10.2 For the purpose of this clause, force majeure shall mean any circumstance not being within a Party's reasonable control including, but not limited to: acts of God, natural disasters, epidemics or pandemics, wars, terrorist attacks, riots, sabotages, impositions of sanctions, embargoes, nuclear, chemical or biological contaminations, laws or action taken by a government or public authority, quotas or prohibition, expropriations, destructions of the worksite, explosions, fires, accidents, any labour or trade disputes, strikes or lockouts.

11. CONFIDENTIALITY

- 11.1 The documents and data provided to or prepared by the Society in performing the Services, and the information made available to the Society, are treated as confidential except where the information:
- is properly and lawfully in the possession of the Society;
 - is already in possession of the public or has entered the public domain, otherwise than through a breach of this obligation;
 - is acquired or received independently from a third party that has the right to disseminate such information;
 - is required to be disclosed under applicable law or by a governmental order, decree, regulation or rule or by a stock exchange authority (provided that the receiving Party shall make all reasonable efforts to give prompt written notice to the disclosing Party prior to such disclosure).
- 11.2 The Parties shall use the confidential information exclusively within the framework of their activity underlying these Conditions.
- 11.3 Confidential information shall only be provided to third parties with the prior written consent of the other Party. However, such prior consent shall not be required when the Society provides the confidential information to a subsidiary.
- 11.4 Without prejudice to sub-clause 11.1, the Society shall have the right to disclose the confidential information if required to do so under regulations of the International Association of Classifications Societies (IACS) or any statutory obligations.

12. INTELLECTUAL PROPERTY

- 12.1 Each Party exclusively owns all rights to its Intellectual Property created before or after the commencement date of the Conditions and whether or not associated with any contract between the Parties.
- 12.2 The Intellectual Property developed by the Society for the performance of the Services including, but not limited to drawings, calculations, and reports shall remain the exclusive property of the Society.

13. ASSIGNMENT

- 13.1 The contract resulting from to these Conditions cannot be assigned or transferred by any means by a Party to any third party without the prior written consent of the other Party.
- 13.2 The Society shall however have the right to assign or transfer by any means the said contract to a subsidiary of the Bureau Veritas Group.

14. SEVERABILITY

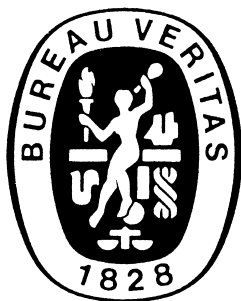
- 14.1 Invalidity of one or more provisions does not affect the remaining provisions.
- 14.2 Definitions herein take precedence over other definitions which may appear in other documents issued by the Society.
- 14.3 In case of doubt as to the interpretation of the Conditions, the English text shall prevail.

15. GOVERNING LAW AND DISPUTE RESOLUTION

- 15.1 These Conditions shall be construed and governed by the laws of England and Wales.
- 15.2 The Parties shall make every effort to settle any dispute amicably and in good faith by way of negotiation within thirty (30) days from the date of receipt by either one of the Parties of a written notice of such a dispute.
- 15.3 Failing that, the dispute shall finally be settled under the Rules of Arbitration of the Maritime Arbitration Chamber of Paris ("CAMP"), which rules are deemed to be incorporated by reference into this clause. The number of arbitrators shall be three (3). The place of arbitration shall be Paris (France). The Parties agree to keep the arbitration proceedings confidential.

16. PROFESSIONAL ETHICS

- 16.1 Each Party shall conduct all activities in compliance with all laws, statutes, rules, economic and trade sanctions (including but not limited to UN sanctions and EU sanctions) and regulations applicable to such Party including but not limited to: child labour, forced labour, collective bargaining, discrimination, abuse, working hours and minimum wages, anti-bribery, anti-corruption, copyright and trademark protection, personal data protection (<https://personal.dataprotection.bureauveritas.com/privacypolicy>).
- Each of the Parties warrants that neither it, nor its affiliates, has made or will make, with respect to the matters provided for hereunder, any offer, payment, gift or authorization of the payment of any money, directly or indirectly, to or for the use or benefit of any official or employee of the government, political party, official or candidate.
- 16.2 In addition, the Client shall act consistently with the Bureau Veritas' Code of Ethics. <https://group.bureauveritas.com/group/corporate-social-responsibility>



RULE NOTE NR 610

NR 610

Rules for the Classification of Diving Systems

Chapter 1	CLASSIFICATION AND CERTIFICATION PRINCIPLES
Chapter 2	DIVING SUB-SYSTEMS
Chapter 3	DESIGN AND CONSTRUCTION
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December 2018

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CLASSIFICATION AND CERTIFICATION PRINCIPLES

SECTION 1	GENERAL
SECTION 2	CERTIFICATION OF MATERIAL AND COMPONENTS
SECTION 3	DOCUMENTATION TO BE SUBMITTED

SECTION 1 GENERAL

1 Application

1.1 General

1.1.1 The present Note provides technical requirements for the design, construction, testing and in-service surveys of manned diving systems for which the class notations defined in Article [3] are granted.

1.1.2 Systems and equipment covered

The present Note is applicable to diving systems using the following diving technics:

- surface supplied diving technics with compressed air or mixed-gas and using:
 - a diving basket
 - a wet bell.
- bounce diving technics using a closed diving bell
- saturation diving technics

1.1.3 Systems and equipment not covered

The following systems and pieces of equipment are not in the scope of the present Note:

- atmospheric diving suits
- autonomous diving equipment (SCUBA)
- diver individual portable equipment (eg: bail-out, closed circuit breathing system)
- submersibles and underwater vehicles
- underwater habitat
- remote operated vehicles.

2 Classification principles

2.1 General

2.1.1 The provisions of this Article prevail over those of the Ship Rules Part A, which remain applicable in general.

2.1.2 Scope

The scope of classification of diving systems includes:

- design review
- manufacturing and testing survey of material and components
- inspection and testing of completed system
- in-service survey.

2.1.3 Exclusion

The following is not included in the scope of classification:

- operational procedure approval
- operation survey during diving operations.

2.2 Assignment of Class

2.2.1 General

The class assigned to a diving system by the Society, following its interventions, is embodied in a Certificate of Classification and noted in the appropriate Register.

The class is assigned by the Society upon the satisfactory completion of one of the procedures detailed in [2.2.2] or [2.2.3].

2.2.2 System surveyed by the Society during construction

When a diving system is surveyed by the Society during construction, it is submitted to the following requirements:

- approval of drawings and examination of documents in accordance with the requirements of Chapter 2 and Chapter 3
- completion of the certification scheme as defined in Sec 2 and concerning:
 - certification of materials
 - certification of components
 - certification of the sub-systems.
- surveillance of the installation and of the commissioning on-board in accordance with Ch 4, Sec 1.

2.2.3 System classed after construction

When a diving system has been surveyed by another IACS Society during its construction and is requested to be admitted to class, it is submitted to the following requirements:

- examination of the drawings and documents
- examination of materials and components certificates
- specific survey of the diving system performed by the Society.

Note 1: As a Rule, these drawings are to be marked with the stamps of the organization by which they were approved upon construction.

Note 2: The extent of this survey depends on the existing conditions of certification, on the general maintenance conditions and on the age of the installation. As a rule, a survey equivalent to the class renewal survey is to be performed.

2.3 Maintenance of class

2.3.1 General

The requirements for maintenance of Class as defined in Ship Rules Pt A, Ch 2, Sec 2 are applicable.

2.3.2 In-service survey

The maintenance of class is subject to completion of the in-service surveys described in Ch 4, Sec 2 with the periodicity defined in [2.3.3].

2.3.3 Survey periodicity

Diving systems are subject to the following in-service surveys witnessed by the Society:

- annual surveys (to be conducted within ± 3 months of anniversary date)

Note 1: The scope of the annual survey may differ from one year to the other as the periodicity of inspection and testing may be different for each component.

- intermediate surveys (to be conducted within ± 3 months of the second anniversary date or within ± 3 months of the third anniversary date)
- class renewal surveys, every 5 years (to be conducted no earlier than 15 months before and no later than anniversary date or 3 months after anniversary date in exceptional circumstances)
- occasional surveys for damage, repairs, reactivation and alterations.

2.3.4 Owner surveys

In addition to the in-service surveys witnessed by the Society, the Owner is to perform semi-annual surveys as detailed in Ch 4, Sec 2, [2.4].

These surveys are to be recorded in the Planned maintenance System.

2.3.5 Modifications and repairs

The Owner shall inform the Society in case of modifications or repair as detailed in Ch 4, Sec 2, [1.3].

A design review may be necessary with relevant surveys. In that case, the original certificate of classification may have to be completed with a description of the modifications.

2.3.6 Portable diving systems

The Owner is to inform the Society about any installation and decommissioning operations of a portable diving system.

The portable diving system is to be inspected in accordance with Ch 4, Sec 2, [3] before it is put back into service.

2.4 Suspension and withdrawal of class certificate

2.4.1 The class certificate would cease to be valid if significant alterations have been made to the diving system without the agreement of the Society, except for the replacement of such equipment or fittings for the purpose of repair or maintenance, or if surveys and inspections as specified by the Society under the provisions of Chapter 4 have not been carried out.

2.4.2 The class certificate would cease to be valid if the diving system is operated beyond its approved rated depth.

2.5 Classification of the diving support unit

2.5.1 The classification of the diving support unit is covered by Part E, Chapter 7 of the Ship Rules (see [6.3.1]).

2.5.2 Integrated diving systems

When the integrated diving system is classed by the Society, it is to be mentioned in the certificate of classification of the ship.

2.5.3 Portable diving systems

The classification of portable diving systems and the classification of diving support units are independent.

3 Classification notations

3.1 Types of notations assigned

3.1.1 The types of classification notations assigned to a diving system are the following:

- a class symbol as per [3.2]
- a construction mark as per [3.3]
- a service notation with an additional service feature as per [3.4].

3.1.2 As an example, the classification notations assigned to a diving system may be as follows (the kind of notation shown in brackets does not form part of the classification notation indicated on the Certificate of Classification):

I ⌘ Diving system - integrated

(class symbol, construction mark, service notation)

SATURATION

(additional service feature)

3.2 Class symbol

3.2.1 The class symbol expresses the degree of compliance of the diving system with the rule requirements as regards its construction and maintenance. There is one class symbol, which is compulsory for every classed diving system.

3.2.2 The class symbol **I** is assigned to diving systems built in accordance with the requirements of the Rules or other rules recognized as equivalent, and maintained in a condition considered satisfactory by the Society.

The period of class (or interval between class renewal surveys) assigned to class symbol **I** diving systems is maximum 5 years.

3.3 Construction mark

3.3.1 General

The construction mark identifies the procedure under which the diving system has been surveyed for initial assignment of the class.

The construction mark refers to the original condition of the diving system. However, the Society may change the construction mark when the diving system is subjected to repairs, conversion or alterations.

3.3.2 System surveyed by the Society

The construction mark $\boxtimes$ is assigned to the diving system when it has been surveyed by the Society during its construction in compliance with the procedure detailed in [2.2.2].

3.3.3 System classed after construction

The construction mark $\boxtimes$ is assigned to the diving system when the latter is classed after construction in compliance with the procedure detailed in [2.2.3] and it is changing class from an IACS Society at the time of the admission.

3.4 Service notations and additional service features

3.4.1 The service notations define the type of diving system which has been considered for classification, according to the request for classification signed by the Interested Party. At least one service notation is to be assigned to every classed diving system.

3.4.2 The different service notations and additional service features which may be assigned to a diving system are listed in [3.4.3] to [3.4.9] and summarized in Tab 1.

3.4.3 Notation diving system - integrated

The service notation **diving system-integrated** is assigned to diving systems permanently installed on a diving support unit.

The service notation **diving system-integrated** is always completed by one of the following additional service features:

- **SURFACE AIR** defined in [3.4.6]
- **SURFACE MIXED GAS** defined in [3.4.7]
- **BOUNCE** defined in [3.4.8]
- **SATURATION** defined in [3.4.9].

Table 1 : List of service notations and additional service features

Service notation	Reference	Remarks
Additional service feature	Reference	
diving system - integrated	[3.4.3]	Permanent diving system
SURFACE AIR	[3.4.6]	
SURFACE MIXED GAS	[3.4.7]	
BOUNCE	[3.4.8]	
SATURATION	[3.4.9]	
diving system - portable	[3.4.4]	Non permanent diving system
SURFACE AIR	[3.4.6]	
SURFACE MIXED GAS	[3.4.7]	
BOUNCE	[3.4.8]	
SATURATION	[3.4.9]	
hyperbaric reception facility	[3.4.5]	

3.4.4 Notation diving system - portable

The notation **diving system-portable** is assigned to diving systems not permanently installed on-board and which may be transferred to another diving support unit.

The service notation **diving system-portable** is always completed by one of the following additional service features:

- **SURFACE AIR** defined in [3.4.6]
- **SURFACE MIXED GAS** defined in [3.4.7]
- **BOUNCE** defined in [3.4.8]
- **SATURATION** defined in [3.4.9].

3.4.5 Notation hyperbaric reception facility

The service notation **hyperbaric reception facility** is assigned to special decompression chambers used to transfer the occupants from an hyperbaric rescue unit and to decompress them safely, as defined in [6.2.15].

The following requirements apply for the design and construction of hyperbaric reception facilities:

- Ch 2, Sec 1 - Deck decompression chamber
- Chapter 3 - Design and construction.

3.4.6 Service feature SURFACE AIR

The additional service feature **SURFACE AIR** is assigned to surface diving systems defined in [5.1] and using compressed air only.

The following requirements apply for the design and construction of surface air diving systems:

- Ch 2, Sec 1 - Deck decompression chamber
- Ch 2, Sec 3 - Wet bell and diving basket
- Ch 2, Sec 4 - Launch and recovery system
- Chapter 3 - Design and construction.

3.4.7 Service feature SURFACE MIXED GAS

The additional service feature **SURFACE MIXED GAS** is assigned to surface diving systems defined in [5.1] and using a breathing gas mixture.

The following requirements apply for the design and construction of surface mixed gas diving systems:

- Ch 2, Sec 1 - Deck decompression chamber
- Ch 2, Sec 3 - Wet bell and diving basket
- Ch 2, Sec 4 - Launch and recovery system
- Chapter 3 - Design and construction.

3.4.8 Service feature BOUNCE

The additional service feature **BOUNCE** is assigned to diving systems using a closed bell and where divers are decompressed after each dive as defined in [5.3].

The following requirements apply for the design and construction of bounce diving systems:

- Ch 2, Sec 1 - Deck decompression chamber
- Ch 2, Sec 2 - Closed diving bell
- Ch 2, Sec 4 - Launch and recovery system
- Chapter 3 - Design and construction.

3.4.9 Service feature SATURATION

The additional service feature **SATURATION** is assigned to diving systems where the divers live in a pressurized environment as defined in [5.2].

The following requirements apply for the design and construction of saturation diving systems:

- Ch 2, Sec 1 - Deck decompression chamber
- Ch 2, Sec 2 - Closed diving bell
- Ch 2, Sec 4 - Launch and recovery system
- Ch 2, Sec 5 - Hyperbaric rescue unit
- Chapter 3 - Design and construction.

4 Statutory requirements

4.1 IMO Code of Safety for Diving Systems

4.1.1 The present rules for classification of diving systems include the technical provisions of IMO Code of Safety for diving systems as applicable to the diving system itself.

Note 1: Attention is drawn to the fact that IMO Code of Safety for Diving Systems also covers the interface between the diving system and the diving support unit.

These technical requirements are reproduced for the purpose of classification in the present Rules, *printed in Italic type*. In reproducing the text, the word “Administration” is replaced by the word “Society”.

5 Description of diving systems

5.1 Surface diving system

5.1.1 A surface diving system is a system where interventions by divers are performed at such depth and durations that the descent onto the seabed, the work and the decompression are carried out in the water (without resorting to the use of a closed diving bell).

The breathing gas is supplied from the supporting vessel through an umbilical.

The breathing gas may be:

- pure compressed air, or
- mixed gas with enriched oxygen or helium.

The surface diving installation generally includes as the case may be:

- means of getting into water
- means to recover the divers
- a decompression chamber
- means adapted to the diving method used.

5.2 Saturation diving system

5.2.1 A saturation diving system is a system where the divers live in a pressurized environment which may be maintained for several days or weeks. Divers are generally decompressed to surface pressure only once, at the end of their tour of duty.

5.3 Bounce diving system

5.3.1 A bounce diving system is a system using a closed diving bell and where the divers are decompressed on-board in a deck decompression chamber after each dive.

5.4 Differences between diving system types

5.4.1 The main differences between surface, bounce and saturation diving systems are:

- the size of the deck decompression chambers
- the divers’ heating system
- the breathing gas mixtures
- the size of the control stands
- the presence of means for transfer under pressure
- the presence of an Hyperbaric Rescue Unit.

5.5 Main components of a diving system

5.5.1 Diving systems generally include, but are not limited to, the main components listed in Sec 2, [4].

6 References

6.1 Acronyms

6.1.1 The following acronyms are commonly used within the industry:

- BIBS : Built-In Breathing System
- DDC : Deck Decompression Chamber [6.2.6]
- ECU : Environment Control Unit
- FAT : Factory Acceptance Test
- FME(C)A: Failure Modes and Effects (and Criticality) Analysis
- HES : Hyperbaric Evacuation System [6.2.14]
- HEU : Hyperbaric Evacuation Unit
- HRC : Hyperbaric Rescue Chamber
- HRF : Hyperbaric Reception Facility [6.2.15]
- HRU : Hyperbaric Rescue Unit [6.2.16]
- LARS : Launch and Recovery System [6.2.17]
- LSS : Life Support System [6.2.18]
- MAWP : Maximum Allowable Working Pressure
- MBL : Minimum Breaking Load [6.2.22]
- MSW : Metres of Sea Water [6.2.21]
- NDT : Non-Destructive Testing
- PMS : Planned Maintenance System
- PRV : Pressure Relief Valve
- PVHO : Pressure Vessel for Human Occupancy
- SCUBA : Self-Contained Underwater Breathing Apparatus
- SDC : Submersible Diving Chamber
- SPHL : Self-Propelled Hyperbaric Lifeboat
- SWL : Safe Working Load
- TUP : Transfer Under Pressure.

6.2 Definitions

6.2.1 Absolute pressure

Pressure measured with reference to void.

6.2.2 Bail-out bottle

Diver's emergency gas supply cylinder used as a backup system in case of a failure of the primary source of breathing gas.

6.2.3 Bottle

Pressure container for the storage and transport of gases under pressure. Also called gas cylinders.

6.2.4 Breathing gas

All gases and mixtures of gases which are used for breathing during diving operations.

6.2.5 Closed diving bell

Manned underwater compression chamber, including its fitted equipment, for transfer of diving personnel under pressure between the work location and the deck chambers.

Also known as a personnel transfer capsule (PTC), submersible diving chamber (SDC) or submersible compression chamber.

6.2.6 Deck Decompression Chamber (DDC)

Pressure vessel for human occupancy which does not go under water. May be used as a living chamber during saturation diving or for diver decompression during surface diving. Also called compression chamber, recompression chamber, deck chamber or surface compression chamber.

6.2.7 Depth

Water depth or equivalent pressure to which the diver is exposed at any time during a dive or inside a surface compression chamber or a diving bell.

6.2.8 Diver

Worker carrying out interventions or works in immersed condition and subjected to pressures higher than atmospheric one.

6.2.9 Diving basket

Man-riding equipment used for transfer of diving personnel at ambient sea pressure between the diving support unit and the work location.

6.2.10 Diving bell

Means for personnel transfer underwater which can be a closed bell or a wet bell (open bell).

6.2.11 Diving system

The whole plant and equipment necessary for conducting diving operations.

6.2.12 Gas reclaim unit

Means for recovery and cleaning of the breathing gas. Gas reclaim unit are sometimes used on saturation diving systems to recover the helium from the breathing gas.

6.2.13 Gas regeneration unit

Means for removal of the carbon dioxide from the breathing gas.

6.2.14 Hyperbaric Evacuation System (HES)

The whole plant and equipment necessary for the evacuation of divers in saturation from a deck decompression chamber to the Hyperbaric Reception Facility (HRF) where decompression can be carried out. The main components of a hyperbaric evacuation system include the Hyperbaric Rescue Unit (HRU), its handling system, the Hyperbaric Reception Facility and the evacuation procedures.

6.2.15 Hyperbaric Reception Facility (HRF)

Normally a shore based facility (but could be installed off-shore) which is capable of accepting a HRU and mating it to a decompression chamber such that the evacuated occupants can be transferred into that chamber and safely decompressed.

6.2.16 Hyperbaric Rescue Unit (HRU)

Floating unit used to evacuate divers under pressure safely from a ship or a floating structure to a location where decompression can be carried out.

It may be a Hyperbaric Rescue Chamber (HRC) or a Self-Propelled Hyperbaric Lifeboat (SPHL). Also known as Hyperbaric Evacuation Unit (HEU).

6.2.17 Launch and Recovery System (LARS)

Plant and equipment necessary for raising, lowering and transporting the diving bell between the work location and the surface compression chamber.

6.2.18 Life Support System (LSS)

The Life Support System includes the equipment used to maintain a suitable life environment for the divers in the pressurized compartments (DDC, closed bell, HRU).

The main functions are to prepare the breathing gas mixtures, supply the gases to the pressurized compartments, adjust the temperature and the humidity and monitor the life support parameters.

6.2.19 Mating device

Equipment necessary for the connection and disconnection of a diving bell to a deck decompression chamber for transfer under pressure operations.

6.2.20 Maximum operating depth

Depth in metres of sea water equivalent to the maximum pressure for which the diving system is designed to operate.

6.2.21 Metres of sea water (MSW)

Metres of sea water are sometimes used to express a water depth equivalent to a pressure. For the purpose of the design and testing of pressure vessels, the values in msw are to be converted into pressure units.

6.2.22 Minimum Breaking Load (MBL)

The Minimum Breaking Load of wire ropes and fibre ropes are provided by the manufacturer in accordance with NR216.

6.2.23 Open diving bell

See wet diving bell.

6.2.24 Partial pressure

Pressure of gas within a mixture which would prevail if the gas would fill by itself alone, the full volume occupied by the mixture. The sum of the partial pressures of the consistent parts of the mixture, proportional to volumetric fractions, is equal to the total absolute pressure of the mixture.

6.2.25 Portable diving systems

Portable equipment not remaining on-board but installed periodically for the purpose of specific works related to diving.

6.2.26 Pressure vessel

Container capable of withstanding an internal maximum working pressure greater than or equal to 1 bar.

6.2.27 Relative pressure

Pressure measured with reference to local barometric pressure and generally read on the pressure gauge.

6.2.28 Safe Working Load

The Safe Working Load (SWL) of a lifting appliance is defined as the maximum load which may be lifted by the appliance in a safe manner, in kN.

6.2.29 Submersible Diving Chamber

See closed diving bell.

6.2.30 Umbilical

Link between the diving support unit and the diving bell. It may contain surveillance, communication and power supply cables, breathing gas and hot water hoses.

6.2.31 Wet diving bell

Bell with a closed top section, capable of containing a gaseous atmosphere to provide a refuge for the divers. It is not a pressure vessel. Also called an open bell.

6.3 Rules and regulations

6.3.1 Ship Rules

Ship Rules means Rules for the Classification of Steel Ships (NR467).

Note 1: Ship Rules Part E, Chapter 7 address the requirements for diving support vessels.

6.3.2 NR216

When reference is made to NR216, the latest version of the Rules on Materials and Welding for the Classification of Marine Units is applicable.

6.3.3 NR266

When reference is made to NR266, the latest version of the Requirements for Survey of Materials and Equipment for the Classification of Ships and Offshore Units is applicable.

6.3.4 NR320

When reference is made to NR320, the latest version of the Certification scheme of material and equipment for classification of marine units is applicable.

6.3.5 NR526

When reference is made to NR526, the latest version of the Rules for the Certification of Lifting Appliances on-board Ships and Offshore Units is applicable.

6.3.6 IMO - Code of Safety for Diving Systems

International Maritime Organization (IMO) - Code of Safety for Diving Systems means the Code of Safety adopted by IMO Resolution A.831(19), as amended.

6.3.7 IMO - Guidelines and Specifications for Hyperbaric Evacuation Systems

International Maritime Organization (IMO) - Guidelines and Specifications for Hyperbaric Evacuation Systems adopted by Resolution A.692(17), as amended.

6.3.8 IMO - International Convention for the Safety of Life at Sea - SOLAS

IMO - SOLAS Convention adopted in 1974, as amended.

6.4 IMCA publications

6.4.1 International Marine Contractors Association (IMCA) is the editor of various publications providing guidelines for commercial diving. The main publications for the design inspection and testing of diving systems are listed below:

- IMCA D 002 - Battery packs in pressure housings
- IMCA D 004 - The initial and periodic examination, testing and certification of hyperbaric evacuation launch systems
- IMCA D 011 - Annual auditing of diving systems
- IMCA D 012 - Stainless steel in oxygen systems
- IMCA D 018 - Code of practice on the initial and periodic examination, testing and certification of diving plant and equipment
- IMCA D 023 - Diving Equipment Systems Inspection Guidance Note (DESIGN) for Surface Oriented (Air) Diving Systems
- IMCA D 024 - Diving Equipment Systems Inspection Guidance Note (DESIGN) for Saturation (Bell) Diving Systems
- IMCA D 037 - Diving Equipment Systems Inspection Guidance Note (DESIGN) for Surface supplied Mixed Gas Diving Systems
- IMCA D 039 - FMEA guide for diving systems
- IMCA D 040 - Diving Equipment Systems Inspection Guidance Note (DESIGN) for Mobile /Portable Surface supplied Systems
- IMCA D 043 - Markings and colour coding of gas cylinders, quads and banks for diving application
- IMCA D 045 - Code of practice for the safe use of electricity in water
- IMCA D 047 - Acrylic plastic viewports
- IMCA D 051 - Hyperbaric Evacuation Systems (HES) interface recommendations.

6.5 Recognized codes and standards

6.5.1 The following technical codes and standards are recognized for the purpose of the present rules.

Pressure Vessel for Human Occupancy:

- ASME PVHO 1 & 2 – Safety standard for pressure vessels for human occupancy
- EN 13445 – Unfired pressure vessels

Gas cylinders and other pressure vessels:

- ISO 9809 – Gas cylinders - Refillable seamless steel gas cylinders - Design, construction and testing
 - Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa
 - Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa
- EN ISO 11120 – Gas cylinders - Refillable seamless steel tube of water capacity between 150 l and 3 000 l - Design, construction and testing
- PD 5500 – Specification for unfired fusion welded pressure vessels
- ISO 6406 – Gas cylinders - Seamless steel gas cylinders - Periodic inspection and testing
- EN 1968 – Transportable gas cylinders - Periodic inspection and testing of seamless steel gas cylinders
- EN 16753 – Gas cylinders - Periodic inspection and testing, in situ (without dismantling) of refillable seamless steel tubes of water capacity between 150 l and 3 000 l, used for compressed gases

Breathing gas and oxygen piping system:

- EN 738 – Pressure regulators for use with medical gases
- ASTM G93 – Standard Practice for Cleaning Methods and Cleanliness Levels for Materials and Equipment Used in Oxygen-Enriched Environments
- EN 12021 – Respiratory protective devices - Compressed air for breathing apparatus.

Synthetic flexible hoses:

- SAE J 517 – Hydraulic hoses
- EN 853 and 856 – Rubber hoses and hose assemblies.

Metallic flexible hoses:

- ISO 10 380 – Pipework - Corrugated metal hoses and hose assemblies

Umbilicals:

- ISO 13628- 5 – Subsea control umbilical
- API 17 E – Specification for Subsea Production Control Umbilicals
- ISO 15333 – Open circuit umbilical supplied compressed gas diving apparatus

Fire extinguishing systems:

- NFPA publications including NFPA 99 – Health care facilities code
- EN 16081 – Hyperbaric chambers - Specific requirements for fire extinguishing systems - Performance, installation and testing

SECTION 2

CERTIFICATION OF MATERIAL AND COMPONENTS

1 General

1.1 Scope

1.1.1 The present Section provides the certification scheme for materials and equipment intended to be part of the diving system classed by the Society.

1.1.2 This certification scheme may be extended to conformity assessment with other standards as specified in NR320.

1.2 Certification levels

1.2.1 The classification of a diving system involves 3 levels of certification for the sub-components:

- a) certification of the main sub-systems, as defined in Article [4]
- b) certification of the components, as defined in Article [5]
- c) certification of the materials, as defined in Article [5].

2 Definitions

2.1 Type of certification

2.1.1 Individual certification

For one-off production for which an individual certification is requested, the following phases are involved:

- design assessment
- fabrication survey
- testing survey.

2.1.2 Type approval with individual certification

For serial production for which a type approval is requested, the following phases are involved:

- design assessment
- prototype fabrication survey
- prototype testing survey.

The product is then subject to fabrication type surveys and type testing surveys as defined in NR320.

2.2 Type of certificates

2.2.1 Product certificate

A product certificate is a certificate issued by the Society.

2.2.2 Manufacturer certificate

A manufacturer certificate is a document stating the results of the tests performed and/or stating compliance with the approved type (as applicable) and issued by the manufacturer itself.

2.2.3 Certificate issued by another recognized independent inspection body

Where applicable, the Society may accept a product certificate issued by another recognized independent inspection body.

2.2.4 Work recognition certificate

As defined in NR320, a work recognition certificate is issued by the Society to a manufacturer upon satisfactory completion of a documentation review and audit.

3 Certification procedure

3.1 General

3.1.1 General certification scheme

The general certification scheme is described in NR320 Certification scheme of materials and equipment for the classification of marine units.

3.1.2 Application form

The application form for certification shall identify if specific mandatory requirements are applicable in the areas where the diving system is intended for.

3.1.3 Design assessment

A design assessment may be included in the certification of sub-systems and components.

In this case, the party applying for certification is to provide the reference of the technical standards used for the design of the product.

3.1.4 Fabrication survey

The certification of components and sub-systems involves the surveillance of the fabrication and the examination of the manufacturer's procedures.

3.1.5 Testing survey

Testing of the main sub-systems and components is to be witnessed by the Society when required.

4 Certification of the diving sub-systems

4.1 General

4.1.1 The diving sub-systems described in Tab 1 are to be certified, as applicable for the type of diving system, with a product certificate issued by the Society.

Typical architecture of diving systems are given in:

- Fig 1 for saturation diving systems
- Fig 2 for surface diving systems.

4.1.2 The scope of certification for the main sub-systems include:

- inspection of the material and components certificates as specified in Article [5]

- design review
- survey of the fabrication or assembly
- testing survey
- inspection of the marking defined in [4.2].

4.1.3 Hyperbaric Rescue Unit

In addition to complying with the requirement of this Rule Note, self-propelled hyperbaric lifeboats and their launching systems are to comply with Life Saving Appliances requirements in accordance with IMO SOLAS convention.

4.2 Marking

4.2.1 Each main sub-systems of the diving plant should be stamped with an official number or other distinctive identification.

Figure 1 : General architecture of saturation diving systems

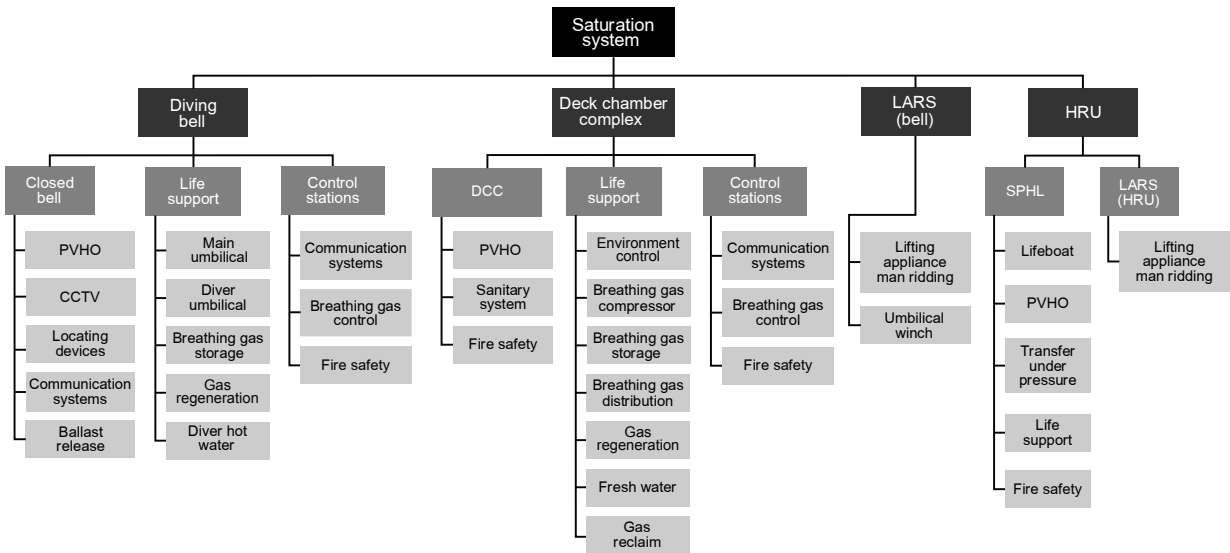


Figure 2 : General architecture of surface diving systems

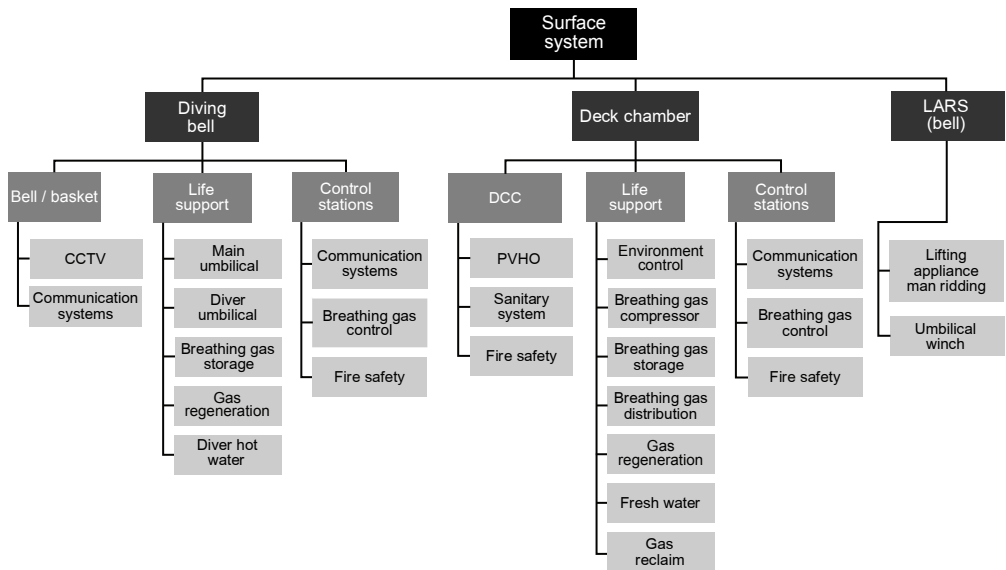


Table 1 : Diving plant main sub-systems

Items	Saturation diving	Bounce diving	Surface diving
Closed diving bell Ch 2, Sec 2	X	X	
Wet diving bell Ch 2, Sec 3			X
Diving basket Ch 2, Sec 3			X
Main bell umbilical Ch 3, Sec 3	X	X	X (1)
Dive control station Ch 3, Sec 4	X	X	X
Bell launch and recovery system Ch 2, Sec 4	X	X	X
Deck decompression chamber Ch 2, Sec 1	X	X	X
Life support control station Ch 3, Sec 4	X		
Life support systems Ch 3, Sec 3			
• breathing gas storage and distribution	X	X	X
• gas regeneration system (CO2 scrubber)	X	X	X
• gas reclaim system	X		
• environmental control unit (heater and chiller)	X		
• diver hot water system.	X		
Hyperbaric Rescue Unit (HRU) Ch 2, Sec 5	X		
HRU launching appliance Ch 2, Sec 5	X		
(1) For wet diving bell.			

5 Certification of material and components

5.1 General

5.1.1 The certification procedure and requirements specified in Tab 2 are to be completed by the manufacturer within the scope of the classification of the diving system.

5.1.2 The Society reserves the right to modify the requirements given in the present Note to formulate new ones or to change their application in order to take into account the particulars of a given construction, as well as local circumstances.

5.1.3 The particular conditions and requirements expressed by National Flag Authorities, owners, shipyards or manufacturers may lead to additional surveys or other services to be specified and agreed in each case by the concerned parties.

5.2 Symbols

5.2.1 Symbols used in Tab 2 are consistent with the definitions of NR266 Requirements for Survey of Materials and Equipment for the Classification of Ships and Offshore Units.

5.3 Explanatory notes, symbols and abbreviations

5.3.1 Symbols used in Tab 2 have the following meaning:
“C” indicates that a BV product certificate is required with invitation of the Surveyor to attend the tests unless otherwise agreed, in addition to the manufacturer’s document stating the results of the tests performed and/or compliance with the approved type as applicable.

“W” indicates that a manufacturer’s document is required, stating the results of the tests performed and/or stating compliance with the approved type (as applicable).

“X” indicates that examinations and tests are required.

Where fitted, each additional index (h, ndt) indicates a specific type of test:

h : Hydraulic pressure test (or equivalent)

ndt : Non-destructive tests as per Rules.

5.3.2 Column 1 (item code)

Column 1 contains an alpha-numeric code for ease of reference equipment or component.

5.3.3 Column 2 (item name)

Column 2 contains the name of the equipment or component with, eventually, its sub-systems.

5.3.4 Column 3 (design assessment / approval index)

Column 3 contains the design assessment / approval index. The meaning of letters TA and DA is the following:

TA : Type Approval is required

TA_{HBV} : Type Approval is required with work’s recognition (HBV scheme as per NR320)

DA : Design assessment / Appraisal of the product is required; this one may be carried out as applicable:

- either for a specific unit, or
- using the Type Approval procedure.

Note 1: Where nothing is mentioned in column 3, a design assessment/approval of the specific unit is not required.

5.3.5 Column 4 (raw material certificate)

Column 4 indicates the nature of the document that is to be submitted by the manufacturer or supplier of the concerned raw material. Consistently with the Rules or agreed specifications, this document includes data such as material tests (chemical composition and mechanical properties), non-destructive tests and surface hardness (if hardened).

5.3.6 Column 5 (examination and testing)

Column 5 indicates that examination and/or testing are required, and are to be carried out by the manufacturer. For the type of examination and/or testing required, reference is to be made to the relevant provisions of the present Note.

Note 1: As a general rule, even if a cross “X” is not fitted in a cell under column 5, examination and tests during fabrication may be required with invitation/attendance of the Society’s Surveyor.

5.3.7 Column 6 (product certificate)

Column 6 indicates the nature of the document to be supplied by the manufacturer of the concerned product.

5.3.8 Column 7 (remarks)

Column 7 indicates the remarks (if any) associated to the concerned equipment or component.

Table 2 : Examination and survey for diving system components

N°	Item	Design assessment	Raw Material certificate	Examination & Testing	Product certificate	Remarks
1	PRESSURE VESSEL FOR HUMAN OCCUPANCY	DA	C (1)	X h ndt	C (1)	Including supports and lifting padeyes. The overpressure test report is to indicate whether the viewports are in place during testing. The welding procedures are to be examined.
1.1	Viewports		W (1)	X h	C (1)	Certificates according to ASME PVHO
1.2	Piping penetrations		W	X h ndt	W	
1.3	Electrical penetrations		W	X h ndt	W	
1.4	Valves		W	X h	C (1)	When the valves are of welded type, the welding procedures are to be examined
1.5	Pressure relief valve		W	X h	C (1)	When the valves are of welded type, the welding procedures are to be examined
1.6	Overpressure alarm			X	W	
1.7	Doors and mating device		C	X h	W	
1.8	Clamp and mating device		C	X h	W	
2	COMMUNICATION SYSTEM					
2.1	Communication equipment: - wired - wireless			X X	(1) C / W C / W	
2.2	CCTV				W	
2.3	Emergency through water communication system			X	C / W	
2.4	Diving bell emergency location system	DA or TA		X	C / W	
3	DDC FIXED FIRE FIGHTING SYSTEM	DA		X	C	
3.1	Pressure vessel and piping	DA	W	X	C / W	Depending on item, refer to NR266. In case of welded construction, the welding procedures are to be examined.
3.2	Sprinkler and nozzle		W	X h	W	
3.3	Valves and fittings		W	X h	W	When the valves and fittings are of welded type, the welding procedures are to be examined
(1)	Product certificate issued by an other recognized inspection body may be submitted in lieu of a certificate issued by the Society, on a case-by-case basis. In any case, the documents listed in Sec 3 are to be submitted.					

N°	Item	Design assessment	Raw Material certificate	Examination & Testing	Product certificate	Remarks
4	DDC FIRE SAFETY EQUIPMENT					
4.1	Portable hyperbaric fire extinguisher	DA or TA		X	C (1)	
4.2	Fire detection and alarm	TA _{HIBV}		X	C / W	Refer to NR266 item C
5	INSTRUMENTATION					
5.1	Pressure gauges			X	W	Calibration certificate to be provided
5.2	High-Low oxygen alarm (in enclosed space)	TA _{HIBV}		X	C / W	
5.3	Oxygen analyzers			X	W	
5.4	CO2 analyzers			X	W	
5.5	Temperature and humidity gauges			X	W	
5.6	Other electronic instruments				W	
6	BREATHING GAS DISTRIBUTION PANEL					
6.1	Oxygen piping	DA	W	X h X h ndt	C C	As per class 1 defined in NR467
6.2	Oxygen valves, regulators and fitting		W	X h	C / W	When the valves and fittings are of welded type, the welding procedures are to be examined. NDT to be performed if of welded construction.
6.3	Other gas piping		W	X h ndt	C / W	As per class 1 defined in NR467
6.4	Flexible hoses and couplings	TA	W	X h	C (1)	
6.5	Other valves, regulators and fittings		W	X h	C / W	As per class 1 defined in NR467. NDT to be performed if of welded construction.
6.6	Gas mixing equipment			X	C / W	
6.7	Pressure relief valve		X	X h	C / W	When the valves are of welded type, the welding procedures are to be examined
6.8	Manifold			X	C / W	When the manifolds are of welded type, the welding procedures are to be examined
6.9	Filters			X	W	
6.10	Built-In Breathing System			X	W	
(1)	Product certificate issued by an other recognized inspection body may be submitted in lieu of a certificate issued by the Society, on a case-by-case basis. In any case, the documents listed in Sec 3 are to be submitted.					

N°	Item	Design assessment	Raw Material certificate	Examination & Testing	Product certificate	Remarks
7	BREATHING GAS COMPRESSOR	DA		X	C	As per class 1 defined in NR467. Depending on installed power.
7.1	Compressor or blower				C / W	
7.2	Prime mover				C / W	Refer to Electrical Installations
7.3	Electrical switchboard				C / W	Refer to Electrical Installations
7.4	Filter				W	
7.5	Cracked plate detector				W	
7.7	Piping and fitting				W	In case of welded construction, the welding procedures are to be examined
7.8	Safety valve			X	W	In case of welded construction, the welding procedures are to be examined
7.9	Hoses			X	C / W	Refer to BREATHING GAS DISTRIBUTION
8	BREATHING GAS STORAGE					
8.1	Gas cylinders (V ≥ 0,5L)	DA	C / W	X h ndt	C (1)	
8.2	Master valve		W	X h ndt	C	As per class 1 defined in NR467. In case of welded construction, the welding procedures are to be examined and NDT is to be performed.
9	GAS REGENERATION AND RECLAIM SYSTEMS					
9.1	Compressors	DA		X	C	
9.2	CO2 scrubbers			X h	C / W	See BREATHING GAS COMPRESSOR
9.3	Filters				W	
9.4	Gas bag (P ≤ 1 bar)				W	
10	ELECTRICAL INSTALLATIONS					
10.1	Switchboards	DA		X	C	
10.2	Electrical motors and generators ≥ 100 kW	DA / TA	C	X	C	Refer to NR266
10.3	Electrical motors and generators < 100 kW	TA _{HV}	W	X	W	
10.4	Batteries			X	C	
10.5	Safety lighting in spaces containing breathing gas	TA		X	C	Refer to NR266 for safety electrical equipment
(1)	Product certificate issued by an other recognized inspection body may be submitted in lieu of a certificate issued by the Society, on a case-by-case basis. In any case, the documents listed in Sec 3 are to be submitted.					

N°	Item	Design assessment	Raw Material certificate	Examination & Testing	Product certificate	Remarks
10.6	Programmable Logic Controller (PLC) and computers used for tasks essential to safety, all components related to safety functions			X	C / W	As per conditions set in the Type Approval. Refer to NR467, Pt C, Ch 3.
10.7	Control, protective and connecting devices	TA / TA _{HBV}		X	C / W	
10.8	Electric cable	TA / TA _{HBV}		X	C / W	
10.9	Electrical penetrators for PVHO	Refer to 1.PVHO				
11	DIVER HOT WATER UNIT	DA		X h	C	
11.1	Manifolds			X h	W	
11.2	Pressure vessel			X h	W	In case of welded construction, the welding procedures are to be examined.
11.3	Thermostat				W	
11.4	Pump				W	
11.5	Flexible hoses	TA		X	C (1)	
11.6	Piping, valves and fittings			X h	W	Depending on class of pressure vessel as per NR467, Pt C, Ch 1. In case of welded construction, the welding procedures are to be examined.
12	ENVIRONMENTAL CONTROL UNIT (Hyperbaric heating / cooling system)	DA		X h	C	Depending on class of pressure vessel as per NR467, Pt C, Ch 1
12.1	Boiler			X	C / W	
12.2	Cooling system / chiller			X	C / W	
12.3	Pressure vessel			X h	W	In case of welded construction, the welding procedures are to be examined
12.4	Heat exchanger			X	W	
12.5	Thermostat				W	
12.6	Pumps				W	
12.7	Piping, valves and fittings			X	W	Depending on class of pressure vessel as per NR467, Pt C, Ch 1. In case of welded construction, the welding procedures are to be examined
13	DDC FRESH / POTABLE WATER UNIT	DA		X h ndt	C	
13.1	Pumps				W	
(1)	Product certificate issued by an other recognized inspection body may be submitted in lieu of a certificate issued by the Society, on a case-by-case basis. In any case, the documents listed in Sec 3 are to be submitted.					

N°	Item	Design assessment	Raw Material certificate	Examination & Testing	Product certificate	Remarks
13.2	Pressure vessel		W	X h	W	In case of welded construction, the welding procedures are to be examined
13.3	Piping and fittings			X	W / C	Depending on class of pressure vessel as per NR467, Pt C, Ch 1. In case of welded construction, the welding procedures are to be examined
14	DDC SEWAGE SYSTEM	DA		X h ndt	C	
14.1	Sewage tank			X h	C / W	Depending on class of pressure vessel as per NR467, Pt C, Ch 1
14.2	Piping and fittings			X	C / W	Depending on class of pressure vessel as per NR467, Pt C, Ch 1. In case of welded construction, the welding procedures are to be examined
15	DIVING MAIN UMBILICAL			X h	C	
15.1	Breathing gas hose	TA		X h	C	
15.2	Communication and instrumentation cable	TA _{HIV}			W	
15.3	Electrical cable	TA _{HIV}		X	W	
15.4	Hot water hose	TA _{HIV}			W	
16	DIVING BELL					
16.1	Bell ballast release			X	C / W	
16.2	Excursion umbilical			X h	C	Each hose to be certified. Refer to DIVING MAIN UMBILICAL
16.3	CCTV				W	
17	LARS - Closed bell	As applicable to lifting appliances with class notation ALM-SUBSEA-MR as per NR526. Refer to NR266				
18	LARS - Wet bell & diving basket	As applicable to lifting appliances with class notation ALM-SUBSEA-MR as per NR526. Refer to NR266				
19	UMBILICAL WINCH - closed bell	DA	W	X	C	Refer to NR266 as applicable to NR595 OHS
19.1	Swivel			X	C / W	
(1)	Product certificate issued by an other recognized inspection body may be submitted in lieu of a certificate issued by the Society, on a case-by-case basis. In any case, the documents listed in Sec 3 are to be submitted.					

SECTION 3

DOCUMENTATION TO BE SUBMITTED

1 General

1.1 Application

1.1.1 The documents listed in this Section are to be provided, as a minimum. Any additional information deemed necessary may be required by the Society.

1.2 Diving support vessel

1.2.1 The requirements for the documentation of the interface with the diving support vessel are specified in the Ship Rules Part E, Chapter 7.

1.3 Failure modes and effects analysis (FMEA)

1.3.1 A FMEA is to be conducted at an early stage of the project.

1.3.2 It is recommended to update the FMEA for each modification of the diving system.

1.3.3 The FMEA is to include the description of the procedure for the evacuation of the divers in the deck chambers.

1.3.4 A guidance to conduct to FMEA is proposed in the document IMCA D039 - FMEA guide for diving systems.

1.4 Master document register

1.4.1 All the documentation submitted are to be listed in a Master Document Register (MDR) with the latest revision of each document.

2 Diving system documentation

2.1 General documents

2.1.1 The documents listed in Tab 1 are to be submitted, as a minimum.

2.1.2 Design basis

A design basis including the following is to be submitted:

- maximum operating depth (and equivalent design pressure)
- maximum operating time
- maximum number of divers in water and in the DDC
- maximum time of occupancy expected in the DDC
- maximum operational wave height
- minimum and maximum sea and air temperature
- safety concept.

2.1.3 Specification of the diving system

The diving system specification is to include:

- the description of the system
- the list of diving equipment with reference and name of the manufacturer
- the emergency evacuation plan when divers are in hyperbaric chamber, when relevant.

2.1.4 Design loading conditions

The design loading conditions of the bell, its connection to the LARS and the umbilical are to be submitted.

2.2 Installation and commissioning procedures

2.2.1 Installation manual

The installation manual provides a description of the procedure for the installation on-board.

This document is to be submitted for portable diving systems.

2.2.2 Commissioning and testing

Description of the commissioning program and test protocol for the complete diving system and for each sub-system is to be provided as defined in Ch 4, Sec 1, [3.2].

2.3 Documents for service and maintenance

2.3.1 User instruction manual

A user instruction manual is to be provided with detailed information concerning:

- the user instructions to operate the system
- the method to use the decompression system
- the operational limitations.

2.3.2 Equipment and certificate register

An equipment and certificate register as defined in IMCA D014 is to be kept on-board and presented to the surveyor attending in-service survey.

The register is to include:

- identification of all pressure relief valves with their: serial number, location, set pressure, reset pressure, the date last tested/due test date.

2.3.3 Service record book

The Owner is to establish and maintain a service record book which is to be submitted to the Society for in-service inspections.

The service record book is to contain all service and maintenance operations:

- log of the dives
- new components installed
- equipment removed or repaired