BRAZILIAN NAVY

DIRECTORATE OF PORTS AND COASTS

MARITIME AUTHORITY NORMS FOR SUBAQCUATIC ACTIVITIES

NORMAM-15/DPC

1st Review

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MARITIME AUTHORITY NORMS FOR SUBAQCUATIC ACTIVITIES

CHANGES RECORD SHEET

CHANGE NUMBER	EXPEDIENT RESPONSIBLE FOR DETERMINING AND RESPECTIVE DATE	AFFECTED PAGES	CHANGE DATE	INITIALS

CONTENTS

ANEXOS

INTRODUCTION

1 – PURPOSE

Establishing basic norms on control and certification of diving equipment and systems, registration of professional diving service providers and certification to companies conducting professional diving courses.

2 – SCOPE

These norms shall be applied to any company or entity having commercial objectives or related to public organizations, carrying out activities involving professional diving instructions or operations.

3 – DEFINITIONS

For the purpose of this norm, constant definitions form Chapter 1 shall be used.

4 – LEGISLATION

The list containing relevant legislation is reported in Annex A.

5 – INDEMNIFICATIONS

The costs of the services to be provided by the Maritime Authority due the application of this norm, such as audits, reports, expert investigations, issuance of certificates, analysis of documents and others, shall be indemnified by the interested party according with the amounts reported in Annex B, which shall be paid by the moment of service order, as provided under Art. 38 of Law nº 9.537/97 (Lesta).

CHAPTER 1

DEFINITIONS

0101 – INTERNAL OR SHELTERED WATERS

Areas of water such as seas, bays, channels, rivers, lakes and dams and every range of water sheltered by natural or artificial protection, free from any dangerous and/or special condition.

0102 – RECEPTIVE ENVIRONMENT

Life chamber (hyperbaric chamber), where the hyperbaric abandonment system or another system compatible provided in the contingency plan is located, that has been designed for such coupling.

0103 – PRELIMINARY RISK ASSESSMENT (PRA)

Mandatory filling out by the contractor and the diving supervisor, aiming at the assessment of preliminary risks involved in the diving operations to be executed.

0104 – SURFACE-SUPPLIED ASSISTANT

A duly qualified professional diver, member of the diving team, responsible for supporting the operations of surface diving.

0105 – REGISTRATION BOOK (CIR)

Document issued by the Port Authorities (CP), Offices (DL) and Agencies (AG), in accordance with the provided in the Maritime Authority Norms for Water Transportation (NORMAM-13/DPC), attesting the professional diver's technical license, which is mandatory for every professional diver carrying out their tasks.

0106 – HYPERBARIC CHAMBER (HB)

Pressure chamber especially designed for human occupation, in which one can be submitted to hyperbaric conditions not only for decompression of divers but also for the treatment of hyperbaric accidents.

0107 – LIFE CHAMBER

Hyperbaric chamber used in Saturation Diving operations or dives requiring its occupation for longer than 12 hours. Its interior is equipped with adequate infrastructure providing essential living conditions for divers during the period in which they are pressurized, such as: shower, toilet, dormitory, climate control, etc.

0108 – DIVING SYSTEM SAFETY CERTIFICATE (DSSC)

Document issued by a Classification Society (SC) or a Specialized Entity acknowledged by the Directorate of Ports and Coasts (DPC) to certify diving systems on behalf of the Brazilian government, which attests the diving systems and all its comprised equipment meet the criteria established herein. DSSC also attests the operational limit of the certified system.

0109 – ACCESS BASKET

Structure used to transport divers from one diving platform (e.g.: deck/platform) to the surface and vice-versa, by using a proper and certified hook whose criteria are reported in item 0802.

0110 – DIVING BASKET

Submersible structure containing side and top protection, equipped with emergency gas supply (high-pressure cylinders connected to the main supplying system). This basket is used as shelter and transport of divers from the surface or diving platform to the workplace and vice versa, and it is not considered a Wet Bell since it does not present an air-filled space. The criteria are found in item 0803.

0111 – CODE OF SAFETY FOR DIVING SYSTEMS

Document issued by the international Maritime Organization on the purpose of laying down a minimum international standard for the design, construction and inspection of diving systems. Its translation is found in Annex 6-A.

0112 – VESSEL'S MASTER OR OFFICER RESPONSIBLE FOR THE DIVING UNIT

One legally responsible for the vessel and/or diving unit assisting underwater tasks.

0113 – HYPERBARIC CONDITION

Condition in which the ambient pressure is higher than the atmospheric pressure.

0114 – SPECIAL AND/OR DANGEROUS CONDITIONS

Situations in which a diving operation involves additional risks or adverse conditions, such as:

a) use and handling of explosives;
b) welding and cutting underwater tasks;
c) open-water or non sheltered-water tasks;
d) tasks performed in currents higher than 1 knot;
e) Sea condition equal or superior to 4, according to Beaufort scale;
f) transport of underwater cargo or use of tool which can compromise the diver's buoyancy control;
g) night time task;
h) confined water tasks;
i) diving in polluted, contaminated waters or in special liquids;
j) tasks performed in Zero visibility (distance equal or higher than 2 meters);
k) use of resins or other chemical products;
l) tasks in dams and underwater reservoirs;
m) presence of underwater obstacles;
n) dive near suction strainers or underwater flushes;
o) use of electric equipment;
p) use of hydraulic or pneumatic equipment or tool for cutting or grinding;
q) use of water or concrete blasting equipment;
r) near sonar navigation or seismic research;
s) dives deeper than 33m from the starting point and/or dive bell to the workplace;
t) tasks involving radioactivity exposure;
u) handling of oils and grease;
v) polar diving (water temperature under 41ºF (5ºC); and
w) work in hulls.

0115 – CONTRACTOR

Individual or corporation contracting the diving services or to whom such services are provided, being co-responsible for the tasks performed by the dive company contracted.

0116 – DECOMPRESSION

Procedure in particular hyperbaric conditions through which a diver eliminates the excess of inert absorbed gas from their organism; it is mandatory before their returning to atmospheric pressure, in order to preserve their physical integrity.

0117 – DECOMPRESSIVE ILLNESS (DCI)

Syndrome caused by sudden decompression of diver. It is characterized by the formation of bubbles (bends) of inert gas which may eventually lead to vascular obstruction, compression and tissue damage. DCI's clinical profile presents INÍCIO TARDIO, ranging from minutes, usually more than 10, up to 24 hours. This syndrome should always be considered as a work/dive accident.

0118 – EMERGENCY

Any abnormal condition affecting the diver's physical integrity or the safety of diving operations.

0119 – DIVE COMPANY

Corporation, properly registered to a CP, DL or AG, responsible for providing diving services, having professional divers are employees.

0120 – DIVING TEAM

Group of people designed by the diving company to attend and participate in diving operations; comprised of diver(s), supervisor, surface support expertise, standby diver and every staff necessary to lead the operation safely.

0121 – DIVING SCHOOL

Corporation, properly registered at DPC, responsible for the formation of professional divers.

0122 – EXCURSIONS

Depths exceeding the life level in which divers initially find themselves in condition of saturation. Such excursions may be either ascending or descending and shall comply with the norm herein established.

0123 – APPLICATION FORM FOR DIVING COMPANY (AFDV)

Document issued by the CP, DL and AG attesting the registration of professional diving companies in the Maritime Authority (MA), and it is mandatory to present such documentation in the work fronts.

0124 – APPLICATION FORM OF DIVING SCHOOL (FCREM)

Document issued by the DPC attesting the accreditation of professional diving schools in the MA, and it is mandatory to present such documentation during the professional diving instructions.

0125 – WORK FRONT

Actual sight where a registered diving company provides diving services, to which it will use a duly certified Diving System.

0126 – LIFE LINE

Cable used to conduct the dive operation which is coupled to the diver through a quick-release hook, enabling recovery from the water along with the entire equipment. It shall be used along with the umbilical and meet the specifications herein provided.

0127 – CHECK LIST

List containing all the component equipment o a Diving System which shall be verified by qualified personnel regarding conservation and operating conditions, in order to prepare the system before the beginning of the diving operation.

0128 – LOGBOOK

Mandatory documentation, issued by the CP, DL and AG as a complement of CIR, in accordance with the established in NORMAM-13/DPC, attesting the diver's physical apt condition and working as a history of the diving operations performed by their holder.

0129 – OPEN SEA

Sea belt located beyond the limit herein established as internal or sheltered waters.

0130 – HYPERBARIC PHYSICIAN

Physician specialized in hyperbaric medicine, in possession of a certificated acknowledged by the Brazilian Nay (MB) or by a competent medical entity, whose curriculum comprises a subject regarding treatment of diseases and diving accidents (theoretical and practical).

0131 – DIVER

Professional in possession of CIR (Water Transport of the 4th Group – MGR or DD), member of the diving team, qualified and legally aptitude to perform diving activities. A diver can be:

a) Compressed air operating diver (surface-supplied diver – SSD): professional qualified to dive up to fifty meters, using compressed air, holder of Certificate of Surface-Supplied Diving Course (issued by registered diving school by the DPC), or of Diploma of Expeditious Courses in Scuba Diving and Surface-Supplied Diving, carried out at the *Centro de Instrução e Adestramento* [Center for Instruction and Training] *Almirante Átila Monteiro Aché* (CIAMA) from MB; or

b) Artificial Respiratory Gas Mixture Operating Diver (deep diver – DD): professional qualified to dive deeper than fifty meters, using Artificial Respiratory Gas Mixture (ARGM), holder of Certificate of Deep Diving Course (issued by registered diving school by the DPC), or , diploma of Expeditious Course in Deep Diving, carried out at CIAMA.

0132 – AMATEUR DIVING

Exclusively recreational diving practice, regulated by recreational diving entities internationally acknowledged which are responsible for the formation and certification procedures of their instructors and students and also for the audit and control of diving equipment used aiming such objective.

The present norm does not apply to this diving modality. However, practitioners of such modality must possess the credential issued by an internationally acknowledged entity, except when it regards students, who shall be always accompanied of qualified and accredited instructors. The credential is a mandatory document which attests the qualification of amateur divers throughout the practice of activities in Brazilian Jurisdictional Waters (AJB), and also liable to be audited on behalf of AM representatives.

0133 – SCUBA DIVING

Diving activity in which the breathing apparatus is taken by the diver alone and used as their sole source of breathing gas.

0134 – SCIENTIFIC DIVING

Diving activity performed by instructors, scientists and students, related to universities developing scientific research on marine environment or to acknowledged entities aiming at such objective, which are qualified by a scientific diving course accredited by the MA. Such modality uses scuba diving techniques as a tool to carry out minimal underwater interventions, aiming exclusively at nonprofit projects of scientific research, usually related to the Biology, geography, Geology and Archaeology domains, such as: sample collection and monitoring, submarine photography and filming, underwater archaeology, analysis of currents and marine life, among other non commercial activities related to academic and research institutions. Other interventions, such as: assembling of underwater structures, removal and buoyancy of structures and others alike or interventions defined as inherent activities to commercial diving shall be performed exclusively by professional divers, according to the criteria herein established, considering the safety limitations imposed to the use of scuba diving equipment.

0135 – COMMERCIAL DIVING

Diving activity for profit purposes performed exclusively by registered professional diving companies and duly qualified professional divers, according to the criteria herein established.

0136 – SURFACE-SUPPLIED DIVING

Diving activity in which the breathing gas is supplied directly from the surface using hoses, having high pressure compressors or cylinders as air sources.

0137 – ALTITUDE DIVING

Diving activity performed above sea level, where the pressure conditions are altered, demanding compliance with specific procedures.

0138 – EXCEPTIONAL DIVING/EMERGENCY SITUATION

Any diving operation demanding special equipment and/or procedures, not included in regular work schedule, only employed in contingency plans and by properly qualified team, in case of accidents or catastrophes, involving or not human lives, as well as severe damage to the environment. The DPC shall be always informed on the occurrence of such diving situation.

0139 – DEEP DIVING

Any diving activity performed under 50 meters, using ARGM. It is divided in:

a) Bounce Dive: dive technique using ARGM, diving bell (wet and closed) and not going beyond 90 meters, with bottom time limited to values not implying the use of saturation techniques. The diving team (supervisor and divers) must be qualified in deep diving when using such technique; and

b) Saturation Dive: diving activity characterized by the use of saturation techniques in which the diver is exposed to pressure long enough so their organism reaches the absorption limit of inert gas, using artificial respiratory gas mixtures (ARGM). During this period, the diver may be taken to the work place via closed bell, returning to the life chamber without needing decompression, which will be only performed by the end of the complete operation.

0140 – SURFACE-SUPPLIED DIVING

Any diving activity up to 50 meters and using compressed air.

0141 – ARTIFICIAL RESPIRATORY GAS MIXTURES (ARGM)

Mixture composed by oxygen, helium, nitrogen or other inert gases suitable for breathing, used during underwater tasks when compressed air is not recommended as air supply. Such mixture shall be used only by divers qualified to its use (deep diver).

0142 – LIFE LEVEL

Depth in which the diver is kept during the saturation dive, used as a reference for performing excursions and the beginning of decompression process.

0143 – DIVING OPERATION

Diving activity involving underwater tasks using professional divers and ranging from initial procedures of preparation until the end of period of diver observation.

0144 – OBSERVATION PERIOD

Period starting when diver is no longer under hyperbaric condition, being close to the Diving System, and extended during the period in which diver presents residues of inert gases in their organism, enabling, in case of decompressive illness or other condition resulting from underwater activity, immediate treatment in hyperbaric chamber in order to remove the inert gas accumulated in body liquids and organic tissues, which by any reason was not completely eliminated during decompression. The observation period lasts:

a) up to 12 hours for compressed air dives; and

b) up to 24 hours for ARGM dives.

0145 – CONTINGENCY PLAN (PC)

Set of procedures and specific plans elaborated to assist emergency situations occurring during diving operations. In saturation diving, such plan shall also include the rescue of divers in hyperbaric conditions, through a hyperbaric evacuation system and a receptive environment.

0146 – DIVING PLATFORM

Ship, vessel, ferry, fixed or floating structure, port or site from which the diving is performed. Such platform shall provide the entire infrastructure necessary to diver's safe access to water, such as: stairs, hoists, etc.

0147 – OPERATION PROCEDURES (PO)

Document elaborated by the diving company/school containing, in details, all procedures regarding the operation of component equipment of a Diving System, qualification and attributions of its operators, rules of safety, schedule maintenance works, necessary spare parts and other relevant information aiming at a safe conduction of diving operations, in order to comply with the norm herein established.

0148 – AMBIENT PRESSURE

Pressure involving the diver in water or hyperbaric chamber environment.

0149 – RECORD OF DIVING OPERATIONS (ROM)

Document in which diving operations must be recorded, from the initial check list up to the end of diving operation. It must contain detailed information, such as: depth, duration, table used, decompression (if any), task performed, water temperature, local current, etc. Its filling is mandatory.

0150 – SAFETY RULES

Basic safety procedures, present in the PO, which must be observed during diving operations in order to ensure their performance in complete safety and divers' physical integrity.

0151 – DIVING SUITS

a) Wetsuit: piece of clothing designed in neoprene or similar material, enabling water entrance, used where the water temperature is above 20ºC and/or depths inferior to fifty meters;

b) Drysuit: piece of clothing designed in neoprene or similar material, hermetically sealed, worn with a wool-made (or similar material) overall, used where water temperatures are below 20ºC and depths superior to fifty meters; and

c) Hot water suits: piece of clothing designed in neoprene or similar material, presenting a quick-coupling plug linking the surface hose to the umbilical line carrying the hot water from the surface down to the suit and circulating through a flexible piping system installed in its interior. It can be used in any depth, and especially recommended where water temperatures are below 20ºC.

0152 – DIVING SERVICES

Task performed underwater by registered diving company, demanding the use of professional divers for its performance.

0153 – WET BELL

Platform in which the lower part contains an open base in order to shelter and transport, at least, two divers, from the surface to the workplace, presenting its own communication system, emergency gas supply, air bubble or artificial respiratory gas mixture enabling divers to breathe without using masks/helmets and windows allowing observation of the external ambiance. The requirements are described in items 0804 and 0805.

0154 – DIVING BELL

Chamber resistant to external pressure, especially designed for underwater use, in which divers are kept in atmospheric pressure.

0155 – CLOSED BELL

Hyperbaric chamber, especially designed to be used in underwater tasks, adequate for a number of divers, used for the transportation of divers, under pressure, from the life chamber to the workplace and vice versa. The requirements are found in Annex 6-A.

0156 – HYPERBARIC EVACUATION SYSTEM

System addressed to the abandon of a deep diving unity, equipped with a rescue hyperbaric chamber and/or a vessel of hyperbaric rescue with a monitoring survival system, through which divers under pressure may be safely evacuated to a receptive environment in case there is an accident in the vessel supporting the diving operation.

0157 – DIVING SYSTEM

Set of equipment, fixed or mobile, duly certified by a SC acknowledged by the MA, necessary for the performance of surface or deep diving operations, which includes wet and closed diving bells, hyperbaric chamber and all equipment necessary for each diving modality, in order to perform it in compliance with the norm herein established.

0158 – DIVING SUPERINTENDENT

Diving supervisor qualified b the professional diving company in order to be its main representative between the contractor and the contracted.

0159 – DIVING SUPERVISOR

Member of diving team, qualified and legally apt to supervise diving operations. A supervisor can be:

a) Surface Diving Supervisor: diver with a minimum period of 3 years of experience in surface diving, proven by the logbook and/or their Work and Social Security Card (CTPS), responsible for the supervision of surface diving operations, or

b) Deep Diving Supervisor: diver with a minimum period of 3 years of experience in deep diving, proven by the logbook and/or their Work and Social Security Card (CTPS), responsible for the supervision of deep diving operations.

0160 – SATURATION SUPERVISOR

Professional diver, qualified and legally apt to supervise the use of equipment and techniques employed during the saturation diving operations, with a minimum period of 3 years of experience as saturation technician, direct responsible for the saturation team.

0161 – SATURATION TECHNIQUES

Procedures to avoid repetitive compressions and decompressions of the diver to atmospheric pressure, maintaining a higher pressure for a certain period so their organism is saturated with inert gases from the respiratory gas mixtures employed.

0162 – SATURATION TECHNICIAN

Professional diver, qualified for the employment of proper techniques in saturation diving operations, apt to analyze gases and prepare the necessary respiratory gas mixtures.

0163 – CONFINED WATER TASK

Underwater task performed in places presenting obstacles to the diver's returning to the surface, adopting a vertical straight line from the diving site (work under quays,

hulls, etc.). Caissons or similar structures are also considered confined environments, making diver's movements difficult, even if there is direct access to the surface.

0164 – UNDERWATER TASK

Any task performed or conducted by a professional diver underwater.

0165 – ATMOSPHERIC DIVING SUIT

Pressure-resistant individual diving equipment in which the person is subject to small variations of atmospheric pressure at sea level, non characterized as diving for purposes of decompression.

0166 – UMBILICAL

Set of life line, air supply hose and other components necessary to the safe diving performance, according to its complexity.

0167 – DAYLIGHT

Period ranging from sunset to sunrise.

CHAPTER 2

REGISTRATION OF PROFESSIONAL DIVING COMPANIES

0201 – OPERATING CONDITION FOR DIVING COMPANY

For the performance of their activities, professional diving companies must be registered in the CP, DL or AG of jurisdiction where the company is located, and the following documents should be available in the work fronts:

- AFDV (Annex 2-A), within the Expiry date; and
- DSSC (Annex 9-E), within the Expiry date and containing its respective annual endorsements, when applicable.

0202 – REGISTRATION PROCEDURES

a) Documentation

The diving company shall submit a registration form to the Captain of Ports, Delegate or Agent of jurisdiction where the company is located, and present the following documents (original or certified copy):

I) Social Contract, Statute or other documents required by the current legislation, whose scope shall mention underwater activities;

II) Location Permit;

III) Corporate Taxpayer's Roll (CNPJ);

IV) DSSC within the Expiry date and issued on behalf of the company requiring the registration, presenting thorough information and the endorsement regarding the annual audit in the back (when applicable). The DSSC must be issued by an SC acknowledged by the DPC in order to certify Diving Systems, as in Chapter 9 of the present norm;

V) Declaration stating that the company is aware and in compliance with all the current legislation regarding such norm (Annex A), signed by the owner of the company (with duly notarization of signature);

VI) Evidence documentation from Hyperbaric physician responsible for conducting the company's hyperbaric treatments. Such evidence shall be demonstrated through analysis of the Certificate of Attainment in Submarine Medicine and Diving (C-ESP-MEDSEK), Expeditious Course in Submarine Medicine (C-EXP-EMSB), carried out at CIAMA, or equivalent Certificate of Attainment in Hyperbaric Medicine, taken at an extra-MB institution acknowledged by competent medical entity;

VII) Voucher presenting payment of tax referred in Annex B regarding issuance of AFDV by the CP/DL/AG;

VIII) Term of Agreement and Liability (Annex 2-C) signed by Hyperbaric Physician;

IX) Evidence documentation of diving professional(s) responsible for the company's underwater activities. Such evidence shall be demonstrated through analysis of the following documents:

Companies using Compressed Air (Surface Diving):

- CIR attesting the Technical Responsible for underwater activities is registered as 4th Waterway Group, under the category "Compressed air operating diver" (SSD), as established in NORMAN-13/DPC;
- LMR attesting a minimum of 3 years of experience as a deep diver; and

Empresas que irão operar com MRA (Mergulho Profundo):

Companies that will operate with MRA (Deep Dive):

- CIR evidencing that the Technician In Charge by company's submersed activities is enrolled as Oceanway from 4th Group, in the category of "Diver who operates with Artificial Breathing Mixtures" (MGP), as defined in NORMAM-13/DPC;

- LRM evidencing minimum expirience of three years of activity as deep diving professionl; andX) Term of Agreement and Liability (Annex 2-D) signed by the Technical Responsible.

b) Issuance of AFDV

After thorough analysis of documentation, the CP/DL/AG shall register the company, issuing a AFDV (Annex 2-A) in three counterparts: the first shall be sent to the DPC, the second shall be filed by the OM itself (along with the copies of the documents presented according to item 0202-a; and the third shall be given to the claimant. The CP/DL/AG shall also send, along with the first AFDV counterpart, the copy(ies) of the Diving System Safety Certificate(s) described in the Application.

The DPC shall file the documents received and shall keep updated the list of registered diving companies in their intranet/internet page.

The detailed instructions for filling of the AFDV are described in Annex 2-B.

c) Expiry and update of AFDV

AFDV shall be valid for one year as from the date of its issuance by the CP/DL/AG, and it must be updated by the company whenever there are changes in its diving system(s) and/or registration data. In such cases, the CP/DL/AG shall issue a new AFDV containing the updated required by the company, and its expiry date shall remain the same as the one previously issued, complying with the procedure mentioned in item b) regarding the submission of counterparts, in addition to the payment of the indemnification foreseen in item VIII above.

The company shall maintain a certified copy of their AFDV in each work front, as well as the original copy of DSSC(s) referring to equipments in use.

The effectiveness of the AFDV is conditioned to the presentation of the valid DSSC(s), containing the up-to-date endorsements regarding annual Inspections (when applicable).

Each company shall have only one valid AFDV, and it shall present all the number of valid DSSC(s), along with their respective issuance, expiry and endorsement dates.

Within a 30-day period before the expiry of the AFDV, the registered company shall renew their registration in the CP/DL/AG, in compliance with item 0202-a. In case such renewal does not occur within the period established, the company shall have their registration cancelled by the DPC, which will inform the respective CP/DL/AG responsible for the company’s registration.

d) Attribution of inscription number

The inscription number attributed to the company shall follow the following formation criterion: XXX-INITIALS-YYY/ZZZZ, where: XXX is the CP/DL/AG code; followed by initials chosen by the owner of the diving company (maximum of 5 characters); YYY is the sequenced inscription number in the CP/DL/AG; and ZZZZ is the year in which the company first registered.

0203 – INSPECTION

The registered diving companies shall be subject to inspections established in item 0907 if the present norm.

0204 – LIST OF REGISTERED DIVING COMPANIES

The DPC shall disclose, through their internet and intranet sites, a list containing data of diving companies registered in the CP/DL/AG. This list shall contain all data referring to the company, as well as the expiry date of their DSSC(s) and AFDV. This list shall be updated according to the AFDV counterparts received from the PC/DL/AG.

The companies whose registrations/certifications are expired or cancelled will also be listed. Under such circumstances, these companies will be part of a specific field listing such discrepancies for a period of 60 days, as from the expiry date of their documentation, and excluded after this deadline.

0205 – REGISTRATION CANCELLATION

The registration cancellation of diving companies shall occur in three situations:

a) Cancellation due expiring of AFDV

The registration will be canceled if the company does not require the issuance of a new AFDV until their expiry date;

b) Cancellation due expiring of DSSC

The registration will be canceled if the company does not present, at least, one valid SMMS, in compliance with item 0906 of the present norm; and

c) Cancellation by non-compliance of requirements

The registration will be canceled if the company does not respect the deadlines for the compliance with requirements established in item 0907-f of the present norm.

The cancellation shall be stated by the DPC, which will inform the CP/DL/AG responsible for the issuance of the company's AFDV.

0206 – REPORT OF DIVING ACCIDENTS

Any diving accident causing victims, liable of filling Work Accident Report (WAR/INSS), whose cause is directly or indirectly related to the diving system and/or the procedure used during the diving operation, shall be immediately reported by the diving company responsible for the service to the CP/DL/AG of the local jurisdiction where the work front is located, so actions described in item 0908 of the present norm are taken.

0207 – REPORT OF WORK FRONT OPENING

Before performing diving operations in a certain work front (10 working days prior the beginning of the work), the registered diving companies shall submit a copy of the Operation Plan (PO) to the CP/DL/AG of the jurisdiction area where the dives will occur. This copy shall be for the purpose of awareness of the local MA, not issuing, therefore, any authority on their behalf.

The copies of PO received by CP/DL/AG shall be forwarded, through Navy Postal Service, to DPC, who will take razonable actions.

0208 – OMITTED CASES

The omitted cases regarding the registration of diving companies, not established in the present chapter, shall be submitted to the DPC by the CP/DL/AG for analysis.

CHAPTER 3

REGISTRATION OF PROFESSION DIVING SCHOOLS

0301 – CONDITION FOR FUNCTIONING OF DIVING SCHOOLS

Professional diving schools must be registered in the DPC for the performance of activities. The following documents should be available during instructions:

- FCREM (Annex 3-A), within its expiry date; an

- DSSC (Annex 9-E), within the expiry date and containing its respective annual endorsements, when applicable.

0302 – ACCREDITING PROCEDURES

a) Documentation

The diving company shall submit a registration form to the DPC, and present the following documents (original or certified copy):

I) Social Contract, Statute or other documents required by the current legislation, whose scope shall mention underwater activities;

II) Location Permit;

III) Corporate Taxpayer's Roll (CNPJ);

IV) DSSC within the expiry date and issued on behalf of the company requiring the registration, presenting the maximum depth of the operation and the endorsement regarding the annual Inspection in the back (when applicable). The DSSC must be issued by an SC acknowledged by the DPC in order to certify Diving Systems, as laid down in Chapter 9 of the present norm. The installation of a hyperbaric chamber within the school's facilities is mandatory, for exclusive use of the course;

V) Copy(ies) of the curriculum(s) of the course(s) meeting, at least, the provided in Annex 3-C (surface diving) and/or Annex 3-D (deep diving), pursuant to the case;

VI) Copy(ies) of the license(s) belonging to the technical responsible instructor for the course and the instructors and assistants, responsible for classes and practical diving activities.

To be able to work as a technical responsible instructor, the diving professional shall have, at least, the experienced mentioned below:

1) Three years as surface or deep diver, according to the instruction to be given.

2) One year as surface or deep diver supervisor, according to the instruction to be given.

The first instructor shall have at least 3 years of experience as a surface or deep diver, according to the instruction to be given.

The qualification of the assistant instructor shall be the same as the one intended by the student.

The evidence shall be demonstrated through analysis of the following documents: CIR; logbook; and CTPS.

VII) Contingency Plan describing the available resources and procedures established to meet the emergencies requiring hyperbaric treatment;

VIII) Ground plan containing the details on the location of equipment, classrooms and other items regarding the facilities of the school;

IX) Declaration stating that the diving school is aware and in compliance with all the current legislation regarding such norm (Annex A), signed by the owner of the company (along with duly notarization of signature);

X) Evidence documentation from Hyperbaric physician responsible for conducting the school's hyperbaric treatments. Such evidence shall be demonstrated through analysis of the Certificate of Attainment in Submarine Medicine and Diving (C-ESP-MEDSEK), Expeditious Course in Submarine Medicine (C-EXP-EMSB), carried out at CIAMA, or equivalent Certificate of Attainment in Hyperbaric Medicine, taken at an extra-MB institution acknowledged by competent medical entity;

XI) Voucher presenting payment of tax referred in Annex B regarding issuance of FCREM and inspection in the school's facilities;

XII) Term of Agreement and Liability (Annex 2-C) signed by Hyperbaric Physician;

XIII) Term of Agreement and Liability (Annex 2-D) signed by the Technical Responsible.

b) Issuance of FCREM

After thorough analysis of documentation, the DPC shall inspect the school's facilities in order to verify the equipment operating conditions, instructional resources available, emergency procedures requiring hyperbaric treatment and didactic/pedagogical used procedures.

By the end of the inspection, the discrepancies highlighted, if any, shall be reported to the school's principal, who, after solving them, shall inform so to the DPC using Annex 9-H. In such case, the school shall receive an Inspection for Withdrawal of Requirements, as established in item 0907 of the present norm at the payment of indemnification foreseen in Annex A.

In case there are no discrepancies, the DPC shall publish an Ordinance of Accreditation and issue the FCREM, whose model is found in Annex 3-A, in three counterparts: the first shall be filed in the DPC, the second shall sent to the CP/DL/AG of the local school jurisdiction; and the third shall be given to the owner of the school.

FCREM shall be valid for one year as from the date of its issuance. By its expiry date, the renewal is conditioned to a new inspection as established above.

The inscription number attributed to the school, to be included in the FCREM, shall follow the following formation criterion: ESC INITIALS-XXX-YYYY, where: INITIALS corresponds to the chosen initials of the diving school; XXX is the sequenced inscription number in the DPC; and YYYY is the year in which the school was first accredited.

Detailed instructions for FCREM filling are described in Annex 3-B.

0303 – LIST OF ACCCREDITED DIVING SCHOOLS

The DPC shall disclose, through their internet and intranet sites, a list containing data of diving schools in active condition.

The schools whose accreditation is expired or cancelled will be kept in the list, as well as the dates in which they remain active, which shall be a source for possible analysis of certificates issued within this period.

0304 – AUDITS AND INSPECTIONS

The schools accredited to conduct courses on professional diving are subject to audits and inspections established in item 0907 of the present norm.

0305 – CLASSES AND PRACTICAL ACTIVITIES

a) The classes and other practical activities developed throughout the course shall comply with the following instructor/student ratio:

I) For instruction of compressed air diving course:

- one first instructor for each group of up to 10 students if the instruction or activity is being conducted in swimming pool or in place presenting identical safety conditions; and

- one first instructor for each group of up to 5 students if the instruction or activity is being conducted in rivers or seas.

II) For instruction of artificial respiratory gas mixtures diving courses:

- one first instructor for each group of up to 4 students.

b) In order to apply the instructor/student ratio, the number of students regards the ones effectively underwater, that is, not including the students involved in supporting roles, such as guides, voice operators and others.

c) Classes or practical activities involving a number of students larger than the established above for instructor/student ratio shall be accompanied by assistant instructors, in order to comply with the above-mentioned. However, the first instructor shall be present in the class or practical activity and shall be the responsible for its conduction.

0306 – MANDATORY MINIMUM REQUIREMENTS FOR ENROLLMENT IN COURSES

a) Requirements for enrollment in compressed air diving courses

I) be between 18 and 40 years old;

II) present the certificate of completion of high school;

III) present evidence documentation (psychological report) of approval in psychological exam, conducted by a Psychology professional certifying the ability and personality requirements compatible with the performance of the required underwater activity;

IV) present medical certificate issued by hyperbaric physician certified by the Special Course of Submarine Medicine and Diving (C-ESP-MEDSEK), Expeditious Course in Submarine Medicine (C-EXP-EMSB), carried out at CIAMA, or equivalent Course of Hyperbaric Medicine, taken at an extra-MB institution acknowledged by competent medical entity; and

V) present physical aptitude necessary to the performance of the following physical exercises:

- run 2,700m in 12 minutes;
- perform 35 push-ups;
- perform 35 sit-ups in, at least, 1 minute;
- perform, at least, 7 pull-ups
- 100m free-styling swimming in maximum 2 minutes;
- 800m free-styling swimming in maximum 25 minutes;
- perform dynamic apnea of at least 25m;
- perform static apnea of, at least, 1 minute; and
- perform buoyancy of, at least, 10 minutes.

b) Requirements for enrollment in diving course using artificial respiratory gas mixture

I) approval in compressed air diving course (Scuba diving and surface-supplied) performed in entities accredited by the DPC or diploma of conclusion Expeditious Course in Scuba Diving (C-Exp-Maut) and Expeditious Course in Surface-Supplied Diving (C-Exp-MarDep), both carried out at CIAMA;

II) documentation referring to items II), III) and IV) of previous clause;

III) proven experience of at least 3 years performing professional compressed air diving activities; and

IV) approval in the physical swimming (one hundred meters) and running (twelve minutes) tests according to the table below:

AGE (years)	RUNNING (meters)	SWIMMING (minutes)
18 - 25	2,700	02m00
26 - 33	2,500	02m15
34 - 39	2,300	02m30
40 - 45	2,100	02m45
46 - 49	1,900	03m00

0307 – ISSUANCE OF CERTIFICATE OF COURSE COMPLETION

a) Procedures to be performed by the accredited school

I) after the completion of each course, the accredited school shall issue a certificate of completion to all approved students, whose model is found in Annex 4-A. This certificate shall be certified by the DPC, in a specific field in the back of the page.

II) the accredited school shall submit to DPC authentication all certificates issued, along with a list containing complete name, date of birth, ID number (and issuing body), Social Security Number and address of all students approved.

b) Authentication of Certificates by the DPC

DPC shall receive the certificates issued by the accredited schools and shall take the following actions:

I) perform the Service Order (SO) regarding the authentication of certificates;

II) affix in the specific field on the back of the Certificate DPC's watermark ;

III) affix in the specific field the signature of the Officer responsible for the accreditation of diving schools; and

IV) send back the authenticated certificates to the accredited school.

0308 – CANCELLATION OF ACCREDITATION

The registration cancellation of diving companies shall occur in three situations:

a) Expiry of FCREM

The registration will be canceled if the school does not require the issuance of a new FCREM until their expiry date;

b) Expiry of DSSC

The registration will be canceled if the school does not present, at least, one valid DSSC, in compliance with item 0906 of the present norm; and

c) non-compliance of requirements

The registration will be canceled if the school does not respect the deadlines for the compliance with requirements established in item 0907-f of the present norm.

0309 – REPORT OF DIVING ACCIDENTS

Any diving accident causing victims, involving instructors or students from the accredited diving school, whose cause is directly or indirectly related to the diving system and/or the procedure used during the practical classes, shall be immediately reported by the diving school responsible for the instruction to the DPC, so actions described in item 0908 of the present norm are taken.

0310 – REGISTRATION OF SCHOOLS AND INSTRUCTION CENTERS CONNECTED TO FEDERAL, STATE OR CITY PUBLIC ORGANS.

The federal, state or city public organs conducting courses for the formation of divers, in order to meet their institutional tasks, shall be registered in the DPC, except for CIAMA.

It shall be admitted the split of hours of instruction foreseen in Annex 3-C, only admitting formation of divers in the module “SCUBA DIVING (MAUT)”.

The divers receiving approval by these entities shall be accepted for admission in the 4th Waterway Group (Divers), as long as the minimum period of hours of instructions foreseen in the curriculum in Annex 3-C is completed or complemented in another Registered Diving School.

The diving school shall submit the register requirement to the Director of Ports and Coasts, along with the following documentation attached:

I) Bylaw or equivalent document containing the institution’s official name, address, owner, etc;

II) List of course instructors, containing basic information on their professional background;

III) Course curriculum;

IV) List of diving equipment belonging to the school;

V) Equipment maintenance plan; and

VI) Contingency plan to assist emergency situations.

The DPC shall schedule a Technical Visit in the school’s facilities after analysis of the above-mentioned documentation.

0311 – OMITTED CASES

The omitted cases regarding the registration of diving schools, not established in the present chapter, shall be submitted to the DPC for analysis.

CHAPTER 4

DIVER'S LICENSE, MINIMUM DIVING TEAM SETTING AND ATTRIBUTIONS

0401 – COMPRESSED AIR OPERATING DIVER – SSD

The compressed air operating diver (SSD), also known as surface diver, shall:

a) be 18+ years old;

b) be approved in Expeditious Course in Scuba Diving (C-Exp-Maut) and Expeditious Course in Surface-Supplied Diving (C-Exp-MarDep), both conducted by CIAMA, or in additional compressed air professional diving courses (surface-supplied diving), performed in schools registered by the DPC to conduct professional diving courses;

c) have CIR of 4th Waterway Group (DD) issued as established in NORMAM-13/DPC; and

d) have a logbook issued and filled in accordance with NORMAN-13/DPC.

The SSD shall only perform diving operations within the limits established for surface-supplied diving, that is, up to 50 meters, exclusively using compressed air as respiratory gas, and it is not permitted to use bounce or saturation dive as diving intervention techniques.

0402 – ARTIFICAL RESPIRATORY GAS MIXTURE OPERATING DIVER – DD

To reach to the DD diver category, also known as deep diver, the SSD shall:

a) have at least 3 years of proved performance in SSD category;

b) be approved in Expeditious Course in Saturation Dive(C-Exp-MGSAT) carried out at CIAMA or equivalent course taken in diving school registered by the DPC;

c) have CIR of 4th Waterway Group (DD) issued as established in NORMAM-13/DPC; and

d) have a logbook issued and filled in accordance with NORMAN-13/DPC.

This category enables the diver to use intervention diving techniques (bounce dive), saturation diving and additional techniques using different respiratory gas mixtures than compressed atmospheric air, as long as such mixtures are listed in the course curriculum.

0403 – REGISTRATION BOOK (CIR)

Every professional diver shall have a CIR of 4th Waterway Group (SSD or DD), issued in accordance with NORMAN-13/DPC, and it is mandatory to be in possession of such document during the performance of their activities.

0404 – LOGBOOK

Every professional diver shall have a Logbook, issued in accordance with NORMAN-13/DPC, and it is mandatory to be in possession of such document during the performance of their activities.

0405 – DIVING TEAMS

The diving teams shall be formed as described below:

a) Minimum team for scuba diving in internal waters:

- one surface-supplied dive supervisor;
- two surface-supplied divers for the work performance;
- one surface-supplied emergency diver ready to assist emergencies; and
- one surface-supplied assistant diver.

b) Minimum team for dive up to 30 meters in internal waters, without decompression and free of any dangerous and/or special conditions:

- one surface-supplied dive supervisor;
- one surface-supplied diver for the work performance;
- one surface-supplied emergency diver ready to assist emergencies; and
- one surface-supplied assistant diver.

Notes:

1) When decompression is scheduled and/or diving operation is performed under dangerous and/or special conditions, it is mandatory to have an exclusive hyperbaric chamber and the minimum team shall be added of one diver, acting as chamber operator.

2) An equipment operator shall be added to the team whenever it is necessary for the diver to use equipment to access water.

c) Minimum team for dive up to 50 meters:

- one surface-supplied dive supervisor;
- two surface-supplied divers (one diver and on bell man);
- one surface-supplied emergency diver ready to assist emergencies; and
- two surface-supplied assistant divers; and
- one chamber operator surface-supplied diver.

Notes:

1) An equipment operator shall be added to the team whenever it is necessary for the diver to use equipment to access water.

2) At least 2 divers from the team shall be qualified to assist underwater emergencies.

d) Minimum team for intervention dive (bounce dive – heliox) up to ninety meters:

- one deep dive supervisor;
- two deep divers (one diver and on bell man);
- one deep diver responsible for bell operation;
- one surface-supplied emergency diver ready to assist emergencies; and
- two deep assistant divers;
- one chamber operator deep diver.

Notes:

1) A deep diver shall be added to the team in case there is a second hyperbaric chamber available to be operated for local use.

2) An equipment operator shall be added to the team whenever it is necessary for the diver to use equipment to access water.

3) At least one equipment technician shall be added to the team.

4) At least 2 divers from the team shall be qualified to assist underwater emergencies.

e) Minimum team for saturation dive

- one deep dive superintendent;
- two deep dive supervisors;
- one saturation supervisor;
- two deep divers for the work performance;
- six deep divers for surface support/chamber operator; and
- four saturation technicians.

Notes:

1) Permanence inside chamber by two saturated divers shall be allowed only up to 180m. Above such life level, at least four saturated divers are needed.

2) There shall be equipment technicians (electric and mechanic) schedule for each shift, in addition to the above-mentioned team.

3) At least one of the divers designed for surface support and one of the divers designed for work performance shall be trained in underwater medical emergencies, in order to assist, if needed, application of medical procedures necessary in hyperbaric environment.

4) The saturation team shall be composed by divers, and it is possible to admit surface-supplied divers. The non dive related professionals already working in such operation shall be registered in the DPC, performing their tasks. However, new saturation technicians who are not professional divers shall not be admitted.

0406 – GENERAL DISPOSITIONS

a) The contractor's obligations are:

- demand, from the contracted diving school, through an agreement, full compliance with procedures established in the present norm;
- demand, from the contracted diving school, the maintenance of DSSC and AFDV in work front and within the expiry date; and
- provide all means of assistance available in cases of emergency when required by the contracted diving company.

b) The contracted diving school's obligations are:

- assure the diving team the adequate means for full compliance of the present norm;
- provide the diving team, in the work front, with equipment manuals, decompression tables, OP, CP and additional mandatory documents foreseen in the present norm;
- list, in written form, the diving team components and their roles;
- immediately report to the CP/DL/AG in whose jurisdiction area the work front is located, via WAR and detailed report, the occurrence of accidents or risk situations during diving operations;
- assure the divers' medical examinations are within the expiry date;
- provide the means necessary to full compliance of OP and CP;
- assure the equipment used by the diving team is in perfect working conditions and duly certified;
- submit the OP, 10 working days prior to the beginning of underwater services, to the CP/DL/AG responsible for the local jurisdiction where the work front is located;
- execute the registration foreseen in divers' logbook and CIR; and
- maintain all ROM of diving operations by the school filed for a 5-year period.

c) The obligations of the vessel's master or officer for diving platform are:

- not to allow the performance of any activity that may offer danger to divers having the vessel as support, consulting the diving supervisor on which may affect safety operation before the dives begin;
- provide the diving supervisor, when required, with the necessary means to assure the divers' physical integrity;
- assure that no machine/equipment maneuver or operation that put divers' physical integrity at risk is performed;
- update diving supervisor on possible occurrences that may lead to the interruption of diving operations, such as: adverse weather conditions, surrounding vessel maneuvers, etc; and
- use adequate means to inform surrounding vessels on the performance of diving operations.

d) The hyperbaric physician's obligations are:

- conduct periodic examinations on divers, such examinations shall be inserted in divers' respective logbook, in a specific filed;
- conduct hyperbaric treatments, which might be necessary during performance of tasks inherent to underwater activities carried out by the diving company;
- promptly help diving team, in case of emergency, regarding adequate procedure for the treatment of diving accidents occurred in the diving company.
- keep their registration updated at the diving company, especially regarding telephone numbers used in emergency situations.

e) The responsibilities of the technical responsible are:

- maintain equipment technical conditions in compliance with the specified in diving company's DSSC;
- assure full compliance with NORMAN-15/DPC concerning diving procedures to be performed and equipment certification;
- provide technical support to diving company in issues established in NORMAN-15/DPC;
- elaborate the technical documents for the diving company, foreseen in Chapters 10 and 12 of NORMAM-15/DPC; and
- assure full compliance with company's Contingency Plan in emergency situations.

f) the diving supervisor's obligations are:

- take direct control on the operation to which (s) he was designed;
- seek for full compliance with the present norm through all stages involving performance of diving operations;
- fill out and sign logbook belonging to divers under his (her) responsibility;
- not to perform dives during operations in which is working as supervisor;
- only allow people who are legally qualified and fit for working conditions to be part of diving team;
- fill and sign all pre and post operation models of mandatory filling, foreseen in the present norm;
- request qualified hyperbaric physician to be present at the diving operation place in case specialized medical treatment is necessary;
- not to allow the beginning of diving operation if there is non compliance of procedures herein provided, as well as if working conditions at the work front do not ensure a safe performance of operation;

- report to the contractor the occurrence of any abnormality during the performance of diving operations; and

- carry out, on a daily basis, before and after each dive, a meeting approaching the main aspects regarding diving operations, such as risks involved, tasks to be performed, emergency procedures, etc.

g) The diver's obligations are:

- be in possession of their logbook and CIR when involved in diving operations;

- update their diving supervisor on possible physical/physiological restrictions which may hinder them from diving;

- comply with the safety procedures herein provided;

- report to diving supervisor abnormalities occurred during diving operations;

- attend medical examination whenever required by the employer;

- check equipment to be used, through a check list elaborated by the company's technical responsible, in order to examine possible abnormalities; and

- seek for the maintenance of diving equipment.

CHAPTER 5

DIVING SYSTEMS FOR INTERNAL WATERS, FREE FROM DANGEROUS AND/OR SPECIAL CONDITIONS

0501 – DIVING SYSTEM UP TO 20 METERS

The diving system for internal water up to 20 meters may be comprised of scuba diving equipments and shall only be used for light operations (visual inspections, underwater search for objects and submarine photography), dives in which decompression is not needed and are free from dangerous and/or special conditions described in Chapter 1 of the present norm.

Its minimum composition shall comprise of:

a) double diving cylinders, manufactured and hydrostatically tested every 5 years, in compliance with the norms of the Brazilian Association of Technical Standards (Table A from NBR 12274) or equivalent, containing at least ten liters of hydrostatic liters inside;

b) safety braces with rigging strap;

c) buoyancy control device with independent air supply cylinder for emergency situations;

d) depth sensor;

e) hook knife;

f) adequate diving suit;

g) diving full face mask (AGA model or similar), equipped with surface communication service (wireless);

h) diving weight belt with quick-release hook;

i) regulating valve for diving full face mask, if applicable;

j) dive watch;

l) high-pressure air compressor (150kgf/cm2) for diving cylinders; and

m) life line (guide cable) of at least one hundred meters long and breaking load of 150kg, equipped with a quick-release hook in one of its extremities.

It is not mandatory that the air compressor used by the system be located at the diving spot.

This system shall not be used for other types of performances different from the ones listed above.

Notes:

1) The inclusion of a double set of air cylinders and diving full face mask equipped with wireless intercom shall be mandatory as from the date corresponding to the second annual Inspection carried and out for Diving Systems up to 20 meters which were aware prior to the date of publication of the present review.

2) the use of the abovementioned equipment is mandatory to the DSSC issued after the publication of the present norm.

0502 – DIVING SYSTEM UP TO 30 METERS

The use of dependent equipment for diving operations up to thirty meters, which meet the basic requirements listed as follows, shall only be performed in the absence of dangerous and/or special conditions listed in Chapter 1 of the present norm.

a) Air compressor with flow equivalent to 168 l/min measured in atmospheric pressure (equivalent to 40 l/min measured in pressure equivalent to diving depth), per diver, and work pressure of 12.2kgf/cm^2, lubricated with non detergent mineral oil, equipped with filters for separation of water, oil, particles and other contaminants. The set of compressor and filter shall be able to provide compressed air to meet, at any time, the contaminant limits foreseen in Chapter 12 of the present norm

b) alternatively, replacing the air compressor, in case there is no decompression stop in water, or if such are performed in the surface, the use of high pressure cylinders shall be used, which meet at least the following requirements:

I) set of at least two cylinders;

II) minimum work pressure of 150kgf/cm^2;

III) minimum cylinder volume of thirty liters;

IV) flexible pigtails and connections tested and approved for the work pressure;

V) high flow regulating valve, for pressure reduction up to 12.2kgf/cm2; and

VI) high pressure air compressor with minimum capacity of 150kgf/cm2, for loading of cylinders.

It shall be accepted the loading of cylinders by companies specialized in compressed air for human breathing; such feature should be added to the certificate, when applicable.

c) compressed air container, built and tested in compliance with the Brazilian Association of Technical Standards or equivalent and that meet the following requirements:

I) minimum internal volume of eighty liters;

II) work pressure of 12.2kgf/cm2;

III) hydrostatic testing every 5 years

IV) be equipped with window enabling cleaning and internal visual inspection, to be executed annually; and

V) be equipped with manometer, safety valve regulated to 10% above the container work pressure, retention valve in compressed air admission, drain and inspection window;

d) basic umbilical in perfect conditions (not present patches), comprised of an air hose of minimum diameter 8.0mm and minimum length of 50 and maximum of 100 meters, work pressure of 12.2kgf/cm2 established by the manufacturer, resistant to traction equivalent to 100kg rigging and life line constituted by special wire with breaking equal or superior to 150kg, with quick-release hooks;

e) safety braces with rigging strap and tierods between the diver’s legs;

f) device to follow the diver’s depth through the surface control (Pneumofathometer);

g) hook knife;

h)temperature adequate diving suit, according to the local temperature;

i) emergency supply cylinder manufactured and hydrostatically tested every five years according to the norms of the Brazilian Association of Technical Standards – ABNT or equivalent, with minimum internal volume of five liters and work pressure equal or superior to 150kgf/cm2

j) helmet or diving full face mask;

l) diving weight belt;

m) console for control of compressed air supply;

n) wired communication equipment and surface control; using bulletproof umbilical communication cables; and

o) sound and image recording system, captured by diver's mask or helmet.

Notes:
1) The inclusion of sound and image recording system shall be mandatory as from the date corresponding to the second annual Inspection carried and out for Diving Systems which were aware prior to the date of publication of the present review.
2) The use of the abovementioned equipment is mandatory to the DSSC issued after the publication of the present norm.

0503 – DIVING SYSTEM BETWEEN THIRTY AND FIFTY METERS OR UP TO THIRTY METERS IN DANGEROUS AND/OR SPECIAL CONDITIONS

It shall meet the same criteria established for up-to-fifty-meter dives in open sea, as provided in item 0601 of the present norm.

0504 – LIMITATIONS OF USE

The diving systems described above shall not be used, under any circumstances, in dives performed under dangerous and/or special conditions described in Chapter 1 of the present norm.

0505 – OBLIGATION OF HYPERBARIC CHAMBER USE

a) Dives up to thirty meters, without decompression and free of any dangerous and/or special conditions

A HC duly certified as provided in Chapter 9 of the present norm shall be available and ready for use, within a distance no longer than a one-hour trip from the work front, considering the resources for diver's transportation available at the diving spot.

This chamber may be transported for the simultaneous use of several work fronts, as long as all of them meet the distance criterion mentioned above. However, in case of diving accident in one of the work fronts, demanding execution of hyperbaric treatment, the additional work fronts must have their activities interrupted until the treatment is completed.

The solution for meeting the above-mentioned criteria shall be included in the CP of the diving companies involved.

b) Dives up to thirty meters with decompression and/or under dangerous and/or special conditions, or between thirty and fifty meters.

A HC shall be available and ready for use at the diving spot, of exclusive use by the work front.

For systems up to thirty meters, designed to meet item 0601 of the present norm, the use of separate certified HC, and the following warning on item 4 of the Diving System Safety Certificate shall be noted:

"IT IS MANDATORY TO HAVE AN AVAILABLE HYPERBARIC CHAMBER, CERTIFIED BY A CLASSIFICATION SOCIETY ACKNOWLEDGED BY THE DPC, FOR OPERATIONS REQUIRING DECOMPRESSION OR UNDER DANGEROUS AND/OR SPECIAL CONDITIONS".

c) Surface decompression dives

In operations which surface decompression is scheduled, the dive shall only begin after the previous dive observation period is over, except for cases in which a second HC and trained personnel for operation are available in the work front.

d) HC occupation for more than twelve hours

The HC shall be equipped with a system of temperature and internal humidity control and a complete sanitary system, including toilet, shower and sink with cold and hot water for this type of operation.

The table below summarizes the HC requirements for the cases mentioned:

OBLIGATION OF HYPERBARIC CHAMBER (HC) USE

Characteristics of the dive	CH use
- performed in internal waters; - up to thirty meters; - no decompression; and - free from dangerous or special conditions.	- HC available and ready for use, within a distance no longer than a one-hour trip from the work front, considering the resources for diver's transportation. - it may be transported for the simultaneous use of several work fronts, as long as all of them meet the distance criterion mentioned above.
- up to fifty meters; or - up to thirty meters with decompression and/or under dangerous and/or special circumstances.	- HC available and ready for use at the diving spot, of exclusively use by the work front.
- performed with surface decompression.	- the dive shall only begin after the previous dive observation period is over, unless there is a second HC and trained personnel for operation are available.
- HC occupation for more than twelve hours.	HC equipped with the following resources: - a system of temperature and internal humidity control; and - a complete sanitary system, including toilet, shower and sink with cold and hot water.

Notes:

1) The use of HC shall be mandatory as from the date corresponding to the second annual Inspection carried and out for Diving Systems which were aware prior to the date of publication of the present review.

2) The use of HC is mandatory to the DSSC issued after the publication of the present norm.

0506 – OMITTED CASES

The use of equipment which is not herein provided and the exemption from mandatory use of equipment in specific situations shall be previously assessed by the DPC.

CHAPTER 6

DIVING SYSTEMS FOR OPEN SEA AND INTERNAL WATERS UNDER DANGEROUS AND/OR SPECIAL CONDITIONS

0601 – BASIC REQUIREMENTS OF DIVING SYSTEMS IN OPEN SEA, OR IN INTERNAL WATERS UNDER DANGEROUS AND/OR SPECIAL CONDITIONS, UP TO FIFTY METERS, USING COMPRESSED AIR

These systems must be constituted by at least the following equipment:

a) Air compressor with flow equivalent to 240 l/min measured in atmospheric pressure (equivalent to 40 l/min measured in pressure equivalent to diving depth), per diver, and work pressure of 17.3kgf/cm^2, established by the manufacturer (or 14.2kgf/cm2 as long as used along with a set of high pressure cylinders), lubricated with non detergent mineral oil, equipped with filters for separation of water, oil, particles and other contaminants. The set of compressor and filter shall be able to provide compressed air to meet, at any time, the contaminant limits foreseen in item 1209 of the present norm;

b) compressed air container, built and tested in compliance with the Brazilian Association of Technical Standards - ABNT or equivalent and that meet the following requirements:

I) minimum internal volume of 150 liters;

II) work pressure of 17.3kgf/cm2 (or 14.2kgf/cm2 as long as used along with a set of at least four high pressure cylinders, with minimum volume of 50l each);

III) hydrostatic testing every 5 years

IV) receives cleaning and internal visual inspection annually; and

V) be equipped with manometer, safety valve regulated to 10% above the container work pressure, retention valve in compressed air admission, drain and inspection window;

c) basic umbilical in perfect conditions (not presenting patches), comprised of an air hose of minimum diameter 8.0mm and minimum length of 70 and maximum of 100 meters, with minimum work pressure compatible to the work pressure of the compressed air container, resistant to traction equivalent to 100kg rigging and life line constituted by special wire with breaking equal or superior to 150kg, with quick-release hooks;

d) safety braces with rigging strap and tierods between the diver's legs;

e) hook knife;

f) temperature adequate diving suit, according to the local temperature;

g) wired communication equipment and surface control; using bulletproof umbilical communication cables;

h) emergency supply cylinder with minimum internal volume of five liters and work pressure equal or superior to 150kgf/cm2 directly connected to diver's mask or helmet;

i) device to follow the diver's depth through the surface control (Pneumofathometer);

j) helmet or diving full face mask, equipped with voice and image capture system ;

l) diving weight belt;

m) console for control of compressed air supply;

n) sound and image recording system, installed at the control cabin, captured by diver's helmet or mask;

o) A duly certified HC shall be available and ready for use at the diving spot, of exclusive use at the diving spot.

p) the use of open bell is mandatory in case dive is deeper than 30 meters or decompression time in water is longer than 20 minutes; and

The use of the separate certified wet bell shall be admitted in order to meet the required in item p). In such case, the following warning on item 4 of the Diving System Safety Certificate shall be noted:

"IT IS MANDATORY TO USE A WET BELL CERTIFIED BY A CLASSIFICATION SOCIETY ACKNOWLEDGED BY THE DPC FOR OPERATIONS OCCURING DEEPEN THAN 30 METERS".

Notes:

1) The use of wet bell shall be mandatory as from the date corresponding to the second Annual Inspection carried and out for Diving Systems up to 20 meters which were aware prior to the date of publication of the present review.

2) The use of the abovementioned equipment is mandatory to the DSSC issued after the publication of the present norm.

0602 – BASIC REQUIREMENTS FOR DIVING SYSTEMS UP TO NINETY METERS, USING ARGM

In order to perform dives up to 90 meters, the following equipment and/or requirements, in addition to the ones presented in item 0601, are mandatory:

a) use of ARGM;

b) wet or closed bell equipped with 4 cylinders of 40 liters of hydrostatic volume and minimum work pressure of 150kgf/cm^2: three for emergency HeO_2 supply and one for oxygen;

c) air supply, as second emergency course com flow equivalent to 240l/min measured in atmospheric pressure of 17.3kgf/cm^2;

d) artificial respiratory gas mixture cylinder loading

e) possibility of oxygen use for conduction of decompression as from a 12m depth;

f) voice-distorting intercom;

g) adequate installation for oxygen and HeO2 use in hyperbaric chamber to perform surface decompression in compliance with the standard tables;

h) oxygen analyzers in respiratory mixtures, measuring from 0 to 100% and having minimum sensitiveness of 0.1%;

i) dry suit or hot water suit;

j) control panel for flow of compressed air, oxygen and HeO2 mixture;

l) umbilical ranging from 70m to 100m. The diver shall not go further than 33m; from the bell to the workplace;

m) hyperbaric chamber containing masks for oxygen and therapeutic mixtures; and

n) respiratory mixture supply three times equivalent to the volume foreseen for diving performance;

0603 – OBLIGATION OF HYPERBARIC CHAMBER USE

a) Dives up to thirty meters with decompression and/or under dangerous and/or special conditions, or between thirty and fifty meters.

A HC shall be available and ready for use at the diving spot, of exclusive use by the work front.

b) Surface decompression dives

In operations which surface decompression is scheduled, the dive shall only begin after the previous dive observation period is over, except for cases in which a second HC and trained personnel for operation are available in the work front.

c) Dives requiring HC occupation for more than twelve hours, including necessary time for decompression

It is mandatory that the HC be equipped with the following resources:

- a system of temperature and internal humidity control;
- and a complete sanitary system, including toilet, shower and sink with cold and hot water for this type of operation.

Saturation dive techniques and procedures, as well as use of closed bell are mandatory in dives requiring HC occupation for a period longer than 12 hours.

Notes:

1) The use of HC shall be mandatory as from the date corresponding to the second Annual Inspection carried and out for Diving Systems which were aware prior to the date of publication of the present review.

2) The use of HC is mandatory to the DSSC issued after the publication of the present norm.

0604 – BASIC REQUIREMENTS FOR DEEP DIVING SYSTEMS UP TO THREE HUNDRED METERS

The systems for the purpose of reaching up to three hundred meters require saturation dives using artificial respiratory mixtures and must meet the Code of safety for diving systems found in Annex 6-A of the present nor, as well as established in the relevant legislation.

0605 – OMITTED CASES

The use of equipment which is not herein provided and the exemption from mandatory use of equipment in specific situations shall be previously assessed by the DPC.

CHAPTER 7

HYPERBARIC CHAMBERS

0701 – HYPERBARIC CHAMBER MANUFACTURING

The pressure cables for human use shall be designed, manufactured and inspected in compliance with the ASME-PVHO USA) norms or with a norm for pressure cables that is internationally acknowledged, having the approval of project and construction followed-up by an SC acknowledged by the DPC for Diving System Certifications, and it shall receive a Declaration of Conformity (DC), whose model is found in Annex 7-A, along with the requirements herein established, in case the norms are not certified in combination with a Diving System.

0702 – DECLARATION OF CONFORMITY FOR HYPERBARIC CHAMBER

The HC shall be part of a Diving System or be separately certified.

In case the HC is separately certified, a DC shall be issued and added of respective HC inspection report, whose model is found in Annex 7-B.

The DC shall be only issued for pressure cables having project and construction approved by SC acknowledged by the DCP to certify Diving Systems.

a) Expiry Date for Declaration of Conformity

The DC for a HC shall be valid for 5 years and shall be endorsed in execution of annual inspections. The DC which are not endorsed within the period set forth for the execution of annual inspections shall expire.

b) Inspections to the executed in HC

I) Primary Inspection (PI)

Shall be executed before HC operation, in order to verify the compliance with the requirements established by current norms, when applicable.

II) Renewal Inspection (RI)

Shall be executed before the beginning of HC operation, in order to verify the compliance with the requirements established by the current norms, when applicable.

Shall be requested thirty days prior to the DC expiry date.

III) Annual Inspection (AI)

Executed annually for DC endorsement, within a 3-month period prior to or after the anniversary date of PI or RI execution.

0703 – VALIDITY OF DECLARATION OF CONFORMITY FOR HYPERBARIC CHAMBER

The DC shall lose validity if:

a) there is any alteration or repair implying change of HC original characteristics; and

b) the periods for tests and reviews set forth expiry, and no renewal was requested:

FREQUENCY OF TESTS TO BE CARRIED OUT IN HC

Safety valve pressure and calibration testing	Manometer Calibration	Leak testing	Hydrostatic testing	Display Substitution
One year	One year	Two years	Five years	Ten years

0704 – BASIC REQUIREMENTS FOR HYPERBARIC CHAMBER USED IN SURFACE-SUPPLIED DIVING

- Minimum work pressure of 5kgf/cm^2.
- Minimum internal diameter of 1.75m.
- Valve arrangement enabling pressurization and depressurization control, internally and externally, and external control shall prevail over internal control.
- Two containers (main chamber and antechamber) enabling entrance and exit of medical or support personnel, without depressurizing the patient.
- Individual oxygen (O_2) masks to all people inside the chamber, in each container.
- Flush of individual oxygen masks to the exterior or valve arrangement enabling safe chamber ventilation.
- O_2 supply comprised of at least two high pressure cylinders of minimum value of 50 liters each, properly arranged and enabling separate replacement, not interrupting eventual treatment.
- O_2 high pressure regulating valve(s), with minimum flow of 180 l/min, per mask installed, measured in atmospheric pressure, proper for service(s) using oxygen.
- External and internal painting of HC and nets with flame-resistant paint, in compliance with Brazilian Association of Technical Standards (ABNT).
- Manometers for pressure control of compressed air and oxygen supply.
- Manometers for depth control, in meters or feet, installed internally and externally, properly calibrated. The manometers which shall be installed inside the HC may be replaced by wrist depth sensors, which shall be attached to the main chamber and to the antechamber as well.
- O_2 analyzer with plugs in supply lines and HC atmosphere.
- CO_2 analyzer to HC atmosphere.
- Safety valve in each container, set for acting pressure 10% above the maximum work pressure. An intercepting valve shall be installed between the safety valve and the HC, enabling its closure intercepting the safety valve if needed. This intercepting valve shall be kept in open position through warning seal.
- In HC equipped with double internal hatches, used to provide access or isolation between the main chamber and the antechamber, there shall be valves installed in both hatches, enabling pressure equalization in annular space.
- Installation of acrylic windows manufactured in compliance with ASME-PVHO USA) Norm or equivalent, providing observation of all people inside.
- Communication between each container and the exterior of HC. This system shall be internally installed preventing the activation of any equipment for external communication (speaker phone).
- System of emergency communication.
- Lighting, preferably by an external source, using fluorescent light spots.
- Maximum tension of 24 volts for the electric equipment.

- Fire suppression system (pressurized water portable extinguisher or an internal water sprinkler are accepted) with internal or external activation.

- Individual containers enabling the transference, under pressure, from the exterior to the interior and vice versa, of medicines, food and small size equipment.
- The O_2 supply manifold and system piping shall be able to operate with the pressure of the cylinders containing such gas, free from any leaks.
- The HC shall be equipped with cooling system able to balance the admitted compressed air both in compression and ventilation processes, providing a temperature between 24° and 32°C inside the chamber, therefore preventing excessive raise of temperature during air admission.
- HC operation checklist displayed both internally and externally.
- Identification of all HC valves, manometers and penetrators with named metal plaques.

Notes:

1) In cases which emergency hyperbaric treatment is necessary, it is permitted to use HC located in hyperbaric clinics; however, such procedure shall not be taken into account in the dive initial plan, neither considered as compliance with the requirements concerning the presence of such equipment in dive operations under dangerous and/or special conditions; and

2) The requirements of item 0704 are discarded to HC exclusively addressed to the transportation of divers in emergency conditions (individual HC).

0705 – PRESSURE TESTING

The HC hydrostatic testing pressure shall respect the determinations provided in the technical norm used in the project and construction. In the absence of construction project, the test shall be carried out at a pressure 1.5 times higher than the maximum work pressure.

Preferably, hydrostatic testing shall be used; however, in case it is not possible, pneumatic testing may be carried out if enough safety actions are taken, in case of equipment structural failure.

Under no circumstances the pneumatic testing pressure shall exceed 1.5 times the maximum work pressure, as provided in Norm ASME, Section 8, Division 1.

0706 – COMPRESSED AIR SUPPLY

a) Primary or main – air sufficient for one pressurization of main container up to 165 feet (fifty meters), two pressurizations of access container (antechamber) up to 165 feet, plus maintenance of ventilation at 2.5m^3/min (measured in atmospheric pressure) for 360 minutes to HC which are not equipped with oxygen masks of external flush or, 1.5m^3/min for chambers equipped with such device.

b) Secondary or emergency - air sufficient for one pressurization of main container up to 165 feet, plus maintenance of ventilation at 2.5m^3/min (measured in atmospheric pressure) for sixty minutes to HC which are not equipped with oxygen masks of external flush or, 1.5m^3/min for chambers equipped with such device.

Each one of the systems can be formed, separately, by compressors or by cylinders for high pressure air storage, reduction/regulation valves and volume tanks.

0707 – CERTIFICATION OF HYPERBARIC CHAMBERS FOR SURFACE-SUPPLIED AND INTERVENTION DIVE

The HC for surface-supplied and intervention dive, without manufacturing and project certification but which are in effective operation in date prior to December 16, 2003, and are in possession of DSSC issued by SC acknowledged by the DPC to certify diving systems, may remain in operation, as long as such certification is maintained valid.

The non-certified HC or which do not own a project and construction approval certificate issued by SC shall not be used as HC in order to assist diving operations, except the ones classified in the previous paragraph.

0708 – ADDITIONAL REQUIREMENTS FOR HYPERBARIC CHAMBERS FOR DIVES UP TO NINETY METERS

In addition to the requirements established above, the HC to be used in dives up to ninety meters shall comply with the following requirements:

- mask for therapeutic mixture to each diver;
- voice-distorting intercom;
- oxygen analyzers in respiratory mixtures, measuring from 0 to 100% and having minimum sensitiveness of 0.1%;

0709 – ADDITIONAL REQUIREMENTS FOR HYPERBARIC CHAMBERS FOR DIVES UP TO THREE HUNDRED METERS

In addition to the applicable requirements above, the HC to be used in dives up to three hundred meters shall comply with the provided in Annex 6-A of the present norm.

CHAPTER 8

ACCESS BASKET, DIVING BASKET AND WET BELL

0801 – PROJECT, CONSTRUCTION AND CERTIFICATION

The access baskets, diving baskets, open bell and its respectives launching systems should have the project approved by SC, duly recognized by DPC, for certification of diving systems, that in addition to contruction follow-up will issue DC with requirements defined herein.

0802 – BASIC REQUIREMENTS FOR ACCESS BASKET

The requirements below apply exclusively to access baskets which are effectively part of a diving system.

a) Basic characteristics

I) Size appropriate to accommodate at least two divers, without restricting movement concerning safety; and

II) equipped with side and top protection.

b) Surface control panel

I) device controlling depth of each diver;

II) independent entrances for main air and emergency supply.

III) pressure manometer of compressed air supply (main and emergency); and

IV) device for communication between surface and divers.

c) Divers' umbilical

I) minimum length enabling diver to go up to a distance of 33m (100 feet) between the access basket and the actual workplace; the emergency diver's umbilical shall be 3m longer than the others';

II) independent hoses, in perfect conditions (not presenting patches), for compressed air supply to divers, minimum diameter of 8.0mm;

III) Pneumofathometer hose in perfect conditions (not presenting patches), in order to measure the divers' depth independently, with minimum diameter of 8.0mm;

IV) life line in perfect conditions (not presenting patches) with breaking load of 150kg, enough to bring the diver to the diving platform;

V) bulletproof communication cable; and

VI) quick-release hook

d) Operational limits:

I) as the divers' umbilical will be guided from the diving platform, one of the divers shall remain in the access basket acting as the umbilical guide for the diver effectively executing the job;

II) shall be only used in dives not exceeding 25 meters, complying with the limit procedure 30/25 provided in the Table Limit Without Decompression (TLWD), therefore without decompression schedule;

III) shall not be used in situations requiring the diver to go further than 33m, between the access basket and the actual workplace; and

IV) the maximum platform height must be 20m.

0803 – BASIC REQUIREMENTS FOR DIVING BASKET

The requirements below shall be applied to diving baskets which are effectively part of the diving systems, not applying to the access baskets used only for transportation of divers to the surface.

a) Basic characteristics:

I) Size appropriate to accommodate at least two divers, without restricting movement concerning safety; and

II) equipped with top protection and side railings;

III) equipped with emergency cylinders summing, at least, 14m^3 of compressed air supply;

IV) equipped with at least three umbilicals, one primary (from surface to basket) and two secondary (from basket to divers); and

V) equipped with manifold to receive main and reserve supply. This manifold shall be used to receive both main and reserve air supplies, installed in basket itself, and its arrangement should enable replacement of supply sources, without interrupting the divers supply. The dive shall be conducted using the main air supply. Throughout the dive operation, the reserve supply shall remain connected to the manifold, with pressure adjusted using regulating valve, only intercepted by a valve of ¼ of total opening.

b) Surface control panel

I) device controlling depth of diving basket and divers individually;

II) independent entrances for main air and emergency supply.

III) pressure manometer of compressed air supply (main and emergency); and

IV) device for communication between surface and divers.

c) Diving basket's umbilical

I) minimum length of eighty meters;

II) independent hoses, in perfect conditions (not presenting patches), for compressed air supply to basket, minimum diameter of 8.0mm;

III) Pneumofathometer hose in perfect conditions (not presenting patches), in order to measure the basket's and divers' depth independently, with minimum diameter of 1/8 pol;

IV) life line in perfect conditions (not presenting patches) with breaking load sufficient to bring the diving basket to the surface, without removing it from the water;

V) bulletproof communication cable; and

VI) work pressure of 14.2kgf/cm^2 and flow of 40 l/min measured in atmospheric pressure, per diver.

d) Divers' umbilical

I) basic umbilical with minimum length of seventy meters; the emergency diver's umbilical shall be 3m longer than the others';

II) independent hoses, in perfect conditions (not presenting patches), for compressed air supply to divers, minimum diameter of 8.0mm;

III) Pneumofathometer hose in perfect conditions (not presenting patches), in order to measure the divers' depth independently, with minimum diameter of 8.0mm;

IV) life line in perfect conditions (not presenting patches) with breaking load of 150kg, enough to bring the diver to the diving platform;

V) bulletproof communication cable; and

VI) quick-release hook

VII) work pressure of 14.2kgf/cm^2 and flow of 40 l/min measured in atmospheric pressure, per diver.

e) Operational limits

I) it may be used in dives not exceeding 30 meters;

II) one diver shall act as basket operator;

III) it shall not be used in special situations requiring the diver to move horizontally further than 33m, measured between the diving basket and the actual workplace.

0804 – BASIC REQUIREMENTS FOR OPEN BELL FOR SURFACE-SUPPLIED DIVING (UP TO FIFTY METERS)

a) Basic characteristics

I) Size appropriate to accommodate at least two divers, without restricting movement concerning safety;

II) must present a cap in its upper part, made of acrylic or other material enabling people inside to breath when pressurized (bubble). Thus, the project of this equipment must provide the use of admission lines and flush for ventilation of cap atmosphere

III) caps made of non-transparent material must present windows providing observation of external environment (at least in four directions) to diver operating bell;

IV) equipped with communication system to the surface, its installation should provide communication from the diver (bell operator) without the need of activating any button (speaker phone);

V) equipped with retention valve along with the cap, in order to prevent subtle depressurization of bell in case breaking of umbilical;

VI) equipped with emergency cylinders summing, at least, 14m^3 of compressed air supply; and

VII) equipped with one manifold to receive main and reserve supplies, installed in the bell itself; and its arrangement should enable replacement of supply sources, without interrupting the divers supply. The dive shall be conducted using the main air supply. Throughout the dive operation, the reserve supply shall remain connected to the manifold, with pressure adjusted using regulating valve, only intercepted by a valve of ¼ of total opening.

b) Surface control panel

I) device controlling depth of diving basket and divers individually;

II) independent entrances for main air and emergency supply.

III) pressure manometer of compressed air supply (main and emergency); and

IV) device for communication between surface and divers.

c) Bell‘s umbilical

I) minimum length of 100 meters;

II) independent hoses, in perfect conditions (not presenting patches), for compressed air supply to bell, minimum diameter of ½ pol;

III) Pneumofathometer hose in perfect conditions (not presenting patches), in order to measure the bell’s and divers’ depth independently, with minimum diameter of 1/8 pol;

IV) life line in perfect conditions (not presenting patches) with breaking load of 150kg, enough to bring the bell to the surface; without removing it from the water;

V) bulletproof communication cable; and

VI) work pressure of 17.2kgf/cm^2.

d) Diver’s umbilical

I) basic umbilical with minimum length of seventy meters; the emergency diver’s umbilical shall be 3m longer than the others’;

II) independent hoses, in perfect conditions (not presenting patches), for compressed air supply to divers, minimum diameter of 8.0mm;

III) Pneumofathometer hose in perfect conditions (not presenting patches), in order to measure the divers’ depth independently, with minimum diameter of 8.0mm;

IV) life line in perfect conditions (not presenting patches) with breaking load of 150kg, enough to bring the diver to bell;

V) bulletproof communication cable; and

VI) quick-release hook; and

VII) work pressure of 17.2kgf/cm^2 and flow of 40 l/min measured in atmospheric pressure, per diver.

e) Operational limits:

I) it shall be only used in dives not exceeding fifty meters;

II) one diver shall act as bell operator;

III) in special situation, the distance between the diver and the bell and the effective workplace shall be of up to sixty meters, as long as the following requirements are met:

- there is no other alternative for the performance of operation and diving supervisor, vessel's master, support vessel's master or officer for the diving platform have been heard on the safety of the operation;
- the maximum depth is equal or less than thirty meters;
- the distance between the bell and the workplace was previously checked by a submarine image capture device;
- the guiding cable between the bell and the diving spot is set, before the effective start of the work, whenever there is visibility between the workplace and the bell and there is no remote control-operated vehicle following the diver;
- individual emergency cylinders for four minutes of autonomy are used; considering a minimum consumption of 40 l/min at the depth of operation; and
- the length of the reserve diver's umbilical shall be three meters longer than the main diver's umbilical.

f) Buoyancy of open bell

The bell, when immersed in salty water without the team, tools or equipment not belonging to its structure, shall have negatively buoyant when its bubble is completely empty; however, it shall present a removable ballast enabling positive buoyancy if necessary.

In case device for ballast release is used the bell shall be also equipped with device preventing its accidental release.

0805 – BASIC REQUIREMENTS TO OPEN BEL FOR DIVES UP TO NINETY METERS

The diving bell up to ninety meters shall, in addition to the requirements established in item 0804, meet the following additional requirements:

a) be equipped with 4 cylinders of 40 liters of hydrostatic volume and minimum work pressure of 150kgf/cm^2: three for emergency HeO_2 supply and one for oxygen;

b) bell's umbilical length of 140m;

c) use of respiratory mixture between 16% and 25% of oxygen;

d) distance achieved by the diver between the open bell and the actual workplace shall be of up to 33m;

e) voice-distorting intercom;

f) air supply, with flow equivalent to 240l/min measured in atmospheric pressure, and pressure of 18.3kgf/cm^2; and

g) umbilical to bell apart from umbilical to divers.

0806 – ADDITIONAL REQUIREMENTS FOR ACCESS BASKET, DIVING BASKET AND OPEN BELL

The system of launch and collection of access baskets, bells and diving baskets shall meet the following requirements:

a) have a manufacturing and construction project of the structure of launch in compliance with the applicable norms and be certified for human transportation by SC acknowledged by the DPC for certification of diving systems;

b) present two independent means of collection; a main and an emergency means;

c) possess certificates of breaking tests from the respective manufacturers for the cranes' steel cables, workloads compatible with the weight of bell/basket, considering the static and dynamic loads and safety concerning human transportation. The set of cables and sockets shall be tested at 2.5 times the workload, whenever it is repaired or changed;

d) steel cabled shall be used, preventing the basket/bell from uncontrolled spinning during its operation; these requirements shall be verified by the SC, at the time of audits for certification of these equipment.

e) be designed in order to be controlled, in normal operation, only by the activation system and not brake systems;

f) be equipped with device of automatic interruption in case it is not intentionally activated ("dead man" command);

g) be equipped with primary brake system able to prevent bell/basket from falling in case of failure of main brake;

h) be equipped with secondary brake device able to prevent bell/basket from falling in case of failure of main brake. This device may be manual.

i) be equipped with mechanical brake able to hold a load equivalent to 1.25 times the crane's safe workload;

j) be designed so it may stop and remain in position in case of loss of energy; if motor is disconnected or turned off;

k) the controls shall be installed or equipped with resources enabling the operator to visualize and control the launch and collection operation;

l) be fully examined and tested at 1.25 times its regular operation load; before certification of the system and after alteration or repair;

m) be certified for human transportation in compliance with the technical specifications of the SC;

n) the steel cables and accessories shall: be installed, assembled and maintained in compliance with the manufacturer's technical specifications; be checked by the operator, whenever they are used, concerning damage or deformation; be examined by sampling and tested in compliance with the norms and standard specified by the manufacturer; every six months;

o) the use of beams, gantries, grommets and basis for cranes, welded in the vessel or platform structure, shall be provided in places where the launch device presented in the respective DSSC may not be used. This alternative device shall have a structure and construction project certified by SC acknowledged by the DPC and enable the use of two means for collection of bell/basket, as well as be annually checked by the SC responsible for its certification.

Note:

The requirements listed above shall be verified by the SC responsible for the certification of this equipment; its characteristics shall be inserted in the audit report, found in the DSSC or in the DC.

0807 – DECLARATION OF CONFORMITY FOR ACCESS BASKET, DIVING BASKET AND OPEN BELL

The access baskets, diving baskets and open bells shall be part of a Diving System or be separately certified.

In case of a separate certification, a DC (Annex 8-A) shall be issued and followed by the respective Inspection Report (Annex 8-B).

The DC shall be only issued for pressure cables having project and construction approved by SC acknowledged by the DCP to certify Diving Systems.

a) Expiry Date for Declaration of Conformity

The DC shall be valid for five years and shall be endorsed in execution of Annual Inspections. The DC which are not endorsed within the period set forth for the execution of annual inspections shall expire.

b) Inspections to the executed

I) Primary Inspection (PI)

Shall be executed before equipment operation, in order to verify the compliance with the requirements established by current norms, when applicable.

II) Renewal Inspection (RI)

Shall be executed before the end of the 5-year validity period of the DC, occasion in which the same inspections in PI shall be executed. It must be requested with minimum 30-day prior notice.

III) Annual Inspection (AI)

Executed annually for DC endorsement, within a 3-month period prior to or after the anniversary date of PI or RI execution.

CHAPTER 9

CERTIFICATION AND INSPECTION OF EQUIPMENT AND DIVING SYSTEMS

0901 – DIVING SYSTEMS UP TO TWENTY METERS

Are subject to inspections listed in item 0907, when shall be verified, at least, the items from the Check List (CL), whose model is found in Annex 9-A. It is mandatory that these systems possess a DSSC issued by an SC acknowledged by the DPC to certify Diving Systems on behalf of the Brazilian Government.

0902 – DIVING SYSTEMS UP TO THIRTY METERS

Are subject to inspections listed in item 0907, when shall be verified, at least, the items from the CL, whose model is found in Annex 9-C. It is mandatory that these systems possess a DSSC issued by an SC acknowledged by the DPC to certify Diving Systems on behalf of the Brazilian Government.

0903 – DIVING SYSTEMS UP TO FIFTY METERS

Are subject to inspections listed in item 0907, when shall be verified, at least, the items from the CL, whose model is found in Annex 9-C. It is mandatory that these systems possess a DSSC issued by an SC acknowledged by the DPC to certify Diving Systems on behalf of the Brazilian Government.

0904 – DIVING SYSTEMS UP TO NINETY METERS

Are subject to inspections listed in item 0907, when shall be verified, at least, the items from the CL, whose model is found in Annex 9-D. It is mandatory that these systems possess a DSSC issued by an SC acknowledged by the DPC to certify Diving Systems on behalf of the Brazilian Government.

0905 – DIVING SYSTEMS DEEPER THAN NINETY METERS

Are subject to inspections listed in item 0907, when shall be verified, at least, the items from the CL, whose model is found in Annex 6-A. It is mandatory that these systems possess a DSSC issued by an SC acknowledged by the DPC to certify Diving Systems on behalf of the Brazilian Government.

0906 - DIVING SYSTEM SAFETY CERTIFICATE (DSSC)

a) Expiry Date for Declaration of Conformity

The DSSC shall be valid for 5 years and shall be endorsed in execution of annual inspections. The DSSC which are not endorsed within the period set forth for the execution of annual inspections shall expire.

b) Issuance of DSSC

The DSSC shall be issued by a SC acknowledged by the DPC to certify Diving Systems on behalf of the Brazilian Government. The certificates shall include the classification attributed to the system in item 4, as follows:

- *“Operation in internal water, … divers, free from dangerous conditions”.*
- *“Operation in internal water, … divers”.*

“Operation in open sea, … divers”.

c) DSSC Model

the DSSC Model to be issued by the SC is found in Annex 9-E.

0907- AUDITS, REPORTS AND INSPECTIONS FORESEEN

a) Primary Inspection (PI)

Executed before beginning of system operation in order to verify the compliance with the requirements established by current norms, when applicable. This inspection shall be conducted by SC acknowledged by CPD in order to certify Diving Systems on behalf of the Brazilian Government.

b) Renewal Inspection (RI)

Executed before the five-year of validity of DSSC is finished. It must be requested with minimum 30-day prior notice and completed before the expiry date of DSSC. This inspection shall be conducted by SC acknowledged by CPD in order to certify Diving Systems on behalf of the Brazilian Government.

c) Annual Inspection (AI)

Executed annually for DC endorsement, within a ninety-day period prior to or after the anniversary date of PI or RI execution, according to the case. This inspection shall be conducted by SC acknowledged by CPD in order to certify Diving Systems on behalf of the Brazilian Government.

d) Maritime Authority Inspection (MAI)

It shall be executed unexpectedly by the DPC whenever found necessary, aiming at checking the compliance with the present norm. At the end of a MAI, a Maritime Authority Inspection Report (MAIR) shall be issued, whose model is found in Annex 9-F, in three counterparts: the first counterpart shall be filed at the DPC, the second counterpart shall be filed at the CP/DL/AG of the local jurisdiction and the third counterpart shall be submitted to the audited company. The MAIR shall contain all the discrepancies found during the MAI and what kind of demand they represent; as described below:

I) Impending Demand – demand directly compromising the safety of diving operations, such as the non compliance with procedures herein provided or severe discrepancy concerning diving equipment, characterizing an irregularity putting divers at risk during the diving operations; and

II) Non Impending Demand – whenever non compliance with the present norm is observed, concerning documentation of the company/school or their diving equipment, characterizing an irregularity that does not put divers at risk during the diving operation/instruction.

e) Investigation in Diving Accident (IDA)

It shall be conducted by the DPC, along with the SC which issued the respective DSSC, upon payment of indemnifications foreseen in Annex A and the charges due to the SC, whenever there is a diving accident causing victim (provoking or not death), aiming at checking the compliance with the present norm and the investigation of possible causes for the accident. At the end of an IDA, an Investigation in diving Accident Report (IDAR) shall be issued, whose model is found in Annex 9-G, in three counterparts: the first counterpart shall be filed at the DPC, the second counterpart shall be filed at the CP/DL/AG of the local jurisdiction and the third counterpart shall be submitted to the audited company. The IDAR shall contain all the discrepancies found during the IDA, what kind of demand they represent; as described below, in addition to the possible causes that of the accident:

I) Impending Demand – demand directly compromising the safety of diving operations, such as the non compliance with procedures herein provided or severe discrepancy concerning diving equipment, characterizing an irregularity putting divers at risk during the diving operations; and

II) Non Impending Demand – whenever non compliance with the present norm is observed, concerning documentation of the company/school or their diving equipment, characterizing an irregularity that does not put divers at risk during the diving operation/instruction.

f) Inspection for Withdrawal of Demand (IWD)

It shall be conducted by the DPC after having received the Information on Compliance with Demands, whose model is found in Annex 9-H, and upon payment of indemnification foreseen in Annex A, aiming at checking the compliance with the demands highlighted by MAIR and IDAR, according to the case.

Notes:

1) Impending Demands shall determine the temporary interdiction of underwater activities at the audited work front/school. The responsible for the company/school will have a thirty-day deadline, as from the date of issue of MAIR/IDAR, extendable to a unique thirty-day period, at the discretion of the DPC, to obtain the cancellation of the Impeding Demands. As the above-mentioned period has finished and the demand has not been repaired and checked by the DPC, the cancellation of the respective DSSC shall be requested to the SC, and the registration shall be cancelled at the Maritime Authority.

2) In case there are Non Impending Demands, the company/school shall operate temporarily at the work front/ instruction for thirty days, as from the date of issue of MAIR/IDAR. As the above-mentioned period has finished and the demand has not been repaired and checked by the DPC, the cancellation of the respective DSSC shall be requested to the SC, and the registration shall be cancelled at the Maritime Authority.

3) The responsible for the company/school shall report to the DPC, by filling and sending Annex 9-H, the compliance with the demands found in MAIR/IDAR, according to the case, minimum 10 days prior to the deadline established for its withdrawal. The non compliance with the prior notice mentioned in this paragraph shall result in cancellation of DSSC and registration, as provided above. The date of report of compliance with the demand shall be considered the date of protocol delivery of Annex 9-H in DPC's Office.

0908 – INTERDICTION OF DIVING SYSTEM

Any diving accident causing victims (provoking or not death), liable of filling Work Accident Report (WAR/INSS), whose cause is directly or indirectly related to the diving system and/or the procedure used during the diving operation, shall be immediately reported by the diving company responsible for the service to the CP/DL/AG of the local jurisdiction where the work front is located (by sending a copy of the WAR), which shall take the following actions:

a) report the accident to the DPC, providing the following information: name of injured diver, details on the accident, diving spot, service being executed, inscription number of responsible company, DSSC used number and additional relevant information concerning the accident;

b) promote, if necessary, an Administrative Investigation on Accidents and Navigation (AIAA), as provided in NORMAN-09/DPC; and

c) in case an AAIA is established, request support Group of Technical Support (GTS) from DPC, comprised of Diving Experts assigned by this Directorate.

The diving system may be closed down aiming at the preservation of equipment characteristics at the moment of the accident, for future investigations. In this case, the DPC shall request interdiction by MSG to the CP/DL/AG of the jurisdiction where the accident took place.

The equipment composing the diving system closed down shall not be used until an IDA is executed and all the demands, if any, be solved, as provided in item 0907.

0909 – IDENTIFICATION OF DIVING SYSTEM COMPONENT

a) Every diving equipment shall be permanently marked, with an individual identification number, providing easy identification when compared with data present in DSSC. Whenever applicable, the equipment shall also be identified with the manufacturer's name, model, year of manufacturing, pressure and work flow and date of the last inspection or test performed.

b) The equipment with which the construction, testing or checking have to comply with the Brazilian Association of Technical Standards or equivalent shall be marked with the norm used along with respective identification.

c) The models for the Inspection Reports of HC, Open Bell for Dive and baskets, to be issued by the SC, are found in Annex 7-B and Annex 8-B, respectively.

d) In pressure vases, the identification about which item a) above shall present, in permanent ink and visible in the equipment body or in identification plaque, at least the following characteristics:

I) name of equipment manufacturer;

II) date of equipment manufacturing:

III) equipment serial number; and

IV) maximum work and testing pressures.

e) the original copies of the DSSC shall remain in the operation spot, available for auditing by responsible organs.

0910 – REPLACEMENT OF CERTIFIED DIVING SYSTEM COMPONENT

The replacement of a certified diving system component may be performed after the inspection in the new component is carried out.

A specific inspection agreement (supplement) of the component to be replaced shall be attached to the DSSC concerning the system. This agreement shall be issued by SC acknowledged by the DPC and used as the original DSSC number which will be supplemented, in addition to the name of the respective company/school.

0911 – OPERATIONAL TESTS

All Diving Systems shall be, as well as possible, submitted to functioning test after inspection of their components.

These tests shall be part of the inspection for the qualification of the system.

0912 – TEMPORARY PROVISIONS

The DSSC issued prior to the date of effectiveness of the present norm (date of publication in the Official Federal Gazette – DOU) shall be accepted until their respective expiry date or until the date of the second annual inspection, as from the date of publication of this norm, for the DSSC endorsement, whichever occurs first, as long as in compliance with the norm in effect at the time of its issuance and submitted to applicable Annual Inspections.

The present norm shall be applied to the new issued DSSC.

CHAPTER 10

MAINTENANCE OF EQUIPMENT THAT COMPOSE A DIVING SYSTEM

1001 - INSTRUCTIONS FOR MAINTENANCE AND REPAIR

Every Diving System should be submitted to a maintenance program that ensures the maintenance of the system's conditions in accordance with the certification performed.

This program should be prepared by the company in charge of the system, and it must be easy to understand, apart from including the following aspects:

- instructions regarding maintenance and repair;
- periodic maintenance program
- drawings, plants and diagrams of the system which identify the components to be kept;
- list of parts and spare parts needed to conduct the periodic maintenance to be performed; and
- Manufacturers instructions and manuals.

1002 - PERIODIC MAINTENANCE PROGRAM

It should be prepared taking into consideration the necessity to perform routines that may be conducted in the work place and that eventually require the displacement of the equipment to specific places.

Apart from the places where the routines should be performed, the program should also set the periodicity, considering not only the manufacturers' recommendation but also the necessity resulting from the operation site and the risk factors generated by it.

The program should also set that the non-compliance will automatically result in the interruption of the system application, and will only start again after the routines have been normalized.

Only equipment in good conservation and maintenance state may receive the CSSM and be kept in operation.

1003 - LIST OF CONSUMABLES AND SPARE PARTS

A list with all the consumables and spare parts necessary to the fulfillment of the maintenance routine should be prepared.

This list should include the items that must be kept in the operation site, the ones which should be stored and the instructions to obtain and transport these items.

1004 - INSPECTION AND MAINTENANCE RECORD

The inspection and maintenance programs should be continually recorded in reports prepared specifically for this end, in order to ensure its control, and the record is accepted by magnetic means. These records must be presented, when asked, in inspection done by MB. It is recommended the use of a history book for each of the main pieces of equipment that are part of a Diving System, such as: compressors, masks/helmets, hyperbaric chambers and signet/diving basket. To substitute the components of a certified Diving System, the established in item 0910 of the current standard.

CHAPTER 11

DIVING TABLE

1101 - INITIAL ASSUMPTIONS

Seeing that Diving results in serious risks to those involved, the speed parameters of compression, decompression, excursions duration, period of submerse works and others, are associated with specific procedures in relation to the diving technique employed.

The current standard does not include, as it is inadequate, these procedures or techniques in a detailed and explanatory way, seeing that the users of the tables and procedures in it should have theoretical and practical knowledge, acquired in professional accredited diving schools, of the diving techniques using air and artificial respiratory mixtures.

1102 - TABLES FOR DIVING WITH COMPRESSED AIR

The tables adopted for air diving, up to the maximum depth of 50m, are the ones employed by MB, and the procedure for their use should meet, at least, the requirements set forth in the current standard, whose subject is in Annex 11-A.

1103 - TABLES FOR BOUNCE DIVE USING He O_2

The tables adopted for the bounce dive with respiratory artificial mixtures composed by helium and oxygen, up to the maximum depth of ninety meters, are the ones employed by MB, and the procedure for their use should meet, at least, the requirements set forth in the current standard, whose subject is in Annex 11-B.

1104- SATURATION DIVING

The saturation dives are divided into three depth ranges, considering the effects on the divers:

a) Standard Saturation

Diving operations in which the life level, including the maximum excursion depth reached by the diver is equal to or less than 180m;

b) Deep Saturation

Diving operations in which the life level, including the maximum excursion depth reached by the diver is between 181 and 300m, including; and

c) Exceptional Saturation

Diving operations in which the life level, including the maximum excursion depth reached by the diver is between 300 and 350m.

1105 - MINIMUM PROCEDURES FOR STANDARD SATURATION UP TO 180 METERS DEEP

The compression and decompression tables should meet the following requirements:

a) Compression speed

I) Saturations at a depth of 100m

From the surface to the depth of 100m, the maximum compression speed should be of up to one meter/minute.

II) Saturations at a depth of up to 180m

From the surface to the depth of 180m, the maximum compression speed should be of up to one meter/minute.

b) Duration of stabilization stops, in the initial compression

I) To depths since the surface up to 100m

From the surface up to 100m - two hours at 100m or proportional time to the depth between the surface and 100m, calculated by the expression:

Stabilization time (min) = 2x 60 x depth (m)/100

II) To depths between 100 and 180m

In Saturations in depths between 100 and 180m, a stop to stabilize should be done for 2 hours at 100m and the arrival at the saturation depth, a stabilization stop, calculated by the expression:

Stabilization time (min) = 2x 60 x (depth (m) - 100)/100

c) Pressurization speed and stabilization stops in intermediate compressions

In intermediary compressions up to the depth of 180m the same pressurization speed should be met as if it were an initial standard pressurization.

In case the new saturation depth is higher than 180m, the pressurization speeds should be met according to the procedures for
deep initial compression.

The stabilization period to be met after an intermediate compression depends on the amplitude of this pressurization, as follows:

I) Amplitude smaller than 30m - no stabilization is demanded and there will not be a stop at 200m in case of a transaction from a Standard Saturation to a Deep Saturation.

II) Amplitude between 31 and 50m - two hours of stabilization when reaching the new saturation depth, not stopping at 200m in case of a transition from a Standard to a Deep Saturation.

III) Amplitude above 50m - use the same stabilization criteria of a deep saturation.

d) Excursions

Excursions can be carried out, up and down, from the saturation depth (life level) in the up or down speed of 10m/min, with no duration restriction.

The excursions are divided into normal and exceptional and are applied regardless of the depth in which the saturation is, as established in item 1108.

e) Decompression

The standard decompression speed and their specific procedures are applied regardless of the depth range in which the saturation is.

Item 1109 presents the procedures and the speeds that should be met during decompression.

f) Maximum bottom time for divers in the diving bell and in the water

I) The divers cannot stay more than 8 hours in a 24 period in the water, between doing and undoing the bell/chamber, ensuring a resting period of 12 hours.

II) The maximum period the divers can stay in water, within the seal-to-seal period above, is 6 hours.

III) The diver who goes to the water can at his own discretion and with the authorization of his supervisor, be replaced by the emergency diver or have a resting period and one for calories recovery inside the diving bell. It is recommended that this period be of up to thirty minutes after half the time established in the previous item has been completed.

1106 - MINIMUM PROCEDURES FOR SATURATION DIVING IN DEPTHS BETWEEN 181 AND 300 METERS

The compression and decompression tables should meet the following requirements:

a) Compression speed

I) From the surface to the depth of 100m, the maximum compression speed should be of up to 2 minutes per meter(0,5m/m).

II) From 100 to 200m, the maximum compression speed should be of up to 4 minutes per meter(0,25m/min).

III) From 200 to 300m, the maximum compression speed should be of up to 6 minutes per meter(0,166m/min).

b) Duration of stabilization stops during the initial compression:

I) At the depth of 100m

Stop for stabilization for two hours.

II) At the depth of 200m

Stop for stabilization for two hours.

c) Duration of stabilization stops after getting to the Life Level:

I) To depths between 181 and 240m:

In saturations between 181 and 240m deep, a stop for stabilization should be done at the saturation depth for at least 6 hours.

II) To depths between 241 and 300m:

In saturations between 241 and 300m deep, a stop for stabilization should be done at the saturation depth for at least twelve hours.

d) Pressurization speed and stabilization stops in intermediate compressions

In intermediate compressions up to 300m deep, the stabilization period to be met depends on the amplitude of this pressurization, as established below:

I) Amplitude smaller than 30m - no stabilization required and there will not be a stop at 200m.

II) Amplitude between 31 and 50m - two hours of stabilization when reaching a new saturation depth, and there will not be a stop at 200m; and

III) Amplitude above 50m - use the same stabilization criteria of a deep saturation.

e) Excursions

Excursions can be carried out, up and down, from the saturation depth (life level) in the up or down speed of 10m/min, with no time duration restriction, as long as it does not exceed 300m deep.

The excursions are divided into normal and exceptional and are applied regardless of the depth in which the saturation is, as established in item 1108.

f) Decompression

The standard decompression speed and the specific procedures are applied regardless of the depth range in which the saturation is.

Item 1109 presents the procedures and the speeds that should be met during decompression.

g) Maximum bottom time for divers in the diving bell and in the water

I) The divers cannot stay more than 8 hours in a 24 period in the water, between undoing and redoing the bell/chamber, ensuring a resting period of 12 hours.

II) The biological cycle of the divers should be respected, and that is understood as the resting period, preferably in the same time every day.

III) The maximum period the divers can stay in water, within the seal-to-seal period above, is:

- 6 hours in the range of 0 to 210m.
- 5 hours in the range of 211 to 260m.
- 4 hours in the range of 261 to 300m.

IV) The diver who goes to the water can at his own discretion and with the authorization of his supervisor, be replaced by the emergency diver or have a resting period and one for calories recovery inside the diving bell. It is recommended that this period be of up to thirty minutes after half the time established in the previous item has been completed.

1107 - MINIMUM PROCEDURES FOR DIVING AT DEPTHS BETWEEN 300 AND 350 METERS

For dives in depths between 300 and 350m, the following requirements should be met:

a) General procedures

I) The divers should have proved professional experience by means of their own records at LMR of at least 6000 hours of saturation in depths superior to 200m;

II) proceed to the previous instruction for the execution of the diving involving the supervisors, saturation technicians, divers, RCV/ROV technicians, health professionals and others whose actions interfere in the dive;

III) proceed to previous training for emergency situations, including the hyperbaric evacuation, with all the divers and support personnel;

IV) use individual emergency equipment (BOS, SLS or similar) with autonomy of at least fifteen minutes, proceeding to specific training before each operation;

V) limit the divers' umbilical to 33m, counted from the bell;

VI) do not compress or decompress more than once without interrupting during the saturation period;

VII) only operate within the depth range established in the schedule; and

VIII) Use RCV/ROV follow-up; recorded sound and video shall be preserved after the operations are over for a minimum period of a year or by the time considered necessary by DPC in case there is an accident.

b) Compression speed

I) From the surface to the depth of 100m, the maximum compression speed should be of up to two minutes per meter.

II) From 100 to 200m, the maximum compression speed should be of up to four minutes per meter.

III) From 200 to 300m, the maximum compression speed should be of up to six minutes per meter.

IV) From 300 to 350m, the maximum compression speed should be of up to eight minutes per meter.

c) Duration of stabilization stops during the initial compression

I) At the depth of 100m

Stop for stabilization for two hours.

II) At the depth of 200m

Stop for stabilization for two hours.

III) At the depth of 300m

Stop for stabilization for two hours.

d) Duration of stabilization stops after getting to the Life Level

In saturations between 300 and 350m deep, a stop for stabilization should be done at the saturation depth for at least twelve hours.

e) Pressurization speed and stabilization stops in intermediate compressions

Intermediate compressions should not be done in dives with life level between 300 and 350. However, if it is necessary for safety reasons, the same speed for pressurization and stabilization stop should be carried out as if it were an initial pressurization.

f) Excursions

Excursions can be carried out, up and down, from the saturation depth (life level) in the up or down speed of 10m/min, with no time restrictions as long as the depth of 350m is never exceeded.

The maximum distance of ascendant excursion is 25m, and there are not exceptional excursions.

g) Decompression

The standard decompression speed and their specific procedures are applied regardless of the depth range in which the saturation is.

Item 1109 presents the procedures and the speeds that should be met during decompression.

h) Maximum bottom time for divers in the diving bell and in the water

I) The divers cannot stay more than six hours in the water, between undoing and redoing the bell/chamber, with three hours at most of effective work in a period of 24 hours, ensuring a resting period of sixteen hours.

II) The biological cycle of the divers should be respected, and that is understood as the resting period, preferably in the same time every day.

1108 - EXCURSION TABLES

a) Excursions speed

Excursions can be carried out, up and down, from the saturation depth (life level) in the up or down speed of 10m/min, with no restrictions as to their duration.

b) Types of excursion

The excursion will be considered Standard or Exceptional according to Table 11-01.

The exception excursions allow greater distances than standard excursions, but they are also associated to job restriction. These excursions should not be scheduled as routine. They should be employed only in special or emergency situations.

Each saturated diver can only perform two exceptional excursions per saturation as a diver or bell guide.

TABLE 11-01 - STANDARD AND EXCEPTIONAL EXCURSION

Life Level (meters)	Standard Downward Excursions Distances	Standard Upward Excursions Distances	Exceptional Downward Excursions Distances	Exceptional Upward Excursions Distances
UP TO 10	N/A	N/A	N/A	N/A
10 to 17	3	2	N/A	N/A
18 to 22	4	4	N/A	N/A
23 to 29	5	5	10	N/A
30	6	6	12	N/A
31 to 39	7	7	14	14
40 to 59	8	8	16	16
60 to 79	9	9	18	18
80 to 99	10	10	20	20
100 to 119	11	11	22	22
120 to 139	12	12	24	24
140 to 179	13	13	26	26
180 to 270	15	15	30	30
270 to 285	15	15	30*	30*
* From 270m the distance should be decreased in a way that no excursion exceeds the depth of 300m.				

c) Stabilization periods for excursions

After an excursion the diver should observe a stabilization period before going on another excursion, according to the established on Table 11-02.

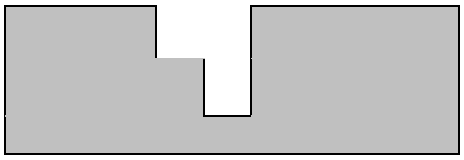
TABLE 11-02 - STABILIZATION PERIOD

Stabilization Period	After Standard Downward Excursion	After Standard Upward Excursion	After Exceptional Downward Excursion	After Exceptional Upward Excursion
Before Standard Downward Excursion	None	None	None	12 hours
Before Standard Upward Excursion	None	None	12 hours	12 hours
Before Exceptional Downward Excursion	None	None	48 hours	48 hours
Before Exceptional Upward Excursion	12 hours	None	48 hours	48 hours

d) Combinations allowed for excursions with no break

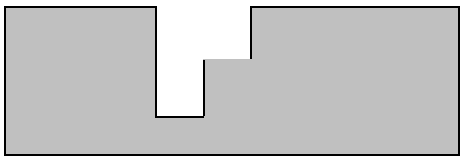
The following excursion combinations may be done according to the criteria established on Table 11-02:

I) Standard Downward Excursion followed by Exceptional Downward Excursion
.



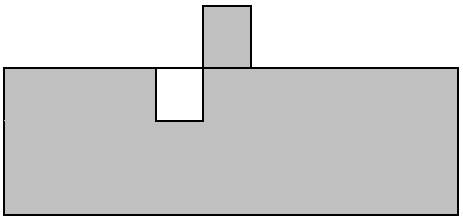
Consider as:
Exceptional Downward Excursion

II) Exceptional Downward Excursion followed by Standard Downward Excursion
.



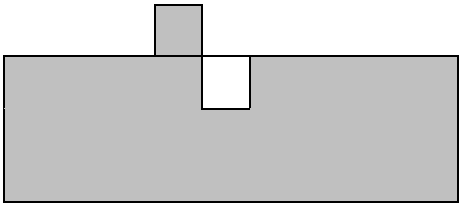
Consider as:
Exceptional Downward Excursion

III) Standard Downward Excursion followed by Standard Upward Excursion



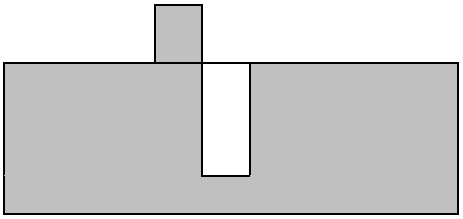
Consider as:
Standard Downward Excursion

IV) Standard Upward Excursion followed by Standard Downward Excursion.



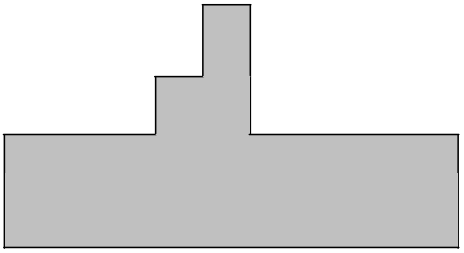
Consider as:
Standard Downward Excursion

V) Standard Upward Excursion followed by Exceptional Downward Excursion.



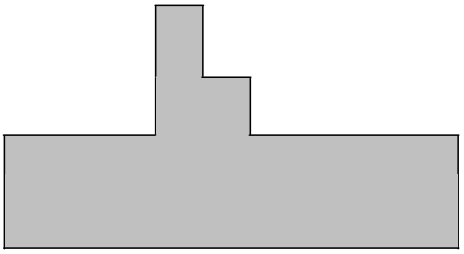
Consider as:
Exceptional Downward Excursion

VI) Standard Downward Excursion followed by Exceptional Upward Excursion.



Consider as:
Exceptional Upward Excursion

VII) Exception Upward Excursion followed by Standard Upward Excursion.



Consider as:
Exceptional Upward Excursion

e) Excursions after an intermediate decompression

After intermediate decompression no stabilization period is required to do a downward excursion. However, to do an upward excursion it will be necessary to have a stabilization period equivalent to the decompression time up to the excursion depth.

1109 - DECOMPRESSION

a) Standard, Deep and Exceptional Saturation

The standard procedure for decompression is the same for standard, deep and exception saturations, and the speeds established for the different depth ranges should be met as applicable.

From the beginning of decompression up to the depth in which the oxygen percentage in the chamber reaches 25%, the partial oxygen pressure of 0,48 and 0,5 bar should be kept. From this depth, the oxygen partial pressure should decrease so that the oxygen percentage in the respiratory mixture used in the chamber be kept between 21 and 25% due to the fire risk.

b) Final and intermediate decompression:

Depth range	Continuous speed	Going up through steps
From 350 to 20m	50 minutes/m	Go up 1m every 50 min
From 20m to the surface	90 minutes/m	Go up 1m every 1 h and 30

c) Stabilization period before beginning decompression:

I) The decompression may initiate with an upward excursion, respecting the stabilization periods established on Table 11-02, before initiating this upward excursion; and

II) If the decompression starts from the life level through the compliance of the decompression speed established in the section b) above, the compliance with the stabilization period will not be mandatory.

1110 - ANNUAL NUMBER OF SATURATIONS

a) Standard and Deep Saturation

Using the Saturation Technique, the maximum one can stay under pressure is 28 days and the minimum interval between two saturations will be the same as the saturation time, and it cannot be below 14 days. The maximum time one can stay under saturation in a period of 12 consecutive months cannot be over 120 days.

b) Exceptional Saturation

I) The diver will only be allowed two saturations per year in this depth range, with a minimum interval of 6 months between them and as long as he has not done saturation deeper than 300m during this interval;

II) In case the diver has already done a saturation between 300 and 350m, he can only perform another up to 300m after 4 months after the end of the previous saturation, and he cannot exceed 77 saturated days in the interval of 12 months, counting from the beginning of saturation between 300 and 350m; and

III) The maximum period one can stay under pressure is 21 days.

1111 - EMPLOYMENT OF OTHER TABLES AND NEW PROCEDURES

The requirements established in the current chapter do not restrict or prohibit the adoption of different tables and procedures.

The tables and diving procedures that are in accordance with the established in the current standard do not need to be submitted to the ratification by DPC. However, other tables and procedures that are not in accordance should be forwarded to DPC, followed by information related to the development, as well as a document that shows the consolidation of its safe application.

CHAPTER 12

GENERAL SAFETY REQUIREMENTS

1201 - GENERAL CONSIDERATIONS

The safety precautions established in this standard are considered basic rules that should be known by everyone involved in the work such as divers (superintendent, supervisor, divers, technicians, instructors, and support group); master or officer of the diving unit; personnel involved in the job safety; personnel involved with the support vessels; etc.

Any person, involved or not with diving operations, when realizing a risky situation for the divers, has to alert the diving supervisor immediately so that appropriate measures can be taken. The time factor is critical in emergency situations, that is why everyone is considered safety inspectors, and this doctrine should be disseminated among the members of a company/school where the diving operations/instructions are carried out.

1202 - DIVING OPERATIONS PLANNING

All diving operations must be preceded by careful and detailed planning, prepared by the technician in charge of the company/school, to be co-substantiated in a document called "OPERATION PROCEDURES (PO)" , which should be known by all members of the diving team, besides the people involved, directly or indirectly, with the diving operations.

At least the following items should be studied for the elaboration of the Operation Procedures (PO):

- Setting of objectives;
- Data gathering and analysis;
- meteorological conditions;
- establishment of operational tasks;
- selection of the diving technique;
- selection of the equipment and supplies;
- selection of the diving team;
- establishment of the procedures and safety precautions;
- final preparation for the diving;
- operation performance;
- sea conditions;
- movement of the vessels;
- Submarine dangers, including drains, suction pumps or places where the hydrostatic pressure difference may generate danger to the divers;
- depth and kind of operation to be executed;
- appropriation of the equipment;
- availability and qualification of the personnel involved;
- exposure to atmospheric pressure drops caused by air transportation, after the dive;

- Contingency plan;
- Simultaneous dive operations;
- Use of CH and Signets/diving baskets;
- Medical support;
- necessary spare parts;
- checklists of equipment verification; and
- other relevant information which guarantee the safety of diving operations and the complete compliance to this current standard.

1203 - CHECK LIST

The equipment that is part of a Diving System should be check regarding its conservation state and operational conditions before the beginning of any operation through a check list prepared by the company/school's technician in charge, and it should be done by duly qualified personnel.

1204 - PRELIMINARY RISK ANALYSIS (APR)

An analysis of the risks resulting from the characteristics and dangers related to the nature of the job and place where the diving will happen should be done at the beginning of every diving operation.

This analysis should be in a document named "Preliminary Risk Analysis (APR)", which shall be filled out by the contractor and by the diving supervisor before the operations.

As a basic safety rule, APR shall be reviewed every time modifications are introduced in the operation or when there is any accident during its performance. It is also recommended that this assessment be reviewed in regular intervals in order to ensure that the adopted procedures are appropriate.

However, because it does not foresee all the threats, the following list should be complemented in accordance with other risks resulting from the nature, operation site and other present factors:

- Limitation of flow and volume of the breathing mixture by the SCBA;
- supply of the breathing mixture for the diving;
- contamination or inadequate composition of the breathing mixture;
- employment of exposure limit times in the dependent diving operations using compressed air or with MRA;
- dives near aspirations or submerged discharges;
- visibility of the site (aerial and underwater);
- undercurrents;
- dives with remote controlled vehicles;
- use of electric equipment;
- use of water blasting equipment at high pressure;
- use of refloating equipment;
- use of cutting tool;
- underwater cut with oxy-arc/ metal arc;
- dives from ships with dynamic positioning;
- diver and diving-bell stuck at the bottom;
- hyperbaric evacuation;

- use of too long umbilical;
- patient treatment in CH;
- operations in sites subject to high level of noise;
- proximity to sonar emissions or seismic researches;
- air trips after the dive;
- temperature of the sea water and the water used to heat the diver;
- limits for the exposure of the diver under saturation;
- familiarization of the team to the activity to be executed; and
- appropriation of check lists; and
- dives in dams/hydroelectric.

1205 - CONTIGENCY PLAN

The companies/schools should prepare specific contingency plans for every kind of operation to be performed in order to effectively the possible emergency situations. This plan should always take into consideration the divers that need to be evacuated under pressure at the moment the emergency happens.

1206 - DIVE ACCIDENTS

All the accidents with victims (fatal or not) occurred with divers during the dive operations/instructions should be informed immediately by the dive company/school and/or contractor to the jurisdiction area CP/DL/AG where the school/work front is, as established in item 0908 of the current standard.

1207 - REQUIREMENTS FOR UNPREDICTED SITUATIONS

The performance of dive operations using procedures that are not in accordance with the requirements established in the current standard should be submitted previously to DPC's appreciation. For this assessment, the company/school should forward the co-substantiated requirement with the following information:

a) equipment list to be effectively employed, including the eventual alterations made in relation to the standard requirements established in the current standards;

b) operational data such as depth, operation site, stream, dive duration and the whole operation, distance to be traveled by the diver and other relevant ones;

c) procedures to be applied, including those related to emergency situations; and

d) grounded justification in relation to the requirement.

1208 - PREVENTION, DETECTION AND FIRE FIGHTING

a) Fire risk in Hyperbaric Chambers

Due to the great fire potential inside the CH because of the presence of oxygen in high partial pressures resulting from the percentage and depth, the main action to reduce this risk is the establishment of measures to prevent the excessive increase of the O2 percentage in the CH atmosphere.

The following minimum requirements are applicable to the CH in order to prevent fires:

I) use of oxygen breathing masks and rich therapeutic mixtures in O2 with discharge to the external atmosphere, or arrangement of valves that allow safe breathing in the chamber in case masks with internal discharges are used;

II) use of oxygen analyzers in order to prevent the percentage increase of O2 before reaching critical levels;

III) ventilation system capable of ensuring that the atmosphere may be corrected to that it can keep the oxygen percentage below 21%.

IV) prohibition of entrance in the chamber with lighters, matches, paints, solvents, fuels or volatile and inflammable materials, as well as restrictions to papers, newspapers and other items that may initiate and feed the fire;

V) use of towels and bed clothing flame retardant;

VI) prohibition of aerosol deodorants or shave lotions;

VII) use of material that prevent the generation of static electricity and sparks;

VIII) use of equipment to fight the fire that use non-toxic extinguisher agents, such as pressurized water extinguisher by non-toxic gas;

IX) regular pressure check of the extinguisher agent cylinder according to the manufacturer's recommendation; and

X) external and internal paint of the chambers and their nets with flame retardants according to ABNT standards.

b) Risk of fire involving the area in which the Dive System is installed

The diving system must be installed in safe areas to avoid or decrease the possibility of being affected by fire, and the following requirements must be applicable:

I) when the system is installed in confined or closed areas, the external area must be equipped with fire detectors and alarms;

II) the diving system control site installed on board ships or platforms must be equipped with self-contained air supply masks that can work for up to thirty minutes consuming 60l/min and fire extinguishers;

III) portable extinguishers should be distributed in appropriate places and identified, and at least one of them should be installed at the compartment's entrance;

IV) the use of fuel should be reduced to the strictly necessary;

V) the use of material and equipment that accumulate static electricity and that may produce sparks should be minimized; and

VI) Diving Systems at platforms or other places subject to be classified as Risk Zones, according to the established in the Code for Construction and Equipment of Mobile Units of offshore drilling - MODU, CODE or equivalent code should be installed in places outside Zones 0, 1 or 2. In Situations where this procedure cannot be followed, the equipment part of the Diving System should be explosion-proof.

1209 - BREATHING MIXTURES

a) Contaminant limits

For underwater activities, the breathing mixture used (compressed air or HeO2) should comply with the technical and safety requirements, and the contaminants level should be below the following limits:

CO2 - 1000 ppm (0,1%) - Equivalent Value in the Surface (VES).

CO - 20 ppm (0,002%) – VES.

Particles, vapors and oil - 5mg/m3.

No taste or smell.

The air analysis to check the above limits may be done through "Dräger Pump" analyzers or equivalent, using reagent tubes such as:

CO2 - 0,1% CH 23501, reading of 0,1 to 6,0%.

CO - 5 /C CH 25601, reading of 5 to 700 ppm.

Oil - 1/A CH 6733031 to 10mg/m3.

The contaminant levels related to any depth can be obtained as follows:

CONTAMINANT LIMIT=	VES ABSOLUTE PRESSURE IN MINUTES

b) Installation of the compressors

All breathing mixtures compressors, specially the air ones, should be installed in a way there is no risk of gas aspiration from the discharge of their own engine or ambient where there was any contamination possibility (engine room, basements, etc.).

c) Breathing mixtures provided by specialized companies

The gases or breathing mixtures, when supplied by third parties in tanks for diving operations, can only be used followed by these specifications:

I) percentage of the constituents elements;

II) purity;

III) kind of analysis performed; and

IV) name and signature of the person in charge of the analysis.

d) Breathing mixtures analysis

The artificial breathing mixtures should be analyzed regarding their oxygen percentage in the operations site and have indelibly marked in their tank the name and composition of their content.

The diving team should always have conditions to analyze the artificial breathing mixtures used at the operation site regarding the percentage of:

I) oxygen;

II) carbon gas; and

III) carbon monoxide.

e) Minimum supply of mixtures

The diving operation can only happen if the gas amount is at least three times the necessary to pressurize the CH in the maximum working depth pressure during normal operation.

The amount of gas can be two thirds of the one calculated as above if the equipment has a recycling system.

1210 - SIGNING REGARDING DIVERS' SAFETY AND NAVIGATION AND PROHIBITION OF THE NAVIGATION AREA

a) In all diving operations proper buoyage and signalization will be used in accordance with the International Sign Code (CIS) and other means judged necessary to the safety; and

b) In case of diving operations done in ports access channels or in predicted vessel traffic area, the contractor and the service provider

should inform CP/DL/AG at least 72 prior to the dive so that the requirement for interdiction of the area need can be assessed though the Notice to the Mariners.

1211 - PRIORITY TO USE OF DEPENDENT EQUIPMENT

The dependent diving technique will always be used to perform underwater jobs. SCBA will be used only for light jobs, such as: Visual inspections, search for underwater objects and photography in dives without decompression, in the absence of dangerous conditions and supported by inflatable boat or provided with ladder or platform from the water line for the boarding of the diver. In specific use cases, the use of SCBA will only be authorized by DPC upon formal request.

1212 - MAXIMUM TIME UNDERWATER FOR AIR DIVE

The maximum daily underwater time, including decompression, for dives using compressed air, should not be over four hours per diver.

1213 - MAXIMUM TIME FOR INTERVATION DIVE WITH HeO2

The maximum daily underwater time, including decompression, in dives of intervention using the HeO2 breathing mixture, up to the depth of 90 meters, should not be over 160 minutes per diver, who shall be equipped with diving suit appropriate for this condition (dry clothes together with a woolen overall or clothes with hot water circulation).

1214 - MAXIMUM TIME UNDERWATER FOR DEEP DIVE (SATURATED)

The maximum period one can stay under pressure is 28 days.

In the saturations up to three hundred meters, the minimum interval between two saturations will be the same as the saturation time, and it cannot be below fourteen days. The maximum time one can stay under saturation in a period of 12 consecutive months cannot be over 120 days.

In the saturations between 300 and 350m, the minimum interval between saturations will be of 6 months, and the diver is allowed to perform only two saturations in this depth range per year.

In case the diver has already done a saturation between 300 and 350m, he can only perform another up to 300m after 4 months after the end of the previous saturation, and he cannot exceed 77 saturated days in the interval of 12 months, counting from the beginning of saturation between 300 and 350m.

1215 - CONSIDERATIONS ABOUT THE USE OF OPEN BELL (SIGNETE) FOR DIVE

The use of open bell (signet) for dive is required compulsorily in the following conditions:

a) Dive deeper than thirty meters.

b) Intervention dive up to ninety meters deep, and the closed bell can be used.

1216 - OPERATIONAL LIMITATIONS FOR INTERVENTION DIVES

Intervention dives (Heliox) up to the maximum depth of ninety meter, can only be performed using the open bell (signet) or closed bell during day time and maximum current of one knot.

For purposes of this standard, daytime dive is the one in which the diver effectively enters the water after sunrise and finishes the decompression and leaves the water before the sunset.

1217 - MARKING OF EQUIPMENT AND CONTROL INSTRUMENTS

All control instrument, indicator, valves and other diving accessories should be legibly marked, in Portuguese, as to their function.

1218 - TRANSPORT OF PATIENTS WITH DECOMPRESSIVE PROBLEMS AND EASINESS TO TREAT DIVING ACCIDENTS

a) Transport of patients with decompression problems

In the transportation of patients with decompression problems, when a portable compression CH is not available, the following aspects must be observed:

- keep the feet in a higher position than that of the head;
- keep the person lying on his/her left side;
- breathe pure oxygen when available;
- keep constant vigilance regarding the evolution of the symptoms;
- use cardio respiratory resuscitation, if necessary;
- keep the patient warm;
- inform the CH team that a patient is on the way;
- when using the aircraft with no pressurization (helicopters, for example) to transport the patient, the flight must be done in the smallest altitude possible; and
- in the transportation of the patient using pressurized aircraft, keep the internal pressure as close as possible to the atmospheric pressure.

b) Easiness to treat the diving accidents

All diving operations, regardless of the necessity of the CH presence should foresee the necessary resources to attend eventual decompression accidents.

This provision should include at least the following aspects: I) localization, availability and readiness of the closest CH;

II) effective availability of victim of accident transport resources; III) availability of medical staff and specialized support to the attendance; and

IV) necessary means of communication.

1219 - USE OF EXPLOSIVES AND ELECTRIC EQUIPMENT

It is prohibited to stay in water because of an explosion caused by the use of explosives underwater.

All electric equipment used underwater should be equipped with safety device that prevents the presence of voltage or high currents that may threat the diver's physical integrity in case there is a malfunction.

1220 - OPERATIONS OF DIVE IN LIVE WORKS OF VESSELS AND ADJACENCIES

In the dive operations in live works of a vessel or immediate surroundings, the following precautions should be observed by the vessel, among others:

a) do not move thrusters or rudders. The dilemma of moving a vessel in a risky situation or keep the diver's safety should be avoided, not scheduling chores of this kind in places where the vessel may be in difficulties;

b) do not activate condensers or pumps whose sea aspiration have diameters above ten centimeters. Put warning signs in the equipment;

c) do not turn sonars and echo sounders;

d) do not throw objects in the water;

e) provide support team with life buoy and illumination;

f) warn through the interior communication system the conditions above at regular intervals;

g) keep vigilant about vessels. Approaching them is not allowed;

h) keep the appropriate CIS sign lifted in the mast and keep the close vessels informed; and

i) only start diving after the authorization of the person in charge of the vessel.

Dives will only be allowed from vessels that are not anchored when the diving supervisor thinks it is safe and appropriate measures have been taken to save the diver's physical integrity, protecting him against thrust, aspiration, discharges and possible obstacles.

This kind of operation will only be allowed if on daylight, except from vessels that have dynamic positioning system, approved by DPC, for this kind of operation.

1221 - DIVE OPERATIONS IN HYDROELETRIC PLANTS

Besides the safety requirements established in the current standard, the additional ones listed as follows should be met because of the dives performed in dams:

a) the generation unit turbine where the dive will be done should be off and the blades locked. The commands located in the control room should be locked and labeled so that they are not activated inadvertently;

b) the turbines immediately adjacent, in case they exist, should also be submitted to the procedures established above;

c) "flow-cut" devices should be installed in case there is flow in the diving site;

d) the diving system used should be in accordance with the requirements established in item 0601 of the current standard;

e) the diver should be duly equipped, in accordance with the requirements established in item 0601 of the current standard;

f) the minimum team should be composed of 6 divers: one supervisor, one diver to do the job, one hose guide, one surface assistant, one back up diver and one chamber operator;

g) a duly certified CH should be available with dedicated and exclusive use.

h) the operational limits of the equipment used should be met, such as: flow and maximum depth, minimum working pressure and appropriate support.

1222 - DIVE FROM ELEVATED PLATFORMS

a) The maximum permitted height for the realization of a straight jump of the diver to the water from a diving platform is 5m.

b) The diver can access the water through a ladder, which has to be available at the site and attend the requirements below, from diving platforms below 10m:

I) The vertical space between the steps should not be higher than 50cm;

II) The horizontal space between the steps and the side surface of the diving platform should be at least 30 cm; and

III) The ladder should be equipped with handrail that extends to 1 m above the platform diving base.

c) For diving platforms higher than 10m measured vertically between the access and the water surface, the equipment in Chapter 8 of the current standard should be used, in order to enable the safe access of the diver to the water.

CHAPTER 13

USE OF VESSELS EQUIPPED WITH DYNAMIC POSITIONING TO SUPPORT DIVE OPERATIONS

1301 - CLASSIFICATION

The dynamic positioning vessels used for diving operations should be classified as, at least, Class Two, as established by Memo MSC/Circ. 645, of 06/06/1994, of IMO.

1302 - OPERATIONAL LIMITS

The following conditions are basic limitations to dive from dynamic positioning vessels:

a) the vessel in movement or without establishing effective dynamic positioning;

b) absence of resource to prevent the diver from being affected by the movements generated in the water by the blades and thrusters; and

c) risk for the diver due to the variation of the vessel position.

1303 - VERIFICATION AND ACCEPTANCE DOCUMENT OF THE FLAG STATE

The vessels or platforms equipped with dynamic positioning from which dives will occur, should have the Verification and Acceptance of Ships with Dynamic Positioning Document (FSVAD) issued in accordance with the Memo MSC/Circ., besides the class notation in item 1301 . 645 - Recommendations for Ships Equipped with Dynamic Positioning Systems, by the Maritime Safety Committee of IMO. The FSVAD model is in the Annex 13-A.

1304 - DIVE ORIENTED FROM THE SURFACE FROM A VESSEL WITH DYNAMIC POSITIONING

The whole diving team should be completely instructed and familiarized with the operation planning before any oriented diving from the surface from a vessel with dynamic positioning.

The topics to be presented must include, at least, the following subjects:

a) a drawing should be shown to the whole team with the ship that identifies the localization of the diving control station, the point of launching into the water, position of the guide diver (tender), "taut wire" cables, cranes, thrusters and blades. The drawing should have no scale, preferably, and should identify if the thrusters are azimuthal or installed within the tunnels on the side;

b) the supervisor must emphasize the need for good communication, constant vigilance and consensus between the team members;

c) every staff member, specially the diver guide, should inform the supervisor of any circumstances that may compromise the dive safety. These considerations should not be restricted to the operation or to the vessel itself also including any external action that affects the work site, such as the approach of other vessels, change of the sea state, visibility reduction, among others;

d) all the members of the diving team should be perfectly aware of their attributions and responsibilities, and their development must be followed by the supervisor;

e) the key persons in the positioning control of the vessel should also participate of the staff instruction meeting;

f) it must be emphasized that every new operation must be considered a first. No one can be considered completely familiarized with the vessel, dive techniques used and involved risks and have to take part in all discussions;

g) the length of the diver's umbilical should not allow him to accidentally reach the blades or thruster in operations in which he is directly thrown into water.

h) in the cases in which the restriction of the umbilical length as established above prevents the diver from reaching his work site, an open bell (signet) can be used, equipped with guide weight, from which the divers' umbilical is connected. In this case, however, the length of the diver's umbilical should be so that it does not allow him to reach the blade or thruster from the bell or basket, and the diver cannot leave those while moving;

i) these operations require that the diver's guide listen every communication between the diver and the supervisor (in the bell or on the surface), as well as speak directly to the supervisor in case it is necessary;

j) the diver's umbilical should be manually guided during the whole time and should not be left with extra clearance, regardless of being guided from the surface or the bell/signet;

k) as much as possible, the diver guide should be protected from time and from any factor that might bring discomfort or lack of attention, and he must be replaced in regular intervals;

l) written procedures shall be prepared and monitored closely so that the diver enters and gets out of water safely, being guided in a safe and appropriate way the whole time. These procedures should foresee, in case of accident, the need to remove the diver from the water and take him to the CH within four minutes at most;

m) the diver's and the guide's umbilical should be marked in regular intervals. The diver guide should inform the supervisor about the length of the umbilical that will be cleared so that the diver can reach his work site and reach the closest blade or thruster. The guide should inform the supervisor about the length of umbilical released and any variation;

n) during the dive, the supervisor should be positioned so that he follows the work of every member accordingly; and

o) there should be direct communication between the supervisor and the person in charge of the operation of the vessel's dynamic positioning system, and there should not be interference.

1305 - OPERATIONS IN SHALLOW WATERS

Operations with vessels with Dynamic Positioning (DP) in shallow water, normally less deep than 25m, may present other kinds of interference that affect the safety of the diving operation.

Among the aspects with the highest interference degree are:

- greater possibility of the acoustic responder of the reference system staying out of reading angle of the transponder in the ship's hull.
- acoustic signal distortion by the diver's bubbles.
- spurious echoes of structures or the sea itself.

- easier for the bell, diver or other equipment to interpose between the transponders.

- acoustic interference caused by water jet equipment under pressure, pneumatic equipment bubbles or other equipments. The use of this equipment should be informed to the system operator of the dynamic positioning.

1306 - OPERATION MANUAL

The vessels equipped with DP should be equipped with a specific operation manual for this kind of ship, which should comprehend at least the following subjects:

a) Check list for the initial position (pre-operation);

b) Check list of room (during operation);

c) Instructions for dynamic positioning;

d) List and instructions for annual tests (for FSVAD endorsement);

e) List and instructions for initial and periodic tests (for the emission and renewal of FSVAD); and

f) List and instructions for tests after changes or identification of non conformities.

1307 - ALARMS AND ALERT LEVELS

The operation should obey certain alert levels to prevent accidents, as follows:

a) Normal operation status

Situation in which the vessel is positioned and the dynamic positioning system is operating normally with all the operational backup systems available.

In this situation, the total power consumed by the thrusters does not exceed the 80% of the total available capacity, tolerated only short isolated periods within the limits established for the position determined and there is no crash risk.

b) Level 1 alert

Situation in which a simple flaw results in the use of a back-up system, but keeping another system ready to be used. This alert will also be assumed if any of the thrusters (cross blades or azimuthal used in the maintenance of the ship position) exceeds 80% of its total capacity or if the total power consumed by the thruster exceeds 80% of the total available, for a longer period than a short and isolated one (maximum of thirty minutes), in both cases.

I) In case of dive with closed bell in this situation, everyone in charge of the operation should be informed, and the return of the divers to their bells and the seal of their hatch is determined. The person in charge of this operation should then assess if the operation can be continued or aborted in the conditions found.

II) If the dive is being conducted with open bell (signet - mandatory for air and intervention dives from vessels equipped with dynamic positioning), should immediately be aborted and the divers brought to the surface. In this case, the decompression in the surface procedure should be adopted using oxygen and establishing the emergency procedure in case it is necessary to bring the diver to the surface without completing the decompression and treat him accordingly.

c) Level 2 alert

Situation in which the malfunction of a system results in immediate and probable risk of position loss or risk of real collision.

In this situation, everyone in charge of the operation should be informed and it should be ordered that all the divers return to the bell and the seals return to their hatch. The bell should be lifted as fast as possible.

The procedure for compressed air and open bell dives (signet) is equal to the one adopted for level 1 alert.

1308 - OPERATION OF THE VESSELS WHICH SUPPORT DIVING IN BRAZILIAN WATERS (AJB)

The vessels which support diving, domestic or foreigners, besides authorizations provided for the operation in the AJB, should have their diving system assessed by DPC according to the procedure described below:

- the person in charge of the ship should forward requirement to DPC, instructed with the presentation of the documents provided in item 0202 (what is applicable), with at least thirty days in advance to the estimated date for the beginning of the ship's operation.
- besides the documentation mentioned, it is necessary to present the Operation Procedures and Contingency Plan related to the diving operations the ship will conduct.
- after assessment of the documentation presented, DPC will perform a pre-operation inspection in the diving system installed on board the ship.
- in case there are no demands, DPC will issue an opinion in favor of the diving operations by the ship.
- DPC will forward the whole process to the CP/DL/AG in charge of the jurisdiction area of the ship's operation in order to process its enrollment, according to the provided in Chapter 2 of the current standard.
- at their own discretion, DPC can emit a provisional authorization to begin dive operations of the ship, and the deadline cannot be over sixty days, aiming at its immediate necessities.
- the inclusion of dive systems installed on board support vessels will be admitted to the Dive Companies Enrollment Form already enrolled.

Notes:

1) The pre-operation inspection is usually performed at AJB. However, to meet the immediate necessities of the operation at the AJB of the vessels built/in operation abroad, the inspection can be done before entering AJB upon request by the person in charge of the vessel via explanatory letter addressed to DPC.

2) In case the inspection is done abroad, the costs related to transportation, accommodation and stay should be up to the applicant. The values related to the stay are the same adopted by MB.

CHAPTER 14

TRAINING FOR EMERGENCY SITUATIONS

1401 - EMERGENCY PROCEDURES

To prepare a PO, provided in Chapter 12 of the current standard, during the planning of the dive operations, the companies/schools should include the emergency procedures training establishments involving at least, the following topics:

- medical support at the site and base;
- first aid;
- removal and transport of people victim of accident;
- decompression problems and others resulting from pressure;
- emergency dive situations such as loss of supply, communication malfunction, diver stuck at the bottom, among others;
- emergency situations in the vessel or launching site; and
- other special situations of the operation to be conducted.

The trainings must be carried out by the companies/schools to follow the PC in the PO, preferably at the site of the dive operations, aiming at attaining a training level as close as possible to a real emergency situation.

1402 - EVACUATION OF DIVERS UNDER PRESSURE

Each diving team on board should have a PC that establishes the procedures and ensures resources so that the divers saturated may
evacuate the vessel used in a safe way while still under pressure.

This plan should include at least the following aspects:

- resources available on board, such as hyperbaric whaling, disposable chambers, abandonment bell, diving bell and others;
- gas supply, CO2 absorbent, hygiene and prophylactic products and other consumables necessary to the decompression after abandonment;
- effective autonomy of resources available, including batteries and other means of energy generation besides the consumables;
- means of transportation of hyperbaric whaling or other mean used to evacuate the divers;
- site designed to hold evacuated divers;
- resources available in the designed place;
- procedures and method for the abandonment of the vessel;
- procedures for decompression;
- action plan, organization and control; and
- chain of command and coordination lines of sectors involved.

The number of divers involved under saturation should be compatible with the resources available according to the PC including the divers that are in decompression. The divers that are being pressurized and that have exceeded the intervention limit should also be included in the available capacity provided by the plan.

The PC should be elaborated and kept by more than one company, using common resources to each one in order to optimize the available resources, since everyone involved is aware of their attributions.

This procedure should be trained whenever possible, aiming at attaining a training level as closer as possible to a real emergency situation.

RELEVANT LAWS

1) International Convention for Human Life Safeguard at the Sea - SOLAS 74, as amended.
2) Resolution A 831 (19) from International Maritime Organization (IMO).
3) Rules from Maritime Authority for Foreign Vessels Operation in Brazilian Waters - NORMAM-04/DPC.
4) Rules from Maritime Authority for Acknowledgement of Grader Authorities to Act on Behalf of Brazilian government - NORMAM-06/DPC.
5) Rules from Maritime Authority for Vessels Traffic and Permanence in Brazilian Waters - NORMAM-08/DPC.
6) Rules from Maritime Authority for Oceanway - NORMAM-13/DPC.
7) International Regulation to Avoid Collision at the Sea – RIPEAM 72, as amended.
8) Signs International Code (CIS).
9) Regulation Rule number 15 (NR-15), from Ministry of Labor and Employment.
10) Law number 6.514 from 12/22/1977, that changes Chapter V from Labor Laws Consolidation, approved by Law-Decree no. 5.452 from 05/01/1943.
11) Safety Standard for Pressure Vessels for Human Occupancy, issued by American Society of Mechanical Engineers (PVHO-ASME).
12) Law number 9.537 from 12/11/1997 (Lesta).

INDEMNIFICATIONS CHART

SERVICES RENDERED TO PROFESSIONAL DIVING SCHOOLS AND COMPANIES

1) Value for Inspection/Service rendered to Professional Diving Company:

INSPECTION/SERVICE	VALUE
1.1 – Process analysis and issuance of enrollment form (FCEM)	R$ 250,00
1.2 – Audit in Diving Accidents (PAM)	R$ 500,00
1.3 – Inspection for Requirements Removal (VRE)	R$ 250,00

2) Value for Inspection/Service rendered to Professional Diving School:

INSPECTION/SERVICE	VALUE
2.1 - Process analysis and issuance of enrollment form (FCREM)	R$ 250,00
2.2 - Audit in Diving Accidents (PAM)	R$ 500,00
2.3 - Inspection for Requirements Removal (VRE)	R$ 250,00

3) Notes:

a) Expenses with services to be rendered by Maritime Authority, due to the application of Art. 38 of the Law no. 9.537 of 12/11/1997 (Lesta), such as inspections, tests and approval of equipments, opinions, audit, certificates issuance, among other, will be indemnified by the interested parties.

b) For every subsequent Day of experts travel the amount of R$ 250,00 will be added.

c) For the accomplishment of Inspections / Audits above mentioned, the expenses of aerial or terrestrial transport to the destiny city, terrestrial transport in the urban displacements and stay of expert (s) will be responsibility of the company / school to be inspected / audited.

ANNEX 2-A

<table>
<tr><td> 

BRAZILIAN NAVY DIRECTORATE
OF PORTS AND COASTS

ENROLLMENT FORM OF DIVING COMPANY - FCEM</td><td>(9) OM Stamp</td></tr>
<tr><td rowspan="2">(1) Company Data:
Name:
CNPJ [National Registry of Legal Entities]:
Address:

Telephone: ( ) Fax: ( )</td><td>(10) OM Abbreviation:</td></tr>
<tr><td>(11) Enrollment Number:</td></tr>
<tr><td>(2) Person in charge for the Company:
Nome:
ID:
CPF [Individual Taxpayers’ Registry]:</td><td>(12) Issuance Date:</td></tr>
<tr><td>(3) Technician In Charge:
Name:
CPF:
CIR:</td><td>(13) Expiry Date:</td></tr>
<tr><td>(4) Hyperbaric Physician:
Name:
CPF:
CRM:</td><td>(14) Distribution:
1st copy – DPC
2nd copy – CP/DL/AG
3rd copy – Company</td></tr>
<tr><td>(5) Number of Diving System Safety Certificates (CSSM):</td><td rowspan="3"></td></tr>
<tr><td>(6) Certificate Issuance Date:</td></tr>
<tr><td>(7) Certificate Expiry Date:</td></tr>
<tr><td>(8) Date of certificate annual endorsement:</td><td>(15) Stamp and signature of CP/DL/AG</td></tr>
</table>

Note:

This form shall be valid only with presentation of Diving Systems Safety Certificates (CSSM) mentioned above, within expiry date and presenting on its back the annual endorsements regarding Annual Inspections, when applicable.

INSTRUCTIONS FOR FCEM FILLING

FIELD 1	Filled in with company's data, including name, CNPJ, complete address (with ZIP CODE), telephone and fax (with DDD), based in the documents requested on item 0202.
FIELD 2	Filled in with company's owner data.
FIELD 3	Filled in with diving professional data, who will technically answer by the Company, as defined on item 0202, that shall have Oceanway CIR from group 4th (MGE or MGP).
FIELD 4	Filled in with Hyperbaric Physician Data, Who shall be responsible for hyperbaric treatments, as defined on item 0202.
FIELD 5	Number of all valid Diving Systems Safety Certificates (CSSM) held by the Company, as defined on item 0202.
FIELD 6	Filled in with issuance date of CSSM listed on filed number 5, separating each one of them.
FIELD 7	Filled in with expiry dated of CSSM listed on field number 5.
FIELD 8	Filled in with the date in which CSSM listed on filed number five was endorsed. (If applicable).
FIELD 9	Apposition of OM (CP/DL/AG) in charge for the enrollment stamp.
FIELD 10	Filled in with OM abbreviation (CP/DL/AG) , responsible by the enrollment of the company.
FIELD 11	Filled in with company enrollment number, attributed by CP/DL/AG, as defined on item 0202-d.
FIELD 12	Filled in with date in which CP/DL/AG issue FCEM.
FIELD 13	Filled in with date one year post the date of its issuance by CP/DL/AG.
FIELD 14	It refers to the distribution which CP/DL/AG will give to FCEM issued.
FIELD 15	Apposition of OM holder stamp and signature in charge for the enrollment.

BRAZILIAN NAVY

DIRECTORATE OF PORTS AND COASTS

HYPERBARIC PHYSICIAN RESPONSIBILITY TERM

HYPERBARIC PHYSICIAN PERSONAL DATA

Name:
Address:
City: **District:** **ZIP CODE:**
Identity Card: **Issuer Body:** **Issuance Date:**
CPF: **CRM:**
TEL.: ( ) **MOBILE: ( )**

DIVING COMPANY DATA

Name of Diving Company:
Address:
City: **District:** **ZIP CODE:**
CNPJ: **TEL.: ( )** **FAX.: ( )**

RESPONSIBILITY TERM

1 – I am aware of my responsibility before the diving company herein mentioned, regarding the following attributions:

- maintenance of divers periodic examinations, which evaluations shall be placed in an specific Field at Diver Record Book (LRM);
- conduction of hyperbaric treatments, that could be necessary, during execution of tasks related to submersed activities developed by the company;
- immediate guidance to diving team, in case of emergency activation, regarding proper procedure to the treatment of diving accidents occurred at the company.
- keep enrollment updated alongside the company, mainly regarding telephone numbers that I use for contact in emergency situation.

2 – I am aware that I shall answer in administrative, civil and penal ways by the consequences of non fulfillment of my attributions as Hyperbaric Physician of the company above mentioned, manly regarding obligations formally assumed by this Responsibility Term.

Place: _____ Date: _____/_____/_____

_____
Hyperbaric Physician Signature
(Notarized)

NOTES

1) Hyperbaric Physician certificate can be validated in CP/DL/AG itself, since it is performed in the presence of a representative.
2) This model shall be exclusively used to certificate Hyperbaric Physician responsibility before the diving company above mentioned, in case of enrollment process alongside CP/DL/AG.

BRAZILIAN NAVY

DIRECTORATE OF PORTS AND COASTS

TECHNICIAN IN CHARGE RESPONSIBILITY TERM

TECHNICIAN IN CHARGE PERSONAL DATA

Name:
Address:
City: **District:** **ZIP CODE:**
Identity Card: **Issuer Body:** **Issuance Date:**
CPF: **CIR:**
TEL: ( ) **MOBILE: ( )**

DIVING COMPANY DATA

Diving Company Name:
Address:
City: **District:** **ZIP CODE:**
CNPJ: **TEL.: ( )** **FAX: ( )**

RESPONSIBILITY TERM

1 - I am aware of my responsibility before the diving company herein mentioned, regarding the following attributions:
- maintenance of equipments technical conditions, as specified in Diving Systems Safety Certificate, issued by Grader Society with competence delegation to certify diving systems;
- ensure total fulfillment of NORMAM-15/DPC, regarding diving procedures and equipment certification;
- provide technical support to the company above mentioned regarding subjects defined in NORMAM-15/DPC;
- prepare company technical documents, foreseen in chapter 10 and 12 of NORMAM-15/DPC; and
- ensure total fulfillment of company's contingence plan in emergency situations.

2 - I am aware that I shall answer in administrative, civil and penal ways by the consequences of non fulfillment of my attributions as Technician In Charge of the company above mentioned, manly regarding obligations formally assumed by this Responsibility Term.

Place: _____ Date: _____/_____/_____

_____
Signature of Technician In Charge
(Notarized)

NOTES

1) Technician In Charge's signature can be validated in CP/DL/AG itself, since it is performed in the presence of a agent.
2) This model shall be exclusively used to certificate technical responsibility of the employee before the diving company above mentioned, in case of enrollment process alongside CP/DL/AG

<table>
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BRAZILIAN NAVY
DIRECTORATE OF PORTS AND
COASTS

ENROLLMENT FORM OF DIVING SCHOOL -
FCREM</td><td>(07) DPC Stamp</td></tr>
<tr><td rowspan="2">(1) School data:
Name:
CNPJ:
Address:

Telephone: ( ) Fax: ( )</td><td>(08) Enrollment Number:</td></tr>
<tr><td>(09) Issuance Date:</td></tr>
<tr><td>(2) Person in charge for the school:
Name:
ID:
CPF:</td><td>(10) Expiry Date:</td></tr>
<tr><td>(3) Instructor, technician in charge:
Name:
CPF:
CIR:</td><td>(11) Distribution:
1st Copy – DPC
2nd Copy – CP/DL/AG
3rd Copy – Company</td></tr>
<tr><td>(4) Hyperbaric Physician:
Name:
CPF:
CRM:</td><td rowspan="2">(12) CSSM Number:

Issuance:

Expiry:

Endorsement:</td></tr>
<tr><td>(5) Titular instructors:</td></tr>
<tr><td rowspan="2">(6) This diving school is licensed to minister the following courses:</td><td></td></tr>
<tr><td>(13) Stamp and signature of officer in charge</td></tr>
</table>

This form shall be valid only with presentation of Diving Systems Safety Certificates (CSSM) mentioned above, within expiry date and presenting on its back the annual endorsements regarding Annual Inspections, when applicable.

INSTRUCTIONS FOR FCEM FILLING

FIELD 1	Filled in with school's data, including name, CNPJ, complete address (with ZIP CODE), telephone and fax (with DDD), based in the documents requested on item 0302.
FIELD 2	Filled in with school's owner or person in charge data.
FIELD 3	Filled in with instructor data, who will technically answer by school theoretical and practice activities, as defined on item 0302. He shall have Oceanway CIR from group 4th (MGE or MGP, as per the course to be ministered).
FIELD 4	Filled in with Hyperbaric Physician Data, Who shall be responsible for hyperbaric
FIELD 5	All titular instructors who will conduct school theoretical and practice activities shall be mentioned (name, CPF and CIR), as defined on item 0302.
FIELD 6	Filled in with course for what school has license to minister, mentioning license Ordinance issued by DPC.
FIELD 7	Apposition of DPC stamp.
FIELD 8	Filled in with enrollment number designed by DPC, as per item 0302.
FIELD 9	Filled in with the date in which DPC issue FCREM.
FIELD 10	Filled in with the date one year post its issuance.
FIELD 11	It refers to distribution that DPC Will give to FCREM issued.
FIELD 12	Filled in with the number of CSSM issued by S/C, its issuance date, expiry and last annual endorsement, in case it exists.
	Stamp apposition and signature of DPC Officer responsible for diving school enrollment.
FIELD 15	Apposition of DPC stamp and signature in charge for the enrollment.

ANNEX 3-C

CURRICULUM OF BASIC COURSE OF PROFESSIONAL SHALLOW DIVING

DURATION: XX WEEKS (*) TOTAL HOUR LOAD: 210 HOURS

1 – COURSE'S GENERAL PURPOSE

Educate Professional divers for safe use of open circuit AUTONOMOUS equipment up to the maximum depth of 20 meters, and DEPENDANT equipment up to the maximum depth of 50 meters, on dives using compressed air. At the end of this course, diver should be capable to enter in the 4th Oceanway Group, in the category of Diver who operates with Compressed Air (MGE).

2 – COURSE'S GENERAL GUIDELINES

a) Regarding course structure

I) For enrollment in the course, divers should fill in age, health and physic capacity requirements, provided in subparagraph 0306-a of this rule;

II) Teaching Unities (UE) from severe disciplines shall be presented in a didactic sequence, in a way to allow student the necessary base to new subjects comprehension, as well as safe performance of practical exercises;

III) As diving activity involves considerable risks, schools may reserve the right to exclude from course students considered as potentially hazardous for conducing practical activities, establishing rules for applying this guideline in the event of candidate enrollment;

IV) Regardless of eventual skills showed in admission tests, even these are harder than those foreseen; every student shall be considered as a complete strange to the subjects to be ministered in the course, subject to all instruction steps;

V) Requirements considered essential for safe practice of autonomous and dependant dive are established in the curriculum. However, activity characteristics suggest a constant and gradual improvement, which is only ensured by the practice. So, it's desirable that school enrich its programs, besides promote your students to progress carefully in the activity, looking for support in element with bigger experience, whenever possible. Subjects as seamanship, practical rules for vessels maneuver, etc have recommended inclusion;

VI) It's desirable that a certain standardization of subject technical language in the country, allowing future checks by the Competent Authority. So, it's necessary that schools adopt terminology contained on Chapter 1 from this rule;

VII) Considering that diving activity requires a good physical conditioning, curriculum shall forecast, at least one hour of physical training per day of practical-theoretical instruction. Purposes and EU lists regarding this subject will be not presented herein.

VIII) Dive schools shall have real equipment for student's instruction, such as: Bell, hyperbaric chamber, helmets and other equipment listed in its CSSM.

b) Regarding teaching techniques

Learning shall be developed through expositive classes using instructional resources proper to the content, specially real models, whenever applicable, in a way to promote maximum participation of students in planned activities.

c) Regarding classes attendance

I) Student shall attend to 90% of the total ministered classes;

II) Attendance to classes and other activities is mandatory; and

III) For the fulfillment of subparagraphs described above, it also considered as absence: delay greater than 10 minutes from the beginning of any planned activity or non authorized leave during its development.

d) Regarding learning measurement

I) Learning shall be measured by a write evaluation, at the end of each subject, covering all its content;

II) At learning evaluation, a numeric scale from 0 to 10, with decimal approximation, shall be considered;

III) At practical tests, the concepts SATISFACTORY and UNSATISFACTORY shall be attributed; and

IV) The issuance of an UNSATISFACTORY concept in practical tests shall occur from student non adaptation to the equipment or diving activity, generating, in this case, student disconnection from instructor's observation.

e) Regarding course approval and student license

I) Minimum concept for approval shall be seven;

II) Student consider as approved at the course shall reach approval in the subjects (including practical tests), and also shall have minimum presence required; and

III) Approved student shall receive a Certificate (Annex 4-A) evidencing He/she completed, satisfactorily, the Basic Course of Professional Shallow Diving. The document shall bear in its back subjects distribution, hour load and respective grades reached in the evaluations.

3 – DISTRIBUTION OF SUBJECTS AND HOUR LOAD

MGE1 – Physics, Medicine and Physiology directed to Diving..... 22 hours
MGE2 - Open Circuit Autonomous Equipment ..... …….42 hours
MGE3 – Dependant Equipment ..... 46 hours
MGE4 – Decompression and Treatment Charts ..... 26 hours
MGE5 – Practical Works, Submerged .....60 hours
REAL HOUR LOAD ..... 196 hours
RESERVE TIME ..... 14 hours
TOTAL HOUR LOAD ..... **210 hours (*)** (*)
About 35 business days, with six daily hours of instruction.

4 – MINIMUM HOUR LOAD OF PRACTICAL CLASSES OF UE BY STUDENT

SUBJECT MGE2
Unity - 4.0 - five hours
Unity - 5.0 - one hour

SUBJECT MGE3
Unity - 1.0 - one hour
Unity - 4.0 - five hours

SUBJECT MGE4
Unity - 3.0 - one hour

SUBJECT MGE5
Unity - 1.0 - four hours
Unity - 2.0 - one hour
Unity - 3.0 - one hour

BASIC COURSE OF PROFESSIONAL SHALLOW DIVING	
SUBJECT: PHYSICS, MEDICINE AND DIVE PHYSIOLOGY	
ABBREVIATION: MGE1	**HOUR LOAD: 22 HOURS**
SUMMARY	

A) SUBJECT GENERAL PURPOSE

Provide student with knowledge about physical laws that acts at liquid mean, physiological functions under pressure and main accidents related to diving activity.

B) EU LIST

1. BASIC PRINCIPLES OF DIVE PHYSICS …..... 06 hours
- 1.1 – Brief history of dive and its generator needs.
- 1.2 – Gases kinetics theory.
- 1.3 – Main gases laws and its applications.
- 1.4 – Buoyancy and Archimedes' Principle.

2. INITIAL NOTIONS OF ANATOMY AND PHYSIOLOGY ..... 03 hours
- 2.1 – Skeletal Muscle System.
- 2.2 – Circulatory and Respiratory Systems.
- **2.3 – Ear and its alterations during dive.**
- **2.4 – Facial sinuses.**

3. DIVING ACCIDENTS .....……..... 06 hours
- 3.1 – Diving accidents.
- 3.2 – Pressure direct effects (physics).
- 3.3 – Pressure indirect effects (biochemical).
- 3.4 – Environmental hazards.

4. METHODS FOR DROWNED RECOVERY ..... 03 hours
- 4.1 – Methods for drowned recovery.

5. FIRST AID .....……..... 04 hours
- 5.1 – Important notions about first aid.

C) SPECIFIC RULES

I) This subject shall be ministered before any practical activity involving usage of compressed air for dive. In the period in which it is being ministered, students shall be in adaptation to equipped swimming and free dive; and

II) The classes from this subject shall be ministered through techniques of Expositive Classes and Practical Demonstration.

D) LEARNING EVALUATION

Write test covering UE 1 to 5.

E) INSTRUCTIONAL RESOURCES

DVD; projector and white board.

F) REFERENCES

I) BRASIL. Centro de Instrução e Adestramento Almirante Áttila Monteiro Aché. Manual Didático de Medicina Submarina. Rio de Janeiro, 1999.

II) BRASIL. Centro de Instrução e Adestramento Almirante Áttila Monteiro Aché. CIAMA 201 – Manual de Mergulho parte I. Rio de Janeiro, 2003.

BASIC COURSE OF PROFESSIONAL SHALLOW DIVING	
DISCIPLINE: OPEN CIRCUIT AUTONOMOUS EQUIPMENT	
ABBREVIATION: MGE2	**HOUR LOAD: 42 HOURS**
SUMMARY	

A) SUBJECT GENERAL PURPOSE

Provide student with theoretical and practical knowledge about free diving equipment and open circuit autonomous equipment.

B) UE LIST

1. BRIEF HISTORY AND CHARACTERISTICS OF OPEN CIRCUIT AUTONOMOUS EQUIPMENT ..... 02 hours

1.1 – Brief history of open circuit autonomous equipment.
1.2 – General characteristics of open circuit autonomous equipment.

2. OPEN CIRCUIT AUTONOMOUS EQUIPMENT ....……..... 04 hours

2.1 – Breathing set.
2.2 - Accessories.

3. PLANNING AND SAFETY ON DIVING .....…..... 04 hours

3.1 – Diving preparation and procedures.
3.2 – Adverse conditions for diving.
3.3 – Safety general rules.
3.4 – Emergency procedures.

4. USE OF EQUIPMENT IN A CONTROLLED ENVIRONMENT ..... 30 hours

4.1 – Adaptation to the equipment.
4.2 – Exercise on bell.
4.3 – Exercise on equip and unequip.
4.4 – Exercise on equipped crossing on surface.

5. BOTTLES LOADS.....……..... 02 hours

5.1 – Load of compressed air bottles.

C) SPECIFIC RULES

I) None of the air compressed dives shall be performed before the ministration of “diving physics and physiology” subject;

II) First dive activity with compressed air shall free dive on Bell, with it, preferably, in ten meters of depth;

III) UE 4 "use of equipment in a controlled environment” shall be ministered in swimming pool, diving tank or in the sea, in a sheltered area;

IV) In this subject, student Will be subjected to the following practical testes: “free diving on Bell”, “unequip and equip”, “equipped crossing on surface” and “checking of adaptation to the equipment and emotional balance under adverse conditions ";

V) Practical tests executed by students shall be regulated by Standard Rules of Instruction (NPI) created by the school;

VI) Classes from this subject shall be ministered through techniques of Expositive Class, Practical Demonstration and Practical Class; and

Vl) Dives shall be performed using a Double set of bottles.

D) LEARNING EVALUATION

I) Write test covering UE 1, 2, 3 and 5;

II) Practical tests of UE 4; and

III) A SATISFACTORY or UNSATISFACTORY concept Will be issued for practical tests regarding UE 4, according to subparagraph II and III, from Course General Rules, presented in Course General Synopsis.

E) INSTRUCTIONAL RESOURCES

DVD; projector and white board.

F) REFERENCES

BRASIL. Centro de Instrução e Adestramento Almirante Áttila Monteiro Aché. CIAMA 201 – Manual de Mergulho parte I. Rio de Janeiro, 2003.

BASIC COURSE OF PROFESSIONAL SHALLOW DIVING	
SUBJECT: DEPENDANT EQUIPMENT	
ABBREVIATION: MGE3	**HOUR LOAD: 46 HOURS**
SUMMARY	

A) SUBJECT GENERAL PURPOSE

Provide students with theoretical and practical knowledge for using, safely, equipment for Dependant Dive.

B) UE LIST

1. DEPENDANT EQUIPMENT ..... 10 hours

1.1 – Dependant Equipment (common types, characteristics and limitations).
1.2 – Functioning of a direct flow mask (Desco, Comask).
1.3 – Functioning of a mask with controller of variable flow (KMB, Comex-pro, etc.).
1.4 - Functioning of equipment with rigid helmet (Advanced, Aquadyne, Superlight, etc.).
1.5 – Safety procedures.
1.6 - Disassembly and assembly of the types of Dependant Equipment.

2. OPEN BELL, BOTTLES AND CONNECTIONS ..... 03 hours

2.1 – Open sign and its advantages
2.2 – Bottles color code
2.3 – Types of connections used on diving

3. PHRASING AND STANDARD SIGNS FOR DIVING..... 03 hours

3.1 – Standard signs for diving
3.2 – Search signs
3.3 – Standard phrasing for diving

4. UTILIZATION IN CONTROLLED ENVIRONMENT ..... 30 hours

4.1 – Adaptation to the equipment;
4.2 – Utilization techniques; and
4.3 – Exercises on bell.

C) SPECIFIC RULES

I) This subject shall be ministered before any activity involving utilization of Dependant Equipment; and

II) The classes from this subject shall be ministered through techniques of Expositive Classes, Practical Demonstration and Practical Class.

D) LEARNING EVALUATION

Write test covering UE 1 to 3.

E) INSTRUCTIONAL RESOURCES

DVD; projector and white board.

F) REFERENCES

BRASIL. Centro de Instrução e Adestramento Almirante Áttila Monteiro Aché. CIAMA 201 – Manual de Mergulho parte I. Rio de Janeiro, 2003.

BASIC COURSE OF PROFESSIONAL SHALLOW DIVING	
SUBJECT: DECOMPRESSION AND TREATMENT CHARTS	
ABBREVIATION: MGE4	**HOUR LOAD: 26 HOURS**
SUMMARY	

A) SUBJECT GENERAL PURPOSE

Provide the student with theoretical and practical knowledge on decompression and treatment charts.

B) EU LIST

1. DECOMPRESSION METHODS ..... 10 hours

1.1 – Decompression Methods.
1.2 – Decompression Charts.

2. HYPERBARIC TREATMENT ..... 10 hours

2.1 – Hyperbaric Treatment Methods.
2.2 – Hyperbaric Treatment Charts.

3. HYPERBARIC CHAMBER ..... 06 hours

3.1 – Hyperbaric Chamber Operation.
3.2 – Safety cautions.
3.3 - Applications.

C) SPECIFIC RULES

Classes from this subject shall be ministered through techniques of Expositive Class and Practical Class.

E) LEARNING EVALUATION

Write test covering UE 1 and 3.

F) INSTRUCTIONAL RESOURCES

DVD; projector and white board.

G) REFERENCES

I) BRASIL. Centro de Instrução e Adestramento Almirante Áttila Monteiro Aché. CIAMA 201 – Manual de Mergulho parte I. Rio de Janeiro, 2003.

II) BRASIL. Centro de Instrução e Adestramento Almirante Áttila Monteiro Aché. Manual Didático de Medicina Submarina. Rio de Janeiro, 1999.

BASIC COURSE OF PROFESSIONAL SHALLOW DIVING	
SUBJECT: SUBMERSED PRACTICAL WORKS	
ABBREVIATION: MGE5	**HOUR LOAD: 60 HOURS**
SUMMARY	

A) SUBJECT GENERAL PURPOSE

Perform submersed works using dependant equipment.

B) UE LIST

1. SUBMERSED WORKS .....……..... 40 hours

1.1 – Characteristics of a dive station
1.2 – Double flange assembly
1.3 – Pontoon assembly and refluctuation.
1.4 – Disassembly and assembly of flange over head.
1.5 – Tubes connection.
1.6 – Methods of search for submersed objects.

2. QUALIFICATION DIVES ..... 14 hours

2.1 – Dive at sea, in sheltered water, with autonomous equipment, in depth between 15m and 20m.

2.2 - Dive at open sea with dependant equipment (complete face mask), in minimum depth of 35 m; and

2.3 – Dive at open sea, with dependant equipment (hard helmet), in minimum depth of 35m.

3. EQUIPMENT MAINTENANCE ..... 06 hours

3.1 – Cares and maintenance routine of dependant equipment.
3.2 – Maintenance of dependant equipment used in the course.

C) SPECIFIC RULES

I) It's necessary to emphasize, in all practical exercises, the correct utilization of Diving Standard Signs and Standard Phrasing;

II) During adapting phase with dependant equipment, students shall be guided in the sense of exploring all possibilities for this equipment, including with emergency simulation;

III) During qualification diving student shall have to execute fast tasks, such as: identification of bottom type; visibility information; draw of little croquis, etc.;

IV) Whenever necessary, new practical works shall be introduced, aiming a better student's formation;

V) Classes of this subject will be ministered through the techniques of Expositive Classes, Practical Demonstration and Practical Class; and

VI) Dives with autonomous equipment shall be performed using a Double bottle set.

D) LEARNING EVALUATION

I) Six submersed practical evaluations for UE1, as listed below:

- perform assembly, in pairs, of double flange with hard helmet;
- perform assembly, in pairs, of double flange with complete face mask;
- perform flange assembly and disassembly over head, with hard helmet;

- perform assembly and refluctuation of pontoon, in pairs, with complete face mask;
- perform assembly and refluctuation of pontoon, in pairs, with hard helmet; and
- perform tubes connections, in pairs, with direct flow mask.

II) the concepts SATISFACTORY or UNSATISFACTORY shall be issued for submersed practical tests, according to the paragraph d, subparagraph II and III, from Course General Rules, presented in Course General Synopsis.

III) For qualifications dives, the concepts SATISFACTORY or UNSATISFACTORY shall be issued, and the disconnections from the course is recommended to the student that gets UNSATISFACTORY concept in any of the dives.

E) INSTRUCTIONAL RESOURCES

DVD; projector and white board.

F) REFERENCES

BRASIL. Centro de Instrução e Adestramento Almirante Áttila Monteiro Aché. CIAMA 201 - Manual de Mergulho partes I e III. Rio de Janeiro, 2003.

CURRICULUM OF BASIC COURSE OF PROFESSIONAL DEEP DIVING

DURATION: XX WEEKS (*) TOTAL HOUR LOAD: (*)

1 – COURSE GENERAL PURPOSE

Complement technical-professional license of divers who operates with compressed air (shallow diver) for the exercise of functions of diver, operation and maintenance of deep diving systems, performing, basically, the following tasks:

- operate saturate diving systems;
- operate system for environmental control and instrumentation of analysis for gases used in ship which operates saturate dive;
- fulfill alleged procedures for diving accidents and apply indicated therapeutic charts, under supervision;
- perform first degree maintenance in deep diving systems;
- fulfill emergency standard procedures recommended for operational incidents during deep dive;
- obey specific basic laws for Professional diving activity;
- perform saturation dives up to the depth of 350m; and
- perform intervention dives using Artificial Breathing Mixtures, up to the depth of ninety meters.

At the end of this course, diver will be capable to enter in 4th Oceanway Group, in the category of Diver Who Operates Artificial Breathing Mixture (MGP).

2 – COURSE GENERAL RULES

a) Regarding course structure

I) For enrollment in the course, candidates should fill in age, health and physic capacity requirements, provided in subparagraph 0306-a of this rule;

II) Teaching Unities (UE) from severe disciplines shall be presented in a didactic sequence, in a way to allow student the necessary base to new subjects comprehension, as well as practical exercises safe performance;

III) As diving activity involves considerable risks, schools may reserve the right to exclude from course students considered as potentially hazardous for conducing practical activities, establishing rules for applying this rule in the event of candidate enrollment;

IV) Regardless of eventual skills showed in admission tests, even these are harder than those foreseen; every student shall be considered as a complete strange to the subjects to be ministered in the course, subject to all instruction steps;

V) Requirements considered essential for safe practice of autonomous and dependant dive are established in the curriculum. However, activity characteristics suggest a constant and gradual improvement, which is only ensured by the practice. So, it's desirable that school enrich its programs, besides promote your students to progress carefully in the activity, looking for support in element with bigger experience, whenever possible.

VI) It's desirable that a certain standardization of subject technical language in the country, allowing future checks by the Competent Authority. So, it's necessary that schools adopt terminology contained on Chapter 1 from this rule;

VII) Considering that diving activity requires a good physical conditioning, curriculum shall forecast, at least, one hour of physical training per day of practical-theoretical instruction. Purposes and EU lists regarding this subject will be not presented herein; and

VIII) Considering the big diversity of equipment and charts currently used and considering as unacceptable require qualification in each existent type, in this curriculum only hour loads considered as necessary are presented, so the student may, rapidly, be qualified in equipment or chart presented thereafter in its professional life.

b) Regarding teaching techniques

Learning shall be developed through expositive classes using instructional resources proper to the content, especially real models, whenever applicable, in a way to promote maximum participation of students in planned activities.

c) Regarding classes attendance

I) Student shall attend to 90% of the total ministered classes;

II) Attendance to classes and other activities is mandatory; and

III) For the fulfillment of subparagraphs described above, it also considered as absence: delay greater than 10 minutes from the beginning of any planned activity or non authorized leave during its development.

d) Regarding learning measurement

I) Learning shall be measured by a write evaluation, at the end of each subject, covering all its content;

II) At learning evaluation, a numeric scale from 0 to 10, with decimal approximation, shall be considered;

III)At practical tests, the concepts SATISFACTORY and UNSATISFACTORY shall be attributed; and

IV) The issuance of an UNSATISFACTORY concept in practical tests shall occur from student non adaptation to the equipment or diving activity, generating, in this case, student disconnection from instructor’s observation.

e) Regarding course approval and student license

I) Minimum concept for approval shall be seven;

II) Student consider as approved at the course shall reach approval in the subjects (including practical tests), and also shall have minimum presence required; and

III) Approved student shall receive a Certificate (Annex 4-A) evidencing he/she completed, satisfactorily, the Basic Course of Professional Shallow Diving. The document shall bear in its back subjects distribution, hour load and respective grades reached in the evaluations.

3 - DISTRIBUTION OF SUBJECTS AND HOUR LOAD

MGP1 – Physics, Medicine and Physiology of Deep Diving..... 46 hours
MGP2 – Gases Analysis ..... 14 hours
MGP3 – Installations and Equipment for Deep Diving ……..... 42 hours
MGP4 - Procedures and Techniques for Deep Diving .....35 hours
MGP5 – Procedures and Techniques for Interventional Diving…..... 35 hours
MGP6 – Deep Diving Practices ..... (*)

(*) Hour load of subject MGP6 shall be determined according to the depth adopted for real saturation.

4 – MINIMUM HOUR LOAD OF PRACTICAL EU, PER STUDENT

SUBJECT MGP1
Unity - 4.0 - hours

SUBJECT MGP2
Unity - 1.0 – three hours

SUBJECT MGP3
Unity - 3.0 – two hours

SUBJECT MGP4
Unity - 2.0 – three hours

SUBJECT MGP6
Only practical class.

BASIC COURSE OF PROFESSIONAL DEEP DIVING	
SUBJECT: DEEP DIVING PHYSICS, MEDICINE AND PHYSIOLOGY	
ABBREVIATION: MGP1	**HOUR LOAD: 46 HOURS**
SUMMARY	

A) SUBJECT GENERAL PURPOSE

Apply physical and physiologic factor at the planning and conduction of a deep diving and describe treatment of possible accidents that may occur during deep diving activity.

B) UE LIST AND PURPOSE

1.0 - DEEP DIVING PHYSICS ..... 11 hours

1.1 – Gases laws, gases kinetics theory;

1.2 – Effects of stratification and concentration of gases used at diving;

1.3 – Equivalent value at the surface for composition or contamination of breathing mixtures;

1.4 – Conversion of values expressed in percentage for parts per million (PPM), parts per billion (PPB) and e vice-versa; and

1.5 – Measurement unities.

2.0 – MEDICAL ASPECTS OF DEEP DIVING ..... 08 hours

2.1 – Anatomy and physiology notions;

2.2 – Physiological alterations that occurs in human being during saturation;

2.3 – Diver nutritional needs during saturation;

2.4 – Procedures for infections prevention during saturate diving;

2.5 – Treatment of decompressive illness during a saturate diving;

2.6 – Physiopathology, clinical status and treatment of asseptical osteonecrosis and compression arthralgia;

2.7 - Physiopathology, clinical status and treatment of neurological syndrome of high pressures;

2.8 - Physiopathology, clinical status and treatment of hypothermia and hyperthermia; and

2.9 – Diver summary neurological examination.

3.0 – THERAPEUTIC CHARTS ..... 02 hours

3.1 – Procedures for treatment of decompressive accidents during a saturate diving; and;

3.2 - Procedures to prevent and treat vestibular manifestations occurrence.

4.0 – FIRST AID ..... 25 hours

4.1 – Vital signs of an injured person;

4.2 – Cardio-respiratory resuscitation techniques, with emphasis to service provided within diving bell;

4.3 – Methods for bleeding control;

4.4 – Technique for immobilization of a patient with trauma;

4.5 – Drugs delivery notions (intravenous and intramuscular);

4.6 – Suture notions; and

4.7 – First aid practice.

C) SPECIFIC RULES

I) Procedures standardization and command voices during all practical exercises shall be emphasize;

II) In this subject, physics direct application will be highlighted on planning and conduction of a dive, with constant practical exemplification.

III) UEs 2.0, 3.0 and 4.0 shall be ministered by an hyperbaric physician;

IV) This subject shall be ministered before simulated dives;

V) Charts adopted by MB (North-American Navy charts converted to metric unities) have mandatory teaching, aiming eventual evaluations by the competent authority. Other charts, in case they are necessary, may be taught as a complement to this subject;

VI) In UE 4, first aid application during simulated diving conduction, within chamber or diving bell, with patient still under pressure will be emphasized.

D) LEARNING EVALUATION

I) Write test, at subject end, with eliminatory profile, covering all its content;

II) Practical test for verification of UE 4.0.

E) INSTRUCTIONAL RESOURCES

DVD; projector and white board.

F) REFERENCES

I) BRASIL. Marinha do Brasil. CIAMA. **Manual de Mergulho Parte II - Mergulho com Mistura**, Rio de Janeiro, 2000.

II) BRASIL. Marinha do Brasil. FORSUB. **ComForS-263**, 1ª revisão, Rio de Janeiro, 2005.

III) BRASIL. Marinha do Brasil. CIAMA, **Manual Didático de Medicina Submarina**, Rio de Janeiro, 1999.

BASIC COURSE OF PROFESSIONAL DEEP DIVING	
SUBJECT: GASES ANALYSIS	
ABBREVIATION: MGP2	**HOUR LOAD: 14 HOURS**
SUMMARY	

A) SUBJECT GENERAL PURPOSE

Describe techniques for analysis of mixtures used on deep dive.

B) LIST AND PURPOSE OF UEs

1.0 – GASES ANALYSIS ..... 14 hours

1.1 – Analyzers used in ships for deep dive and its functioning principles;
1.2 – Procedures of analysis (tests); and
1.3 – Practical exercises

C) SPECIFIC RULES

Students shall become conscious about the importance of gases analysis in deep dives, mainly in what it represents for operation safety.

D) LEARNING EVALUATION

Write test, at subject end, with eliminatory profile, covering all its content;

E) INSTRUCTIONAL RESOURCES

DVD; projector; white board and real equipment.

F) REFERENCES

I) BRASIL. Marinha do Brasil. CIAMA. **Manual de Mergulho Parte II - Mergulho com Mistura,** Rio de Janeiro, 2000.
II) BRASIL. Marinha do Brasil. FORSUB. **ComForS-263**, 1ª revisão, Rio de Janeiro, 2005.

BASIC COURSE OF PROFESSIONAL DEEP DIVING	
SUBJECT: INSTALLATIONS AND DEEP DIVING EQUIPMENT	
ABBREVIATION: MGP3	**HOUR LOAD: 42 HOURS**
SUMMARY	

A) SUBJECT GENERAL PURPOSE

Describe functioning of a deep diving standard system.

B) UE LIST AND PURPOSES

1.0 – BASIC SYSTEMS FOR SUPPORT OF A DEEP DIVING INSTALLATION.....10 hours

1.1 – Distribution and storage of diving gases;
1.2 – Operation of a breathing mixtures recovery system;
1.3 – System for Environmental Control;
1.4 – Fire prevention and extinction system for life chamber; and
1.5 – Communication System.

2.0 – CHAMBERS AND CONSOLES ..... 10 hours

2.1 – Life chamber and its accessories;
2.2 – Operation of material transfer compartment;
2.3 – Operation of sanitary equipment, CO2 absorbers, emergency masks and control valves;
2.4 – Intermediary chamber and/or antechamber;
2.5 – Diving bell and its operation; and
2.6 – Chamber control panels.

3.0 – DIVING EQUIPMENT ..... 22 hours

3.1 – Diving equipment with open circuit, semi-closed and closed;
3.2 – Diving system with gas recovery;
3.3 – Dive heating system analyzing temperature and necessary flows;
3.4 – Masks, helmets and diving special clothes used in MB; and
3.5 – Diving practice

C) SPECIFIC RULES

I) All UE from this subject shall be ministered whenever possible, in view of real equipment; and
II) In UE 3 a real demonstration of equipment will be programmed, in diving tank.

D) LEARNING EVALUATION

I) Write test, at subject end, with eliminatory profile, covering all its content; and
II) Practical test for verification of EU 3.0 regarding the use of equipment on diving tank.

E) INSTRUCTIONAL RESOURCES

DVD; projector; white board and real equipment.

F) REFERENCES

I) BRASIL. Marinha do Brasil. CIAMA. **Manual de Mergulho Parte II - Mergulho com Mistura**, Rio de Janeiro, 2000.

II) BRASIL. Marinha do Brasil. FORSUB. **ComForS-263**, 1ª revisão, Rio de Janeiro, 2005.

BASIC COURSE OF PROFESSIONAL DEEP DIVING	
SUBJECT: INTERVENTION DIVING TECHNIQUE "BOUNCE DIVE"	
ABBREVIATION: MGP4	**HOUR LOAD: 35 HOURS**
SUMMARY	

A) SUBJECT GENERAL PURPOSE

Perform intervention dive up to the maximum depth of ninety meters, using open bell and breathing mixture Heliox.

B) UE LIST AND PURPOSES

1.0 – INTERVENTION DIVING TECHNIQUE ..... 15 hours

1.1 - Procedures for dives using intervention diving technique (*bounce dive*).
1.2 – Equipment used.
1.3 – Employment limits.
1.4 – Safety procedures.
1.5 – Minimum team to performance of dives with depth up to ninety meters.
1.6 – Decompression charts used.

2.0 – DIVING PRACTICE ..... 20 hours

2.1 – Dive in open bell using compressed air.
2.2 - Dive in open bell using breathing mixture Heliox.

C) SPECIFIC RULES

In this subject, dives should be performed in open or closed bell, using techniques of Heliox intervention dive (bounce dive), in a way to transmit to the students the minimum experience to this type of employment, familiarizing them with procedures presented and highlighting special cares to be addressed.

D) LEARNING EVALUATION

I) Write test covering all content of UE 1.0.

II) UE 2.0 will be evaluated with issuance of SATISFACTORY or UNSATISFACTORY concept, as instructor observation.

E) INSTRUCTIONAL RESOURCES

Real equipment.

F) REFERENCES

I) BRASIL. Marinha do Brasil. CIAMA. **Manual de Mergulho Parte II - Mergulho com Mistura**, Rio de Janeiro, 2000.

II) BRASIL. Marinha do Brasil. FORSUB. **ComForS-263**, 1ª revisão, Rio de Janeiro, 2005.

BASIC COURSE OF PROFESSIONAL DEEP DIVING	
SUBJECT: DEEP DIVING PROCEDURES AND TECHNIQUES	
ABBREVIATION: MGP5	**HOUR LOAD: 35 HOURS**
SUMMARY	

A) SUBJECT GENERAL PURPOSE

Describe safety procedures and rules applied to deep diver.

B) UE LIST AND PURPOSE

1.0 – PROCEDURES FOR DEEP DIVING ..... 25 hours

1.1 – Parameters adopted for deep diving.

1.2 – Procedures for decompression for dives with artificial breathing mixtures using saturation technique, applied to deep dive.

1.3 – Excursions and employment limit.

1.4 – Emergency procedures applied to deep dive.

2.0 – DECOMPRESSION IN SATURATION DIVES ..... 08 hours

2.1 – Decompression techniques applied to saturation dives

2.2 – Emergency decompression

3.0 – DUTIES AND RESPONSIBILITIES ..... 02 hours

3.1 – Duties and responsibilities of the components of a diving team; and

3.2 – Rules and general norms of safety.

C) SPECIFIC RULES

I) All UEs from this subject shall, whenever possible, be ministered in view of real equipment;

II) All practical utilization examples shall be highlighted for the procedures presented.

D) LEARNING EVALUATION

Write test, at subject end, covering all UEs.

E) INSTRUCTIONAL RESOURCES

DVD; projector; white board and real equipment.

F) REFERENCES

I) BRASIL. Marinha do Brasil. CIAMA. **Manual de Mergulho Parte II - Mergulho com Mistura**, Rio de Janeiro, 2000.

II) BRASIL. Marinha do Brasil. FORSUB. **ComForS-263**, 1ª revisão, Rio de Janeiro, 2005.

BASIC COURSE OF PROFESSIONAL DEEP DIVING	
SUBJECT: DEEP DIVING PRACTICES	
ABBREVIATION: MGP6	**HOUR LOAD: XX HOURS SUMMARY**

A) SUBJECT GENERAL PURPOSES

Perform real deep dive, using saturation techniques.

B) LIST AND PURPOSE OF UE

1.0 – SATURATE DIVE PRACTICE ..... XX HOURS (*)

1.1 – Real dives with compressed air, up to tem meters, for recognition of saturate dive installations;

1.2 – Real dives with compressed air, up to Five meters, for diver rescue training with SLS and/or BOS; and

1.3 – Real dives, in hyperbaric chamber, using saturation technique, in depths between fifty and one hundred meters, using artificial breathing mixtures and gas recovery equipment from diver helmet, present on the deep dive ship.

C) SPECIFIC RULES

I) In this subject, dives in hyperbaric chamber and diving Bell (closed) shall be performed, in a way to transmit to students the minimum experience for the deep dive activity, familiarizing them with presented procedures and resulting in special cautions to be addressed; and

II) For calculation of hour load to this UE (*), depth in which saturation Will be performed shall be considered.

III) In this subject, a real saturation shall be performed, in depth between 50 and 100 meters, using exclusively saturation techniques. Realization may occur in Hyperbaric Center, that allows wet dive in controlled environment (wet vessel).

D) LEARNING EVALUATION

Student shall receive, at the end of each UE, SATISFACTORY or UNSATISFACTORY concept, as instructor observation.

E) INSTRUCTIONAL RESOURCES

Real equipment.

F) REFERENCES

I) BRASIL. Marinha do Brasil. CIAMA. **Manual de Mergulho Parte II - Mergulho com Mistura**, Rio de Janeiro, 2000.

II) BRASIL. Marinha do Brasil. FORSUB. **ComForS-263**, 1ª revisão, Rio de Janeiro, 2005.

ANEXO 4-A

TIMBRE DA ESCOLA DE MERGULHO
Diving School Stamp

NOME DA ESCOLA DE MERGULHO

NAME OF DIVING SCHOOL

CERTIFICADO

Certificate

BRASÃO DA DPC
DPC's blazon

Certificamos que _____
Certify that **name**

RG _____, **Órgão Expedidor** _____, **CPF nº**_____
Identification NR *income tax registration NR*

concluiu com aproveitamento o _____
Has been completed successfully the

de acordo com o capítulo 4 da NORMAM-15/DPC e Resolução A.536(13) da IMO,
IN ACCORDANCE UNDER THE PROVISIONS OF CHAPTER 4 FROM NORMAM-15/DPC AND IMO RESOLUTION A.536(13)

conduzido pela *nome da escola credenciada / nº credenciamento* **, realizado no**
carried out by The name of the authorized school, at

_____ de ___ / ___ / ___ a ___ /___ / ___
Place *from dd/mm/yy* *to dd/mm/yy*

Rio de Janeiro, __ de _____de ____.
Place and date dd/mm/yy

_____ _____
Assinatura do Portador
Holder´s signature

Assinatura do Diretor
Head of Institute

DISCIPLINAS Subject	**Carga Horária** *Timetable*
Mergulhador habilitado conforme a Ordem de Serviço (O\S) NO _____ de ____ de _____ de_____ ***Diretoria de Portos e Costas em*** ____ / ____ / ____ . _____ **Assinatura do Oficial responsável** *Signature of the representative of the Maritime Authority*	Carimbo da DPC *Stamp of the representative of teh Maritime Authority*

CODE OF SAFETY FOR DIVING SYSTEMS

Resolutions A.831(19) and A. 692 (17) from International Maritime Organization

PREAMBLE

This Code has been developed to provide a minimum international standard for the design, construction and survey of diving systems on ships and floating structures engaged in diving operations, in order to enhance safety of divers/personnel. The Code accepts that interchangeability of equipment or the addition or deletion of components is reasonable and common practice and that this Code should not inhibit this.

Throughout the development of the Code, it was recognized that it must be based upon sound design and engineering principles and experience gained from operating such systems. Furthermore, that design technology of diving systems is complex and that the Code should be re-evaluated and revised as necessary. To this end IMO will periodically review the Code, taking into account both experience and the latest technical developments.

Any existing diving system which complies with the provisions of the Code should be considered eligible for issuance of a certificate in accordance with this Code

The Code is not intended to prohibit the use of an existing system simply because its design, construction and equipment does not conform to the requirements of this Code. Many existing diving systems have operated successfully and safely for extended periods of time and their operating history should be considered in evaluating their suitability

The Code does not include requirements for diving operations or the procedures for control of diving operations

The intent of the Code is also to facilitate the international movement and operation of diving systems.

Finally, the Code has been developed for fixed diving systems. However, any temporary diving systems which comply with the provisions of the Code may be certificated in accordance with the Code.

GENERAL

1.1 - PURPOSE

The purpose of this Code is to recommend design criteria, and construction, equipment and survey standards for diving systems so as to minimize the risk to divers, personnel, ships and floating structures having such systems on board and to facilitate the international movement of such ships and floating structures in the context of diving operations.

1.2 - APPLICATION

The Code applies to new fixed diving systems which are certificated more than 12 months after the date after the adoption of this Code. However, any existing system which complies with the provisions of the Code should be considered eligible for issuance of a certificate in accordance with this Code.

1.3 - DEFINITIONS

Terms used in this Code have the meanings defined in the following paragraphs unless expressly provided otherwise:

1.3.1 - Administration means the Government of the State whose flag a ship or floating structure which carries a diving system is entitled to fly or in which the ship or floating structure is registered. In Brazil, DPC has delegation of Administration competence.

1.3.2 - Bottle means a pressure container for the storage and transport of gases under pressure.

1.3.3 - Breathing gas/breathing mixture means all gases/mixtures of gases which are used for breathing during diving operations.

1.3.4 - Certificate means Diving System Safety Certificate.

1.3.5 - Surface decompression chamber means a pressure vessel for human occupancy with means of controlling the pressure inside the chamber.

1.3.6 - Depth means the water depth or equivalent pressure to which the diver is exposed at any time during a dive or inside a surface decompression chamber or a diving bell.

1.3.7 - Diving bell means a submersible compression chamber, including its fitted equipment, for transfer of diving personnel under pressure between the work location and the surface decompression chamber.

1.3.8 - Diving system means the whole plant and equipment necessary for the conduct of diving operations.

1.3.9 - Evacuation system means a system whereby divers under pressure can be safely evacuated from a ship or floating structure to a position where decompression can be carried out.

1.3.10 - Handling system means the plant and equipment necessary for raising, lowering and transporting the diving bell between the work location and the surface decompression chamber.

1.3.11 - Hazardous areas are those locations in which an explosive gas-air mixture is continuously present, or present for long periods (zone 0); in which an explosive gas-air mixture is likely to occur in normal operation (zone 1); in which an explosive gas-air mixture it not likely to occur, and if it does it will only exist for a short time (zone 2).

1.3.12 - Life support system means the gas supply, breathing gas system, decompression equipment, environmental control system and equipment required to provide a safe environment for the diving crew in the diving bell and the surface decompression chamber under all ranges of pressure and conditions they may be exposed to during diving operations.

1.3.13 - Living compartment means the part of the surface decompression chamber which is intended to be used as the main habitation for the divers during diving operations and which is equipped for such purpose.

1.3.14 - Main components of a diving system include the surface decompression chamber, diving bell, handling system and fixed gas storage facilities.

1.3.15 - Mating device means the equipment necessary for the connection and disconnection of a diving bell to a surface decompression chamber.

1.3.16 - Maximum operating depth of the diving system is the depth in meters or feet of seawater equivalent to the maximum pressure for which the diving system is designed to operate.

1.3.17 - Organization means the International Maritime Organization (IMO).

1.3.18 - Pressure vessel means a container capable of withstanding an internal maximum working pressure greater than or equal to 1 bar.

1.3.19 - Umbilical means the link between the diving support unit and the diving bell and may contain surveillance, communication and power supply cables, breathing gas and hot water hoses. The hoisting and lowering strength member may be part of the umbilical.

1.3.20 - Category A machinery spaces are those spaces and trunks to such spaces as defined in the International Convention for the Safety of Life at Sea, 1974, as amended.

1.4 - EXEMPTIONS

DPC may exempt any system which embodies features of a novel kind from any of the provisions of the Code, so that the research and development into such novel features is not restricted by the Code. Any such system should, however, comply with safety requirements which, in the opinion of DPC, are adequate for the operation intended and are such as to ensure the overall safety of the system. DPC allowing any such exemptions should list the exemptions on the Certificate.

1.5 - EQUIVALENTS

Where the Code requires that a particular fitting, material, appliance, apparatus, item or type of equipment should be fitted or carried in a system, or that any particular provision should be made, or any procedure or arrangement complied with, DPC may allow alternative arrangements in that system, provided that DPC is satisfied that such alternatives are at least as effective as the requirements of the Code.

1.6 – SURVEYS AND CERTIFICATION

1.6.1 - Each diving system should be subject to the surveys specified below:

a) An initial survey before any fixed system is put into service or before the Certificate required under this section of the Code is issued for the first time, which should include a complete and thorough examination of the diving system, equipment, fittings, arrangements and material and which should be such as to ensure their full compliance with the applicable provisions of the Code;

b) A renewal survey at intervals specified by the Administration, but not exceeding five years, which should be a complete and thorough examination to ensure that the diving system, equipment, fittings, arrangements and material fully comply with the applicable provisions of the Code;

c) An annual survey within three months before or after each anniversary date of the Diving System Safety Certificate so as to ensure that the diving system, fittings, arrangements, safety equipment and other equipment remain in compliance with the applicable provisions of the Code and are in good working order. Such annual survey should be endorsed on the Certificate issued under the provisions of this section.

1.6.2 - An inspection either general or partial according to the circumstances should be made every time a defect is discovered or an accident occurs which affects the safety and certification of the diving system or whenever a significant repair or alteration is made. The inspection should be such as to ensure that the repairs or alterations carried out have been done effectively and are in all respects in full compliance with the applicable provisions of the Code.

1.6.3 - Surveys and inspections should be carried out by DPC. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it.

1.6.4 - After any survey or inspection under this section has been completed no significant change should be made in the diving system without the agreement of DPC or any person or organization duly authorized.

1.6.5 - The Certificate should be issued by DPC or by entity duly authorized by it after survey or inspection in a diving system that meets Code requirements.

1.6.6 – The Certificate should be drawn up in the official language of the Administration in the form corresponding to the model giving in the appendix to the Code. If the language used is neither English nor French, the text should include a translation into one of these languages.

1.6.7 - Any exemptions granted under 1.4 should be clearly noted on the Certificate.

1.6.8 - A certificate should be issued for a period specified by DPC, and should not exceed five years from the date of issue.

1.6.9 - An extension of the validity of the Certificate may be granted for a maximum period of five months at the discretion DPC, subject to an annual survey being carried out.

1.6.10 - A Certificate would cease to be valid if significant alterations have been made to the diving system without the agreement of DPC or any person or organization authorized by it, except for the replacement of such equipment or fittings for the purpose of repair or maintenance, or if surveys and inspections as specified by DPC under the provisions of 1.6.1 have not been carried out.

1.6.11 - Each main component of the diving system should be stamped with an official number or other distinctive identification which should be given on the Certificate.

1.6.12 - Limiting operating parameters including vessels' motion (balance and dogsleep) and environmental conditions (wave's amplitude and stream intensity) should be shown in the Certificate.

1.7 - CONTROL

1.7.1 - Every diving system, issued with a Certificate under section 1.6, is subject, whilst under the control of an Administration other than that which has issued the Certificate, to control by officers duly authorized by that Administration for verification that the Certificate is valid. Such Certificate should be accepted unless there are clear grounds for believing that the condition of the diving system or its equipment does not correspond substantially with the particulars of that Certificate. In that case, the officer carrying out the control may take such steps as will allow the system to operate on a temporary basis without undue risk to the divers and the personnel on board. In the event of this control giving rise to intervention of any kind, the officer carrying out the control should inform the Administration or the Consul or, in his absence, the nearest diplomatic representative of the State in which the ship or floating structure is registered, in writing forthwith of all circumstances on the basis of which intervention was deemed to be necessary.

1.7.2 - Notwithstanding 1.7.1, the provisions of 1.6 are without prejudice to any rights of the coastal State under international law to impose its own requirements relating to the regulation, surveying and inspection of diving systems engaged, or intending to engage in diving operations on those parts of the sea-bed and subsoil over which that State is entitled to exercise sovereign rights.

DESIGN, CONSTRUCTION AND SURVEY

2.1 - GENERAL

2.1.1 - As far as reasonable and practicable, a diving system should be designed to minimize human error and constructed so that the failure of any single component (determined, if necessary, by an appropriate risk assessment) should not lead to a dangerous situation.

2.1.2 - Diving systems and components thereof should be designed for the conditions under which they are certificated to operate.

2.1.3 - Materials for diving system components should be suitable for their intended use.

2.1.4 - All components in a diving system should be designed, constructed and tested in accordance with international or national standards recognized by DPC.

2.1.5 - In the design of pressure vessels including accessories such as doors, hinges, closing mechanisms and penetrators, the effects of rough handling and accidents should be considered in addition to design parameters such as pressure, temperature, vibration, operating and environmental conditions.

2.1.6 - All components in a diving system should be so designed, constructed and arranged as to permit easy cleaning, disinfection, inspection and maintenance.

2.1.7 - A diving system should include the control equipment necessary for safe performance of diving operations.

2.2 – SURFACE DECOMPRESSION CHAMBERS

2.2.1 - A diving system should, as a minimum, include either one surface decompression chamber with two separate compartments, or two interconnected separate chambers so designed as to permit ingress or egress of personnel while one compartment or chamber remains pressurized. All doors should be designed so that locking mechanisms, if provided, can be operated from both sides.

2.2.2 - Where a surface decompression chamber is to be used in circumstances in which a person is intended to remain under pressure for a continuous period of more than 12 hours, it should be so arranged as to allow most divers to stand upright and to stretch out comfortably on their bunks. The smaller of the two compartments should be large enough for at least two persons. One of these compartments should be a living compartment.

2.2.3 - The living compartment and other compartments intended to be used for decompression should have a lock through which provisions, medicine and equipment may be passed into the chamber while its occupants remain under pressure.

2.2.4 - Each pressure compartment should have view ports to allow observation of all occupants from the outside.

2.2.5 - A surface decompression chamber should provide a suitable environment and facilities for the persons who use it, having regard to the type and duration of the diving operation. Where the chamber is intended to be occupied for more than 12 hours, toilet facilities should also be provided. Toilet facilities capable of discharging the waste to the outside should be fitted with suitable interlocks.

2.2.6 - The diving system should be capable of allowing the safe transfer of a person under pressure from the diving bell to the surface decompression chamber (and vice versa).

2.3 – DIVING BELLS

2.3.1 - A diving bell should:

a) be provided with adequate protection against mechanical damage during handling operation;

b) be equipped with one extra lifting point designed to take the entire dry weight of the bell including ballast and equipment as well as the weight of the divers staying on in the bell;

c) be equipped with means whereby each diver using the bell is able to enter and leave it safely as well as with means for taking an unconscious diver up into a dry bell;

d) be fitted with a manifold at a suitable point close to the main lifting attachment which should include connections for the following services:

- ¾ inch NPT (female) - for hot water;
- ½ inch NPT (female) - for breathing mixture.

The manifold should be clearly marked and suitably protected.

2.3.2 - Diving bell doors should be so designed as to prevent accidental opening during normal operations. All doors should be so designed that locking mechanisms, if provided, can be operated from both sides.

2.3.3 - A diving bell should provide a suitable environment and facilities for the persons who use it, having regard to the type and duration of the diving operation.

2.3.4 - Each diving bell should have view ports that as far as practicable allow an occupant to observe divers outside the bell.

2.3.5 - Diving bells should be so designed as to provide adequate space for the number of occupants envisaged, together with the equipment.

2.4 – OTHER PRESSURE VESSELS NOT INTENDED FOR HUMAN OCCUPANCY

2.4.1 - Special attention should be paid to the design and choice of material for the construction of pressure vessels containing oxygen.

2.4.2 - Oxygen and gases with an oxygen volume percentage higher than 25 per cent should be stored in bottles or pressure vessels exclusively intended for such gases.

2.5 – PIPES, VALVES, FITTINGS AND HOSES

2.5.1 - Pipe systems should be so designed as to minimize the noise inside the diving bell and surface decompression chamber during normal operation.

2.5.2 - A surface decompression chamber should be equipped with such valves, gauges and other fittings as are necessary to control and indicate the internal pressure and safe environment of each compartment from outside the chamber at a centralized position.

2.5.3 - Valves, gauges and other fittings should be provided outside the bell as necessary to . control and indicate the pressure and safe environment within the diving bell. The external pressure on the diving bell should also be indicated inside the bell.

2.5.4 - All pipe penetrations on chambers should be fitted with two shutoff devices as close to the penetration as practicable. Where appropriate, one device should be a nonreturn valve.

2.5.5 - All surface decompression chambers and diving bells which may be pressurized separately should be fitted with overpressure alarms or safety valves.

If safety valves are fitted, a quick-operating manual shutoff valve should be installed between the chamber and the safety valve and should be wired opened with a frangible wire.

All other pressure vessels and bottles should be fitted with a safety device.

2.5.6 - Piping systems which may be subjected to a higher pressure than designed for should be fitted with a pressure relief device.

2.5.7 - All materials used in oxygen systems should be compatible with oxygen at the working pressure and flow rate.

2.5.8 - The use of high-pressure oxygen piping should be minimized by the fitting of pressure reducing devices, as close as practicable to the storage bottles.

2.5.9 - Flexible hoses, except for umbilicals, should be reduced to a minimum.

2.5.10 - Hoses for oxygen should, as far as practicable, be of fire-retardant construction.

2.5.11 - Piping systems carrying mixed gas or oxygen under high pressure should not be arranged inside accommodation spaces, engine rooms or similar compartments.

2.5.12 - Exhaust lines should be fitted with an anti-suction device on the inlet side.

2.5.13 - Gases vented from the diving system should be vented to the open air away from sources of ignition, personnel or any area where the presence of those gases could be hazardous.

2.5.14 - All high-pressure piping should be well protected against mechanical damage.

2.5.15 - Piping systems containing gases with more than 25 per cent oxygen should be treated as systems containing pure oxygen.

2.5.16 - Oxygen systems with pressure greater than 1.72 bar must have slow opening shutoff valves except pressure boundary shutoff valves.

2.6 – BREATHING GAS SUPPLY, STORAGE AND TEMPERATURE CONTROL

2.6.1 - Each surface decompression chamber and diving bell should be fitted with adequate equipment for supplying and maintaining the appropriate breathing mixtures to its occupants at all depths down to maximum operating depth. When adding pure oxygen to the chamber, a separate piping system should be provided.

2.6.2 - In addition to the system mentioned in 2.6.1 each surface decompression chamber and diving bell should contain a separately controlled built-in breathing system for oxygen, therapeutic gas or bottom mix gas-with at least one mask per occupant stored inside each separately pressurized compartment and means should be provided to prevent any dangerous accumulation of gases.

2.6.3 - The diving bell should be designed with a self-contained breathing gas system capable of maintaining a satisfactory concentration of breathing gas for the occupants for a period of at least 24 hours at its maximum operating depth.

2.6.4 - Oxygen bottles should be installed in a well-ventilated location.

2.6.5 - Oxygen bottles should not be stored near flammable substances.

2.6.6 - The diving system and breathing gas storage facilities should not be sited in machinery spaces if the machinery is not associated with the diving system. Where, due to the requirements of diving operations, systems are sited in hazardous areas, the electrical equipment should comply with the requirements for such equipment in hazardous areas. Diving systems should not be permitted in hazardous areas designated as zone 0.

2.6.7 - A diving system should include adequate plant and equipment to maintain the divers in safe thermal balance during normal operations.

2.6.8 - There should be means to maintain the divers within the diving bell in thermal balance in an emergency for at least 24 hours. Such requirements may be satisfied by the use of passive means carried in the bell.

2.6.9 - For piping systems and gas storage bottles/pressure vessels the ABNT NB 46 – IDENTIFICATION OF GASES ON BOTTLES rule should be used.

In addition, each bottle/pressure vessel should be marked with the name and symbol of gases contained in it. Mark and color codes on storage bottles should be at the ends near the valve.

2.7 – HANDLING SYSTEM FOR DIVING BELLS

2.7.1 - A diving system should be equipped with a main handling system to ensure safe transportation of the diving bell between the work location and the surface decompression chamber.

2.7.2 - The handling system should be designed with adequate safety factors considering the environmental and operating conditions, including the dynamic loads which are encountered • while handling the diving bell through the air-water interface.

2.7.3 - The handling system should enable smooth and easily controllable handling of the diving bell.

2.7.4 - The lowering of diving bells under normal conditions should not be controlled by brakes, but by the drive system of the winches.

2.7.5 - If the energy supply to the handling system fails, brakes should be engaged automatically.

2.7.6 - In the event of single component failure of the main handling system, an alternative means should be provided whereby the bell can be returned to the surface decompression chamber. In addition, provisions should be made for emergency retrieval of the bell if the main and alternative means fail. If this involves buoyant ascent the bell should have sufficient stability to maintain a substantially upright position and means should be provided to prevent accidental release of the ballast weights.

2.7.7 - Handling systems and mating devices should enable easy and firm connection or disconnection of a diving bell to a surface decompression chamber, even under conditions where the support ship or floating structure is rolling, pitching or listing to predetermined degrees.

2.7.8 - Where a power actuating system is used for mating operations, an auxiliary power actuating system or an appropriate means should be provided to connect a diving bell to a surface decompression chamber, in the event of failure of the normal power actuating system.

2.8 – INTERFACE BETWEEN DIVING SYSTEM AND THE SHIP OR FLOATING STRUCTURE

2.8.1 - The diving system and breathing gas facilities should be arranged in spaces or locations which are adequately ventilated and provided with suitable electric lighting.

2.8.2 - When any part of the diving system is sited on deck, particular consideration should be given to providing reasonable protection from the sea, icing or any damage which may result from other activities on board the ship or floating structure.

2.8.3 - Provision should be made to ensure that the diving system and auxiliary equipment are securely fastened to the ship or floating structure and that adjacent equipment is similarly secured. Consideration should be given to the relative movement between the components of the system. In addition, the fastening arrangements should be able to meet any required survival conditions of the ship or floating structure.

2.9 - FIRE PREVENTION, DETECTION AND EXTINCTION

2.9.1 - All materials and equipment used in connection with the diving system should be, as far as is reasonably practicable, of fire-retardant type in order to minimize the risk of fire and sources of ignition.

2.9.2 - Spaces in the interior of ships or floating structures in which the diving system or its auxiliary equipment is carried should be provided with structural fire protection in a way similar to control stations bounding main zones.

Control station is defined as provided on Rule 3 and 20, Chapter II-2 from SOLAS 74.

2.9.3 - Interior spaces containing diving equipment such as surface decompression chambers, diving bells, gas storage, compressors and control panels should be covered with an automatic fire detection and alarm system and a suitable fixed fire-extinguishing system.

2.9.4 - Portable fire extinguishers of approved types and designs should be distributed throughout the space containing the diving system. One of the portable fire-extinguishers should be stowed near the entrance to that space.

2.9.5 - When pressure vessels are situated in enclosed spaces, a manually actuated water spray system having an application rate-of 10 1/m2/per minute of the horizontal projected area should be provided to cool and protect such pressure vessels in the event of external fire. When pressure vessels are situated on open decks, fire hoses may be considered as providing the necessary protection.

2.9.6 - Each compartment in a surface decompression chamber should have a suitable means of extinguishing a fire in the interior which would provide rapid and efficient distribution of the extinguishing agent to any part of the chamber.

2.10 – ELECTRICAL SYSTEM

2.10.1 - All electrical equipment and installation, including power supply arrangements, should be designed for the environment in which they will operate to minimize the risk of fire, explosion, electrical shock and emission of toxic gases to personnel, and galvanic action of the surface decompression chamber or diving bell.

2.10.2 - In the event of failure of the main source of electrical power supply to the diving system an independent source of electrical power should be available for the safe termination of the diving operation. It is admissible to use the ship's emergency source of electrical power as an emergency source of electrical power if it has sufficient electrical power capacity to supply the diving system and the emergency load for the vessel at the same time.

2.10.3 - The alternative source of electrical power should be located outside the machinery casings to ensure its functioning in the event of fire or other casualty causing failure to the main electrical installation.

2.10.4 - Each surface decompression chamber and diving bell should have adequate means of normal and emergency lighting to allow an occupant to read gauges and operate the system within each compartment.

2.11 – CONTROL SYSTEMS

2.11.1 - The diving system should be so arranged as to ensure that centralized control of the safe operation of the system can be maintained under all weather conditions.

2.11.2 - At least, facilities should be provided at the central control position to monitor the values of the following parameters for each occupied compartment.

	Compartments	
Parameters	Surface decompression chamber	Diving bell
Pressure or depth (*)	X	X (**)
Temperature (*)	X	
Humidity	X	
Oxygen partial pressure (*)	X	X
C02 partial pressure (*)	X	X

(*)These parameters should be indicated continuously.
(**) Pressure or depth both inside and outside bell should be indicated at central control.

2.11.3 - Provision should be made within the bell for an independent means of monitoring ' oxygen and carbon dioxide levels.

2.12 - COMMUNICATIONS AND RELOCATION SYSTEM

2.12.1 - The communication system should be arranged for direct two-way communication between the control stand and:

- diver in water
- diving bell
- each compartment of the chambers
- system control table for bell handling
- dynamic positioning room
- bridge, ship's command centre or drilling floor.

2.12.2 - Alternative means of communication with divers in the surface decompression chamber and diving bell should be available.

2.12.3 - Each surface decompression chamber and diving bell should be connected to a speech unscrambler when used with gas systems, including helium.

2.12.4 - A self-contained through-water communication system should be provided for emergency communication with diving bells when operating under water.

2.12.5 - Diving bell should have an emergency locating device with a frequency of 37.5 kHz designed to assist personnel on the surface in establishing and maintaining contact with the submerged diving bell if the umbilical to the surface is severed. The device should include the following components:

1 – TRANSPONDER

1.1 - The transponder should be provided with a housing capable of operating to a depth of at least 200 m containing batteries and equipped with salt water activation contacts. The batteries should be of the readily available "alkaline" type and, if possible, be interchangeable with those used in communication system between diver and surface personnel.

1.2 - The transponder should be designed to operate with the following characteristics:

- Common emergency reply frequency	37,5 kHz
- Individual interrogation frequencies:	
Channel A...	38,5 +0,05 kHz
Channel B...	39,5 + 0,05 kHz
- Receptor sensitivity	+15 dB at pressure of 1µbar
- Minimum interrogation pulse width	4 ms
- Turnaround delay	125,7+0,2 ms
- Reply frequency	37,5+0,05 kHz
- Maximum interrogation rates:	
more than 20% of battery life remaining	Once per second
less than 20% of battery life remaining	Once per 2 seconds
	85 dB at 1µbar pressure in 1 meter
- Minimum transducer polar diagram	6 dB at ± 135° solid angle, centered on the transponder vertical axis and transmitting towards the surface
- Minimum listening life in water using transponder in passive mode (just listening)	10 weeks
- Minimum listening life in water Minimum battery life replying at 85 dB 37.5 kHz (speaking)	5 days

2 - DIVER-HELD INTERROGATOR/RECEIVER

2.1 - The interrogator/receiver should be provided with a housing capable of operating to a depth of at least 200 m with pistol grip and compass. The front end should contain the directional hydrophone array and the rear end the three-digit LED display readout calibrated in meters. Controls should be provided for "on/off receiver gain" and "channel selection". The battery pack should be of the readily available "alkaline" type and, if possible, be interchangeable with that of the interrogator and receiver.

2.2 - The interrogator/receiver should be designed to operate with the following characteristics:

- Common emergency reply frequency		37,5 kHz
- Individual interrogation frequencies:	Channel A	38,5 kHz
	Channel B	39,5 kHz
- Minimum transmitter output power		85 dB at pressure of 1µbar to 1 meter
- Transmit pulse duration		4 ms
- Directivity		+ 15º
- Maximum detectable range		more than 500 meters

2.12.6 - In addition to the communication systems referred to above, a standard bell emergency communication tapping code should be adopted, as given below, for use between persons in the bell and rescue divers. A copy of this tapping code should be displayed inside and outside the bell and also in the dive control room.

BELL EMERGENCY COMMUNICATION TAPPING CODE

Tapping code	Situation
3.3.3	Communication opening procedure (inside and outside)
1	Yes or affirmative or agreed
3	No or negative or disagreed
2.2	Repeat please
2	Stop
5	Have you got a seal?
6	Stand by to be pulled up
1.2.1.2	Get ready for through water transfer (open your hatch)
2.3.2.3	You will NOT release your ballasts
4.4	Do release your ballast in 30 minutes from now
1.2.3	Do increase your pressure
3.3.3	Communication closing procedure (inside and outside)

3 – EVACUATION

3.1 – EVACUATION SYSTEM

If an evacuation system is provided then it should have sufficient capacity to evacuate all divers under pressure, in the event of the ship having to be abandoned, and should be in accordance with the provisions of this Code.

It is recognized that there are various methods available for evacuating divers in an emergency and that the suitability of the various options for a safe hyperbaric evacuation depends on a number of factors including the geographical area of operation, environmental conditions, and any available offshore or onshore medical and support facilities. Options available to diving contractors will include:

- hyperbaric self-propelled lifeboats;
- towable hyperbaric evacuation units;
- hyperbaric evacuation units which may or may not be towable suitable for offloading on to an attendant vessel;
- transfer of the diving bell to another facility;
- transfer of the divers from one diving bell to another when in the water and under pressure;
- negatively buoyant unit with inherent reserves of buoyancy, stability and life support capable of returning to the surface to await independent recovery.

The Guidelines and Specifications do not therefore attempt to specify which particular type of hyperbaric evacuation system should be employed and recommend examination and identification of the option most suited for the area and type of operation in which they are engaged. Consideration may have to be given to the provision of separate evacuation facilities for divers at significantly different depths.

3.2 - CONTINGENCY PLANNING

3.2.1 - A potentially dangerous situation can arise if a floating unit, from which saturation diving operations are being carried out, has to be abandoned with a diving team under pressure. While this hazard should be reduced by pre-planning, under extreme conditions consideration may have to be given to hyperbaric evacuation of the divers. The hyperbaric evacuation arrangements should be studied prior to the commencement of the dive operation and suitable written contingency plans made. Where, in the event of diver evacuation, decompression would take place in another surface decompression chamber the compatibility of the mating devices should be considered.

3.2.2 - Once the hyperbaric evacuation unit has been launched, the divers and any support personnel may be in a precarious situation where recovery into another facility may not be possible and exposure to seasickness and accompanying dehydration will present further hazards. It is, therefore, necessary that diving contractors ensure that any such contingency plans include appropriate solutions. It should be emphasized that hasty or precipitate action may lead to a premature evacuation situation which could be more hazardous.

3.2.3 - In preparing the contingency plans, the various possible emergency situations should be identified taking into consideration the geographical area of operation, the environmental conditions, the proximity of other vessels, and the availability and suitability of any onshore or offshore facilities.

The facilities for rescue, recovery and subsequent medical treatment of divers evacuated in such circumstances should be considered. In case of unattended hyperbaric evacuation units, consideration should be given to providing equipment to transfer the towline to an attendant vessel before launch of the evacuation unit. Such an arrangement would enable the unit to be towed clear immediately after launching. Copies of contingency plans should be available on board the parent vessel, ashore and in the hyperbaric evacuation unit.

3.3 - TRAINING

Periodic training exercises should be carried out to ensure the operation of the hyperbaric evacuation system and the efficiency of the personnel responsible for the hyperbaric evacuation of the divers. Such training exercises should not normally be carried out while the chambers are pressurized, but should be carried out at each available opportunity.

3.4 – RECOMMENDATIONS AND SPECIFICATIONS FOR HYPERBARIC EVACUATION SYSTEMS

The recommendations and specification apply to new hyperbaric evacuation units which are constructed as from November 6, 1992 for units which can be mated to a surface chamber. In these cases, after survey performed by Grader Society of the ship, the presence of equipment and/or lifeguard equipment for divers under pressure should be registered in the Certificate of Safety and Construction for Load Ships. Also, any existing system which complies with the provisions of these rules may be considered for endorsement of the safety equipment certificate.

3.5 - DESIGN AND CONSTRUCTION

3.5.1 - The design and construction of the hyperbaric evacuation systems should consider horizontal or vertical dynamic snatch loads that may be imposed on the system and its lifting points particularly during evacuation and recovery.

3.5.2 - The hyperbaric evacuation unit should be capable of being recovered by a single point lifting arrangement and means should be provided on the unit to permit a swimmer to hook on or connect the lifting arrangement.

3.5.3 - In the design of pressure vessels including accessories such as doors, hinges, door landings, closing mechanisms, penetrators and viewports, the effects of rough handling should be considered in addition to design parameters such as pressure, temperature, vibration, operating and environmental conditions. In general, piping penetrations through the chamber should have isolating valves on both sides.

3.5.4 - Component parts of a hyperbaric evacuation system should be constructed in accordance with ASME, ANSI PVHO- RULES FOR PRESSURE VESSELS FOR HUMAN OCCUPATION, or equivalent, as well as to attend Grader Societies rules in charge for issuance of respective Diving System Safety Certificate.

3.5.5 - Components in the hyperbaric evacuation system should be so designed, constructed and arranged as to permit easy inspection, maintenance, cleaning and, where appropriate, disinfection.

3.5.6 - The hyperbaric evacuation system should be provided with the necessary control equipment to ensure its safe operation and the well-being of the divers.

3.5.7 - Special arrangements and instructions should be provided externally to enable the hyperbaric evacuation unit to be recovered safely. The instructions should be located where they will be legible when the hyperbaric evacuation unit is floating.

3.5.8 - Hyperbaric evacuation system should not be located in zone 0 or zone 1. Hazardous areas and high fire risk areas should be avoided as far as is reasonably practicable.

3.6 - HYPERBARIC EVACUATION UNITS

3.6.1 - The hyperbaric evacuation unit is to be designed for the rescue of all divers in the diving system at the maximum operating depth. Compression chamber should provide a suitable environment and adequate facilities, including, where appropriate, seat belts, for the maximum number of persons for which the unit is designed. The seating or other arrangements provided should be designed to provide an adequate degree of protection to the divers from impact collisions during launch and while the unit is afloat. Where the chamber is intended to be occupied for more than 12 h, arrangements for the collection or discharge of human waste should be provided.

3.6.2 - Interlocks should be provided to prevent the inadvertent release of the hyperbaric evacuation unit from the surface decompression chamber while the access trunking is pressurized. The mating flange should be adequately protected from damage at all times including during the launch and recovery stages.

3.6.3 - Arrangements should be provided to enable an unconscious diver to be taken into the unit.

3.6.4 - Compression chamber doors should be so designed as to prevent accidental opening while pressurized. All doors should be so designed that, where fitted, the locking mechanisms can be operated from both sides.

3.6.5 - Arrangements should be provided to allow the occupants to be observed. If viewports are provided they should be situated so that risk of damage is minimized.

3.6.6 - Where it is intended to carry out decompression of the divers after hyperbaric evacuation in another surface decompression chamber, then consideration must be given to the suitability of the mating arrangements on that surface decompression chamber. Where necessary, a suitable adapter and clamping arrangements should be provided.

3.6.7 - A medical lock should be provided and be so designed as to prevent accidental opening while the compression chamber is pressurized. The dimensions of the medical lock should be adequate to enable essential supplies, including C02 scrubber canisters, to be of such dimensions as to minimize the loss of gas when the lock is being used.

3.7 - STABILITY AND BUOYANCY

3.7.1 - Hyperbaric evacuation units designed to float should be provided with adequate stability for all envisaged operating and environmental conditions and be self-righting. In determining the degree of stability to be provided, consideration should be given to the adverse effects of large righting moments on the divers. Consideration should also be given to the effect which equipment and rescue personnel, required to be placed on the top of the system to carry out a recovery from the sea, may have on the stability of the hyperbaric evacuation unit.

3.7.2 - Towing attachment points should be so situated that there is no likelihood of the hyperbaric evacuation unit being capsized as a result of the direction of the tow line.

3.7.3 - Hyperbaric evacuation units designed to float should have sufficient reserves of buoyancy to enable the necessary rescue crew and equipment to be carried.

3.7.4 - Where hyperbaric evacuation units are designed to be placed on board a rescue vessel, attachment points should be provided on the unit to enable it to be secured to the deck.

3.7.5 - Hyperbaric evacuation units on ships required to be provided with fire-protected lifeboats should be provided with a similar degree of fire protection.

3.8 - LIFE-SUPPORT SYSTEM

3.8.1 - Means should be provided to maintain all the occupants in thermal balance and in a safe and breathable atmosphere for all environmental conditions envisaged - air temperature, sea temperature and humidity - and with the maximum and minimum number of divers likely to be carried. In determining the duration and amount of life support necessary, consideration should be given to the geographical and environmental conditions, the 02 and gas consumption and C02 generation under such conditions, the heat input or removal and the emergency services that may be available for the decompression of the divers. Gas losses as a result of using toilet facilities which discharge to outside the hyperbaric evacuation unit and medical lock operation should be taken into account in determining the amount of gases required. The effects of hypothermia should be considered and the effectiveness of the arrangements provided should be established as far as is reasonable and practicable under all conditions envisaged. However, in no such case should the duration of the unit's autonomous life-support endurance be less than 72 h.

3.8.2 - In addition to any controls and equipment fitted externally, compression chambers should be provided with adequate controls within for supplying and maintaining the appropriate breathing mixtures to the occupants, at any depth down to the maximum operating depth.

The persons operating the chamber, whether they are within or outside it, should be provided with adequate controls to provide life support. As far as practicable, the controls should be capable of operation without the person who operates them having to remove his/her seat belt.

3.8.3 - Two separate distribution systems should be provided for supplying oxygen to the compression chamber. Components in the system should be suitable for oxygen service.

3.8.4 - Adequate equipment should be provided and be suitably situated to maintain oxygen and carbon dioxide levels and thermal balance within acceptable limits while the life-support equipment is operating.

3.8.5 - In addition to any instrumentation necessary outside the compression chamber, suitable instrumentation should be provided within the chamber for monitoring the partial pressures of oxygen and carbon dioxide and be capable of operation equal that of all system for environmental control.

3.8.6 - Where it is intended that divers may be decompressed within the hyperbaric evacuation unit, provision should be made for the necessary equipment and gases, including therapeutic mixtures, to enable the decompression process to be carried out safely.

3.8.7 - An adequate supply of food and water should be provided within the hyperbaric evacuation unit. In determining, in particular, the amount of water to be provided, consideration should be given to the area of operation and the environmental conditions envisaged.

3.8.8 – An individual breathing system should be provided with a sufficient number of masks for all the occupants.

3.8.9 - Provision should be made external to the hyperbaric evacuation unit, and in a readily accessible place, for the connection of emergency hot or cold water and breathing therapeutic mixture. The dimensions of the connections provided should be as follows:

3/4 in. NPT (female) - hot or cold water 1/2.
½ in. NPT (female) - breathing mixture.

Connections should be clearly and permanently marked and be suitably protected.

3.8.10 - In hyperbaric evacuation units designed to pass through fires, the breathing gas bottles and piping systems and other essential equipment should be adequately protected. In addition, thermal insulation should be non-toxic and suitable for this purpose.

3.8.11 - First-aid equipment, sickness bags, paper towels, waste disposal bags and all necessary operational instructions for equipment within the compression chamber should be available within the chamber, on board the parent vessel and ashore.

3.9 - FIRE PROTECTION AND EXTINCTION

3.9.1 - Materials used in the construction and installation should so far as is possible be non- combustible and non-toxic.

3.9.2 - A fire-extinguishing system should be provided in the hyperbaric evacuation unit which should be suitable for exposure to all depths down to the maximum operating depth.

3.10 - ELECTRICAL ARRANGEMENTS

3.10.1 - All electrical equipment and installation, including the power supply arrangements, should be designed for the environment in which they will be required to be operated and designed to minimize the risk of electrical capacity depletion as a result of a fault, fire or explosion, electric shock, the emission of toxic gases and galvanic action. Electrical equipment within the compression chamber should be designed for hyperbaric use, high humidity levels and marine application.

3.10.2 - Power supplies required for the operation of life-support systems and other essential services should be sufficient for the life-support duration. The battery charging arrangements should be designed to prevent overcharging under normal or fault conditions. The battery storage compartment should be provided with means to prevent over pressurization and any gas released be vented to a safe place.

3.10.3 - Each compression chamber should be provided with a source of lighting sufficient for the life-support time and of sufficient luminosity to allow the occupants to read gauges and operate essential systems within the chamber.

3.11 - LAUNCH AND RECOVERY OF HYPERBARIC EVACUATION UNITS

3.11.1 - Means should be provided for the safe and timely evacuation and recovery of the unit and due consideration should be given to the environmental and operating conditions and the dynamic snatch and impact loadings that may be encountered. Where appropriate, the increased loadings due to water entrainment should be considered. Where the primary means of launching depends on the ship's main power supply, then a secondary and independent launching arrangement should be provided.

3.11.2 - If the power to the handling system fails, brakes should be engaged automatically. The brake should be provided with manual means of release.

3.11.3 - The launching arrangements provided should be designed to ensure easy connection or disconnection of the hyperbaric evacuation unit from the surface decompression chamber and for the transportation and removal of the unit from the ship under the same conditions of trim and list as those for the ship's other survival craft.

ANNEX 6-A

3.11.4 - Where a power-actuated system is used for the connection or disconnection of the hyperbaric evacuation unit and the surface decompression chamber, then a manual or stored power means of connection or disconnection should also be provided.

3.11.5 - The means provided for release of the falls or lift wire after the unit is afloat should provide for easy disconnection, particular attention being given to units not provided with an attendant crew.

3.11.6 - Where the hyperbaric evacuation unit is designed to be recovered from the sea, or from a ship in a seaway, consideration should be given to the mode of recovery. Adequate equipment to enable a safe recovery of the unit should be provided on the unit. Permanently marked clear instructions should be provided adjacent to the lifting equipment as to the correct method for recovery, including the total weight of the hyperbaric evacuation unit. Consideration should be given to the effect which entrained water and any bilge water may have on the total weight to be lifted by the recovery vessel. Consideration should also be given to any means that can be provided for the absorption of the dynamic snatch loads imposed during the recovery of the hyperbaric evacuation unit from the sea.

3.12 - COMMUNICATIONS AND LOCATING SYSTEMS

3.12.1 - If breathing mixtures containing helium or hydrogen are used, a self-contained primary communication system fitted with an unscrambler device should be arranged for direct two-way communication between the divers and those outside the compression chamber. A secondary communication system should also be provided

3.12.2 - In addition to the communication system referred before, a standard bell emergency communication tapping code should be provided. Copies of the tapping code should be permanently displayed inside and outside the hyperbaric evacuation unit.

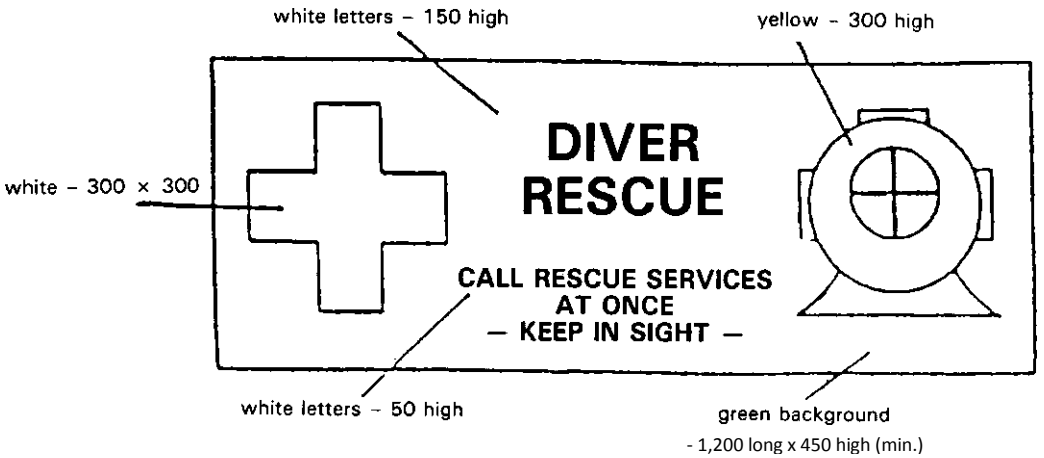
3.12.3 - Hyperbaric evacuation units designed to be waterborne should be provided with a strobe light and radar reflector.

3.12.4 - Hyperbaric evacuation units designed to be placed on the sea-bed to await independent recovery should be provided with an acoustic transponder. The transponder should be suitable for operation with a diver-held interrogator-receiver which will be retained on board the parent ship. The equipment provided should meet the requirements specified item 2.12.5.

3.13 - MARKING AND INFORMATION TO BE PROVIDED ON HYPERBARIC EVACUATION UNITS.

3.13.1 - Dedicated hyperbaric evacuation units should be colored orange and be provided with retro- reflective material to assist in their location during hours of darkness.

3.13.2 - Each hyperbaric evacuation unit designed to be waterborne should be marked with at least three identical signs as shown below. One of these markings should be on top of the unit and be clearly visible from the air and the other two be mounted vertically on either side and as high as possible and be capable of being seen while the unit is afloat.



3.13.3 - The following instructions and equipment should be kept readily available while the unit is afloat:

- buoyant towline and other devices;
- all external connections, particularly for the provision of emergency gas, hot/cold water and communications;
- maximum gross weight of unit in air;
- lifting points;
- name of the parent ship and port of registration; and;
- telephone, telex and facsimile numbers.

3.14 – WARNING INSTRUCTIONS

Where appropriate, the following instructions should be permanently displayed on every hyperbaric evacuation unit in two separate locations so as to be clearly visible while the unit is afloat:

"Unless specialized diving assistance is available:

- do not touch any valves or other controls;
- do not try to get occupants out;
- do not connect any gas, air, water or other supplies;
- do not attempt to give food, drinks or medical supplies to the occupants; and
- do not open any hatches".

3.15 - MAINTENANCE AND TESTING

The availability of any hyperbaric evacuation system provided is dependent on the regular testing and maintenance of the system. A planned maintenance and testing program should be devised with the responsibility for carrying out the maintenance tasks being allocated to specific crew members. A maintenance and testing schedule should be available for recording the execution of the tasks and the signatures of the persons allocated the tasks. Such schedules should be maintained on board and be available for inspection.

ANNEX 7-A

REPÚBLICA FEDERATIVA DO BRASIL
HYPERBARIC CHAMBER COMPLIANCE STATEMENT
This statement shall be supplemented by Inspection Report

Issued in the pursuance of the CODE OF SAFETY FOR DIVING SYSTEMS, 1995. (Adopted by the IMO Assembly resolution A.831(19)*, and in the pursuance of the National Standard Regulation to the Diving System (NORMAM-15/DPC).

Issued under the authority of the Government of República Federativa do Brasil
by_____(Grader Society recognized by DPC)

Name of ship or diving company_____ Official number of ship or diving company_____
Date on which the Chamber was certificated for the first time _____

THIS IS TO CERTIFY

1 - That the above mentioned Hyperbaric Chamber has been fully surveyed and tested in accordance with the applicable provisions of Code of Safety for Diving Systems, 1995 and the NORMAM-15/DPC.

2 - That the survey showed that the design, construction, equipment, fittings, communication system, arrangements and materials of the system and conditions there of are in all respects satisfactory and that the system complies with the relevant provisions of the Code.

3 - That the Hyperbaric Chamber is designed and constructed for a maximum operating depth of_____

4 - That the Hyperbaric Chamber and its main components are designed in accordance with the following limiting operating parameters:
Number of divers supported: _____

Type of Breathing Mixture Used:

This statement is valid until_____Day of_____20_____
Issued at_____ Day of_____20_____
(place of issue of certificate)

The undersigned declares that he is authorized by the said Government to issue this certificate.

_____
(Signature of official issuing the certificate)
(Seal or stamp of issuing authority, as appropriate)

ANNEX 7-A

SURVEYS

This is to certify that, at a survey required by item 0702 of the NORMAM-15, this chamber was found to comply with the relevant provisions of the Code and of the NORMAM-15

Annual survey

Place:_____ Date_____
Signature and seal of issuing authority

Place:_____ Date_____
Signature and seal of issuing authority

Place:_____ Date_____
Signature and seal of issuing authority

Place:_____ Date_____
Signature and seal of issuing authority

Attached:
SURVEY REPORT NUMBER .....

REPORT NUMBER _____

REPORT OF INSPECTION IN HYPERBARIC CHAMBER

This document certifies that the undersigned, inspector of Grader Society....., on the order of ....(requester company), attended to its facilities in order to inspect the equipment described below:

A) Equipment Description

Inspect equipment is composed by a decompression chamber with Double compartment and its accessories.

B) Chamber Data

B.1 Manufacturer	:	
B.2 Dimensions	:	Ø x mm
B.3 Manufacturing Rule	:	ASME PVHO Sec. VIII D.1
B.4 Work pressure	:	kgf/cm^2
B.5 Test Pressure	:	kgf/cm^2
B.6 Test Date	:	
B.7 Identification	:	

C) Accessories

C.1 Depth measurer(inner)			Depth measurer (outer)		
Brand	:		Brand	:	
Diameter	:	Ø “	Diameter	:	Ø “
Scale	:	SFW	Scale	:	SFW
Identification	:		Identification	:	
Quantity	:		Quantity	:	

D) Analyzers

D.1 Oxygen			**D.2 Carbon Dioxide**		
Brand	:		Brand	:	
Identification No.	:		Identification No.	:	
Model	:		Model	:	

E) Hyperbaric Extinction

		Chamber	**Antechamber**
Brand	:		
Identification	:		
Tests Dates	:		

F) Intercom

		Main	Auxiliary
Brand	:		
Identification	:		
Tests Dates	:		

G) Thermo hygrometers

H) Lighting of Chamber and Antechamber

I) Compressed Air Supply

I.1	**Compressor/motor**	**:**	**Main**	**Auxiliary**
I.2	Manufacturer	:		
I.3	Model	:		
I.4	Identification	:		
I.5	Operating Pressure	:	kgf/cm^2	kgf/cm^2
I.6	Volume Output		l/min	l/min
I.7	Type	:		
I.8	Safety Valve Reg.	:	kgf/cm^2	kgf/cm^2
I.9	Lubricant Oil	:		
I.10	Activating	:		
I.11	Manufacturer	:		
I.12	Potency	:		
I.13	Number	:		
I.14	Transmission	:		
I.15	Model	:		

J) Compressed Air Reservoir Data

			Main	**Auxiliary**
J.1	Manufacturer	:		
J.2	Identification	:		
J.3	Operating Pressure	:	kgf/cm^2	
J.4	Volume	:	l	
J.5	Constructive Norm	:		
J.6	Hydrostatic Test	:	kgf/cm^2	
J.7	Inspection Window	:		
J.8	Operating Range	:		
J.9	Manometer	:		
J.10	Retention Valve	:	Regulated for..... kgf/cm^2	Regulated for.....kgf/cm^2
J.11	Safety Valve	:		
J.12	Manual Drain	:		
J.13	Oil Filter	:		
J.14	Water Sep. Filter	:		
J.15	Particles Filter	:		
J.16	Painting as ABNT	:		

K) Bottles Frame Data

K.1	Manufacturer	:		
K.2	Manufacturing Rule	:		
K.3	Capacity of Each Bottle	:		
K.4	Working Pressure	:		kgf/cm
K.5	Test Pressure	:		kgf/cm
K.6	Bottles Identification Number	:		

L) Inspections and Tests

L.1) The equipment mentioned above was visually inspected and considered in good conditions.
L.2) Chamber was subjected to a leakage test, with air, at the pressure of ….. kgf/cm^2 , the volume tank with pressure of..... kgf/cm^2.
L.3) The certificates of measurement of depth manometers were presented, with satisfactory results.
L.4) The watches ..... were certified according to the standard ASME P.H.V.O.
L.5) The following hydrostatic tests were performed with satisfactory results:

Chamber		Volume Tank		Air Bottles		O_2 Bottles	
Pressure	Date	Pressure	Date	Pressure	Date	Pressure	Date

L.6) The system of communication between chamber/antechamber and the outer environment were tested, with satisfactory results.
L.7) The following tests were performed with satisfactory results:

Ultrasound		Radiographic		(Others)	
Company	Date	Company	Date	Company	Date

L.8) Chamber calculation memorial was presented.
L.9) Chamber and antechamber safety valves were regulated with..... Kgf/cm^2, safety valve of volume tank was regulated with.....kgf/cm^2, with satisfactory result.
L.10) Compressors were tested at the pressure of ..... kgf/cm^2, with satisfactory results.
L.11) The analysis of air supplied by compressor was performed, according to the requirements defined on Chapter 3 from NORMAM-15/DPC.
L.12) Manifold of O_2 bottle was subject to leakage test at pressure of ..... kgf/cm^2, with satisfactory results.

SEAL OR STAMP
OF GRADER
SOCIETY

....., ... of 20..... .
(location)

_____
Inspector

REPÚBLICA FEDERATIVA DO BRASIL
DIVING BELLS AND BASKETS COMPLIANCE STATEMENT
This statement shall be supplemented by Inspection Report

Issued in the pursuance of Norm of Maritime Authority for Submersed Activities (NORMAM-15/DPC).

Issued under the authority of the Government of República Federativa do Brasil
by_____
(CP/DLAG or Grader Society recognized by DPC)

Name of ship or diving company_____
Official number of ship or diving company_____
Date on which the access basket/diving basket/diving open bell was certificated for the first time _____

THIS IS TO CERTIFY

1 - That the above mentioned equipment has been fully surveyed and tested in accordance with the applicable provisions of International Code of Diving Safety and Norm of Maritime Authority to Submersed Activities (NORMAM-15/DPC).

2 - That the survey showed that the design, construction, equipment, fittings, communication system, arrangements and materials of the system and conditions there of are in all respects satisfactory and that the system complies with the relevant provisions of the Code.

3 - That the equipment is designed and constructed for a maximum operating depth of_____

4 - That the equipment and its main components are designed in accordance with the following limiting operating parameters:
Number of divers supported: _____

Type of Breathing Mixture Used:

This statement is valid until_____Day of_____20_____
Issued at_____ Day of_____20_____
(place of issue of certificate)

The undersigned declares that he is authorized by the said Government to issue this certificate.

_____
(Signature of official issuing the certificate)
(Seal or stamp of issuing authority, as appropriate)

SURVEYS

This is to certify that, at a survey required by item 0807 of the NORMAM-15/DPC, this (e) access basket/diving basket/diving open bell was found to comply with the relevant provisions of the Code and of NORMAM-15/DPC.

Annual survey

Place:_____ Date_____
Signature and seal of issuing authority

Place:_____ Date_____
Signature and seal of issuing authority

Place:_____ Date_____
Signature and seal of issuing authority

Place:_____ Date_____
Signature and seal of issuing authority

Attached:
SURVEY REPORT NUMBER .....

REPORT NUMBER _____

REPORT OF INSPECTION ON ACCESS BASKET/DIVING BASKET/OPEN BELL (as applicable)

This document certifies that the undersigned, inspector from Grader Society ....., under request of .....(requester company), attended to its facilities aiming to inspect the following equipment:

A Acess Basket/Diving Basket/Open Bell for Diving (as applicable)

A.1 Inspected equipment is composed of:

A.1.1 Structure in steel tubes;

A.1.2 Steel Bell with acrylic watches/ acrylic bell;

A.1.3 Air supply system of low/high pressure;

A.1.4 Phony lighting system;

A.1.5 Two devices for guide cable;

A.1.6 Eyepad for lifting; and

A.1.7 Emergency air supply. (two autonomous equipment)

A.2 Data from Acess Basket/Diving Basket/Open Bell for Diving (as applicable)

A.2.1 Identification Number :
A.2.2 Work Load : kgf
A.2.3 High Pressure Bottles :
A.2.4 Main Entrance :
A.2.5 Secondary Entrance :
A.2.6 Depth measure identification and scale :

B. Surface Control Panel

B.1 Depth Measurer

B.1.1 Brand :
B.1.2 Id. Number :
B.1.3 Diameter :
B.1.4 Quantity :
B.1.5 Panel Arrangement :
B.1.6 Air supply manometer :

C. Main Umbilical Data

C.1	Manufacturer	:	
C.2	Identification :		
C.3	Diameter/lenght	:	
C.4	Operation Pressure	:	kgf/cm^2
C.5	Test Pressure	:	kgf/cm^2
C.6	Life Line	:	
C.7	Protected Phony Cables	:	
C.8	Bell Depth Measurer	:	
C.9	Depth Measurer of Diver 1	:	
C.10	Depth Measurer of Diver 2	:	

D.	**Divers' Umbilical**		**Umbilical 1**	**Umbilical 2**
D.1	Manufacturer	:		
D.2	Identification	:		
D.3	Diameter/lenght	:		
D.4	Operation Pressure	:	kgf/cm^2	kgf/cm^2
D.5	Test Pressure	:	gf/cm^2	kgf/cm^2
D.6	Test Date	:		
D.7	Life Line	:		
D.8	Phony Cable	:		
D.9	Hose to Measure Depth	:		
D.10	Type of Terminals	:		

E. Frame

E.1	Identification Number	:	
E.2	Work Load	:	kgf
E.3	Load Test	:	kgf
E.4	Structure/Material	:	

F.	**Winch**		**Main**	**Emergency**
F.1	Brand	:		
F.2	Identification No	:		
F.3	Cable Specification	:		
F.4	Work Load	:	kgf	kgf
F.5	Test Load	:	kgf	kgf

G.	**Intercom**		**Main**	**Emergency**
G.1	Brand	:		
G.2	Model	:		
G.3	Identification No	:		
G.4	Number of Divers	:		

H. Inspection and Test

H.1 The above mentioned equipment was visually inspected and considered in good conditions.

H.2 The manifold for air supply on Bell and control panel was subject to tightness test under pressure of ..... kgf/cm^2, with satisfactory result.

H.3 Communication and lighting systems were testes and considered as satisfactory.

H.4 Weight of Access basket/diving basket/Bell in operating conditions is of ..... kgf (equipment more two equipped divers).

H.5 Equipment was subjected to a floatability test, with negative fluctuation with air bubble totally complete.

H.6 Emergency bottle were subject to a hydrostatic test in .....of 20....., with satisfactory result.

H.7 Certificates of depth measurer standardization were presented.

H.8 Winches brake was tested, with satisfactory result.

H.9 Intercom system was testes, with satisfactory result.

H.10 Frame was subject to a load test of .....kgf.

SEAL OR
STAMP
OF
GRADER SOCIETY

....., ... of 20.....
(location)

_____
Inspect

ANNEX 9-A

DIRECTORATE OF PORTS AND COASTS
(Name of Grader Society)

Date: / /

Company Name:
Enrollment Number: **CNPJ:**

Checklist of System for Shallow Diving up to twenty meters

Code	Description	Ref.	Quant	OK	N/A	Req
001	Ampoule manufacturing norm, ABNT or equivalent	0501				
002	Ampoules hydrostatic test	0501				

Ampoule Number	Test Date	Next Test Date	Ampoule Number	Test Date	Next Test Date
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-
-	-	-	-	-	-

Code	Description	Ref.	Quant	OK	N/A	Req
003	Ampoules Marking	0909				
004	Ampoules General State	1003				
005	Safety suspensory with loop for MG lifting	0501				
006	Controlled Floating Jackets and automatic filling	0501				
007	Regulation Valves with Double Stage	0501				
008	Wrist Depth Measurer	0501				
009	Diving clock	0501				
010	Diving clothe (at least, jacket, trousers and hood)	0501				
011	Facial mask with breathing tube (“snorkel”)	0501				
012	Belt with weights with fast looseness buckle	0501				
013	Paddles	0501				
014	Safety Knife	0501				
015	Life line (guide cable) with 100m, resistance of 150kg and hook with fast looseness	0501				
016	High pressure air compressor with accessories for ampoules loading*	0501				
017	Filter and sifters of water, oil and particles.	0501				
018	Analysis of the air supplied by the compressor in agreement with purity standard established in Chapter 12 of NORMAM-15 /DPC	1203				
019	Manual or instructions for maintenance and repair	1003				
020	Inspection or maintenance registration	1006				
021	Equipment General Status	1003				
022	Proper warning signaling	1204				

Stamp of Grader Society

Inspector Name and Signature

DIRECTORATE OF PORTS AND COASTS
(Name of Grader Society)

Date: / /

Company Name:
Enrollment Number: **CNPJ:**

Checklist of Shallow Dive System up to thirty meters

Cod.	Descriptio	Ref	Quant	OK	N/A	Req
	Air Compressor					
001	Air compressor with working pressure of 12,2kgf/cm^2 and minimum flow of 168l in atmospheric pressure (40l/min in 12,2kgf/cm^2 pressure)	0502				
002	Filter and sifters of water, oil and particles.	0502				
003	Analysis of the air supplied by the compressor in agreement with purity standard established in Chapter 12 of NORMAM-15 /DPC.	1203				
004	Manual or instructions for maintenance and repair	1003				
005	Inspection or maintenance registration	1006				
006	Compressor General Status	1003				
	Compressed Air Reservoir (Volume Tank)					
007	Minimum volume of 80 liters	0502				
008	Working pressure (Min. 12,2kgf/cm^2)	0502				
009	Hydrostatic Test	0502				

	Reservoir Number	Test Date	Next Test Date	Reservoir Number	Test Date	Next Test Date
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-

Code	Description	Ref.	Quant	OK	N/A	Req
010	Window for internal visual inspection	0502				
011	Manometer	0502				
012	Safety valve regulated to 10% above the working pressure	0502				
013	Retention valve in compressed air admission	0502				
014	Drain valve	0502				
015	General status	1003				
	Main supply through high pressure ampoules (optional)					
016	Minimum volume of 30l	0502				
017	Minimum working pressure of 150kgf/cm^2	0502				

	Ampoule Number	Test Date	Next Test Date	Ampoule Number	Test Date	Next Test Date
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-

018	General state of conservation of valves, connections and tubes connected to the bottles.	1003				
019	Marking of hoses or flexible nets	0909				
	Bottle for Emergency Supply					
020	Minimum internal volume of 5l	0502				
021	Minimum working pressure of 150kgf/cm2.	0502				
022	ABNT Manufacturing Rule or equivalent	0502				

Code	Description				Ref.	Quant	OK	N/A	Req
023	Bottles hydrostatic test				0502				
	Ampoule Number	Test Date	Next Test Date	Ampoule Number	Test Date		Next Test Date		
	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -		- - - - -		
Code	**Description**				**Ref.**	**Quant**	**OK**	**N/A**	**Req**
024	Bottles Marking				0909				
025	General state of conservation				1003				
	Umbilical:								
026	Device to accompany diver depth ("pneufathometer") or depth measurer				0502				
027	Maximum length of 100m without amendments				0502				
028	Minimum internal diameter of 8,0mm				0502				
029	Working pressure of 12,2kgf/cm^2				0502				
030	Resistance to traction equivalent to lifting of 100kg				0502				
031	Life line constituted by special cable with work load equal or superior to 150kg				0502				
032	Hooks with fast disconnection				0502				
033	Communications cable (optional)				0502				
034	Umbilical general status and its connections				1003				
	Several								
035	Intercom (optional)				0502				
036	Safety suspensory with loop for MG lifting with bonds between diver’s legs				0502				
037	Diving clock				0502				
038	Proper diving clothes				0502				
039	Facial mask "full face" type or hard helmet for dive				0502				
040	Belt with weights with fast looseness buckle				0502				
041	Paddles				0502				
042	Safety Knife				0502				
043	Proper warning signaling				1204				
044	Air control panel				0502				
	Functioning Test								
045	Compressed air supply to diver test				0910				
046	Communication System Test *				0910				

Stamp of Grader Society

Inspector name and signature

DIRECTORATE OF PORTS AND COASTS
(Name of Grader Society)

Company Name: **Date: / /**
Enrollment Number: **CNPJ:**

Checklist of Shallow Dive System up to fifty meters

Code	Description	Ref.	Quant	OK	N/A	Req
	Air Compressor (Secondary Source)					
001	Air compressor with working pressure of 17,3kgf /cm2 and minimum flow of 240l/min in atmospheric pressure (40l/min in 17,3kgf /cm2 pressure)	0601				
002	Filter and sifters of water, oil and particles.	0601				
003	Analysis of the air supplied by the compressor in agreement with purity standard established in Chapter 12 of NORMAM-15 /DPC.	1203				
004	Manual or instructions for maintenance and repair	1003				
005	Inspection or maintenance registration	1006				
006	Compressor General Status	1003				
	Compressed Air Reservoir (Volume Tank)					
007	Minimum volume of 150l	0601				
008	Working pressure (Min. 17,3kgf/cm2)	0601				
009	Hydrostatic Test (validity of 5 years)	0601				

	Reservoir Number	Test Date	Next Test Date	Reservoir Number	Test Date	Next Test Date
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-

Code	Description	Ref.	Quant	OK	N/A	Req
010	Window for internal visual inspection	0601				
011	Manometer	0601				
012	Safety valve regulated to 10% above the working pressure	0601				
013	Retention valve in compressed air admission	0601				
014	Drain valve	0601				
015	General status	1003				
	Bottle for Emergency Supply					
016	Minimum internal volume of 5l	0601				
017	Minimum working pressure of 150kgf/cm2.	0601				
018	ABNT Manufacturing Rule or equivalent	0601				
019	Bottles hydrostatic test	0601				

	Ampoule Number	Test Date	Next Test Date	Ampoule Number	Test Date	Next Test Date
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-

Code	Description	Ref.	Quant	OK	N/A	Req
020	Bottles Marking	0909				
021	General state of conservation	1003				
022	Direct connection with diver mask or helmet	0601				

Code	Description	Ref.	Quant	OK	N/A	Req
	Umbilical:					
023	Device to accompany diver depth ("pneufathometer") from the surface	0601				
024	Maximum length of 100m without amendments	0601				
025	Minimum internal diameter of 8,0mm	0601				
026	Working pressure of 17,3kgf/cm^2	0601				
027	Resistance to traction equivalent to lifting of 100kg	0601				
028	Life line constituted by special cable with work load equal or superior to 150kg	0601				
029	Hooks with fast disconnection	0601				
030	Protected communications cable	0601				
031	Umbilical general status and its connections	1003				
	Hyperbaric Chamber (applicable in depths > 30m)					
032	Compliance Statement (Annex 7-A)	0702				
033	ASME-PVHO manufacturing rule or equivalent	0701				
034	Fulfillment of basic requirements presented in chapter 7	0704				
	Open Diving Bell - Signet (applicable in depths > 40m)					
035	Compliance Statement (Annex 8-A)	0803				
036	Fulfillment of basic requirements presented in chapter 8	0801				
	Several					
037	Intercom	0601				
038	Safety suspensory with loop for MG lifting with bonds between diver's legs	0601				
039	Diving clock	0601				
040	Proper diving clothes	0601				
041	Facial mask "full face" type or hard helmet for dive	0601				
042	Belt with weights with fast looseness buckle	0601				
043	Paddles	0601				
044	Safety Knife	0601				
045	Proper warning signaling	1204				
046	Air control panel	0601				
047	Equipment for sound and image recording captured by diver mask or helmet	0601				
	Functioning Test					
048	Compressed air supply to diver test	0910				
049	Communication System Test	0910				

Stamp of Grader Society

Inspector Name and Signature

DIRECTORATE OF PORTS AND COASTS
(Name of Grader Society)

Date: / /

Company Name:
Enrollment Number: **CNPJ:**

Checklist for Diving System up to Ninety Meters

Code	Description	Ref.	Quant	OK	N/A	Req
	Artificial Breathing Mixture Reservoir (MRA)					
001	MRA supply equivalent to 3 times the volume foreseen for dive	0602				
002	ABNT Manufacturing Rule or equivalent	0602				
003	Supply of enough therapeutic mixture to conduct decompressions and emergencies	0602				
004	Direct connection with the mask and/or diving helmet	0602				
005	Direct connection with the hyperbaric chamber	0602				
	Oxygen Reservoir (O2)					
006	Possibility of oxygen (O2) use to conduct decompression starting from 12m of depth	0602				
007	Direct connection with the hyperbaric chamber	0602				
008	ABNT Manufacturing Rule or equivalent	0602				
	Air Compressor (Secondary Source)					
009	Air compressor with working pressure of 17,3kgf /cm2 and minimum flow of 240l/min in atmospheric pressure (40l/min in 17,3kgf /cm2 pressure)	0602				
010	Filter and sifters of water, oil and particles.	0602				
011	Analysis of the air supplied by the compressor in agreement with purity standard established in Chapter 12 of NORMAM-15 /DPC.	1203				
012	Manual or instructions for maintenance and repair	1003				
013	Inspection or maintenance registration	1006				
014	Compressor General Status	1003				
	Compressed Air Reservoir (Volume Tank)					
015	Minimum volume of 150l	0601				
016	Working pressure (Min. 17,3kgf/cm2)	0601				
017	Hydrostatic Test (validity of 5 years)	0601				

	Reservoir Number	Test Date	Next Test Date	Reservoir Number	Test Date	Next Test Date
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-
	-	-	-	-	-	-

Code	Description	Ref.	Quant	OK	N/A	Req
018	Window for internal visual inspection	0601				
019	Manometer	0601				
020	Safety valve regulated to 10% above the working pressure	0601				
021	Retention valve in compressed air admission	0601				
022	Drain valve	0601				
023	General status	1003				
	Bottle for Emergency Supply					
024	Minimum internal volume of 5l	0601				
025	Minimum working pressure of 150kgf/cm2.	0601				
026	ABNT Manufacturing Rule or equivalent	0601				
Code	**Description**	**Ref.**	**Quant**	**OK**	**N/A**	**Req**
027	Bottles hydrostatic test	0601				

	Ampoule Number	Test Date	Next Test Date	Ampoule Number	Test Date	Next Test Date
	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	- - - - -

Code	Description	Ref.	Quant	OK	N/A	Req
028	Bottles Marking	0909				
029	General state of conservation	1003				
030	Direct connection with diver mask or helmet	0601				
031	Direct connection with hyperbaric chamber	0602				
032	Loading with Artificial Breathing Mixture	0602				
	Umbilical:					
033	Device to accompany diver depth ("pneufathometer")	0601				
034	Maximum length of 100m without amendments	0601				
035	Minimum internal diameter of 8,0mm	0601				
036	Working pressure of 17,3kgf / cm^2	0601				
037	Resistance to traction equivalent to lifting of 100kg	0601				
038	Life line constituted by special cable with work load equal or superior to 150kg	0601				
039	Hooks with fast disconnection	0601				
040	Protected communications cable	0601				
041	Umbilical general status and its connections	1003				
	Hyperbaric Chamber (applicable in depths > 30m)					
042	Compliance Statement (Annex 7-A)	0702				
043	ASME-PVHO manufacturing rule or equivalent	0701				
044	Fulfillment of basic requirements presented in chapter 7	0704				
045	Individual masks for oxygen and therapeutic mixtures	0602				
046	Proper installation for use of HeO2 e O_2	0602				
	Open Diving Bell - Signet (applicable in depths > 40m)					
047	Compliance Statement (Annex 8-A)	0803				
048	Fulfillment of basic requirements presented in chapter 8	0801				
049	4 ampoules with 40l of hydrostatic volume and minimum working pressure of 150kgf/cm2, three for emergency supply of HeO2 and one for O_2	0602				
	Several					
050	O2 Analyzer of in breathing mixtures with reading between 0 and 100% and minimum sensibility of 0,1%	0602				
051	Intercom with voice distorter	0602				
052	Safety suspensory with loop for MG lifting with bonds between diver's legs	0601				
053	Diving clock	0601				
054	Dry dive clothes or with a heating system	0602				
055	Facial mask "full face" type or hard helmet for dive	0601				
056	Belt with weights with fast looseness buckle	0601				
057	Paddles	0601				
058	Safety Knife	0601				
059	Proper warning signaling	1204				
060	Panel with control of air flow, mixture of HeO2 and O_2	0602				
061	Equipment for sound and image recording captured by diver mask or helmet	0602				

	Functioning Test					
062	Compressed air supply to diver test	0910				
063	Bell Lifting System Test	0801				
064	Communication System Test	0910				

Stamp of Grader Society

Inspector Name and Signature

REPÚBLICA FEDERATIVA DO BRASIL
DIVING SYSTEM SAFETY CERTIFICATE
The list of equipment should be enclosed to this certificate

Issued in the pursuance of the CODE OF SAFETY FOR DIVING SYSTEMS, 1995. (Adopted by the IMO Assembly resolution A.831(19)*, and in the pursuance of the National Standard Regulation to the Diving System (NORMAM-15/DPC).

Issued under the authority of the Government of República Federativa do Brasil by_____

(full official designation of the competent Organization authorized by the Administration)

Name of ship or diving company_____
Official number of ship or diving company_____
Distinctive identification and its location for each main component in accordance with the List of Equipment supplemented.
Date on which the diving system was certificated for the first time _____

THIS IS TO CERTIFY

1 - That the above mentioned system has been fully surveyed and tested in accordance with the applicable provisions of Code of Safety for Diving Systems, 1995 and the NORMAM-15/DPC.
2 - That the survey showed that the design, construction, equipment, fittings, communication system, arrangements and materials of the system and conditions there of are in all respects satisfactory and that the system complies with the relevant provisions of the Code.
3 - That the diving system is designed and constructed for a maximum operating depth of_____
4 - That the diving system and its main components are designed in accordance with the following limiting operating parameters:

_____

_____

5 - That in accordance with section 1.4, the provisions of the Code are modified in respect of the system in the following manner:

_____

_____

This certificate is valid until_____Day of_____20_____
Issued at_____ Day of_____20_____
(place of issue of certificate)
The undersigned declares that he is authorized by the said Government to issue this certificate.

_____
(Signature of official issuing the certificate)
(Seal or stamp of issuing authority, as appropriate)

SURVEYS

This is to certify that, at a survey required by section 1.6 of the Code of Safety for Diving Systems, and by article 0907 of the NORMAM-15, this system was found to comply with the relevant provisions of the Code.

Annual survey

Place:_____ Date_____
Signature and seal of issuing authority

Place:_____ Date_____
Signature and seal of issuing authority

Place:_____ Date_____
Signature and seal of issuing authority

Place:_____ Date_____
Signature and seal of issuing authority

Attached:
LIST OF DIVING SYSTEM EQUIPMENT

ANNEX OF CERTIFICATE NUMBER_____

LIST OF SHALLOW DIVING SYSTEM EQUIPMENT

A. COMPRESSOR

A.1 Compressor Identification Number

A.2 Compressor _____ Identification Number

-
-
-

B. COMPRESSED AIR RESERVOIR

B.1 Compressed air reservoir Identification Number

B.2

-
-
-

C. UMBILICAL

C.1 Umbilical Identification Number

-
-
-

D. EMERGENCY BOTTLE

D.1 Bottle Identification Number

-
-
-

E. CONTROL PANEL

E.1 Panel Identification Number

-
-
-

F. FACIAL MASKS/HELMETS

F.1 Facial mask Identification Number

-
-
-

G. INTERCOM

G.1 Intercom Identification Number

-
-
-

H. HYPERBARIC CHAMBER

H.1 Chamber Identification Number

-
-
-

I. WINCH
I.1 Winch
Identification Number

J. FRAME
J.1 Frame Identification Number

K. BASKET
K.1 Basket Identification Number

L. BELL
L.1 Bell Identification Number

M. BOTTLE FRAME
M.1 Bottle frame Identification Number

N. PROPER CLOTHES **:** yes

O. REGULATION VALVES **:** yes

P. BELTS WITH BALLAST **:** yes

Q. PADDLES **:** yes

R. KNIFES **:** yes

S. SUSPENSORIES **:** yes

T. INFLATABLE JACKETS **:** yes

U.: LANTERNS **:** yes

V.: DEPTH MEASURER **:** yes

Rio de Janeiro, xxx xxxxx of xxxx

_____
Inspector

REPÚBLICA FEDERATIVA DO BRASIL
DIVING SYSTEM SAFETY CERTIFICATE
The list of equipment should be enclosed to this certificate

Issued in the pursuance of the CODE OF SAFETY FOR DIVING SYSTEMS, 1995. (Adopted by the IMO Assembly resolution A.831(19)*, and in the pursuance of the National Standard Regulation to the Diving System (NORMAM-15/DPC).

Issued under the authority of the Government of República Federativa do Brasil by_____

(full official designation of the competent Organization authorized by the Administration)

Name of ship or diving company_____
Official number of ship or diving company_____
Distinctive identification and its location for each main component in accordance with the List of Equipment supplemented.
Date on which the diving system was certificated for the first time _____

THIS IS TO CERTIFY

1 - That the above mentioned system has been fully surveyed and tested in accordance with the applicable provisions of Code of Safety for Diving Systems, 1995 and the NORMAM-15/DPC.

2 - That the survey showed that the design, construction, equipment, fittings, communication system, arrangements and materials of the system and conditions there of are in all respects satisfactory and that the system complies with the relevant provisions of the Code.

3 - That the diving system is designed and constructed for a maximum operating depth of_____

4 - That the diving system and its main components are designed in accordance with the following limiting operating parameters:

_____

_____

5 - That in accordance with section 1.4, the provisions of the Code are modified in respect of the system in the following manner:

_____

_____

This certificate is valid until_____Day of_____20_____
Issued at_____ Day of_____20_____
(place of issue of certificate)

The undersigned declares that he is authorized by the said Government to issue this certificate.

_____
(Signature of official issuing the certificate)
(Seal or stamp of issuing authority, as appropriate)

SURVEYS

This is to certify that, at a survey required by section 1.6 of the Code of Safety for Diving Systems, and by article 0907 of the NORMAM-15, this system was found to comply with the relevant provisions of the Code.

Annual survey

Place:_____
Date_____
Signature and seal of issuing authority

Place:_____
Date_____
Signature and seal of issuing authority

Place:_____
Date_____
Signature and seal of issuing authority

Place:_____
Date_____
Signature and seal of issuing authority

Attached:
Diving System Equipment List

BRAZILIAN NAVY

DIRECTORATE OF PORTS AND COASTS
REPORT OF MARITIME AUTHORITY INSPECTION (RIAM)
NO. ___/20xx

1 - I hereby certify that, on _____/_____/__, diving system number_____, which belongs to the company _____, currently being used in the Work Front located in _____, was subjected to INSPECTION IN DIVING ACCIDENT (PAM), according to the provisions of Chapter 9 from NORMAM-15/DPC. The system _____ (**presents/does not present**) satisfactory conditions for safe performance of dive operations.

2 - The following IMPEDITIVE REQUIREMENT(S) was/were checked:

ITEMS	IMPEDITIVE REQUIREMENTS	Item from NORMAM-15/DPC
1 -		
2 -		
3 -		

Note: item 1 - ...

3 - The following NON IMPEDITIVE REQUIREMENT(S) was/were checked:

ITEMS	NON IMPEDITIVE REQUIREMENTS	Item from NORMAM-15/DPC
1 -		
2 -		
3 -		

Notes: item 1 - ...

4 - Requirements showed above _____(determines temporary interdiction/allow temporary operation) of diving system within 30 days, according to the item 0907 of NORMAM-15/DPC.

NAME
POST
Inspector
DIGITALLY SIGNED

INSTRUCTIONS FOR RIAM FILLING

1. First paragraph will always be filled in. Paragraphs 2 and 3 should only be filled in if there are IMPEDITIVE REQUIREMENTS or NON-IMPEDITIVE REQUIREMENTS, respectively. Paragraph will only be filled in if there is any non conformity reported as Impeditive Requirement or Non-Impeditive Requirement. In case there are not requirements, paragraphs 2, 3 and 4 will be suppressed of RIAM.
2. Compositions of REQUIREMENTS will always be initiate with the verb in infinitive form, indicating desired effects of necessary actions to correct non conformities that generated REQUIREMENTS.
3. All of the REQUIREMENTS should be based on these Norms, being fundamental the filling of the field "Item of NORMAM-15 / DPC", in order to references them.
4. Surveyors can add more information about the non conformity found in field of observation, below each REQUIREMENTS table, in case it is necessary to enlarge explanations for better understanding.
5. Item 4 will be completed with "determines temporary interdiction", when there is Impeditive Requirement, or with "allows temporary operation", when there is just a Non Impeditive Requirement.

ANNEX 9-G

BRAZILIAN NAVY

DIRECTORATE OF PORTS AND COASTS

REPORT OF INSPECTION IN DIVING ACCIDENT (RPAM) NO. _____/20xx

1 - I hereby certify that, on _____/_____/__, diving system number_____, which belongs to the company _____, currently being used in the Work Front located in _____, was subjected to INSPECTION IN DIVING ACCIDENT (PAM), according to the provisions of Chapter 9 from NORMAM-15/DPC. The system _____ (**presents/does not present**) satisfactory conditions for safe performance of dive operations.

2 - The following IMPEDITIVE REQUIREMENT(S) was/were checked:

ITEMS	IMPEDITIVE REQUIREMENTS	Item from NORMAM-15/DPC
1 -		
2 -		
3 -		

Note: item 1 - ...

3 - The following NON IMPEDITIVE REQUIREMENT(S) was/were checked:

ITEMS	NON IMPEDITIVE REQUIREMENTS	Item from NORMAM-15/DPC
1 -		
2 -		
3 -		

Notes: item 1 - ...

4 - Requirements showed above _____(determines temporary interdiction/allow temporary operation) of diving system within 30 days, according to the item 0907 of NORMAM-15/DPC.

5 - DOCUMENTATION:

a) Diving System Safety Certificate number _____

Issuance: _____Expiry: _____

Annual Endorsement: _____

b) Enrollment Form/Enrollment of Diving Company/School

number _____

Issuance: _____ Expiry: _____

6 – QUALIFICATION OF DIVING COMPANY:

- SUPERVISOR
- Name:
- CIR / LRM:
- CPF:
- ID Card:
- Address:

DIVERS

- Name:
- CIR / LRM:
- CPF:
- ID Card:
- Address:
- Function performed at accident time:

7 – DATA ABOUT ACCIDENT LOCATION:

a) Location identification:

b) Environmental condition at the moment of occurrence:

8 – SEQUENCE OF FACTS:

9 – CONSEQUENCES OF THE ACCIDENT:

10 – CONTRIBUTORY FACTORS:

NAME
POST
Inspector
DIGITALLY SIGNED

INSTRUCTIONS FOR RPAM FILLING

1 - Item 1 will always be filled in. Items 2 and 3 should only be filled in if there IMPEDITIVE REQUIREMENTS or NON-IMPEDITIVE REQUIREMENTS, respectively. Item 4 will only be filled in if there is any non conformity reported as Impeditive Requirements or non-Impeditive Requirement. In case there are not requirements, items 2, 3 and 4 will be suppressed of RPAM.

2 - Compositions of REQUIREMENTS will always be initiate with the verb in infinitive form, indicating desired effects of necessary actions to correct non conformities that generated REQUIREMENTS.

3 - All of the REQUIREMENTS should be based on these Norms, being fundamental the filling of the field "Item of NORMAM-15 / DPC", in order to references them.

4 - Surveyors can add more information about the non conformity found in field of observation, below each REQUIREMENTS table, in case it is necessary to enlarge explanations for better understanding.

5 - Item 4 will be completed with "determines temporary interdiction", when there is Impeditive Requirement, or with "allows temporary operation", when there is just a Non Impeditive Demand.

6 - Item 5 will be filled in with documentation (CSSM and FCEM / FCREM) of the Company / Diving School responsible for the accident.

7 - Item 6 will be filled in with personal data of the diving team members.

8 - Item 7 will be filled in with identification accident place, address, depth, water temperature, intensity of flow and wind, sea status and visibility in the moment of the accident, mentioning the sources.

9 - Item 8 will be filled in with a chronological summary, if possible with times of occurrence, presenting events, circumstances, actions and omissions that resulting in the accident, mentioning the name of the sources in case of indirect counting.

10 - Item 9 will be filled in with the victims' qualification, describing lesions and causa mortis (in agreement with Death Certificate).

11 - Item 10 will be filled in with the factors that competed for the accident, describing human, materials and operational factors separately.

ANNEX 9-H

INFORM ABOUT REQUIREMENTS FULFILLMENT

Excl. Mr. Ports and Coasts Director

(Name of Company/School), located at _____

(complete address, ZIP CODE, telephone, telex, fax), enrolled in_____ (CP/DL/AG) under the abbreviation _____, in the quality of Responsible, come to inform _____ that the requirements of_____ presented in the Maritime Authority Inspection Report (RIAM) / Report of Inspection in Diving Accidents (RPAM) nº _____, dated of , regarding Diving System number _____ , were fulfilled, in compliance with item 0907 of NORMAM-15/DPC.

As per the above stated, I hereby request the execution of a Survey for Requirements Withdrawn (VRE).

PLACE AND DATE

NAME, POSITION and RESPONSIBLE SIGNATURE

Attached:
Copy of payment receipt of indemnification of Survey for Requirements Withdrawn in Diving Systems, foreseen in Annex B.

STANDARD CHART FOR AIR DECOMPRESSION

DEPTH METERS / FEET	TTF MIN	TPP MIN:S	STOPS FOR DECOMPRESSION 15 50	12 40	9 30	6 20	3 10	TTD MIN:S	GR
12	200						0	1:20	*
	210	1:00					2	3:20	N
	230	1:00					7	8:20	N
40	250	1:00					11	12:20	O
	270	1:00					15	16:20	O
	300	1:00					19	20:20	Z
	360	*1:00*					*23*	*24:20*	**
	480	*1:00*					*41*	*42:20*	**
	720	*1:00*					*69*	*70:20*	**
15	100						0	1:40	*
	110	1:20					3	4:40	L
	120	1:20					5	6:40	M
50	140	1:20					10	11:40	M
	160	1:20					21	22:40	N
	180	1:20					29	30:40	O
	200	1:20					35	36:40	O
	220	1:20					40	41:40	Z
	240	1:20					47	48:40	Z
18	60						0	2:00	*
	70	1:40					2	4:00	K
	80	1:40					7	9:00	L
60	100	1:40					14	16:00	M
	120	1:40					26	28:00	N
	140	1:40					39	41:00	O
	160	1:40					48	50:00	Z
	180	1:40					56	58:00	Z
	200	1:20				1	69	72:00	Z
	240	*1:20*				*2*	79	*83:00*	**
	360	*1:20*				*20*	119	*141:00*	**
	480	*1:20*				*44*	148	*194:00*	**
	720	*1:20*				*78*	187	*267:00*	**
21	50						0	2:20	*
	60	2:00					8	10:20	K
	70	2:00					14	16:20	L
70	80	2:00					18	20:20	M
	90	2:00					23	25:20	N
	100	2:00					33	35:20	N
	110	1:40				2	41	45:20	O
	120	1:40				4	47	53:20	O
	130	1:40				6	52	60:20	O
	140	1:40				8	56	66:20	Z
	150	1:40				9	61	72:20	Z
	160	1:40				13	72	87:20	Z
	170	1:40				19	79	100:20	Z

* See TLSD.

** Successive dives can not be performed after a dive with exceptional exposure.

STANDARD CHART FOR AIR DECOMPRESSION

DEPTH METERS	TTF	TPP	STOPS FOR DECOMPRESSION 15	12	9	6	3	TTD	GR
FEET	MIN	MIN:S	50	40	30	20	10	MIN:S	
24	40						0	2:40	*
	50	2:20					10	12:40	K
	60	2:20					17	19:40	L
80	70	2:20					23	25:40	M
	80	2:00				2	31	35:40	N
	90	2:00				7	39	48:40	N
	100	2:00				11	46	59:40	O
	110	2:00				13	53	68:40	O
	120	2:00				17	56	75:40	Z
	130	2:00				19	63	83:40	Z
	140	2:00				26	69	97:40	Z
	150	2:00				32	77	111:40	Z
	180	*2:00*				*35*	*85*	*122:40*	**
	240	*1:40*			*6*	*52*	*120*	*180:40*	**
	360	*1:40*			*29*	*90*	*160*	*281:40*	**
	480	*1:40*			*59*	*107*	*187*	*355:40*	**
	720	*1:20*		*17*	*108*	*142*	*187*	*456:40*	**
27	30						0	3:00	*
	40	2:40					7	10:00	J
	50	2:40					18	21:00	L
90	60	2:40					25	28:00	M
	70	2:20				7	30	40:00	N
	80	2:20				13	40	56:00	N
	90	2:20				18	48	69:00	O
	100	2:20				21	54	78:00	Z
	110	2:20				24	61	88:00	Z
	120	2:20				32	68	103:00	Z
	130	2:00			5	36	74	118:00	Z
30	25						0	3:20	*
	30	3:00					3	6:20	I
	40	3:00					15	18:20	K
100	50	2:40				2	24	29:20	L
	60	2:40				9	28	40:20	N
	70	2:40				17	39	59:20	O
	80	2:40				23	48	74:20	O
	90	2:20			3	23	57	86:20	Z
	100	2:20			7	23	66	99:20	Z
	110	2:20			10	34	72	119:20	Z
	120	2:20			12	41	78	134:20	Z
	180	*2:00*		*1*	*29*	*53*	*118*	*204:20*	**
	240	*2:00*		*14*	*42*	*84*	*142*	*285:20*	**
	360	*1:40*	*2*	*42*	*73*	*111*	*187*	*418:20*	**
	480	*1:40*	*21*	*61*	*91*	*142*	*187*	*505:20*	**
	720	*1:40*	*55*	*106*	*122*	*142*	*187*	*615:20*	**
33	20						0	3:40	*
	25	3:20					3	6:40	H
	30	3:20					7	10:40	J
110	40	3:00				2	21	26:40	L
	50	3:00				8	26	37:40	M
	60	3:00				18	36	57:40	N
	70	2:40			1	23	48	75:40	O
	80	2:40			7	23	57	90:40	Z
	90	2:40			12	30	64	109:40	Z
	100	2:40			15	37	72	127:40	Z

* See TLSD.

** Successive dives can not be performed after a dive with exceptional exposure.

METERS	21	18	15	12	9	6	3

STANDARD CHART FOR AIR DECOMPRESSION

DEPTH FEET	TTF MIN	TPP MIN:S	STOPS FOR DECOMPRESSION 70	60	50	40	30	20	10	TTD MIN:S	GR
36	15								0	4:00	*
	20	3:40							2	6:00	H
	25	3:40							6	10:00	I
120	30	3:40							14	18:00	J
	40	3:20						5	25	34:00	L
	50	3:20						15	31	50:00	N
	60	3:00					2	22	45	73:00	O
	70	3:00					9	23	55	91:00	O
	80	3:00					15	27	63	109:00	Z
	90	3:00					19	37	74	134:00	Z
	100	3:00					23	45	80	152:00	Z
	120	*2:40*				*10*	*19*	*47*	*98*	*178:00*	**
	180	*2:20*			*5*	*27*	*37*	*76*	*137*	*286:00*	**
	240	*2:20*			*23*	*35*	*60*	*97*	*179*	*398:00*	**
	360	*2:00*		*18*	*45*	*64*	*93*	*142*	*187*	*553:00*	**
	480	*1:40*	*3*	*41*	*64*	*93*	*122*	*142*	*187*	*656:00*	**
	720	*1:40*	*32*	*74*	*100*	*114*	*122*	*142*	*187*	*775:00*	**
39	10								0	4:20	*
	15	4:00							1	5:20	F
	20	4:00							4	8:20	H
130	25	4:00							10	14:20	J
	30	3:40						3	18	25:20	M
	40	3:40						10	25	39:20	N
	50	3:20					3	21	37	65:20	O
	60	3:20					9	23	52	88:20	Z
	70	3:20					16	24	61	105:20	Z
	80	3:00				3	19	35	72	133:20	Z
	90	3:00				8	19	45	80	156:20	Z

DEPTH METERS FEET	TTF MIN	TPP MIN:S	STOPS FOR DECOMPRESSION 27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	3 10	TTD MIN:S	GR
42	10										0	4:40	*
	15	4:20									2	6:40	G
	20	4:20									6	10:40	I
140	25	4:00								2	14	20:40	J
	30	4:00								5	21	30:40	K
	40	3:40							2	16	26	48:40	N
	50	3:40							6	24	44	78:40	O
	60	3:40							16	23	56	99:40	Z
	70	3:20						4	19	32	68	127:40	Z
	80	3:20						10	23	41	79	157:40	Z
	90	*3:00*					*2*	*14*	*18*	*42*	*88*	*168:40*	**
	120	*3:00*					*12*	*14*	*36*	*56*	*120*	*242:40*	**
	180	*2:40*				*10*	*26*	*32*	*54*	*94*	*168*	*388:40*	**
	240	*2:20*			*8*	*28*	*34*	*50*	*78*	*124*	*187*	*513:40*	**
	360	*2:00*		*9*	*32*	*42*	*64*	*84*	*12 2*	*142*	*187*	*686:40*	**
	480	*2:00*		*31*	*44*	*59*	*100*	*114*	*122*	*142*	*187*	*803:40*	**
	720	*1:40*	*16*	*6*	*88*	*97*	*100*	*114*	*122*	*142*	*187*	*926:40*	**

* See TLSD.

** Successive dives can not be performed after a dive with exceptional exposure.

STANDARD CHART FOR AIR DECOMPRESSION

DEPTH METERS / FOOTS	TTF MIN	TPP MIN:S	STOPS FOR DECOMPRESSION 27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	3 10	TTD MIN:S	GR
45 / 150	5										0	5:00	C
	10	4:40									1	6:00	E
	15	4:40									3	8:00	G
	20	4:20								2	7	14:00	H
	25	4:20								4	17	26:00	K
	30	4:20								8	24	37:00	L
	40	4:00							5	19	33	62:00	N
	50	4:00							12	23	51	91:00	O
	60	3:40						3	19	26	62	115:00	Z
	70	3:40						11	19	39	75	149:00	Z
	80	3:20					1	17	19	50	84	176:00	Z
48 / 160	5										0	5:20	D
	10	5:00									1	6:20	F
	15	4:40								1	4	10:20	H
	20	4:40								3	11	19:20	J
	25	4:40								7	20	32:20	K
	30	4:20							2	11	25	43:20	M
	40	4:20							7	23	39	74:20	N
	50	4:00						2	16	23	55	101:20	Z
	60	4:00						9	19	33	69	135:20	Z
	70	*3:40*					*1*	*17*	*22*	*44*	*80*	*169:20*	**

DEPTH METERS FEET	TTF MIN	TPP MIN:S	STOPS FOR DECOMPRESSION 33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	3 10	TTD MIN:S	GR
51 / 170	5												0	5:40	D
	10	5:20											2	7:40	F
	15	5:00										2	5	12:40	H
	20	5:00										4	15	24:40	J
	25	4:40									2	7	23	37:40	L
	30	4:40									4	13	26	48:40	M
	40	4:20								1	10	23	45	84:40	O
	50	4:20								5	16	23	61	112:40	Z
	60	4:00							2	15	22	37	74	155:40	Z
	70	*4:00*							*8*	*17*	*19*	*51*	*86*	*186:40*	**
	90	*3:40*						*1 2*	*12*	*1 4*	*34*	*52*	*120*	*240:40*	**
	120	*3:00*					*2*	*10*	*12*	*18*	*32*	*42*	*82*	*150*	*350:40*	**
	160	*2:40*				*4*	*10*	*22*	*28*	*34*	*50*	*78*	*120*	*187*	*536:40*	**
	240	*2:40*				*18*	*24*	*30*	*42*	*50*	*70*	*116*	*142*	*187*	*684:40*	**
	360	*2:20*			*22*	*34*	*40*	*52*	*60*	*98*	*114*	*122*	*142*	*187*	*876:40*	**
	480	*2:00*	*14*	*40*	*42*	*50*	*91*	*97*	*100*	*114*	*122*	*142*	*187*	*1010:40*	**
54 / 180	5												0	6:00	D
	10	5:40											3	9:00	F
	15	5:20										3	6	15:00	I
	20	5:00									1	5	17	29:00	J
	25	5:00									3	10	24	43:00	L
	30	5:00									6	17	27	56:00	N
	40	4:40								3	14	23	50	96:00	O
	50	4:20							2	9	19	30	65	131:00	Z
	60	4:20							5	16	19	44	81	171:00	Z

STANDARD CHART FOR AIR DECOMPRESSION

DEPTH	TTF	TPP	STOPS FOR DECOMPRESSION											TTD	GR
METERS			33	30	27	24	21	18	15	12	9	6	3		
FOOTS	MIN	MIN:S	110	100	90	80	70	60	50	40	30	20	10	MIN:S	
57	5	5:40											0	6:20	D
	10	5:40										1	3	10:20	G
	15	5:40										6	7	17:20	I
190	20	5:20									2	6	20	34:20	K
	25	5:20									5	11	25	47:20	M
	30	5:00								1	8	19	32	66:20	N
	40	5:00								8	14	23	55	106:20	O
	50	*4:40*							*4*	*13*	*22*	*33*	*72*	*150:20*	**
	60	*4:40*							*10*	*17*	*19*	*50*	*84*	*186:20*	**

DEPTH	TTF	TPP	STOPS FOR DECOMPRESSION													TTD
METERS			39	36	33	30	27	24	21	18	15	12	9	6	3	
FEET	MIN	MIN:S	130	120	110	100	90	80	70	60	50	40	30	20	10	MIN:S
60	*5*	*6:20*													*1*	*7:40* **
	10	*6:00*												*1*	*4*	*11:40* **
	15	*5:40*											*1*	*4*	*10*	*21:40* **
200	*20*	*5:40*											*3*	*7*	*27*	*43:40* **
	25	*5:40*											*7*	*14*	*25*	*52:40* **
	30	*5:20*										*2*	*9*	*22*	*37*	*76:40* **
	40	*5:00*									*2*	*8*	*17*	*23*	*59*	*115:40***
	50	*5:00*									*6*	*16*	*22*	*39*	*75*	*164:40***
	60	*4:40*								*2*	*13*	*17*	*24*	*51*	*89*	*202:40***
	90	*3:40*					*1*	*10*	*10*	*12*	*12*	*30*	*38*	*74*	*134*	*327:40***
	120	*3:20*				*6*	*10*	*10*	*10*	*24*	*28*	*40*	*64*	*98*	*180*	*476:40***
	180	*2:40*		*1*	*10*	*10*	*18*	*24*	*24*	*42*	*48*	*70*	*106*	*142*	*187*	*688:40***
	240	*2:40*		*6*	*20*	*24*	*24*	*36*	*42*	*54*	*68*	*114*	*122*	*142*	*187*	*845:40***
	360	*2:20*	*12*	*22*	*36*	*40*	*44*	*56*	*82*	*98*	*100*	*114*	*122*	*142*	*187*	*1061:40***
63	*5*	*6:40*													*1*	*8:00***
	10	*6:20*												*2*	*4*	*13:00***
	15	*6:00*											*1*	*5*	*13*	*26:00***
210	*20*	*6:00*											*4*	*10*	*23*	*44:00***
	25	*5:40*										*2*	*7*	*17*	*27*	*60:00***
	30	*5:40*										*4*	*9*	*24*	*41*	*85:00***
	40	*5:20*									*4*	*9*	*19*	*26*	*63*	*128:00***
	50	*5:20*								*1*	*9*	*17*	*19*	*45*	*80*	*178:00***
66	*5*	*7:00*													*1*	*8:20***
	10	*6:40*												*2*	*5*	*14:20***
	15	*6:20*											*2*	*5*	*16*	*30:20***
220	*20*	*6:00*										*1*	*3*	*11*	*24*	*46:20***
	25	*6:00*										*3*	*8*	*19*	*33*	*70:20***
	30	*5:40*									*1*	*7*	*10*	*23*	*47*	*95:20***
	40	*5:40*									*6*	*12*	*22*	*29*	*68*	*144:20***
	50	*5:20*								*3*	*12*	*17*	*18*	*51*	*86*	*194:20***

* See TLSD.

** Successive dives can not be performed after a dive with exceptional exposure.

STANDARD CHART FOR AIR DECOMPRESSION

DEPTH	TTF	TPP	STOPS FOR AIR DECOMPRESSION													TTD
METERS			39	36	33	30	27	24	21	18	15	12	9	6	3	
FOOTS	MIN	MIN:S	130	120	110	100	90	80	70	60	50	40	30	20	10	MIN:S
69	5	7:20													2	9:40**
	10	6:20											1	2	6	16:40**
	15	6:20											3	6	18	34:40**
230	20	6:20										2	5	12	26	52:40**
	25	6:20										4	8	22	37	78:40**
	30	6:00									2	8	12	23	51	103:40**
	40	5:40								1	7	15	22	34	74	160:40**
	50	5:40								5	14	16	24	51	89	206:40**
72	5	7:40													2	10:00**
	10	7:00											1	3	6	18:00**
	15	7:00											4	6	21	39:00**
240	20	6:40										3	6	15	25	57:00**
	25	6:20									1	4	9	24	40	86:00**
	30	6:20									4	8	15	22	56	113:00**
	40	6:00								3	7	1 7	22	39	75	171:00**
	50	5:40							1	8	15	16	29	51	94	222:00**
75	5	7:40												1	2	11:20**
	10	7:20											1	4	7	20:20**
	15	7:00										1	4	7	22	42:20**
250	20	7:00										4	7	17	27	63:20**
	25	6:40									2	7	10	24	45	96:20**
	30	6:40									6	7	17	23	59	120:20**
	40	6:20								5	9	17	19	45	79	182:20**
	60	5:20					4	10	10	10	12	22	36	64	164	302:20**
	90	4:20		8	10	10	10	10	10	28	28	44	68	98	186	518:20**
78	5	8:00												1	2	11:40**
	10	7:40											2	4	9	23:40**
	15	7:20										2	4	10	22	46:40**
260	20	7:00									1	4	7	20	31	71:40**
	25	7:00									3	8	11	23	50	103:40**
	30	6:40								2	6	8	19	26	61	130:40**
	40	6:20							1	6	11	16	19	49	84	194:40**
81	5	8:20												1	3	13:00**
	10	8:00											2	5	11	27:00**
	15	7:40										3	4	11	24	51:00**
270	20	7:20									2	3	9	21	35	79:00**
	25	7:00								2	3	8	13	23	53	111:00**
	30	7:00								3	6	12	22	27	64	143:00**
	40	6:40							5	6	11	17	22	51	88	209:00**

* See TLSD.

** Successive dives can not be performed after a dive with exceptional exposure.

STANDARD CHART FOR AIR DECOMPRESSION

DEPTH METROS FEET	TTF MIN	TPP MIN:S	STOPS FOR DECOMPRESSION 39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	3 10	TTD MIN:S
84	5	8:40												2	2	13:20**
	10	8:00										1	2	5	13	30:20**
	15	7:40									1	3	4	11	26	54:20**
280	20	7:40									3	4	8	23	39	86:20**
	25	7:20								2	5	7	16	23	56	118:20**
	30	7:00							1	3	7	13	22	30	70	155:20**
	40	6:40						1	6	6	13	17	27	51	93	223:20**
87	5	9:00												2	3	14:40**
	10	8:20										1	3	5	16	34:40**
	15	8:00									1	3	6	12	26	57:40**
290	20	8:00									3	7	9	23	43	94:40**
	25	7:40								3	5	8	17	23	60	125:40**
	30	7:20							1	5	6	16	22	36	72	167:40**
	40	7:00						3	5	7	15	16	32	51	95	233:40**
90	5	9:20												3	3	16:00**
	10	8:40										1	3	6	17	37:00**
	15	8:20									2	3	6	15	26	62:00**
300	20	8:00								2	3	7	10	23	47	102:00**
	25	7:40							1	3	6	8	19	26	61	134:00**
	30	7:40							2	5	7	17	22	39	75	177:00**
	40	7:20						4	6	9	15	17	34	51	90	236:00**
	60	6:00		4	10	10	10	10	10	14	28	32	50	90	187	465:00**

* See TLSD.

** Successive dives can not be performed after a dive with exceptional exposure.

EXTREME EXPOSURES - 75M (250 FEET AND 90M (300 FEET)

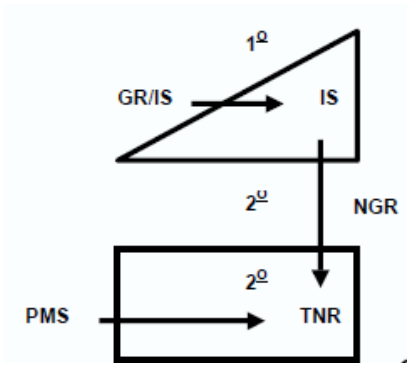
DEPTH METERS FEET	TTF MIN	TPP MIN: S	STOPS FOR DECOMPRESSION 60 200	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	3 10	TTD MIN: S
75	120	3:40							5	10	10	10	10	16	24	24	36	48	64	94	142	187	688:20
250	180	3:00					4	8	8	10	22	24	24	32	42	44	60	84	114	122	142	187	935:20
	240	3:00					9	14	21	22	22	40	40	42	56	76	98	100	114	122	142	187	1113:20
90	90	4:40					3	8	8	10	10	10	10	16	24	24	34	48	64	90	142	187	698:00
300	120	4:00			4	8	8	8	8	10	14	24	24	24	34	42	58	66	102	122	142	187	895:00
	180	3:30	6	8	8	8	14	20	21	21	28	40	40	48	56	82	98	100	114	122	142	187	1173:00

CHART FOR LIMITS AND ASSIGNMENT OF REPETITION GROUPS FOR AIR DIVE WITHOUT DECOMPRESSION STOPS

DEPTH		LIMITS W/DEC.	REPETITION GROUPS														
M	FEET	MIN.	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
3	10		60	120	210	300	797	*									
4,5	15		35	70	110	160	225	350	452	*							
6	20		25	50	75	100	135	180	240	325	390	917	*				
7,5	25	595	20	35	55	75	100	125	160	195	245	315	361	540	595		
10	30	405	15	30	45	60	75	95	120	145	170	205	250	310	344	405	
10,5	35	310	5	15	25	40	50	60	80	100	120	140	160	190	220	270	310
12	40	200	5	15	25	30	40	50	70	80	100	110	130	150	170	200	
15	50	100		10	15	25	30	40	50	60	70	80	90	100			
18	60	60		10	15	20	25	30	40	50	55	60					
21	70	50		5	10	15	20	30	35	40	45	50					
24	80	40		5	10	15	20	25	30	35	40						
27	90	30		5	10	12	15	20	25	30							
30	100	25		5	7	10	15	20	22	25							
33	110	20			5	10	13	15	20								
36	120	15			5	10	12	15									
39	130	10			5	8	10										
42	140	10			5	7	10										
45	150	5			5												
48	160	5				5											
51	170	5				5											
54	180	5				5											
57	190	5				5											

* Larger repetition group for this depth, regardless of bottom time.

* Dives after surface intervals g
are not successive. Consider r
TPD entry and attainment of dec
for such dive



REPETITION GROUP AT SURFACE INTERVAL START

NGR	Z	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
Z	0:10 0:22	0:23 0:34	0:35 0:48	0:49 1:02	1:03 1:18	1:19 1:36	1:37 1:55	1:56 2:17	2:18 2:42	2:43 3:10	3:11 3:45	3:46 4:29	4:30 5:27	5:28 6:56	6:57 10:05	10:06 12:00 *
O	0:10 0:23	0:24 0:36	0:37 0:51	0:52 1:07	1:08 1:24	1:25 1:43	1:44 2:04	2:05 2:29	2:30 2:59	3:00 3:33	3:34 4:17	4:18 5:16	5:17 6:44	6:45 9:54	9:55 12:00 *	
N	0:10 0:24	0:25 0:39	0:40 0:54	0:55 1:11	1:12 1:30	1:31 1:53	1:54 2:18	2:19 2:47	2:48 3:22	3:23 4:04	4:05 5:03	5:04 6:32	6:33 9:43	9:44 12:00 *		
M	0:10 0:25	0:26 0:42	0:43 0:59	1:00 1:18	1:19 1:35	1:36 2:05	2:06 2:34	2:35 3:08	3:09 3:52	3:53 4:49	4:50 6:18	6:19 9:28	9:29 12:00 *			
L	0:10 0:26	0:27 0:45	0:46 1:04	1:05 1:25	1:26 1:49	1:50 2:19	2:20 2:53	2:54 3:36	3:37 4:35	4:36 6:02	6:03 9:12	9:13 12:00 *				
K	0:10 0:28	0:29 0:49	0:50 1:11	1:12 1:35	1:36 2:03	2:04 2:38	2:39 3:21	3:22 4:19	4:20 5:48	5:49 8:58	8:59 12:00 *					
J	0:10 0:31	0:32 0:54	0:55 1:19	1:20 1:47	1:48 2:20	2:21 3:04	3:05 4:02	4:03 5:40	5:41 8:50	8:51 12:00 *						
I	0:10 0:33	0:34 0:59	1:00 1:29	1:30 2:02	2:03 2:44	2:45 3:43	3:44 5:12	5:13 8:21	8:22 12:00 *							
H	0:10 0:36	0:37 1:06	1:07 1:41	1:42 2:23	2:24 3:20	3:21 4:49	4:50 7:59	8:00 12:00 *								
G	0:10 0:40	0:41 1:15	1:16 1:59	2:00 2:58	2:59 4:25	4:26 7:35	7:36 12:00 *									
F	0:10 0:45	0:46 1:29	1:30 2:28	2:29 3:57	3:58 7:05	7:06 12:00 *										
E	0:10 0:54	0:55 1:57	1:58 3:24	3:25 6:34	6:35 12:00 *											
D	0:10 1:09	1:10 2:38	2:39 5:48	5:49 12:00 *												
C	0:10 1:39	1:40 4:49	4:50 12:00 *													
B	0:10 3:20	3:21 12:00 *														
A	0:10 12:00 *															

SUCCESSIVE DIVE DEPTH M / FEET

M	FEET	Z	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
3	10	**	**	**	**	**	**	**	**	**	**	**	797	279	159	88	39
6	20	**	**	**	**	**	**	917	399	279	208	159	120	88	62	39	18
9	30	□	□	□	349	279	229	190	159	132	109	88	70	54	39	25	12
12	40	257	241	213	187	161	138	116	101	87	73	61	49	37	25	17	7
15	50	169	160	142	124	111	99	87	76	66	56	47	38	29	21	13	6
18	60	122	117	107	97	88	79	70	61	52	44	36	30	24	17	11	5
21	70	100	96	87	80	72	64	57	50	43	37	31	26	20	15	9	4
24	80	84	80	73	68	61	54	48	43	38	32	28	23	18	13	8	4
27	90	73	70	64	58	53	47	43	38	33	29	24	20	16	11	7	3
30	100	64	62	57	52	48	43	38	34	30	26	22	18	14	10	7	3
33	110	57	55	51	47	42	38	34	31	27	24	20	16	13	10	6	3
36	120	52	50	46	43	39	35	32	28	25	21	18	15	12	9	6	3
39	130	46	44	40	38	35	31	28	25	22	19	16	13	11	8	6	3
42	140	42	40	38	35	32	29	26	23	20	18	15	12	10	7	5	2
45	150	40	38	35	32	30	27	24	22	19	17	14	12	9	7	5	2
48	160	37	36	33	31	28	26	23	20	18	16	13	11	9	6	4	2
51	170	35	34	31	29	26	24	22	19	17	15	12	10	8	6	4	2
54	180	32	31	29	27	25	22	20	18	16	14	11	10	8	6	4	2
57	190	31	30	28	26	24	21	19	17	15	13	10	10	8	6	4	2

= Use times for residual nitrogen mentioned on depth of 12m /40 FEET. Dive decompression shall be performed by TPD, also using depth of 12m/40 FEET instead of 9m/30 FEET.

** In cases where Time for Residual Nitrogen is not provided, Repetition Group from first dive shall remain as GR from successive dive.

ANNEX 11-A

CHART FOR SURFACE DECOMPRESSION USING OXYGEN

PROF METROS FEET	TTF MIN	TPP MIN:SEC	STOPS IN AIR IN WATER (MIN) M FEET	18 60	15 50	12 40	9 30	IS	STOPS IN 12 40	O_2 SURFACE	TTD MIN:SEC
21	52	2:48		0	0	0	0		0		2:48
	90	2:48		0	0	0	0		15		23:48
	120	2:48		0	0	0	0		23		31:48
70	150	2:48		0	0	0	0		31		39:48
	180	2:48		0	0	0	0		39		47:48
24	40	3:12		0	0	0	0		0		3:12
	70	3:12		0	0	0	0		14		23:12
	85	3:12		0	0	0	0		20		29:12
80	100	3:12		0	0	0	0		26		35:12
	115	3:12		0	0	0	0		31		40:12
	130	3:12		0	0	0	0		37		46:12
	150	3:12		0	0	0	0		44		53:12
27	32	3:36		0	0	0	0		0		3:36
	60	3:36		0	0	0	0		14		23:36
	70	3:36		0	0	0	0		20		29:36
90	80	3:36		0	0	0	0		25		34:36
	90	3:36		0	0	0	0		30		39:36
	100	3:36		0	0	0	0		34		43:36
	110	3:36		0	0	0	0		39		48:36
	120	3:36		0	0	0	0		43		52:36
	130	3:36		0	0	0	0		48		57:36
30	26	4:00		0	0	0	0		0		4:00
	50	4:00		0	0	0	0		14		24:00
	60	4:00		0	0	0	0		20		30:00
100	70	4:00		0	0	0	0		26		36:00
	80	4:00		0	0	0	0		32		42:00
	90	4:00		0	0	0	0		38		48:00
	100	4:00		0	0	0	0		44		54:00
	110	4:00		0	0	0	0		49		59:00
	120	2:48		0	0	0	3		53		65:48
33	22	4:24		0	0	0	0		0		4:24
	40	4:24		0	0	0	0		12		22:24
	50	4:24		0	0	0	0		19		29:24
110	60	4:24		0	0	0	0		26		36:24
	70	4:24		0	0	0	0		33		43:24
	80	3:12		0	0	0	1		40		51:12
	90	3:12		0	0	0	2		46		58:12
	100	3:12		0	0	0	5		51		66:12
	110	3:12		0	0	0	12		54		76:12
36	18	4:48		0	0	0	0		0		4:48
	30	4:48		0	0	0	0		9		19:48
	40	4:48		0	0	0	0		16		26:48
120	50	4:48		0	0	0	0		24		34:48
	60	3:36		0	0	0	2		32		44:36
	70	3:36		0	0	0	4		39		53:36
	80	3:36		0	0	0	5		46		61:36
	90	3:12		0	0	3	7		51		72:12
	100	3:12		0	0	6	15		54		86:12

THE FIRST STOP ON THE WATER AND THE FIRST STOP ON CHAMBER SHALL NOT EXCEED 5 MINUTES

TIME PASSED BETWEEN

1 MIN AND 20 SEC TO COME FROM 40 FEET ON CHAMBER UP TO THE SURFACE

CHART FOR SURFACE DECOMPRESSION USING OXYGEN

PROF METROS FEET	TTF MIN	TPP MIN:SEC	STOPS IN AIR IN WATER (MIN) M FEET	18 60	15 50	12 40	9 30	IS	STOPS IN 12 40	O_2 SURFACE	TTD MIN:SEC
39	15	5:12		0	0	0	0		0		5:12
	30	5:12		0	0	0	0		12		23:12
	40	5:12		0	0	0	0		21		32:12
130	50	4:00		0	0	0	3		29		43:00
	60	4:00		0	0	0	5		37		53:00
	70	4:00		0	0	0	7		45		63:00
	80	3:36		0	0	6	7		51		75:36
	90	3:36		0	0	10	12		56		89:36
42	13	5:36		0	0	0	0		0		5:36
	25	5:36		0	0	0	0		11		22:36
	30	5:36		0	0	0	0		15		26:36
140	35	5:36		0	0	0	0		20		31:36
	40	4:24		0	0	0	2		24		37:24
	45	4:24		0	0	0	4		29		44:24
	50	4:24		0	0	0	6		33		50:24
	55	4:24		0	0	0	7		38		56:24
	60	4:24		0	0	0	8		43		62:24
	65	4:00		0	0	3	7		48		70:00
	70	3:36		0	2	7	7		51		79:36
45	11	6:00		0	0	0	0		0		6:00
	25	6:00		0	0	0	0		13		25:00
	30	6:00		0	0	0	0		18		30:00
150	35	4:48		0	0	0	4		23		38:48
	40	4:24		0	0	3	6		27		48:24
	45	4:24		0	0	5	7		33		57:24
	50	4:00		0	2	5	8		38		66:00
	55	3:36		2	5	9	4		44		77:36
48	9	6:24		0	0	0	0		0		6:24
	20	6:24		0	0	0	0		11		23:24
	25	6:24		0	0	0	0		16		28:24
160	30	5:12		0	0	0	2		21		35:12
	35	4:48		0	0	4	6		26		48:48
	40	4:24		0	3	5	8		32		61:24
	45	4:00		3	4	8	6		38		73:00
51	7	6:48		0	0	0	0		0		6:48
	20	6:48		0	0	0	0		13		25:48
	25	6:48		0	0	0	0		19		31:48
170	30	5:12		0	0	3	5		23		44:12
	35	4:48		0	4	4	7		29		57:48
	40	4:24		4	4	8	5		36		72:24

IS: TIME PASSED BETWEEN THE FIRST STOP ON THE WATER AND THE FIRST STOP ON CHAMBER SHALL NOT EXCEED 5 MINUTES

O_2: 1 MIN AND 20 SEC TO COME FROM 40 FEET ON CHAMBER UP TO THE SURFACE

ANNEX 11-A

CHART FOR SURFACE DECOMPRESSION USING AIR

DEPTH METERS	DEPTH FEET	TTF MIN	TPP MIN:S	STOPS IN AIR ON WATER (MIN) M	9 30	6 20	3 10	IS	STOPS IN CHAMBER 6 20	3 10	TTD MIN:S
12	40	230	1:00				3			7	15:20
		250	1:00				3			11	19:20
		270	1:00				3			15	23:20
		300	1:00				3			19	27:20
15	50	120	1:20				3			5	13:40
		140	1:20				3			10	18:40
		160	1:20				3			21	29:40
		180	1:20				3			29	37:40
		200	1:20				3			35	43:40
		220	1:20				3			40	48:40
		240	1:20				3			47	55:40
18	60	80	1:40				3			7	16:00
		100	1:40				3			14	23:00
		120	1:40				3			26	35:00
		140	1:40				3			39	48:00
		160	1:40				3			48	57:00
		180	1:40				3			56	65:00
		200	1:20			3			3	69	81:30
21	70	60	2:00				3			8	17:20
		70	2:00				3			14	23:20
		80	2:00				3			18	27:20
		90	2:00				3			23	32:20
		100	2:00				3			33	42:20
		110	1:40			3			3	41	53:50
		120	1:40			3			4	47	60:50
		130	1:40			3			6	52	67:50
		140	1:40			3			8	56	73:50
		150	1:40			3			9	61	79:50
		160	1:40			3			13	72	94:50
		170	1:40			3			19	79	107:50
24	80	50	2:20				3			10	19:40
		60	2:20				3			17	26:40
		70	2:20				3			23	32:40
		80	2:00			3			3	31	44:10
		90	2:00			3			7	39	56:10
		100	2:00			3			11	46	67:10
		110	2:00			3			13	53	76:10
		120	2:00			3			17	56	83:10
		130	2:00			3			19	63	92:10
		140	2:00			26			26	69	128:10
		150	2:00			32			32	77	148:10
27	90	40	2:40				3			7	17:00
		50	2:40				3			18	28:00
		60	2:40				3			25	35:00
		70	2:20			3			7	30	47:30
		80	2:20			13			13	40	73:30
		90	2:20			18			18	48	91:30
		100	2:20			21			21	54	103:30
		110	2:20			24			24	61	116:30
		120	2:20			32			32	68	139:30
		130	2:00		5	36			36	74	158:30

IS TIME PASSED BETWEEN THE FIRST STOP ON THE WATER AND THE FIRST STOP ON CHAMBER SHALL NOT EXCEED 5 MINUTES

ANNEX 11-A

CHART FOR SURFACE DECOMPRESSION USING AIR

METERS			M	15	12	9	6	3		6	3	
FEET	MIN	MIN:S	FEET	50	40	30	20	10		20	10	MIN:S
30	40	3:00						3			15	25:20
	50	2:40					3			3	24	37:50
	60	2:40					3			9	28	47:50
100	70	2:40					3			17	39	66:50
	80	2:40					23			23	48	101:50
	90	2:20				3	23			23	57	113:50
	100	2:20				7	23			23	66	126:50
	110	2:20				10	34			34	72	157:50
	120	2:20				12	41			41	78	179:50
33	30	3:20						3			7	17:40
	40	3:00					3			3	21	35:10
	50	3:00					3			8	26	45:10
110	60	3:00					18			18	36	80:10
	70	2:40				1	23			23	48	103:10
	80	2:40				7	23			23	57	118:10
	90	2:40				12	30			30	64	144:10
	100	2:40				15	37			37	72	169:10
36	25	3:40						3			6	17:00
	30	3:40						3			14	25:00
	40	3:20					3			5	25	41:30
120	50	3:20					15			15	31	69:30
	60	3:00				2	22			22	45	99:30
	70	3:00				9	23			23	55	118:30
	80	3:00				15	27			27	63	140:30
	90	3:00				19	37			37	74	175:30
	100	3:00				23	45			45	80	201:30
39	25	4:00						3			10	21:20
	30	3:40					3			3	18	32:50
	40	3:40					10			10	25	53:50
130	50	3:20				3	21			21	37	90:50
	60	3:20				9	23			23	52	115:50
	70	3:20				16	24			24	61	133:50
	80	3:00			3	19	35			35	72	172:50
	90	3:00			8	19	45			45	80	205:50
42	20	4:20						3			6	17:40
	25	4:00					3			3	14	29:10
	30	4:00					5			5	21	40:10
140	40	3:40				2	16			16	26	69:10
	50	3:40				6	24			24	44	107:10
	60	3:40				16	23			23	56	127:10
	70	3:20			4	19	32			32	68	164:10
	80	3:20			10	23	41			41	79	203:10
45	20	4:20					3			3	7	22:30
	25	4:20					4			4	17	34:30
	30	4:20					8			8	24	49:30
150	40	4:00				5	19			19	33	85:30
	50	4:00				12	23			23	51	118:30
	60	3:40			3	19	26			26	62	145:30
	70	3:40			11	19	39			39	75	192:30
	80	3:20		1	17	19	50			50	84	230:30

THE FIRST STOP ON THE CHAMBER SHALL NOT EXCEED 5 MINUTES BETWEEN THE FIRST STOP AND THE WATER TIME PASSED

ANNEX 11-A

CHART FOR SURFACE DECOMPRESSION USING AIR

DEPTH	TTF	TPP	STOPS ON AIR IN WATER (MIN)						IS	STOPS IN CHAMBE		TTD
METERS			M	15	12	9	6	3		6	3	
FEET	MIN	MIN:S	FEET	50	40	30	20	10		20	10	MIN:S
48	20	4:40					3			3	11	26:50
	25	4:40					7			7	20	43:50
	30	4:20				2	11			11	25	58:50
160	40	4:20				7	23			23	39	101:50
	50	4:00			2	16	23			23	55	128:50
	60	4:00			9	19	33			33	69	172:50
	70	3:40		1	17	22	44			44	80	217:50
51	15	5:00					3			3	5	21:10
	20	5:00					4			4	15	33:10
	25	4:40				2	7			7	23	49:10
170	30	4:40				4	13			13	26	66:10
	40	4:20			1	10	23			23	45	112:10
	50	4:20			5	18	23			23	61	140:10
	60	4:00		2	15	22	37			37	74	197:10
	70	4:00		8	17	19	51			51	86	242:10
54	15	5:20					3			3	6	22:30
	20	5:00				1	5			5	17	38:30
	25	5:00				3	10			10	24	57:30
180	30	5:00				6	17			17	27	77:30
	40	4:40			3	14	23			23	50	123:30
	50	4:20		2	9	19	30			30	65	165:30
	60	4:20		5	16	19	44			44	81	219:30
57	15	5:40					4			4	7	25:50
	20	5:20				2	6			6	20	44:50
	25	5:20				5	11			11	25	62:50
190	30	5:00			1	8	19			19	32	89:50
	40	5:00			8	14	23			23	55	133:50
	50	4:40		4	13	22	33			33	72	187:50
	60	4:40		10	17	19	50			50	84	240:50

TIME PASSED BETWEEN THE FIRST STOP ON THE WATER AND THE FIRST STOP ON CHAMBER SHALL NOT EXCEED 5 MINUTES

CHART OF EQUIVALENT DEPTHS FOR DIVING ON HEIGHT *

DEPTH.	ALTITUDE IS									
(FEET)	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
10	10	15	15	15	15	15	15	15	15	15
15	15	20	20	20	20	20	20	25	25	25
20	20	25	25	25	25	25	30	30	30	30
25	25	30	30	30	35	35	35	35	35	40
30	30	35	35	35	40	40	40	50	50	50
35	35	40	40	50	50	50	50	50	50	60
40	40	50	50	50	50	50	60	60	60	60
45	45	50	60	60	60	60	60	70	70	70
50	50	60	60	60	70	70	70	70	70	80
55	55	60	70	70	70	70	80	80	80	80
60	60	70	70	70	80	80	80	90	90	90
65	65	70	80	80	80	90	90	90	100	100
70	70	80	80	90	90	90	100	100	100	110
75	75	90	90	90	100	100	100	110	110	110
80	80	90	90	100	100	100	110	110	120	120
85	85	100	100	100	110	110	120	120	120	130
90	90	100	110	110	110	120	120	130	130	140
95	95	110	110	110	120	120	130	130	140	140
100	100	110	120	120	130	130	130	140	140	150
105	105	120	120	130	130	140	140	150	150	160
110	110	120	130	130	140	140	150	150	160	160
115	115	130	130	140	140	150	150	160	170	170
120	120	130	140	140	150	150	160	170	170	180
125	125	140	140	150	160	160	170	170	180	190
130	130	140	150	160	160	170	170	180	190	190
135	135	150	160	160	170	170	180	190	190	200
140	140	160	160	170	170	180	190	190	200	210
145	145	160	170	170	180	190	190	200	210	
150	160	170	170	180	190	190	200	210		
155	170	170	180	180	190	200	210			
160	170	180	180	190	200	200				
165	180	180	190	200	200					
170	180	190	190	200						
175	190	190	200							
180	190	200	210							
185	200	200								
190	200									
Decomp. (on water)										
10	10	9	9	9	8	8	8	7	7	7
20	19	19	18	17	17	16	15	15	14	14
30	29	28	27	26	25	24	23	22	21	21
40	39	37	36	35	33	32	31	30	29	28
50	48	47	45	43	42	40	39	37	36	34
60	58	56	54	52	50	48	46	45	43	41

REPETITION GROUPS RELATED TO DIVING ON HEIGHT *

ALTITUDE (FEET)	REPETITION GROUP
1.000	A
2.000	B
3.000	B
4.000	C
5.000	D
6.000	E
7.000	E
8.000	G
9.000	G
10.000	H

CHART OF SURFACE INTERVALS FOR FLIGHTS AFTER DIVING *

Group of	INCREASE IN ALTITUDE (FEET)									
	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000
A	0:00	0:00	0:00	0:00	0:00	0:00	0:00	**0:00**	0:00	0:00
B	0:00	0:00	0:00	0:00	0:00	0:00	0:00	**0:00**	0:00	2:11
C	0:00	0:00	0:00	0:00	0:00	0:00	0:00	**0:00**	3:06	8:26
D	0:00	0:00	0:00	0:00	0:00	0:00	0:09	**3:28**	7:33	12:52
E	0:00	0:00	0:00	0:00	0:00	0:51	3:35	**6:54**	10:59	16:18
F	0:00	0:00	0:00	0:00	1:12	3:40	6:23	**9:43**	13:47	19:07
G	0:00	0:00	0:00	1:23	3:34	6:02	8:46	**12:05**	16:10	21:29
H	0:00	0:00	1:31	3:26	5:37	8:05	10:49	**14:09**	18:13	23:33
I	0:00	1:32	3:20	5:15	7:26	9:54	12:38	**15:58**	20:02	24:00
J	1:32	3:09	4:57	6:52	9:04	11:32	14:16	**17:35**	21:39	24:00
K	3:00	4:37	6:25	8:20	10:32	13:00	15:44	**19:03**	23:07	24:00
L	4:21	5:57	7:46	9:41	11:52	14:20	17:04	**20:23**	24:00	24:00
M	5:35	7:11	9:00	10:55	13:06	15:34	18:18	**21:37**	24:00	24:00
N	6:43	8:20	10:08	12:03	14:14	16:42	19:26	**22:46**	24:00	24:00
O	7:47	9:24	11:12	13:07	15:18	17:46	20:30	**23:49**	24:00	24:00
Z	8:17	9:54	11:42	13:37	15:49	18:17	21:01	**24:00**	24:00	24:00

* Because these are new charts, it's recommended reading Chapter 5, from Manual 201 of CIAMA.

DECOMPRESSION CHART FOR INTERVENTION DIVINGS (HELIOX)

DEPTH Meters FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
18 60 Max O2 40.0% Min O2 14.0%	10	2:00																		0	0
	20	2:00																		0	0
	30	2:00																		0	0
	40	2:00																		0	0
	60	0:40																10	11	16	1
	80	0:40																10	13	22	2
	100	0:40																10	16	27	2
	120	0:40																10	17	28	2

DEPTH Meters FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
21 70 Max O2 40.0% Min O2 14.0%	10	2:20																		0	0
	20	2:20																		0	0
	30	2:20																		0	0
	40	2:00																10	10	16	1
	60	1:00																10	14	24	2
	80	1:00																10	18	30	2
	100	1:00																10	19	34	2
	120	1:00																10	21	37	2

DEPTH Meters FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
24 80 Max O2 38.0% Min O2 14.0%	10	2:40																		0	0
	20	2:40																		0	0
	25	2:40																		0	0
	30	1:20																10	11	16	1
	40	1:20																10	13	21	2
	60	1:20																10	18	32	2
	80	1:20																10	21	38	2
	100	1:20																10	24	42	3
	120	1:20																10	25	45	3

DEPTH Meters FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
27 90 Max O2 34.9% Min O2 14.0%	10	3:00																		0	0
	20	3:00																		0	0
	30	1:40																10	13	21	2
	40	1:40																10	16	26	2
	60	1:40																10	21	38	2
	80	1:40																10	25	45	3
	100	1:40																10	28	50	3
	120	1:40																10	29	52	3

DEPTH Meters / FEET	TTF Min	TPP Min:sec	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
FEET	10	3:20																		0	0
	20	2:00																10	11	17	1
	30	2:00																10	15	24	2
30	40	2:00																10	18	32	2
	60	2:00																10	25	44	3
100	80	2:00																10	28	52	3
Max O2 32.3%	100	2:00																10	31	56	3
Min O2 14.0%	120	2:00																10	32	58	3

DEPTH Meters / FEET	TTF Min	TPP Min:sec	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	2:20																10	8	11	1
	20	2:20																10	12	20	1
33	30	2:20																10	17	28	2
	40	2:20																10	20	36	2
110	60	2:20																10	27	49	3
Max O2 30.0%	80	2:20																10	31	58	3
Min O2 14.0%	100	2:20																10	33	62	4
	120	2:20																10	35	64	4

DEPTH Meters / FEET	TTF Min	TPP Min:sec	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
FEET	10	2:40																10	9	13	1
	20	2:40																10	14	23	2
	30	2:40																10	19	33	2
36	40	2:40																10	23	42	3
120	60	2:40																10	30	55	3
Max O2 28.0%	80	2:40																10	34	63	4
Min O2 14.0%	100	2:40																10	36	66	4
	120	2:40															10	10	35	65	4

DEPTH Meters / FEET	TTF Min	TPP Min:sec	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	2:40															10	10	6	8	1
FEET	20	2:40															10	10	12	19	1
39	30	2:40															10	10	18	30	2
130	40	2:20															10	10	22	40	3
Max O2 26.3%	60	2:20															10	10	29	52	3
	80	2:20															10	10	33	60	3
Min O2 14.0%	100	2:20															10	10	35	64	4
	120	2:20														7	11	11	35	66	4

NOTE: EXCEPTIONAL EXPOSURE TIMES ARE INVOLVED BY A BLACK BOX

42 / 140 Max O2 24.8% / Min O2 14.0%

DEPTH Meters / FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	3:00															10	10	6	8	1
	20	3:00															10	10	12	19	1
	30	3:00															10	10	18	30	2
	40	3:00														7	10	10	22	40	2
	60	3:00														7	10	10	29	52	3
	80	3:00														7	10	10	33	60	3
	100	3:00														7	10	10	35	64	4
	120	3:00														7	11	11	35	66	4

45 / 150 Max O2 23.4% / Min O2 14.0%

DEPTH Meters / FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	3:20															10	10	7	8	1
	20	3:00														7	10	10	14	22	2
	30	3:00														7	10	10	19	34	2
	40	3:00														7	10	10	24	44	3
	60	3:00														7	10	10	31	56	3
	80	3:00														7	10	10	35	64	4
	100	3:00														7	13	13	36	66	4
	120	3:00														9	16	16	36	66	5

48 / 160 Max O2 22.2% / Min O2 14.0%

DEPTH Meters / FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	3:20														7	10	10	8	10	1
	20	3:20														7	10	10	15	24	2
	30	3:20														7	10	10	21	37	2
	40	3:20														7	10	10	26	47	3
	60	3:20													7	6	10	10	30	56	3
	80	3:00													7	9	10	10	35	66	4
	100	3:00													7	13	14	14	35	66	5
	120	3:00													7	17	17	17	36	66	5

51 / 170 Max O2 21.1% / Min O2 14.0%

DEPTH Meters / FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	3:20													7	0	10	10	8	12	1
	20	3:20													7	0	10	10	15	28	2
	30	3:20													7	1	10	10	23	42	3
	40	3:20													7	4	10	10	28	52	3
	60	3:20													7	10	10	10	33	62	4
	80	3:20													9	14	14	14	35	66	4
	100	3:00													5	18	18	18	36	66	5
	120	3:00													9	21	21	21	36	66	5

NOTE: EXCEPTIONAL EXPOSURE TIMES ARE INVOLVED BY A BLACK BOX

54 180 Max O2 20.1% / Min O2 14.0%

DEPTH Meters FEET	TTF Min	TPP Min:sec	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	3:40													7	0	10	10	9	14	1
	20	3:40													7	0	10	10	17	30	2
	30	3:40													7	4	10	10	25	45	3
	40	3:20												7	0	8	10	10	30	54	3
	60	3:20												7	5	11	11	11	35	64	4
	80	3:20												7	9	15	15	15	36	66	4
	100	3:20												7	13	19	19	19	36	66	5
	120	3:20												7	17	23	23	23	36	66	6

57 190 Max O2 19.2% / Min O2 14.0%

DEPTH Meters FEET	TTF Min	TPP Min:sec	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	4:00												7	7	0	10	10	10	15	1
	20	3:40												7	0	2	10	10	19	34	2
	30	3:40												7	0	7	10	10	26	46	3
	40	3:40												7	4	9	10	10	31	56	3
	60	3:40												7	9	13	13	13	34	62	4
	80	3:20											7	3	13	18	18	18	36	66	5
	100	3:20											7	6	16	21	21	21	36	66	6
	120	3:20											7	8	20	23	23	23	36	66	7

60 200 Max O2 18.4% / Min O2 14.0%

DEPTH Meters FEET	TTF Min	TPP Min:sec	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	4:00												7	0	0	10	10	11	17	1
	20	4:00												7	0	4	10	10	20	36	2
	30	3:40											7	0	3	7	10	10	27	50	3
	40	3:40											7	0	7	10	10	10	31	58	3
	60	3:40											7	4	10	14	14	14	35	66	4
	80	3:40											7	8	14	18	18	18	36	66	5
	100	3:40											7	12	17	23	23	23	36	66	6
	120	3:40											7	15	21	23	23	23	36	66	7

63 210 Max O2 17.7% / Min O2 10.0%

DEPTH Meters FEET	TTF Min	TPP Min:sec	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	4:20												7	0	0	10	10	12	19	1
	20	4:00											7	0	1	6	10	10	22	38	2
	30	4:00											7	0	6	7	10	10	29	53	3
	40	4:00											7	3	9	10	10	10	33	60	3
	60	3:40										7	0	9	11	17	17	17	35	66	5
	80	3:40										7	3	11	15	20	20	20	36	66	6
	100	3:40										7	6	14	19	23	23	23	36	66	7
	120	3:40										7	8	18	23	23	23	23	36	66	7

NOTE: EXCEPTIONAL EXPOSURE TIMES ARE INVOLVED BY A BLACK BOX

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
		Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
Meters	Min		**DEEP MIXED GAS**										50% O2						O2 100%		
FEET																					
66	10	4:40												7	0	2	10	10	13	20	1
	20	4:20											7	0	3	7	10	10	23	41	3
	30	4:20											7	2	6	9	10	10	30	54	3
220	40	4:00										7	0	6	9	11	11	11	34	62	4
Max O2 17.0%	60	4:00										7	4	9	12	18	18	18	36	66	5
Min O2 10.0%	80	4:00										7	8	12	17	21	21	21	36	66	6
	100	4:00										7	12	15	20	23	23	23	36	66	7
	120	4:00										8	14	19	23	23	23	23	36	66	8

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
		Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
Meters	Min		**DEEP MIXED GAS**										50% O2						O2 100%		
FEET																					
69	10	4:40											7	0	0	3	10	10	14	22	2
	20	4:20										7	0	3	4	7	10	10	24	44	3
	30	4:20										7	0	5	7	10	10	10	31	57	3
230	40	4:00									7	0	3	7	9	13	13	13	34	64	4
Max O2 16.3%	60	4:00									7	0	8	10	14	18	18	18	36	66	6
Min O2 10.0%	80	4:00									7	3	10	14	18	23	23	23	36	66	7
	100	4:00									7	6	12	17	23	23	23	23	36	66	8
	120	4:00									7	7	16	19	23	23	23	23	36	66	8

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
		Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
Meters	Min		**DEEP MIXED GAS**										50% O2						O2 100%		
FEET																					
72	10	4:40										7	0	0	3	4	10	10	14	24	2
	20	4:40										7	0	3	5	7	10	10	25	46	3
	30	4:20									7	0	3	6	7	10	10	10	32	58	3
240	40	4:20									7	0	5	8	9	14	14	14	35	64	4
Max O2 15.7%	60	4:20									7	4	8	11	14	19	19	19	36	66	6
Min O2 10.0%	80	4:20									7	7	11	16	18	23	23	23	36	66	7
	100	4:20									7	10	14	19	23	23	23	23	36	66	8
	120	4:00								7	3	12	17	19	23	23	23	23	36	66	8

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
		Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
Meters	Min		**DEEP MIXED GAS**										50% O2						O2 100%		
FEET																					
75	10	5:00										7	0	0	3	4	10	10	15	25	2
	20	4:40									7	0	0	3	7	7	10	10	26	47	3
	30	4:40									7	0	4	6	8	10	10	10	32	60	4
250	40	4:40									7	2	5	9	9	14	14	14	35	64	4
Max O2 15.2%	60	4:20								7	0	7	9	12	16	21	21	21	36	66	6
Min O2 10.0%	80	4:20								7	3	9	13	15	21	23	23	23	36	66	7
	100	4:20								7	6	11	14	19	23	23	23	23	36	66	8
	120	4:20								7	8	13	19	20	23	23	23	23	36	66	8

NOTE: EXCEPTIONAL EXPOSURE TIMES ARE INVOLVED BY A BLACK BOX

78 260
Max O2 16.3%
Min O2 10.0%

DEPTH Meters FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	5:00									7	0	0	0	4	4	10	10	16	27	2
	20	5:00									7	0	3	4	6	7	10	10	27	50	3
	30	4:40								7	0	2	5	6	9	10	10	10	33	62	4
	40	4:40								7	0	3	8	9	10	15	15	15	35	64	5
	60	4:40								7	3	7	10	14	16	21	21	21	36	66	6
	80	4:40								7	6	10	13	17	23	23	23	23	36	66	7
	100	4:20							7	2	9	13	16	20	23	23	23	23	36	66	8
	120	4:20							7	4	11	14	19	20	23	23	23	23	36	66	8

81 270
Max O2 14.2%
Min O2 10.0%

DEPTH Meters FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	5:20									7	0	0	3	3	4	10	10	17	28	2
	20	5:00								7	0	0	3	6	6	8	10	10	29	52	3
	30	5:00								7	0	3	6	6	9	13	13	13	34	62	4
	40	5:00							7	0	2	5	8	8	12	16	16	16	35	66	5
	60	4:40							7	0	6	8	10	14	19	23	23	23	36	66	6
	80	4:40							7	3	8	11	14	17	23	23	23	23	36	66	7
	100	4:40							7	5	11	13	16	20	23	23	23	23	36	66	8
	120	4:40							7	8	12	16	19	20	23	23	23	23	36	66	8

84 280
Max O2 13.7%
Min O2 10.0%

DEPTH Meters FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	5:40									7	0	0	3	3	4	10	10	18	31	2
	20	5:20								7	0	0	4	6	7	7	10	10	30	54	3
	30	5:00							7	0	1	5	5	9	9	12	12	12	35	64	4
	40	5:00							7	0	4	6	8	9	12	17	17	17	36	66	5
	60	5:00							7	4	6	8	12	15	18	23	23	23	36	66	7
	80	4:40						7	0	7	9	11	15	17	23	23	23	23	36	66	8
	100	4:40						7	2	9	11	16	17	20	23	23	23	23	36	66	8
	120	4:40						7	4	11	13	16	19	20	23	23	23	23	36	66	8

87 290
Max O2 13.3%
Min O2 10.0%

DEPTH Meters FEET	TTF Min	TPP Min:seg	57 190	54 180	51 170	48 160	45 150	42 140	39 130	36 120	33 110	30 100	27 90	24 80	21 70	18 60	15 50	12 40	9 30	6 20	No of O2 Chamber Periods
			DEEP MIXED GAS										50% O2						O2 100%		
	10	5:40								7	0	0	0	4	3	4	10	10	19	33	2
	20	5:20							7	0	0	2	6	6	6	9	10	10	30	56	3
	30	5:20							7	0	2	5	5	9	9	14	14	14	34	63	5
	40	5:20							7	0	5	7	8	11	13	17	17	17	35	66	5
	60	5:00						7	0	6	7	9	12	15	20	23	23	23	36	66	7
	80	5:00						7	2	8	10	12	16	19	23	23	23	23	36	66	8
	100	5:00						7	5	10	12	15	19	20	23	23	23	23	36	66	8
	120	5:00						7	8	11	16	17	19	20	23	23	23	23	36	66	8

NOTE: EXCEPTIONAL EXPOSURE TIMES ARE INVOLVED BY A BLACK BOX

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
Meters FEET	Min	Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
90 300 Max O2 12.9% Min O2 10.0%	**DEEP MIXED GAS**												50% O2						O2 100%		
	10	6:00								7	0	0	0	4	3	4	10	10	19	33	2
	20	5:40							7	0	0	2	6	6	6	9	10	10	30	56	3
	30	5:40							7	0	2	5	5	9	9	14	14	14	34	63	5
	40	5:40							7	0	5	7	8	11	13	17	17	17	35	66	6
	60	5:20						7	0	6	7	9	12	15	20	23	23	23	36	66	7
	80	5:20						7	2	8	10	12	16	19	23	23	23	23	36	66	8
	100	5:20						7	5	10	12	15	19	20	23	23	23	23	36	66	8
	120	5:20						7	8	11	16	17	19	20	23	23	23	23	36	66	8

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
Meters FEET	Min	Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
93 310 Max O2 12.5% Min O2 10.0%	**DEEP MIXED GAS**												50% O2						O2 100%		
	10	6:00							7	0	0	0	3	3	3	7	10	10	21	36	2
	20	5:40						7	0	0	2	4	5	6	7	10	10	10	31	57	4
	30	5:40						7	0	2	4	5	7	8	11	15	15	15	35	66	5
	40	5:20					7	0	1	4	6	7	8	12	15	19	19	19	36	66	7
	60	5:20					7	0	5	6	9	11	13	17	20	23	23	23	36	66	8
	80	5:20					7	3	7	9	1	13	17	20	23	23	23	23	36	66	8
	100	5:20					7	5	9	11	13	17	19	20	23	23	23	23	36	66	8
	120	5:20					7	7	12	13	16	17	19	20	23	23	23	23	36	66	8

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
Meters FEET	Min	Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
96 320 Max O2 12.2% Min O2 10.0%	**DEEP MIXED GAS**												50% O2						O2 100%		
	10	6:20							7	0	0	0	4	3	3	7	10	10	21	38	2
	20	6:00						7	0	0	3	5	5	6	8	10	10	10	32	59	4
	30	5:40					7	0	0	4	4	6	7	9	11	17	17	17	35	66	5
	40	5:40					7	0	4	4	6	7	9	12	16	20	20	20	36	66	6
	60	5:40				7	0	2	6	8	9	11	14	17	23	23	23	23	36	66	8
	80	5:20				7	0	6	8	8	13	14	19	20	23	23	23	23	36	66	8
	100	5:20				7	2	7	10	13	16	17	19	20	23	23	23	23	36	66	8
	120	5:20				7	4	8	12	13	16	17	19	20	23	23	23	23	36	66	8

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
Meters FEET	Min	Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
99 330 Max O2 11.8% Min O2 10.0%	**DEEP MIXED GAS**												50% O2						O2 100%		
	10	6:20						7	0	0	0	2	3	3	4	7	10	10	22	40	2
	20	6:00					7	0	0	2	3	4	6	5	10	10	10	10	33	60	4
	30	6:00					7	0	1	4	5	6	8	8	13	17	17	17	35	66	6
	40	5:40				7	0	1	4	5	7	7	10	12	17	20	22	22	36	66	7
	60	5:40				7	0	5	6	8	9	11	15	20	23	23	23	23	36	66	8
	80	5:40				7	2	7	8	10	13	5	19	20	23	23	23	23	36	66	8
	100	5:40				7	5	9	9	13	16	17	19	20	23	23	23	23	36	66	8
	120	5:20			7	1	7	10	13	15	16	17	19	20	23	23	23	23	36	66	8

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
		Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
Meters	Min		**DEEP MIXED GAS**										50% O2						O2 100%		
FEET																					
	10	6:40						7	0	0	0	3	3	3	4	7	10	10	23	41	3
	20	6:20					7	0	0	2	4	5	7	8	9	10	10	10	33	60	5
102	30	6:00				7	0	0	3	5	5	6	8	9	13	18	18	18	35	66	6
340	40	6:00				7	0	2	4	6	7	8	10	13	16	22	22	22	36	66	7
Max O2 11.5%	60	5:40			7	0	3	5	6	9	10	13	16	18	21	23	23	23	36	66	8
	80	5:40			7	0	7	7	8	11	13	15	19	20	23	23	23	23	36	66	8
Min O2 10.0%	100	5:40			7	2	8	8	12	13	16	17	19	20	23	23	23	23	36	66	8
	120	5:40			7	4	9	11	13	15	16	17	19	20	23	23	23	23	36	66	8

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
		Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
Meters	Min		**DEEP MIXED GAS**										50% O2						O2 100%		
FEET																					
	10	6:40					7	0	0	0	2	2	3	3	5	7	10	10	21	43	3
	20	6:20				7	0	0	0	4	4	5	5	7	9	13	13	13	31	63	5
105	30	6:20				7	0	1	4	4	5	7	8	11	13	18	18	18	33	66	6
350	40	6:00			7	0	1	3	5	6	7	8	11	14	17	23	23	23	33	66	7
Max O2 11.2%	60	6:00			7	0	5	5	8	8	11	12	16	19	23	23	23	23	33	66	8
	80	6:00			7	2	7	7	10	11	13	17	19	20	23	23	23	23	33	66	8
Min O2 10.0%	100	5:40		7	0	6	8	9	11	15	16	17	19	20	23	23	23	23	33	66	8
	120	5:40		7	1	7	9	12	14	15	16	17	19	20	23	23	23	23	33	66	8

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
		Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
Meters	Min		**DEEP MIXED GAS**										50% O2						O2 100%		
FEET																					
	10	7:00					7	0	0	0	2	2	3	3	7	7	10	10	25	44	3
	20	6:40				7	0	0	2	3	4	5	5	8	10	13	13	13	34	63	5
108	30	6:20			7	0	0	3	3	5	5	7	8	11	13	19	19	19	36	66	6
360	40	6:20			7	0	2	4	5	7	7	9	10	14	20	23	23	23	36	66	7
Max O2 10.9%	60	6:20			7	2	5	6	7	9	11	14	16	19	23	23	23	23	36	66	8
	80	6:00		7	0	6	6	8	11	12	14	16	19	20	23	23	23	23	36	66	8
Min O2 10.0%	100	6:00		7	2	7	8	11	13	13	16	17	19	20	23	23	23	23	36	66	8
	120	6:00		7	4	8	10	12	14	15	16	17	19	20	23	23	23	23	36	66	8

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
		Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
Meters	Min		**DEEP MIXED GAS**										50% O2						O2 100%		
FEET																					
	10	7:00				7	0	0	0	0	3	3	3	3	7	7	10	10	25	46	3
	20	6:40			7	0	0	0	3	4	4	5	5	8	10	13	13	13	34	63	5
111	30	6:20		7	0	0	2	3	4	4	7	7	8	11	16	19	19	19	36	66	7
370	40	6:20		7	0	0	4	4	5	6	8	10	11	14	20	23	23	23	36	66	8
Max O2 10.6%	60	6:20		7	0	4	5	7	8	9	11	13	17	20	23	23	23	23	36	66	8
	80	6:00	7	0	3	6	7	9	10	12	15	17	19	20	23	23	23	23	36	66	8
Min O2 10.0%	100	6:00	7	0	6	7	9	10	14	15	16	17	19	20	23	23	23	23	36	66	8
	120	6:00	7	1	7	9	11	13	14	15	16	17	19	20	23	23	23	23	36	66	8

DEPTH	TTF	TPP	57	54	51	48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	No of O2 Chamber Periods
		Min:seg	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	
Meters FEET	Min		**DEEP MIXED GAS**										50% O2						O2 100%		
	10	7:20				7	0	0	0	0	3	3	3	3	7	7	10	10	25	46	3
	20	7:00			7	0	0	0	3	4	4	5	5	8	10	13	13	13	34	63	6
114	30	6:40		7	0	0	2	3	4	4	7	7	8	11	16	19	19	19	36	66	7
380	40	6:40		7	0	0	4	4	5	6	8	10	11	14	20	23	23	23	36	66	8
Max O2 10.4%	60	6:20		7	0	4	5	7	8	9	11	13	17	20	23	23	23	23	36	66	8
Min O2 10.0%	80	6:20	7	0	3	6	7	9	10	12	15	17	19	20	23	23	23	23	36	66	8
	100	6:20	7	0	6	7	9	10	14	15	16	17	19	20	23	23	23	23	36	66	8
	120	6:20	7	1	7	9	11	13	14	15	16	17	19	20	23	23	23	23	36	66	8

NOTE: EXCEPTIONAL EXPOSURE TIMES ARE INVOLVED BY A BLACK BOX

ANNEX 13-A

Document nº .

FLAG STATE VERIFICATION AND ACCEPTANCE DOCUMENT
OF SHIPS WITH DYNAMIC POSITIONING SYSTEM
Issued under the provision of the Guidelines for Vessels with Dynamic Positioning Systems (MSC/CIRC 643)**,**
under the authority of the Government of Brazil
(FSVAD)

Particulars of Ship:

Name of Ship	Distinctive number or letters	Port of Registry	IMO Number

Date on which keel was laid or vessel was at similar stage of construction or on which major conversion was commenced : .....

THIS IS T0 CERTIFY that the above mentioned vessel has been duly documented, surveyed, and tested in accordance with the Guidelines for Vessels with Dynamic Positioning Systems (MSC/Circ 645) and found to comply with the Guidelines.

The vessel is allowed to operate in DP Equipment Class .....and in lower equipment classes.

This document remains valid until ..... unless terminated by the Administration, provided that the vessel is operated, tested, and surveyed according to the requirements in the guidelines and the results are properly recorded.

Issued at
(place of issue of document)

Date of issue _____

Seal or stamp
of the Classification
Society

_____
Name and signature of authorized official

ANNEX 13-A

Document no _____,

FLAG STATE VERIFICATION AND ACCEPTANCE DOCUMENT OF SHIPS WITH DYNAMIC POSITIONING SYSTEM

LIST OF EXEMPTIONS AND EQUIVALENTS

(Refer to items 1.4 and 1.5 of the Guidelines)

Issued at

(place of issue of document)

Date of issue _____

Seal or stamp
of the Classification
Society

_____

Name and signature of authorized

ANNEX 13-A

Document no .

FLAG STATE VERIFICATION AND ACCEPTANCE DOCUMENT OF SHIPS WITH DYNAMIC POSITIONING SYSTEM

LIST OF MAIN SYSTEMS AND COMPONENTS COVERED BY THE DOCUMENT

Seal or stamp of the Classification Society

Name and signature of authorized official

All main system and components included in the dynamic positioning system are to be listed in a systematic way. As an alternative reference can be made to drawings, etc. It is important that it is possible by this list to identify. Equipment installed after date of issuing FSVAD should only be included in the list after control and testing has been completed and modifications and non-conformities report signed.

ANNEX 13-A

Document no .

Record of annual survey reports and special (5 years) survey reports

Date	Test Type	Remarks	Report reference date/number	Name and signature of authorized official	Name and signature of Captain/Master of the vessel

Issued at
(place of issue of document)

Date of issue _____

Seal or stamp of the Classification Society

_____
Name and signature of authorized official