National Défense
Defence nationale

B-GG-380-000/FP-003

CANADIAN FORCES DIVING MANUAL

VOLUME 3

SURFACE SUPPLIED DIVING MANUAL

(Supersedes B-GG-380-000/FP-003 dated 2002-09-01)

Issued on Authority of the Chief of the Defence Staff.
Publiée avec l'autorisation du Chef de l'étatmajor de la Défense.

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Canada

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Contact Officer: D DIVE S

DIVING EMERGENCY ASSISTANCE / MEDICAL CONSULTATION CANADA

WEST COAST

FDU(P) – CFB Esquimalt

Day .... (250) 363-4976

CO .... (250) 363-4974

24 Hours .... (250) 363-2379

Sick Bay .... (250) 363-4981

CSN 255-XXXX

Base Hospital – CFB Esquimalt

Base Hospital (working hours):

.... (250) 363-4122

Duty Diving Medical Officer

.... (250) 888-0632

or pager ...... (250) 978-2647

Transportation

Ship/Unit ____________________

Ambulance __________________

PMV _________________________

CENTRAL

Defence R&D Canada – Toronto (DRDC – Toronto)

Day .... (416) 635-2100

OC EDU .... (416) 635-2080

For urgent matters involving diving emergencies
(24/7 response), contact:

.... (416) 246-3155

and follow directions provided.

For routine questions contact Consultant in Diving & Hyperbaric Medicine (normal working hours) at:

.... (416) 635-2159

CFSSAT – Winnipeg

Operator .... (204) 833-2500

Wing Ops (24/7) (204) 833-2700

or 1-877-283-6827

DMO Pager ...... (204) 931-6615

Diving Supervisor Cell

.... (204) 291-6003

MIR .... 0730-1600 Ext 5595

CMDT .... (204) 833-5877

CSN 257

EAST COAST

FDU(A) – CFB Shearwater

FDU(A): Commercial (902)/
All numbers are direct dial-in.
No change for CSN.

Dive Ops .... (902) 720-1339

Sick Bay .... (902) 720-1355

Duty Diver .... (902) 720-1353
(silent hours)

CSN ....(902) 479-XXXX

12 Wing – CFB Shearwater

Medical Assistance

.............................(902) 720-1558

CFB Halifax

Hospital .... (902) 721-8700

Emergencies ..... (902) 721-8890

Ambulance .... (902) 721-8888

Transportation

Ship/Unit ____________________

Ambulance __________________

PMV _________________________

Directorate of Diving Safety (D DIVE S)

In the event D DIVE S must be contacted during silent hours, CFICC is the primary point of contact.
D DIVE S contact numbers during normal working hours are contained in the cover letter to the annual *Diving General Memoranda Change.*

via Canadian Forces Integrated Command Centre (CFICC)

(24/7) .... (613) 945-2643

CSN 945-2643

E-mail (DWAN only): +CFICC SCW-CCIFC ESCS@SJS CFICC@OTTAWA-HULL

USA

Navy Experimental Diving Unit (NEDU) Panama City, FL

24 Hours .... (850) 230-3100

FAX .... (850) 234-4238

USAF School of Aerospace Medicine (USAFSAM) Davis Hyperbaric Center Brooks City-Base, San Antonio, TX

VOICE DSN 240-3281

VOICE COM .... (210) 536-3281

FAX DSN 240-2944

FAX COM .... (210) 536-2944

Divers Alert Network (DAN)

24-hr emergency hotline

+1 (919) 684-8111

First Aid FOR Emergencies

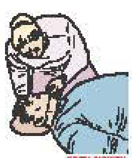
To handle an emergency situation, use Emergency Scene Management (ESM).

1. Take charge.
2. Call out for help.
3. Assess hazards and make the area safe.
4. Find out what happened.
5. Identify yourself and offer to help.
6. If head or spinal injuries are suspected, support the head and neck.
7. Assess responsiveness.
8. Send or go for medical help.

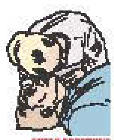
Note: Protect yourself and others by wearing non-latex gloves when giving first aid. Use a shield or face mask with a one-way valve when giving CPR.

Cardiopulmonary Resuscitation (CPR – Adult)

1. Open airway – push back on forehead and lift chin.
2. **Check breathing. If the casualty is not breathing...**
3. Pinch nose and make a tight seal over the mouth. Give 2 breaths.
4. Make sure casualty is on a firm flat surface.
5. Place hands on centre of chest.
6. Position shoulders directly over hands and keep elbows locked.
7. Compress firmly 30 times then give 2 breaths. Push hard - Push fast
8. Continue cycles of 30 compressions and 2 breaths until help arrives.



OPEN AIRWAY



CHECK BREATHING

BREATHE INTO CASUALTY TWICE

POSITION YOUR HANDS IN THE CENTRE OF THE CHEST

PRESS DOWN FIRMLY 30 TIMES, THEN GIVE 2 BREATHS. CONTINUE CPR UNTIL HELP ARRIVES

Choking (Adult)

If a choking person can speak, breathe or cough – STAND BY and encourage coughing.

If a conscious person cannot speak, breathe or cough:

1. Stand behind person and find top of the hip bones with your hands.
2. Place a fist midline against the abdomen.
3. Grasp fist with other hand and press inward and upward forcefully.
4. Continue until object is expelled or person becomes unconscious.

FIND TOP OF HIPBONES

PLACE FIST MIDLINE ON ABDOMEN

PRESS INWARD AND UPWARD

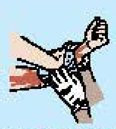
If the person becomes unconscious ease him or her to the ground and send for medical help

1. Open the mouth and look for obstruction.
2. Open the airway and check breathing. If not breathing...
3. Give two breaths. If air doesn't go in the first time, reposition the head and try again.
4. Begin CPR. Give 30 compressions.
5. Each time you finish 30 compressions, look in mouth before giving the first breath.

Bleeding **To control severe bleeding**

Immediately apply direct pressure to the wound over a pad of dressings

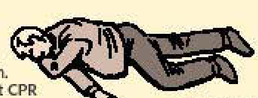
Keep the casualty lying down



CONTROL BLEEDING IMMEDIATELY

Unconsciousness

Get medical help. Make certain person is breathing and then place the casualty in the recovery position. If the casualty is not breathing, start CPR



RECOVERY POSITION

Emergency Numbers

AMBULANCE ____________________

FIRE ____________________

POLICE ____________________

FAMILY DOCTOR ____________________

POISON INFORMATION CENTRE ____________________

NOTE: This poster is a step-by-step guide to what you can do until medical help arrives. These tips do not take the place of first aid training.

St. John Ambulance
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9901/10/00

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Premiers soins EN cas d'urgence

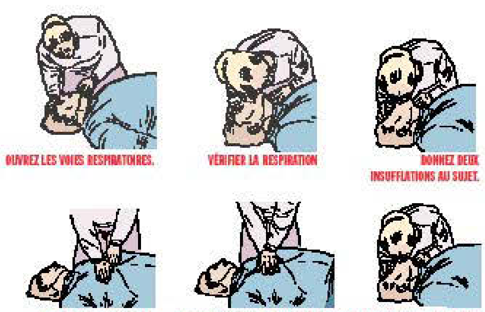
Pour faire face à une situation d'urgence, appliquez les principes de la Prise en charge d'une situation d'urgence (PCSU).

1. Prenez la situation en main.
2. Appelez à l'aide.
3. Évaluez les dangers et rendez les lieux sûrs.
4. Déterminez les circonstances de l'incident.
5. Indiquez que vous êtes secouriste et offrez votre aide.
6. Si vous soupçonnez une blessure à la tête ou à la colonne vertébrale, soutenez la tête et le cou de la victime.
7. Évaluez la faculté de réponse de la victime.
8. Envoyez quelqu'un chercher des secours médicaux ou allez-y vous-même.

Nota : Assurez votre sécurité ainsi que celle des autres en portant des gants lorsque vous donnez les premiers soins. Utilisez un écran protecteur ou un masque à soupape unidirectionnelle lorsque vous pratiquez la RCR.

La réanimation cardio-respiratoire (RCR - Adulte)

1. Ouvrez les voies respiratoires – renversez la tête vers l'arrière en appuyant sur le front du sujet et soulevez le menton.
2. **Surveillez la respiration. Si le sujet ne respire pas**…
3. Pincez les narines du sujet et assurez un contact hermétique à la bouche. Donnez deux insufflations.
4. Assurez-vous que la victime se trouve sur une surface ferme et plate.
5. Placer deux mains au centre de la poitrine
6. Placez vos épaules directement au-dessus des mains et garder les coudes immobilisés.
7. Exercez de fortes poussées (30 fois) et donnez 2 insufflations.
8. Continuez le cycle de 30 fortes poussées et de 2 insufflations jusqu'à ce que les secours médicaux prennent la relève.



L'Étouffement (Adulte)

Si la victime peut parler, respirer ou tousser – TENEZ-VOUS PRÊT à intervenir et encouragez-la à tousser.

Si la victime est consciente mais qu'elle ne peut ni parler, ni respirer, ni tousser :

1. Placez-vous derrière la victime et repérez le dessus des os des hanches à l'aide de vos mains.
2. Placez un poing dans l'axe médian de l'abdomen.
3. Saisissez le poing avec votre autre main et exercez de fortes poussées vers l'intérieur et vers le haut.
4. Continuez jusqu'à ce que l'objet soit délogé ou que la victime perde conscience.

Si la victime perd conscience, allongez-la sur le sol et faites dépêcher des secours médicaux :

1. Ouvrez-lui la bouche et recherchez le corps étranger. Retirez-le si vous le voyez.
2. Ouvrez les voies respiratoires et surveillez la respiration. Si la victime ne respire pas…
3. Donnez deux insufflations. Si vous ne parvenez pas à donner une insufflation au premier essai, replacez la tête et essayer à nouveau.
4. Commencez à administrer la RCR. Exercez 30 fortes poussées.
5. Chaque fois que vous avez terminé d'exercer 30 fortes poussées, ouvrez la bouche de la victime et cherchez s'il s'y trouve un corps étranger avant de donner la première insufflation.

L'hémorragie

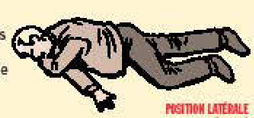
Pour réprimer une hémorragie grave

Exercez immédiatement une pression directe sur la plaie couverte d'un pansement si vous en avez un.

Gardez la victime allongée.

L'inconscience

Envoyez quelqu'un chercher des secours médicaux. Assurez-vous que la victime respire puis placez-la en position latérale de sécurité. Si la victime ne respire pas commencer la RCR.



Numéro de téléphone en cas d'urgence

AMBULANCE ______________________

SERVICE D'INCENDIE ______________________

POLICE ______________________

MÉDECIN DE FAMILLE ______________________

CENTRE ANTIPOISON ______________________

NOTA : Cette affiche est un guide qui vous indique quoi faire, étape par étape, jusqu'à l'arrivée des secours médicaux. Ces conseils ne remplacent pas la formation en premiers soins.

Ambulance Saint-Jean

SAUVER DES VIES au travail, à la maison et dans les loisirs

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Warning

The equipment in this manual uses highpressure oxygen and oxygen enriched mixtures of gases. The following precautions shall be observed:

1. Use no grease or oil, other than approved lubricants, on any fitting or equipment;

2. Compressed gas is potentially dangerous due to the considerable amount of contained energy within the pressurized containers and piping. Care must be taken when working in the vicinity of pressurized hoses and piping;

3. No naked lights or smoking shall be allowed in the vicinity of gas cylinders or flasks when charging, testing or maintenance is being carried out;

4. Isolation and cylinder valves are to be opened slowly and fully; and

5. All personnel operating or maintaining oxygen or HP enriched air systems are to be fully conversant with C-87-010-000/TB-001 (fire hazards in high pressure oxygen systems).

FOREWORD

1. B-GG-380-000/FP-003, CF Diving Manual Volume 3 – Surface Supplied Breathing Apparatus, is issued by Director Diving Safety on authority of the Chief of the Defence Staff IAW DAOD 8009-0 and 8009-1.

2. B-GG-380-000/FP-003 is effective on receipt and supersedes B-GG-380-000/FP-003, dated 1986 02 17

3. This Volume is the principal reference document governing the conduct of all CF Surface Supplied diving. CF Diving manual is compiled of the following volumes:

   a. B-GG-380-000/FP-001, Canadian Forces Diving Manual, Volume 1– History, Physics and Physiology of diving;

   b. B-GG-380-000/FP-002, Canadian Forces Diving Manual, Volume 2 – Compressed Air Breathing Apparatus;

   c. B-GG-380-000/FP-003, Canadian Forces Diving Manual, Volume 3 – Surface Supplied Diving Manual

   d. B-GG-380-000/FP-004, Canadian Forces Diving Manual, Volume 4 – Self-contained mixed gas diving (books 1, 2 and 3);

   e. B-GG-380-000/FP-005, Canadian Forces Diving Manual, Volume 5 – Hyperbaric Chamber Operation and Treatment Procedures;

   f. B-GG-380-000/FP-006, Canadian Forces Diving Manual, Volume 6 – Diving Supervisor's Handbook;

   g. B-GG-380-000/FP-007, Manuel de Plongée Des Forces Canadiennes, Volume 7 – Aide-Mémoire du Superviseur de Plongée (Vol 6, in French) ; and

   h. B-GG-380-000/FP-008, Manuel de Plongée Des Forces Canadiennes Volume 2 – Organisation, Consignes, Règles et Appareil Respiratoire A Air Comprime (ARAC).

4. The CF Diving manual is a controlled publication for issue solely to diving teams and schools in support of their diving operation / training.

5. The content of this publication is presented in English only. A French version will be distributed as soon as it is provided by the translation bureau. Pending its publication, inquiries in French can be forwarded to NDHQ D Dive S.

6. Suggestions for amendments shall be forwarded through normal channels to: National Defence Headquarters, Attention: Directorate of Diving Safety (D DIVE S).

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FOREWORD

METRICATION OF CF DIVING

Refer to Diving General Memorandum (DGM) 2006/11/A — Conversion of CF Diving to the metric system.

1. This publication has been converted to metric as per DGM.

2. The following guidelines for metrication were created by DMSS 442:

   a. **Publication Title.** Metric is included in the title of the CFTO to allow retention of the existing NDID number. However, the representation of parameters will remain in dual reading (metric and imperial).

   b. **Manufacturer's Information.** Dimensions will remain in the original, unchanged units of design by the manufacturer. However, volumes derived from imperial dimensions having a bearing on computations required to operate the equipment have been soft converted to metric.

   c. **Derived Values for Operation.** All derived values for operational parameters originally specified in the imperial system will now be represented with the metric equivalent in the main and with the imperial parameter following in brackets. This is with the exception of depth measurements which will be represented strictly in metric to avoid confusion.

   d. **Conversion Factors in Annex.** All conversion factors for derived units have been based on the conversion factors located in Annex A.

NOTE

However, all readings referring to pressure or depth are IAW Annex D of CSA Z275.105 and Annex E 2A of BGG380000/FP001.

CHAPTER 1
RULES
AND
REGULATIONS

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CHAPTER 1
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AND
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RULES AND REGULATIONS

SECTION 1

GENERAL

1101 Introduction

1. This chapter contains the regulations governing the conduct of all surface-supplied diving. These regulations are applicable to all Canadian Forces Clearance Diving personnel.

2. These regulations are mandatory and are intended to ensure both the safety of the diver and the efficiency of diving operations. In emergencies or operations during hostilities, and during training for specific hazardous missions, calculated risks may have to be taken. Commanding Officers will have to weigh these risks against the consequence of failure to complete the task. Commanding Officers are to ensure that no unjustifiable deviations from these regulations are permitted.

3. All Clearance Diving personnel shall make themselves thoroughly conversant with these regulations. Strict compliance is essential to ensure the safety of the diver.

4. Regulations and definitions governing Canadian Forces Diving in general, which are not specific to surface-supplied diving, are given in Volume 2 of the CF Diving Manual.

5. Considerable importance is attached to the study of accidents and unusual incidents experienced by divers in all types of diving equipment. The analysis of accurate data recorded shortly after a dive or exposure to pressure in which injury has occurred, or could have occurred owing to failure of equipment or procedure, is an important factor in the future safety of divers.

6. Full instructions on Incident and Accident Reporting are found in Volume 2 of the CF Diving Manual.

1102 – 1199 Not Allocated

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SECTION 2

DIVING RESPONSIBILITIES

1201 CF Diving Organization

1. Diving authorities and their areas of responsibility in Units, Commands and NDHQ are laid down in Volume 2, Chapter 1 of the CF Diving Manual and DAOD 8009-0 and 8009-1. These directions also apply to surface-supplied diving.

1202 Commanding Officer

1. The Commanding Officer shall ensure that all possible facilities are made available for the proper training and exercise of those personnel listed in Figure 1-2-1, *Personnel Qualifications,* under their command. Such personnel should be exercised sufficiently to maintain proficiency in all types of routine and emergency surface-supplied diving operations.

1203 Diving Officer

1. The officer selected by the Commanding Officer to be the Diving Officer in charge of surface-supplied diving operations shall be qualified in Clearance Diving. See Figure 1-2-1, *Personnel Qualification* and Figure 1-2-2, *Diver Qualification and Equipment; Operation and Supervisory Limits.*

2. The Diving Officer is responsible to the Commanding Officer for:

a. The efficiency of all diving personnel under their direction;

b. The organization, preparation and planning of all diving operations carried out under the Diving Officer's direction;

c. Scheduling of diving exercises and training, in order to maintain the proficiency and qualification of all diving personnel;

d. Maintenance of all diving records;

e. Maintenance, preparation and testing of diving equipment IAW operating and technical instructions;

f. Proper briefing of the Diving Supervisor; and

g. Safe execution of surface-supplied diving operations IAW this volume, Command Orders and Commanding Officer directives.

1204 Diving Supervisor

1. All diving operations, practices and exercises shall be carried out under the direct supervision of a Diving Supervisor. See **Figure 1-2-1 and Figure 1-2-2.**

2. The Diving Supervisor, as detailed for each particular task, shall be in full charge of the team for that task and is responsible to the Diving Officer. The Diving supervisor must be continuously present at the dive site:

a. The Diving Supervisor shall not enter the water or hyperbaric chamber unless properly relieved by a qualified supervisor.

3. Where none of the supervisory personnel listed in **Figure 1-2-1** are available, only emergency diving operations shall be carried out, under the supervision of the Commanding Officer or an officer delegated in writing.

4. The Diving Supervisor is to be fully conversant with the objectives and requirements of the task and is responsible for ensuring:

a. The safety of all members of his diving team;

b. That the diving team, for any task, meets or exceeds the minimum permitted number of qualified divers, as laid down in Article 1301, Minimum Personnel Required, and as shown in Figure 1-3-1, Surface-Supplied Dive Manning Requirements;

c. That each member of the team is capable of carrying out the assigned task;

d. That each member of the team is fully briefed on the objectives and requirements of the task;

e. That the diving operation is conducted in strict compliance with diving regulations; and

f. That an accurate record of every dive and of the procedures carried out is available on completion of operations.

1205 Diver / Standby Diver

1. The Diver/Standby Diver shall be a qualified Clearance Diving Officer / Clearance Diver. Each diver is responsible for ensuring:

a. Proper preparation of the diving equipment used for the dive;

b. Medically, dentally and physically fit; and

c. That the diver is appropriately practiced for the ensuing dive, or to otherwise advise the supervisor.

2. Diving Officers and Supervisors will not appoint Divers / Standby Divers who are unfit for diving.

3. Whenever SSBA diving operations are in progress. A Standby Diver is required at the surface at ***an immediate state of readiness***, regardless of equipment used. “Immediate State of Readiness” is defined as:

a. **Standby Diver Using CABA.** Fully dressed and ready for the water less mask and mouthpiece;

b. **Standby Diver using LWSSDE.** Fully dressed and ready for the water less mask; and

c. **Standby Diver using SSBA.** All pre-dive checks completed, fully dressed and ready for the water in the equipment appropriate for the planned max depth of the dive.

1206 Diving Attendants (Tenders)

1. In SSBA diving, the diver shall be attended by another diver qualified in the apparatus being used. **Figure 1-2-1** outlines the attendant’s responsibilities and the level of proficiency required. Personnel not qualified in the equipment used may used as the secondary attendant if they have been trained to do so as outlined in Volume 2, **Article 109**.

2. In diving training units, personnel under instruction may act as attendants, at the discretion of the Diving Training Officer.

TASK DESIGNATION	MINIMUM QUALIFICATION	RESPONSIBILITIES
DIVING OFFICER	- CLDO MARS 00207 - CL DIV TECH 00342, QL6B PO1 AND ABOVE	1. Complete authority for all diving operations to the maximum depth of the equipment available. **Ref: Article 1203**
DIVING MEDICAL OFFICER	-Basic Diving Medical Officer (DMO)	1. Responsible for medical care and treatment of divers.
DIVING MEDICAL TECHNICIAN	- Diving Medical Assistant (DMA)	1. Responsible for diving medical first aid and advice. (A DMA is the preferred attendant for recompression treatment)
DIVING SUPERVISOR	CLDO MARS 00207 - CL DIV 00342 QL6B PO1 and above - CL DIV 00342 QL6B PO2 (45 MSW max)	1. Responsible to the Diving Officer for the conduct of the diving operation. 2. In addition, the Supervisor: a. Plans the operation; b. Briefs the divers; c. Takes proper precautions against foreseeable contingencies: d. Supervises and directs diving operations; and e. The Diving supervisor must be continuously present at the dive site. **NOTE:** When leaving the surface post. Supervisory duties must be temporarily turned over to a qualified supervisor.
DIVER	Qualified CL DIV 00342 or under training in diving equipment being used, and qualified to depth of dive anticipated. The limitations imposed by Chapter 1 must prevail.	1. Carries out pre-dive checks 2. Carries out underwater task to the best of ability. 3. Obeys instructions from the Diving Supervisor. 4. Ensures briefing is understood completely. **Ref: Article 1205**
STANDBY DIVER	CL DIV 00342 or above, qualified in the equipment being used. The limitation imposed by Chapter 1 must prevail.	Is prepared to enter the water immediately and render assistance to the diver in an emergency. **Ref: Article 1205**

Figure 1-2-1 Personnel Qualification (Sheet 1 of 2)

TASK DESINATION	MINIMUM QUALIFICATION	RESPONSIBLITIES
ATTENDANT **(*including Timekeeper Recorder and Communications Attendant)***	Qualified CL Div 00342 or under training in diving equipment being used and qualified to the planned depth of dive. The limitations imposed by Chapter 1 must prevail	1. Ensures the diver receives proper care both on the surface and while submerged. a. Dress diver. b. Checks proper function of the equipment before descent; c. Maintains communication with the diver; d. Tends the diver's hoses and lines; e. Is aware of the diver's position and depth; f. Advises the Supervisor of diver's condition and approximate bottom time expiry. 2. Maintains a careful record in the diving log of; a. Diver particulars; b. Dive particulars, including; 1) Descent time; 2) Bottom time; 3) Depth of dive; 4) Time of ascent to first stop; 5) Time of stops; and 6) Any pertinent information dictated by the Supervisor.
STAGE / WINCH OPERATOR	Qualified CL DIV 00342 (or competent Seaman) thoroughly briefed and trained	1. Under the Diving Supervisor's direction, controls the rate of descent and ascent of the diver by controlling the paying out or retrieving of the stage line.
COMPRESSOR OPERATOR **/HOT WATER OPERATOR**	Qualified MAR ENG T or CL DIV 00342 trained in breathing compressors and auxiliary machinery peculiar to diving.	1. Operates air compressors; 2. Operate auxiliary diving machinery
GAS PANEL OPERATOR	CL DIV 00342	1. Ensures an adequate supply of diver's breathing gas (at the correct mix and pressure) as required by the Supervisor. 2. Maintains a proper standby supply of properly mixed gas. Readily available. 3. Records gas consumption.

Figure 1-2-1 Personnel Qualification (Sheet 2 of 2)

EQUIPMENT TYPE	DIVER QUALIFICATION	DIVING LIMITS	SUPERVISORY LIMITS
SURFACE-SUPPLIED COMPRESSED AIR & SURFACE-SUPPLIED HeO2	Clearance Diving Officer (CLDO) (MARS 00207)	MAXIMUM AUTHORIZED DEPTH OF EQUIPMENT (See Figure 1-2-3)	Max Authorized Depth of Equipment (see Fig 1-2-3)
	CL DIV 00342 QL6B PO1 and above		Max Authorized Depth of Equipment (see Fig 1-2-3)
	CL DIV 00342 QL6B PO2		Max Depth: 45 msw
	CL DIV 00342 QL6A PO2		NIL
	CL DIV 00342 QL5B MS		NIL
	CL DIV 00342 QL5A LS		NIL
	CL DIV 00342 QL5 AB/LS		NIL

Figure 1-2-2 Diver Qualification and Equipment; Operation and Supervisory Limits

EQUIPMENT	MAXIMUM DEPTH							
	AIR DIVING				HeO2 DIVING			
	AIR DIVING WITH STAGE (NOTE 1)		AIR DIVING WITHOUT STAGE		HeO2 DIVING WITH STAGE (NOTE 1)		HeO2 DIVING WITHOUT STAGE	
	RCC On-Site (Note 2)	RCC Within 4-hours Travelling Time	RCC On-Site (Note 2)	RCC Within 4-hours Travelling Time	RCC On-Site (Note 2)	RCC Within 4-hours Travelling Time	RCC On-Site (Note 2)	RCC Within 4-hours Travelling Time
SSBA	**54 msw**	**45 msw**	**45 msw**	**45 msw**	**90 msw**	**45 msw**	**45 msw**	**45 msw**
LWSSDE	**54 msw**	**45 msw**	**54 msw**	**45 msw**				

Figure 1-2-3 Table of Equipment Authorized Depth Limits

NOTES

1. Surface-Supplied Diving with Stage is required when diving deeper then 45 msw.
2. “RCC ON-Site” means the diver is able to leave the last water stop, surface, transit to the hyperbaric chamber and be under pressure within :06::20.

1207 – 1299 Not Allocated

SECTION 3

SAFETY REGULATIONS

1301 Minimum Personnel Required

1. Under normal SSBA diving, personnel required as shown in Figure 1-3-1.

2. Urgent operation requirements may necessitate minimum dive team.

3. A **minimum dive team** shall be comprised of no less than six (6) Clearance Divers:

   a. Working diver;

   b. Diver Attendant;

   c. Standby diver;

   d. Standby Diver Attendant;

   e. Assistant: and

   f. Diving Supervisor.

4. The supervisor shall not be used as an attendant except in an extreme emergency. See **Figures 1-2-1** and **1-3-1**.

5. Other diving personnel who may be required to operate support equipment are as previously stated in this chapter and as shown in **Figure 1-2-1**:

   a. Personnel required for handling equipment on deck need not be divers; and

   b. They shall not act as primary attendants, except in extreme emergency.

TEAM PERSONNEL	ONE DIVER	TWO DIVERS
Diving Officer	**1**	**1**
Diving Supervisor	**1**	**1**
Medical Officer	**1***	**1***
Compressor / Machinery Technician	**1**	**1**
Diver	**1**	**2**
Standby Diver	**1**	**1**
Attendant	**3**	**5**
Communications Attendant	**1**	**1**
Timekeeper / Recorder	**1**	**1**
Gas Panel Operator	**1**	**1**
Stage / Winch Operator	**1**	**1**
TOTAL	**13**	**16**

Figure 1-3-1 Surface-Supplied Dive Manning Requirements

- **If available, during initial training a DMO or DMT shall be utilized**

NOTES

1. During shallow water training dives, a Diving Officer is not required in addition to a Diving Supervisor.
2. Minimum personnel manning requirements are given at Article 1301.
3. SurD O2 diving requires an RCC attendant and RCC Operator. Personnel shown above are to be assigned duties as required.
4. When a Hot Water Heating (HWH) system is utilized, personnel are to be designated to operate and monitor.

1302 Depth Limitations

1. The maximum authorized depths for the Surface Supplied Breathing Apparatus in The Canadian Forces are shown in **Figure 1-2-3, *Table of Equipment Authorized Depth Limits***.

2. The depths specified in **Figure 1-2-3** may be exceeded with the approval of the appropriate authority from the list below:

a. National Defence Headquarters / CMS// Director Diving Safety);

b. Commander, Maritime Forces Atlantic // N34-1 / Staff Officer Diving and Mine Warfare and Explosive Ordnance Disposal;

c. Commander, Maritime Forces Pacific // N33-2/SSO COASTAL OPS; and.

d. Head of Department, Experimental Diving and Undersea (EDU) Group, DRDG-Toronto.

1303 Marking of Lines

1. Lines used for controlling the depth of the diver are to be marked as outlined below. This requirement may include umbilicals, lifelines, shot lines and lazy shot lines. For guidelines and procedure, refer to Volume 2 Article 124 of the CF Diving Manual, ***Lifelines, Float Diving, Marked Swimming & Marking of Lines.***

1304 Divers in Boats Underway

1. Those in charge of boats carrying divers must always keep in mind the safety of the divers.

2. A diver using SSBA shall never wear weights or helmet while in a boat underway.

3. If divers are using dry suits, they are to be, completely zipped up and the weights and harness removed.

1305 Exceptional Exposures

1. Exceptional exposure dives shall only be authorized in cases of extreme operational necessity.

2. The authority to use exceptional exposure schedules is vested solely in Commanding Officers of Clearance Diving Units. In addition, the Head of Department, Experimental Diving Undersea (EDU) Group may exercise this authority for experimental or training purposes.

1306 Diving Equipment Maintenance

1. Service diving equipment and diving support equipment shall be tested, repaired and maintained IAW the appropriate Canadian Forces Technical Orders (CFTO). See **Annex A Chapter 4, *Orders and References Pertaining to Diving.***

2. Should no relevant CFTO be in existence, the manufacturer's maintenance recommendations and repair manuals are to be used in consultation with NDHQ (DMSS).

3. CL DIV 00342 QL 5B and above are the only divers authorized to maintain life support equipment:

   a. CL DIV 00342 QL 5A, under the direct supervision of a CL DIV 00342 5B or above, may assist in the maintenance of equipment with which they are thoroughly familiarized.

4. Diving equipment is Life Support Equipment and a high level of quality control is necessary when carrying out repairs and maintenance. Maintenance personnel are to be aware of the hazards of handling high-pressure gases, the effects of toxic/contaminating vapours, the explosive hazard resulting from mixing oxygen and hydrocarbons.

1307 Wearing of Knives

1. All divers are to carry knives when underwater or when acting as a standby diver or attendant IAW CF Diving Manual Volume 2, Article 129 for guidelines and procedures.

1308 – 1399 Not Allocated

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CHAPTER 2
DIVING EMERGENCIES

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CHAPTER 2
DIVING EMERGENCIES

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CHAPTER 2
DIVING EMERGENCIES

SECTION 1

DIVING EMERGENCIES AND PROCEDURES

2101 Diving Emergencies

1. This chapter does not cover every possible situation, which may cause problems for a diver. It does not provide basic First Aid or resuscitation procedures, or response to medical emergencies, decompression sickness or pulmonary over-inflation. This chapter is to be read in conjunction with Chapter 2, Volume 2 of the CF Diving Manual: ***Compressed Air Breathing Apparatus***.

2102 Equipment related Emergencies

1. With good equipment, well maintained and thoroughly inspected and tested before each dive, actual operational failure will rarely be a problem. When a failure does occur, the correct procedure will depend upon the nature of the equipment of the dive. The procedures detailed in the following articles do not cover every emergency that may be met. The Diving Officer, Supervisor, and members of the team must be capable of responding to any emergency as it may develop, taking into consideration all factors relevant to coping with the specific situation.

2103 Equipment Failure During Diving

1. ***If the equipment failure does not immediately threaten the diver's life:***

   a. Terminate the bottom time and commence decompression.

2. ***If the situation deteriorates further, due to a loss of gas or further equipment failure:***

   a. Bring the diver immediately to the surface. Determine if the diver is within SurD O2 limits or whether to treat for omitted decompression IAW **Article 3304.**

2104 Carbon Dioxide Build-up

1. The Superlite helmet must be carefully adjusted for each diver's head to prevent CO2 build-up. See **Article 4203, para. 2** ***Helmet Interior**,* and **Article 4208*****, Oral Nasal***

2. ***If a CO2 build-up occurs:***

   a. Ventilate and rest the diver; and
   b. The Supervisor will decide if the dive is to be terminated.

3. ***If the CO2 build-up recurs:***

   a. The dive is to be terminated.

4. ***If the dive is terminated:***

a. Conduct normal in-water or surface decompression as appropriate, ventilating as often as required to prevent further CO_2 build-up.

5. ***If ventilating does not alleviate the condition and the diver is not within SurD limits:***

a. Surface the diver and treat for omitted decompression IAW Article 3304.

2105 Excessive Breathing Resistance

1. Breathing Resistance encountered by the diver may vary from a slight to a total loss of breathing gas. See **Article 4206**, ***Regulator Adjustment***. After the demand regulator adjustments have been made, the diver; through training and experience; must determine when to initiate the following procedure:

a. Inform the surface of the problem;

b. Open steady flow valve as required;

c. If opening the steady flow valve does not provide acceptable breathing resistance, switch to the emergency cylinder. If possible, the steady flow valve must be closed once breathing from the emergency cylinder, to conserve breathing gas; and

d. Abort the dive as directed.

2. ***If the Dive Supervisor orders the dive aborted:***

a. Decompress the diver in the water if the level of breathing resistance permits carry on with planned decompression profile;

b. If within SurD limits, complete the dive on the appropriate SurD O_2 table; or

c. Otherwise, bring the diver to the surface immediately and treat for omitted decompression.

2106 Freeze-up

1. Freeze-up of the demand regulator in cold water normally results in an uncontrolled free-flow rather than breathing resistance. The free-flow may be preceded by slight leaking of air or even ice pellets that spray into the diver's mouth. First stage freeze-up should not occur if the environmental protection kit is installed and maintained correctly and if the air meets Canadian Forces dryness requirements, (see **Annex A Chapter 4**). Freeze-up of the second stage results from water leaking into the second stage either via the exhaust valve or around the diver's mouth or from the diver's spittle and exhaled breath. High gas flow rates, from high ventilation rates, from regulator purging or even life-vest / dry suit inflation may produce temperatures that freeze the water and foul the regulator demand mechanism.

2. Normally, a free-flowing regulator cannot be shut off. The high flow rates of gas will rapidly deplete a diver's air supply. Additionally, breathing from the air stream can cause cold injury to the mouth. Therefore, it is important to terminate the dive, commence decompression and prepare for omitted decompression. In the rare case where the regulator freezes in the closed state or freezing increases breathing resistance substantially, response shall be IAW with **Article 2105 *and* Figure 2-1-1**, ***Diving Emergency Procedures, "Excessive Breathing resistance".***

2107 Flooded Helmet

1. The faceplate is acrylic and can be scratched but it is unlikely to be cracked or severely damaged. Flooding is very unlikely in normal diving positions.

2. ***Should this occur:***

   a. Maintain a slight gas flow as required using the steady flow valve; gas will exit but little or no water will enter.

3. ***Flooded helmet when the diver is inverted***

   a. Water may enter if there is a leak of the neck dam;

   b. To clear, shift to a head-up position so that the water floods the forward portion of the hat. A push on the demand regulator purge button, or turning on the steady flow valve will remove the water by way of the main exhaust valve; and

   c. The purge button will also clear the oral-nasal.

4. ***If there is continuous leak:***

   a. Terminate the dive but do not omit necessary decompression if the leak can be overridden by intermittent purging.

5. ***For flooding due to loss of main gas supply and simultaneous failure of the non-return valve:***

   a. Switch to emergency cylinder inform the surface and terminate the dive.

2108 Flooded Suit / Loss of Hot Water Supply

1. If the diver's dry suit floods, an immediate loss of buoyancy and chilling of the diver will result, varying with the size and location of the leak. Additionally, if the flow of hot water is interrupted the diver will immediately begin to chill:

   a. The diver should remain upright and maintain positive suit pressure so that the suit will not be flooded above the leak; and

   b. The dive should be aborted and the dive profile completed if possible, unless the diver becomes hypothermic. In such a case, it may be necessary to surface the diver and treat for omitted decompression.

2. There should be no necessity for the diver to ditch their weights. The diver can travel on the stage or be hauled up by the attendants.

2109 Lost Communication

1. ***In the event voice communication is lost:***

   a. The attendant must report loss of communication to the Supervisor immediately;

   b. While conducting the following checks, the Stand-by Diver may be brought to a higher level of readiness;

   c. Immediately try line-pull signals, but keep in mind that, because of depth, current, bottom or work site conditions, they may not always work;

   d. Check for breathing deflection on the divers gas panel, look for the rising bubbles; looking for a cessation or a marked decrease which could be a sign of trouble;

e. Listen for breathing sounds from the diving helmet;

(1) If no sounds are heard, the circuit may be out of order. If the flow of bubbles seems normal, the diver may well be all right,

(2) If sounds are heard but the diver does not respond to signals, assume that the diver is in trouble,

f. If another diver is on the bottom, have them investigate; or send the standby diver down the troubled diver's umbilical; and

g. Upon finding the diver, the standby diver must use hand signals to determine the divers condition and assist the diver to the surface, if required.

2110 Blow-up

1. Blow-up can lead to a number of serious problems, including pulmonary over inflation, arterial gas embolism, decompression sickness, and physical injury from collision with surface objects. Additionally, the divers' dry suit could rupture from over-inflation possibly causing loss of all buoyancy.

2. A diver should be particularly wary when executing any manoeuvre, which requires an increase in buoyancy, particularly if trying to break free from a muddy bottom.

3. The possibility of blow-up is also high when using a dry suit during underwater jetting or tunnelling operations. Silt or sand stirred up by the hose can clog the exhaust valve, resulting in a gradual and often unnoticed build-up of air in the suit.

a. It is good practice to actuate the exhaust valve at regular intervals to ensure that it is working properly.

4. Blow-up can also occur when a diver over adjusts airflow to inflate the suit while trying to offset or avoid a squeeze or, for example, to avoid falling.

5. ***If caught in a blow-up:***

a. The diver must exhale ***continuously*** to avoid gas embolism;

b. The diver should attempt to vent air from the suit all the way through the water column;

c. The attendant should maintain proper tension in the life line;

d. Get the diver out of the water and give a quick examination for signs of serious injury;

e. If the dive did not require decompression stops and the diver appears to be uninjured;

(1) Maintain a close watch for four (4) hours and remain within in one hour's traveling time to a hyperbaric chamber; and

f. If the dive required decompression stops which were omitted, or if the diver has any symptoms;

(1) Treat accordingly. If a chamber is not immediately available, transport the diver to the nearest chamber as soon as possible, using the prescribed emergency procedures.

2111 Loss of Main Gas Supply / Use of Emergency Cylinder

1. An emergency cylinder IAW **Article 4207** shall be used on every surface-supplied dive.

2. If the main gas supply fails, switch to the emergency cylinder.

3. Terminate the dive and commence decompression options.

2112 Fouling

1. As soon as a diver discovers that the umbilical has become fouled, an attempt should be made to clear it.

2. ***If the umbilical is fouled on some obstruction:***

   a. The diver's steps can be retraced in order to free the umbilical from the obstruction. Coil the umbilical over their arm and control the slack until the umbilical is unfouled.

3. ***If the umbilical cannot be unfouled quickly and easily by the diver or the diver's partner:***

   a. The standby diver may be sent down to assist;

      (1) This is a normal procedure should communications be interrupted and the attendant not be able to haul the diver up, and

      (2) The standby, follows the divers umbilical (as a descending line), to trace the foul and release the umbilical.

4. ***If the diver becomes fouled with the descending line, and cannot be cleared:***

   a. The attendant(s) pulls the diver and descending line up to his first stop;

   b. The standby diver shall assist in clearing the fouled diver; and

      (1) If unable to clear the umbilical;

         (a) The shot line shall be cut below the fouled diver upon direction from the Dive Supervisor.

NOTE

The diver will probably be overtired and cold and may have physical injuries. The Supervisor must prepare for prolonged decompression, or treatment for omitted decompression.

2113 – 2199 Not Allocated

NOTE

THE FOLLOWING PROCEDURES ARE RECOMMENDED ONLY AS BASIC RULES AND DO NOT DEAL COMPREHENSIVELY WITH EVERY SITUATION.

CAUSE OF EMERGENCY	PERSONNEL AFFECTED	ACTION / ACTION BY
TRAUMATIC INJURY WHILE IN WATER	**DIVER**	1. Reduce blood loss by application of pressure
	STANDBY DIVER	1. Improvise tourniquet or pressure dressing. 2. Assist diver in regulating ascent. 3. Be prepared to handle diver in shock.
	SUPERVISOR	1. If injury is not severe, conduct normal in-water of surface decompression. 2. If the diver's condition deteriorates, conduct surface decompression (if within surface decompression limits or omit decompression and treat as necessary. 3. Treat the diver for shock and blood loss.
UNCONSCIOUS DIVER	**DIVER**	
	STANDBY DIVER	1. Descend to diver. Ventilate and assist 2. Assist diver to surface in a controlled ascent. 3. At surface administer first aid as required
	SUPERVISOR	1. Consider ventilating the diver by over-pressurizing the second stage on the helmet. Beware of the loss of communications from excessive noise. 2. Treat for CO2 build-up if the diver regains consciousness. Terminate the dive. Conduct normal in-water or surface decompression. 3. If the diver's condition deteriorates but is still within surface decompression limits, conduct surface decompression. 4. If the diver does not regain consciousness, bring the diver to the surface and commence treatment for urgent omitted decompression. 5. Employ ancillary resuscitation equipment, as appropriate

Figure 2-1-1 Diving Emergency Procedures *(Sheet 1 of 5)*

NOTE

THE FOLLOWING PROCEDURES ARE RECOMMENDED ONLY AS BASIC RULES AND DO NOT DEAL COMPREHENSIVELY WITH EVERY SITUATION.

CAUSE OF EMERGENCY	PERSONNEL AFFECTED	ACTION / ACTION BY
DROWNING	DIVER	1. Do not panic 2. Achieve positive buoyancy. 3. Signal for help.
	STANDBY DIVER	1. Assist diver in making regulated buoyant ascent. 2. Get diver to safety boat / dive platform.
	SUPERVISOR	1. Prepare for resuscitation 2. Continue resuscitation and consider recompression treatment procedures.
OVER-EXERTION	DIVER	1. If tired, anxious, weak or panicky: **STOP WORK, REST AND VENTILATE** 2. If not recovering, signal intent to come up or ask for assistance in ascent.
	STANDBY DIVER	1. Assist diver in regulated ascent 2. Bring diver to safety boat / dive platform.
	SUPERVISOR	1. Assist diver into safety boat / dive platform. 2. Observe diver closely for other problems
EXCESSIVE BREATHING RESISTANCE	DIVER	1. Inform surface 2. Open steady flow valve 3. Switch to Emergency, if required (Close steady flow valve 4. Terminate dive as directed.
	STANDBY DIVER	
	SUPERVISOR	1. Complete in-water stops if breathing resistance permits. 2. If within limits Sur-D. 3. Otherwise surface diver immediately and treat for omitted decompression

Figure 2-1-1 Diving Emergency Procedures *(Sheet 2 of 5)*

NOTE

THE FOLLOWING PROCEDURES ARE RECOMMENDED ONLY AS BASIC RULES AND DO NOT DEAL COMPREHENSIVELY WITH EVERY SITUATION.

CAUSE OF EMERGENCY	PERSONNEL AFFECTED	ACTION / ACTION BY
CONVULSION	DIVER	**Convulsion are prevented by** 1. Avoiding work or activity at O_2 stop. 2. Reporting toxicity symptoms immediately.
	STANDBY DIVER	1. Avoid danger to self from convulsing diver. 2. Try to prevent diver from self-inflicted injury using minimal restraint. 3. Try to keep diver's breathing equipment in place. 4. Stabilize the diver at depth and maintain communications with the Supervisor. Assist and surface the diver as directed by the Supervisor.
	SUPERVISOR	1. Shift the diver's breathing gas immediately from oxygen to alternate breathing gas supply. 2. Consider ventilating by over-pressurization if diver is incapacitated. 3. Stabilize the diver at depth. **The diver is not to be brought to the surface nor moved upward while convulsing.** 4. Once the dive's condition has stabilized, surface the diver carefully to reduce the risk of embolism. Treat for possible embolism if any uncertainty exists. Otherwise treat diver for omitted decompression and observe carefully.
FOULING	DIVER	1. Move slowly and carefully. 2. Retrace steps to source of fouling and attempt to clear. 3. Inform surface of condition, and what is being attempted.
	STANDBY DIVER	1. At the Supervisors direction, check to see if OK. 2. Assist fouled diver to clear umbilical. 3. If unable to clear, connect diver to the stage bailout (if fitted), or other breathing gas supply. 4. Request permission from Supervisor to sever umbilical.
	SUPERVISOR	1. Prepare to decompression options. 2. Direct tenders to take up umbilical slack.

Figure 2-1-1 Diving Emergency Procedures *(Sheet3 of 5)*

NOTE

THE FOLLOWING PROCEDURES ARE RECOMMENDED ONLY AS BASIC RULES AND DO NOT DEAL COMPREHENSIVELY WITH EVERY SITUATION.

CAUSE OF EMERGENCY	PERSONNEL AFFECTED	ACTION / ACTION BY
LOSS COMMUNICATIONS	**DIVER**	1. Revert to Manual Signal Code (see **Fig 5-2-1**). 2. Retrace umbilical to stage.
	ATTENDANT	1. Report loss of communications to Supervisor. 2. Take up slack.
	STANDBY DIVER	1. As directed by the Supervisor, follow the trouble diver's umbilical down to determine diver's condition 2. Assist as directed by the Supervisor
	SUPERVISOR	1. Establish Manual signal Code (see **Fig 5-2-1**) signals to diver. 2. Send the standby diver down to follow the diver's umbilical if required.
CO_2 BUILD-UP	**DIVER**	1. Inform surface and **VENTILATE**
	STANDBY DIVER	1. Assist as directed by the Supervisor.
	SUPERVISOR	1. Ventilate the diver. 2. If CO_2 build-up recurs, the dive is to be terminated.
FREEZE-UP	**DIVER**	1. Inform surface 2. Return to stage
	STANDBY DIVER	1. Assist as directed by Supervisor
	SUPERVISOR	1. Terminate the dive. 2. Commence decompression. 3. Prepare for omitted decompression.
FLOODING HELMET	**DIVER**	1. Shift to upright position 2. Open steady flow valve.
	STANDBY DIVER	1. Assist as directed by Supervisor.
	SUPERVISOR	1. Terminate dive if leak is continuous

Figure 2-1-1 Diving Emergency Procedures *(Sheet 4 of 5)*

NOTE

THE FOLLOWING PROCEDURES ARE RECOMMENDED ONLY AS BASIC RULES AND DO NOT DEAL COMPREHENSIVELY WITH EVERY SITUATION.

CAUSE OF EMERGENCY	PERSONNEL AFFECTED	ACTION / ACTION BY
FLOODED DRY SUIT / LOSS OF HOT WATER SUPPLY	**DIVER**	1. Inform surface. 2. Remain upright. 3. Maintain positive suit pressure.
	STANDBY DIVER	1. Assist as directed by Supervisor.
	SUPERVISOR	1. Consider terminating dive (due to possible onset of hypothermia).
BLOW-UP	**DIVER**	1. ***Exhale continuously*** to avoid A.G.E. 2. Attempt to vent suit.
	STANDBY DIVER	1. Assist diver as directed by Supervisor.
	SUPERVISOR	1. Examine diver for signs of A.G.E. 2. Treat if required.
LOST GAS	**DIVER**	1. Switch to emergency gas supply. 2. Inform surface 3. Return to stage / shot line.
	STANDBY DIVER	1. Assist diver as directed by Supervisor.
	SUPERVISOR	1. Ensure diver is on emergency gas supply. 2. Determine cause, terminate dive if necessary. 3. Prepare for Omitted Decompression.

Figure 2-1-1 Diving Emergency Procedures *(Sheet 5 of 5)*

CHAPTER 3
DECOMPRESSION
PROCEDURES & TABLES

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CHAPTER 3
DECOMPRESSION
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CHAPTER 3
DECOMPRESSION
PROCEDURES & TABLES

SECTION 1

GENERAL

3101 Introduction

1. When air is breathed at depth, the inert gas – nitrogen – diffuses into the various tissues of the body. Nitrogen diffusion continues at different rates for the various tissues as long as the partial pressure of the inspired nitrogen is greater than the partial pressure of the gas absorbed into the tissues. The amount of nitrogen absorbed increases with the partial pressure of the inspired nitrogen and the duration of the exposure.

2. When the diver ascends, the process is reversed as the nitrogen partial pressure in the tissues exceeds that of the circulatory and respiratory systems. This pressure gradient from the tissues of the blood and lungs must be carefully controlled to prevent a too rapid diffusion of nitrogen. If the pressure gradient is uncontrolled, bubbles of nitrogen gas form in the tissues and blood that can result in the development of decompression sickness.

3. To prevent decompression sickness, a set of air decompression tables has been developed for CF divers by the Experimental Diving and Undersea Group (EDUG) of Defence Research and Development Canada - Toronto (DRDC - Toronto). These tables take into consideration the amount of nitrogen absorbed by the body at various depths for given periods. The tables also consider the allowable pressure gradients that can exist without excessive bubble formation, and the different gas elimination rates associated with various body tissues.

3102 Background

1. The CF Air Diving Tables and procedures were derived from DRDC – Toronto (formerly DCIEM) ***1983 Decompression Model.*** This model was the result of over 20 years of decompression research that began with the pioneering studies by Kidd and Stubbs in 1962. These tables provide a more conservative approach to decompression procedures than those currently published by the United States Navy and the Royal Navy.

2. Selected profiles were tested extensively using Doppler ultrasonic bubble detector as an aid to assessing the severity of the decompression stress produced by these tables. These tables were tested in a hyperbaric chamber with wet / working divers in cold water between 5° and 10° C. as well as with dry / resting divers. Doppler ultrasonic bubble detection procedures utilized to evaluate the model showed that the basic conservatism of the model was indeed justified.

3. No realistic decompression procedures can eliminate the occurrence of decompression sickness. However, these tables are believed to be safer than most existing tables.

4. **Figure 3-1-1**, ***Air Diving Limits***, shows the Normal Air Diving Range and the Exceptional Exposure Range for these tables.

3103 Description of Tables

1. The CF Air Diving Tables consist of the follow Tables:

CF Table 1 CF Air Decompression

CF Table 1S CF Air Short Air Decompression

CF Table 2 CF Air In-water Oxygen Decompression

CF Table 2S CF Air Short In-Water Oxygen Decompression

CF Table 3 CF Air Surface Decompression with Oxygen (SurD O2)

CF Table 4 Repetitive Diving - Air

- **CF Table 4A** Repetitive Factors / Surface Intervals Table

- **CF Table 4B** No-Decompression Repetitive Diving Table

CF Table 5 CF Air Depth Corrections – Diving at Altitude

2. These tables cover depths to 72 msw and bottom times to the limit of the Exceptional Air Diving Range. See **Figure 3-1-1**, ***Air Diving Limits****.*

3104 Definition of Terms

1. The following is the Definition of terms use in diving found throughout this manual, they are:

a. **Actual Depth of Dive** The "Actual Depth of Dive" is determined by adding 2 metres to the deepest gauge depth achieved during the dive (plus 2-metre rule). This total is used to determine required decompression.

b. **Ascent Rate** A specified rate of travel that the diver must maintain up to and between decompression stops. For these tables, the ascent rate is

18 mpm ± 3m.

c. **Bottom Time (BT)** The total elapsed time from when the diver leaves the surface to the time (next whole minute) that the diver begins to ascend, measured in minutes.

d. **Decompression Schedule** Specific decompression procedure for a given combination of depth and bottom time as listed in a decompression table. It is normally indicated as Maximum Depth (msw) / Bottom Time (min).

e. **Decompression Stop** Specific length of time which a diver must spend at a specified depth to allow for the elimination of sufficient inert gas from the body to allow safe ascent to the next decompression stop or the surface.

f. **Depth** The maximum depth attained. Measured in msw.

g. **Descent Rate** The maximum rate of travel allowed in descending to the bottom. For these tables, the descent rate is:

18 mpm or slower.

h. **Effective Bottom Time (EBT)** For Repetitive Diving: the calculated Bottom Time for decompression purposes, taking into consideration the residual nitrogen from the previous dive.

i. **Effective Depth (ED)** For a dive at altitude, the depth of an equivalent dive at sea level.

j. **No-Decompression Limit** The maximum bottom time that allows a direct ascent to the surface without requiring decompression stops.

k. **Omitted Decompression** Occurs when the actual dive decompression profile does not satisfy the required stop times of the appropriate CF Dving Table decompression schedule.

l. **Point of Interuption** The time at which normal decompression was interupted as a result of an emergency procedure, *e.g.* symptoms of O2 toxicity. Once the situation allows the return to normal decompression procedures. The table is re-entered at the point where the interuption occurred.

m. **Recorded Time** Record of event times placed on the dive chart record sheet in hours and minutes. Seconds may be recorded in the "Remarks" column.

n. **Repetitive Dive** Any dive that has a Repetititve Factor (RF) greater then 1.0.

o. **Repetitive Factor (RF)** A figure, used to Repetitive Diving, deteminined by the Repetitive Group (RG) and the length of the surface interval after a dive.

p. **Repetitive Group (GR)** A letter relating directly to the amout of residual nitrogen in a diver's body immediately upon surfacing from a dive.

q. **Stop Time** The tabulated decompression stop time which includes travelling time to that stop at 18 mpm ± 3 (except for in-water O2 stops where the stop time commences after the diver is confirmed on O2).

r. **Surface Interval (SI)** The time a diver has spent on the surface following a dive, beginning as soon as the diver surfaces and ending as soon as the diver starts the descent for the next dive.

s. **Surface Interval – Sur-D O2** (When using Table 3, (Sur-D O2)). Time from when the diver leaves the 9 msw stop to arriving at the 12 msw RCC stop. The maximum time allowed is **7 minutes.**

t. **Total time of Dive** The total elapsed time from when the diver leaves the surface until the diver returns to the surface, including all travel times and decompression stop times.

3105 Dive Recording

1. Every Canadian Forces dive must be recorded.

2. A sample Dive Record is shown as **Figure 3-2-2**. The Dive Record Chart is a convenient means of collecting the dive data that must then be entered into **CFDITS**.

3. A full-size Dive Record Chart for Local reproduction is contained within **Annex B, Chapter 3.**

3106 - 3199 Not Allocated

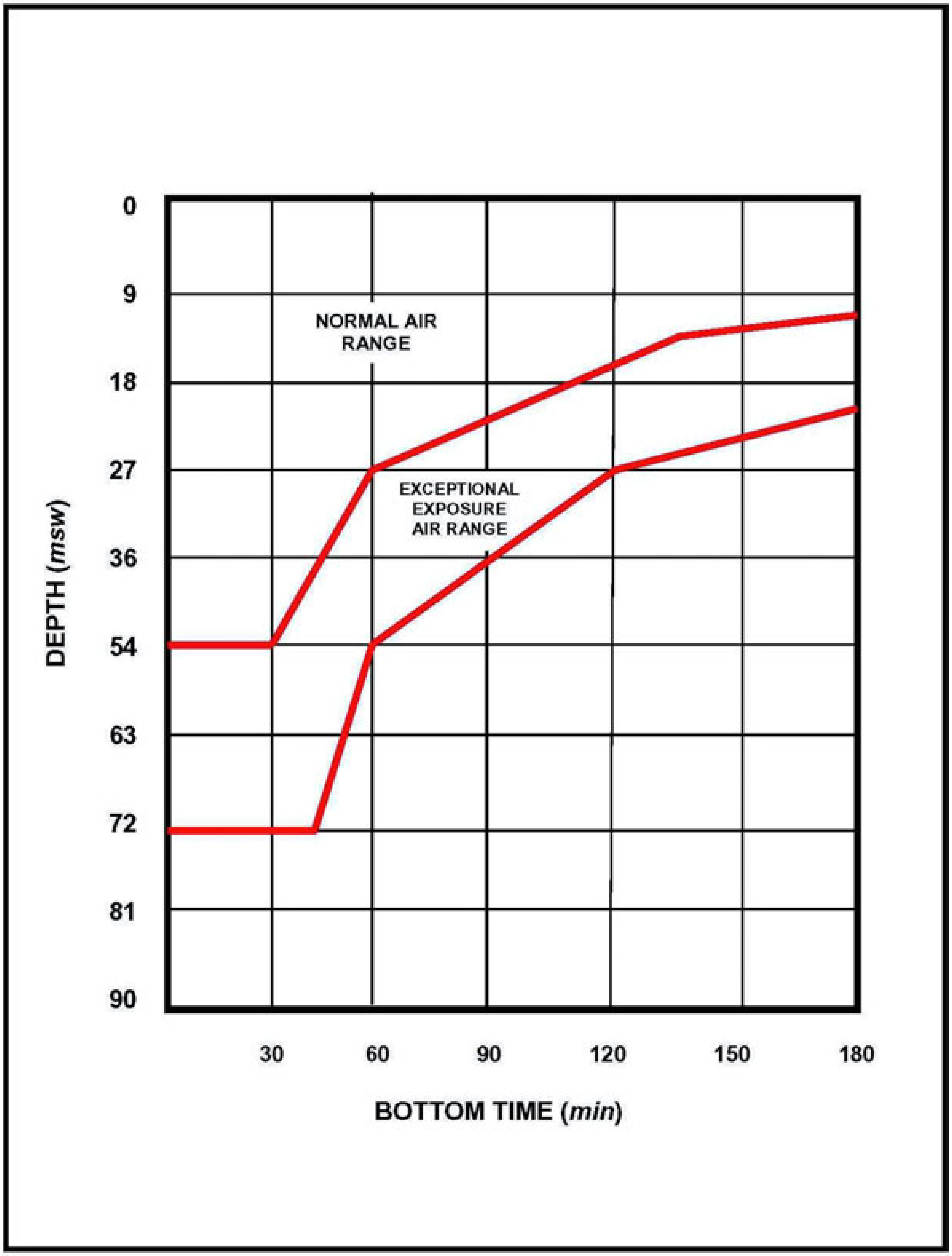

Figure 3-1-1 Air Diving Limits

SECTION 2

INSTRUCTIONS FOR USE OF CF AIR DECOMPRESSION TABLES

3201 CF Air Decompression (*CF Table 1*)

1. The CF air decompression table is set out in CF Table 1**, *CF Air Decompression***, (Annex A, Chapter 3), for msw in the traditional tabular format of depth, bottom time, stop times and total ascent time. Each depth segment in the table is divided into two sections by a line that corresponds to the Normal Air Diving Limit shown in **Figure 3-1-1**. Dives beyond this limiting line are in the Exceptional Exposure Range. ***Users of this CF Air Decompresssion Table are cautioned that it has been validated by manned experiments to the limit of the Normal Air diving range only.***

2. Repetitive Groups (RG's) are shown for dives within the Normal Air Diving Limits only and are not shown for dives in the Exceptional Exposure Range.

NOTE

Repetitive diving is <u>not recommended</u> in the Exceptionl Exposure Range

3. The procedure for CF Air Decompression is:

   a. Descend at 18 mpm or slower; and

   b. Ascend at 18 mpm ±3 to the indicated stops and remain at each stop for the stop time,

      (1) The tabulated stop time for each stop includes the ascent time to that stop.

<u>**EXAMPLE 1 (Air)**</u>

Deterimine the decompression schedule required for a dive to 30 msw +2 msw with a bottom time of 22 minutes.

- Enter **CF Table 1** at the depth that is equal to or next greater than 32 msw.

Select 33 msw

- Using the 33 msw schedule, proceed to the bottom time column and find the listed time that is equal to or next greater than 22 minutes.

Select 25 minutes

- Proceed horizontally across the table at the 33 msw / 25 min level to find the decompression stops and the Repetitive Group (RG) designator prescribed for this dive.

6 minutes stop at 6 msw

10 minute stop at 3 msw

Repetitive Group upon surfacing – 'G'

EXAMPLE 1 (Air) CF Table (1)

Dive	**32 msw (30+2) / 22 min**
Decompression Schedule	**33 msw / 25 (*from CF Table 1*)**
Decompression Stops **6 msw - 6 min** **3 msw – 10 min**	**Travel time to 6 msw is** **:01::26** **Actual stop time at 6 msw is** **:04::34**
Repetitive Group (RG)	**RG = G**

4. A dive profile and chart for Example 1 (Air) is illustrated in **Figures 3-2-1** and **3-2-2**, respectively.

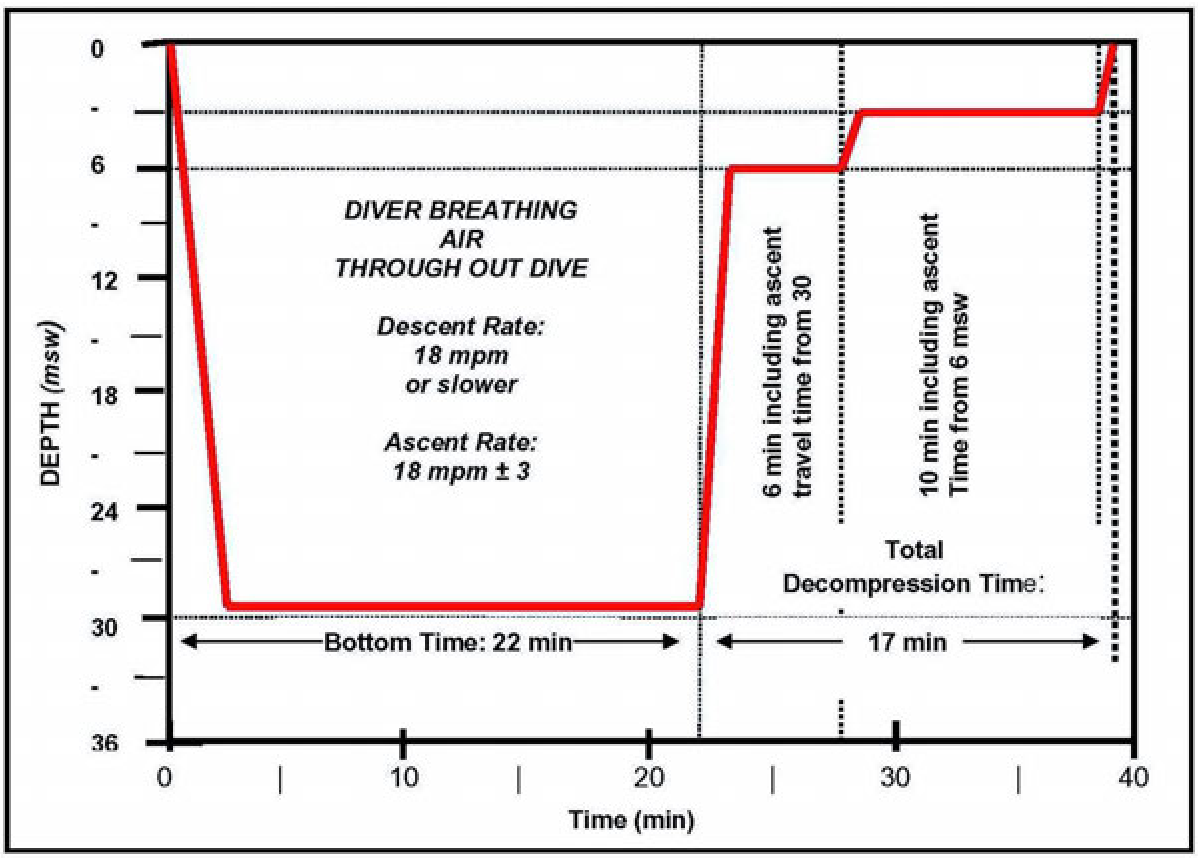

Figure 3-2-1 EXAMPLE 1 (Air)
CF Air Dive to 32 msw (30+2)/22 min

DIVER	Rank	Tender	Rank	**Date: 21 Nov 09**	
DIVER	Rank	Tender	Rank	Table Used	
SUPERVISOR	Rank	Schedule Used **33 / 25**	**O2% AIR**	Depth in msw **30+2=32**	Bottom Time **:22**
Left Surface (Clock Time) **1430**	Left Bottom **:22**	Max. Time to 1st Stop **/**	Reached Surface (Clock Time) **1509**		
Total decomp. Time **:17**	Total time of dive **:39**	Repet. Group **G**	CHARTMAN (Print)	Rank	

REMARKS	STOPS IN MSW	STAND AIR TABLE	Decompression Time Water	Decompression Time Chamber	EMERG AIR	EVENT TIME **:39** Water	EVENT TIME Chamber
	3		**10**			L **:38**	
						S	
	6		**6**			L **:28**	
						S	
	9					L	
						S	
	12					L	
						S	
	15					L	
						S	
	18					L	
						S	
	21					L	
						S	
	24					L	
						S	
	27					L	
						S	
REACHED BOTTOM :02	30					L **:22**	
						S	
OR :01:39	33					L	
						S	
	36					L	
						S	
	39					L	
						S	
	42					L	
						S	
	45					L	
						S	
	48					L	
						S	
	51					L	
						S	

Location of Dive	Name / Rank of Standby Diver	Divers (Signatures)
Purpose of Dive	Supervisor (sign)	Chartman (sign)

Figure 3-2-2 EXAMPLE 1 Dive Record Chart (msw)

CF Air Dive to 32 msw (30+2) / 22 min

3202 Short CF Air Decompression (CF Table 1S)

1. The "short" CF air table is set out as CF Table 1S ***Short CF Air Decompression**,* (Annex A, Chapter 3). Essentially a simplified, one-page version of the CF Air Decompression Table and limited to 45 msw. It is divided into two sections – a no decompression section on the left of the broad vertical line and a decompression required section to the right of the line. Each entry in the table gives a Bottom Time (BT) and, where applicable, a Repetitive Group (RG):

NOTE

Where bottom times appear without a Repetitive Group (RG), repetitive diving is <u>not allowed</u>.

2. In the No-Decompression (no-stops) section, bottom times are given for each Repetitive Group at each depth. These are for the purposes of calculating repetitve dives. The largest number to the left of the broad vertical line is the No-Decompression Limit at the given depth ***for first dives only***.

3. For bottom times in the "Decompression-Required" section of the CF Table 1S, the decompression stop times and stop depths are specified after the 18 msw row and at the bottom of the table after the 45 msw row:

   a. Stop times are given in increments of 5 minutes;

   b. Stop times include the ascent time to the stop at the travel rate of 18 mpm ± 3.

4. **For depths to 18 msw:** Decompression stops are taken at 3 msw only.

5. **For deeper depths:** Decompression stops are taken at 6 msw and 3 msw.

6. The no-decompression limits in CF Tables 1 and 1S are for ***first dives only*.**

7. For repetitive, no-decompression dives the allowable no-decompression limits are prescribed in CF Table 4B, ***No Decompression Repetitive Diving***.

8. To use Table 1S, follow the CF Air Decompression (Table 1) procedures previously described in **Article 3201, para 3.**

9. **Example 1S (Air)** below is previous EXAMPLE 1 (Air) reworked for Table 1S

<u>EXAMPLE 1S</u> (AIR) (Table 1S)

Determine the decompression schedule requried for a dive to 32 msw (30+2) with a bottom time of 22 minutes.

- Enter **Table 1S** at the depth which is equal to or next greater than 32 msw.

  Select 33 msw

- Using the 33 msw schedule, proceed to the Bottom Time column and find the listed time which is equal to or next greater than 22 minutes.

  Select 24 minutes

- Follow the bottom time column downward to the listed decompression stops for 6 msw and 3 msw, respectively. Table 1S shows that the required decompression is as follows:

  5 minute stop at 6 msw

  10 minute stop at 3 msw

  Repetitive Group upon Surfacing – 'G'

<u>EXAMPLE 1S</u> (Air) (Table 1S)

Dive	**32 msw (30+2) / 22 min**
Decompression Schedule	**<u>33 msw / 24 min</u> from CF Table 1S**
Decompression Stops 6 msw – 5 min 3 msw – 10 min	**Travel Time to 6 msw is :01::26 Actual stop time at 6 msw is :03::34**
Repetitive Group (RG)	**RG = G**

3203 In-Water Oxygen Decompression

1. The benefits of using oxygen for decompression are well known and applied universally with various surface decompression procedures. In diving operations however, it is not always possible to have a chamber on-site. Yet it is often possible to supply the diver with O2. Therefore, it was decided to utilize O2 in the water.

2. Although O2 is only given to divers at the conservative depth of 9 msw, the possibility of O2 toxicity problems still exist. Therefore, the following conditions must be met before using in-water O2 procedures:

   a. A diver on O2 must be ***constantly monitored*** (e.g. two divers on O2 or one diver on O2 with voice communications) for the period of O2 breathing; and

   b. A recompression chamber (RCC) *must* be available as required by **Figure 1-2-2, *Table of Authorized Depth Limits***.

3. The In-Water Oxygen Decompression Table may be found at CF Table 2 ***In-Water Oxygen Decompression,*** (Annex A, Chapter 3):

a. In-water decompression stops on air – to and including 12 msw – are indentical to the CF Air Table;

b. At 9 msw the diver breathes O2 until the decompression requirements are satisfied, then ascends directly to the surface;

c. The decompression time listed starts when the diver is confirmed on O2 (next whole minute), It does not include the ascent time to 9 msw; and

d. This procedure reduces the total decompression time by 35 – 40% over the CF Air method.

4. The In-Water Oxygen Decompression procedure is as follows:

a. Ascend as for CF Air to 9 msw and stop;

b. Switch the diver's gas to O2,

(1) The diver remains on O2 at 9 msw for the full-tabulated stop time. This stop time commences when the diver is confirmed on O2; and

c. Ascend to the surface on O2, "1 minute" is included in the Decompression Time column as a guide only.

<u>EXAMPLE 2 (AIR)</u> (CF Table 2)

Determine the decompression schedule required for a dive to 22 msw (20+2) with a bottom time of 58 minutes.

- Enter CF **Table 2** at the depth which is equal to or next greater than 22 msw.

Select 24 msw

- Using the 24 msw schedule, proceed to the Bottom Time (BT) column and find the listed time which is equal to or next greater than 58 minutes.

Select 60 minutes

- Proceed horizontally across the table at the 24 msw / 60 min schedule to find the decompression stops and the RG.

The required decompression stop is at 9 msw

The stop time, once confirmed on O2, is 16 minutes

Repetitive Group upon surfacing – 'I'

<u>EXAMPLE 2</u> (Air) (CF Table 2)

Dive	**22 msw (20+2) / 58 min** ***See Figures 3-2-3 and 3-2-4***
Decompression Schedule	**<u>24 msw / 60 min</u>** **from CF Table 2**
Decompression Stops	**9 msw – 16 min O2** ***Stop Time does not include travel time to this stop***
Repetitive Group (RG)	**RG = I**

5. During the O2 breathing period at 9 msw, a 5-minute air break shall be applied at the end of each 30 minute O2 period:

NOTE

5-minute air breaks are <u>not</u> included in the total decompression times shown in the printed tables.

6. CF Table 2, ***In-Water Oxygen Decompression***, can also be applied to repetitive diving:

a. Repetitive Groups (RG's) are shown in Table 2 for dives within the normal Air Diving Range as shown in **Figure 3-1-1**;

b. Note that these RG's are different from those in Table 1 because of the O2 decompression.

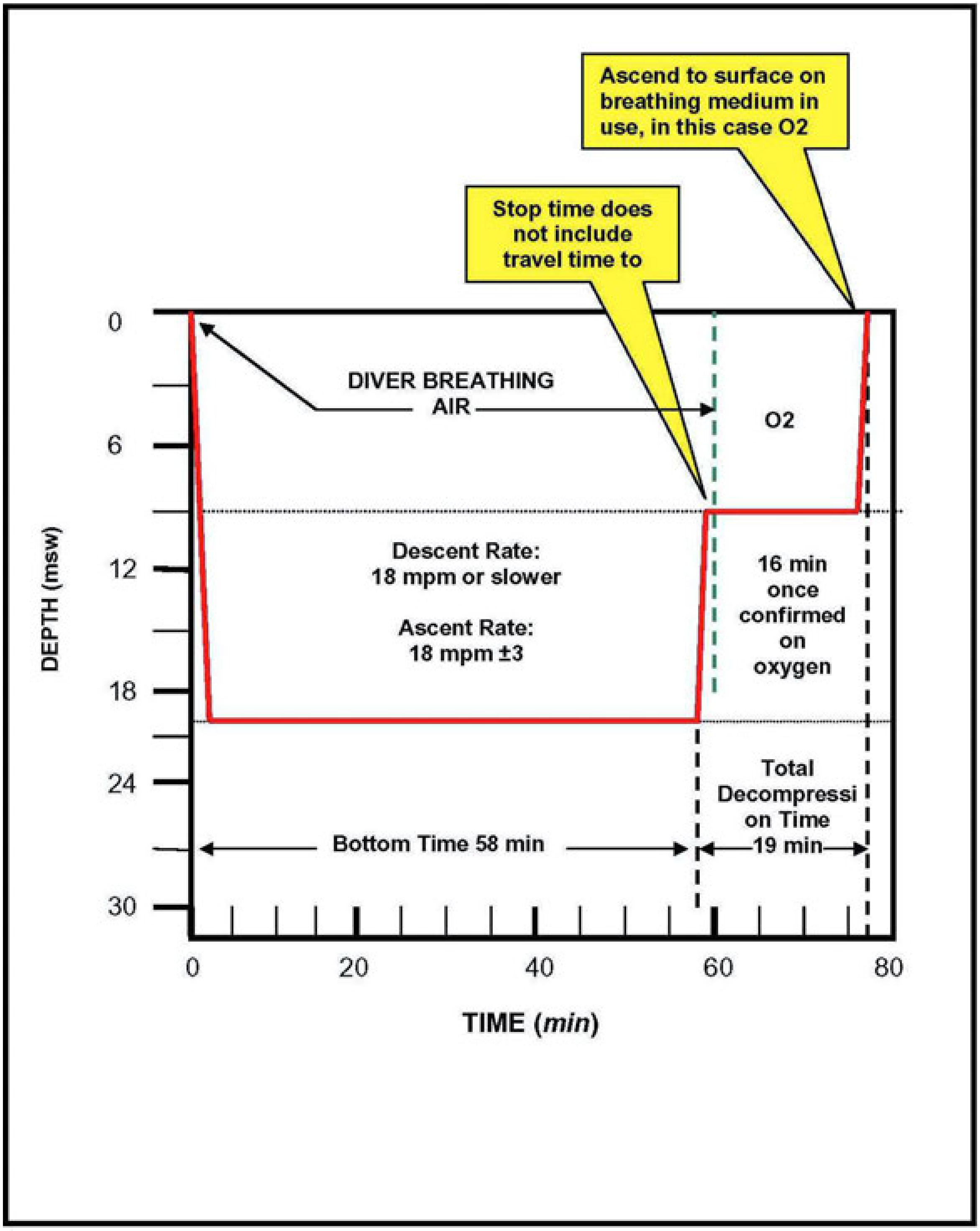

Figure 3-2-3 EXAMPLE 2 (Air)
In-Water O2 Decompression Dive to 22 msw (20+2) / 58 min

CF DIVE RECORD CHART IN METRES

DIVER	Rank	Tender	Rank	**Date: 11 Oct 09**	
DIVER	Rank	Tender	Rank	Table Used **2**	
SUPERVISOR	Rank	Schedule Used **24 / 60**	O2% **AIR / 100**	Depth in msw **20 + 2= 22**	Bottom Time **: 58**
Left Surface (Clock Time) **1000**	Left Bottom **: 58**	Max. Time to 1st Stop	Reached Surface (Clock Time) **1117**		
Total decomp. Time **: 19**	Total time of dive **1:17**	Repet. Group **I**	CHARTMAN (Print)		Rank

REMARKS	STOPS IN MSW	STAND AIR TABLE	Decompression Time Water	Decompression Time Chamber	EMERG AIR		**1 : 17** EVENT TIME Water	EVENT TIME Chamber
	3	**21**				L		
						S		
	6	**6**	**O2**			L		
						S		
ON O2 :59::36	9		**16**			L	**1:16**	
REACHED : 58::36			**Shift O2**			S	**1:00**	
	12					L		
						S		
	15					L		
						S		
20	18					L		
						S		
REACHED BOTTOM :01::18	21					L	**:58**	
						S		
	24					L		
						S		
	27					L		
						S		
	30					L		
						S		
	33					L		
						S		
	36					L		
						S		
	39					L		
						S		
	42					L		
						S		
	45					L		
						S		
	48					L		
						S		
	51					L		
						S		

Location of Dive	Name / Rank of Standby Diver	Divers (Signatures)
Purpose of Dive	Supervisor (sign)	Chartman (sign)

Figure 3-2-4 EXAMPLE 2 (Air) Dive Record Chart (msw)

In-Water Decompression Dive to 22 msw (20+2) / 58 min

3204 Short In-Water Oxygen Decompression (CF Table 2S)

1. The 'short' in-water oxygen decompression table may be found at CF Table 2S ***Short In-Water Oxygen Decompression***, Annex A, Chapter 3. It is similar to CF Table 1S with a no-decompression section on the left-hand side and a decompression-required section on the right-hand side. Each entry in the table gives a Bottom Time (BT) and, where applicable, a Repetitive Group (RG). In the decompression-required section, the bottom times are restricted to those where the only stop is the 9-msw O2 decompression stop:

a. The required decompression times are given in increments of 5 minutes;

b. They do not include the ascent time to the 9-msw stop at a travel rate of 18 mpm ±3.

2. EXAMPLE 2S (Air) below is previous EXAMPLE 2 (Air) reworked for CF Table 2S.

EXAMPLE 2S (Air) (***for CF Table 2S***)

Determine the decompression schedule required for a dive to 22 msw (20+2) with a bottom time of 58 minutes.

- Enter CF Table 2S at the depth which is equal to or next greater than 22 msw.

Select 24 msw

- At 24 msw, proceed to the Bottom Time column to the listed time that is equal to or next greater than 58 minutes.

Select 58 minutes

- Follow the Bottom Time column downward to the Decompression Time line.

The required decompression is 15 minutes on oxygen at 9 msw (not including the time required to reach 9 msw).

3205 Surface Decompression with Oxygen (SurD O2) (*CF Table 3*)

1. Surface decompression procedures reduce in-water exposure time substantially with most of the decompression being carried out in a dry recompression chamber (RCC) on the surface:

a. Decompression is carried out normally as for CF Air until the end of the 9-msw stop. Thus, the decompression stops on air – to and including the 9 msw stop – are identical to those of the CF Air Table;

b. On completion of the 9-msw stop time, the Sur-D O2 procedure commences by having the diver travel to the surface, removing the diving apparatus, placing the diver on O2 in an RCC and pressed to a depth of 12 msw to complete the decompression requirements; and

NOTE

MAXIMUM TIME FROM LEAVING THE 9-MSW IN-WATER STOP TO REACHING THE 12-MSW CHAMBER STOP, BREATHING O2 IS SEVEN MINUTES. Delays in reaching the 12-MSW (see – ART 3305).

c. 5-minutes air breaks are taken after each 30 minute period on O2.

2. The SurD O2 table has been validated by manned experiments to the limits of the Exceptional Exposure Range shown in **Figiure 3-1-1**:

a. SurD O2 is the preferred method for all compressed air diving requiring significant amount of decompression;

b. It is the only method recommended for exceptional exposure diving.

3. The surface decompression with oxygen (SurD O2) table may be found at CF Table 3 ***Surface Decompression with Oxygen*** **(*SurD O2*)** (Annex A, Chapter 3).

4. The procedure for the use of **CF Table 3** is as follows:

a. Ascend and decompress as for CF Air to the completion of the 9-msw stop (or the surface if no in-water stop is shown),

(1) Stop time includes ascent to the 9-msw stop at a travel rate of 18 mpm ± 3;

b. Ascend to the surface at 18 mpm ± 3 and recompress on O2 to 12 msw in the RCC,

(1) The Surface Interval (SI SurD O2) is the time from leaving the 9-msw in-water stop to reaching the 12-msw RCC stop. This interval must not exceed 7 minutes,

(a) The Surface Interval (SI) of 7 minutes was chosen to enhance the operability of the procedure and to reduce the chances of omitted decompression during operations. Extensive experimentation using the full 7-minute SI has proven this procedure safe. In operational use, the SI should be kept to a minimum. (See A**rticle 3305).**

(b) When the depth of the dive does not have an adequate decompression stop time or the time to travel from the dive depth to 9 msw is equal to or near the travel time required to reach that depth, the diving supervisor is to cycle the travel stopwatch when the diver reaches the 9-metre depth. This will provide a time mark to begin the Sur-D procedure.

c. Remain in the RCC, on O2 at 12 msw for the tabulated stop time with 5-minute air breaks after every 30 minutes on O2:

(1) The asterisks (***) following the O2 stop times in the tables represent the number of air breaks: in this case, three asterisks represent three (3) five-minute air breaks, and

(2) Where the O2 stop time is a multiple of 30 minutes, a five-minute air break may or may not be required before ascent to the surface is possible. The 5-minute air breaks after 30 minutes on O2 were included in calculating the 12-msw RCC decompression stop times. However, the tabulated 12–msw stop times are “O2 Times” only, while the Total Decompression Time column includes the air breaks; and

d. Ascend to the surface on the breathing medium in use.

(1) “1 minute” is included in the Decompression Time column as a guide only.

<u>EXAMPLE 3</u> (Air)

Determine the decompression schedule required for a dive to 36 msw (34 +2) / 75 minutes.

- Enter **CF Table 3** at the depth which is equal to or next greater than 36 msw.

  Select 36 msw

- Using the 36 msw schedule, proceed to the Bottom Time column and find the listed time which is equal to or next greater than 75 minutes.

  Select 75 minutes

- Proceed horizontally across the table at the 36 msw / 75 min schedule to find the decompression stops and stop times. These are as follows:

  8 minute stop at 12 msw

  8 minute stop at 9 msw

  80 minute stop at 12 msw
  - (*70 min on O2 + two 5-min air breaks in RCC*)

<u>EXAMPLE 3</u> (Air)

Dive	**36 msw (34+2) / 75 min** **See *Figure 3-2-5 and 3-2-6***
Decompression Schedule	**<u>36 msw / 75 min</u>** ***from CF Table 3***
Decompression Stops	
12 msw – 8 min #	**Air**
9 msw – 8 min #	
(# Includes travel time to stop)	
Surface Interval **7 min (max)**	**Time from leaving 9 msw in-water stop** **to reaching 12 msw stop in RCC**
12 msw – 80 min **	**70 min O2 + two 5-min air breaks**
Repetitive Group (RG)	**RG = NONE** **Exceptional Exposure Dive**

5. Repetitive diving can also be conducted using SurD O2:

   a. Repetitive Groups (RGs) are shown in CF Table 3 for dives within the normal air diving range, and

   b. Note that these RGs may be different from those of CF Tables 1 and 2

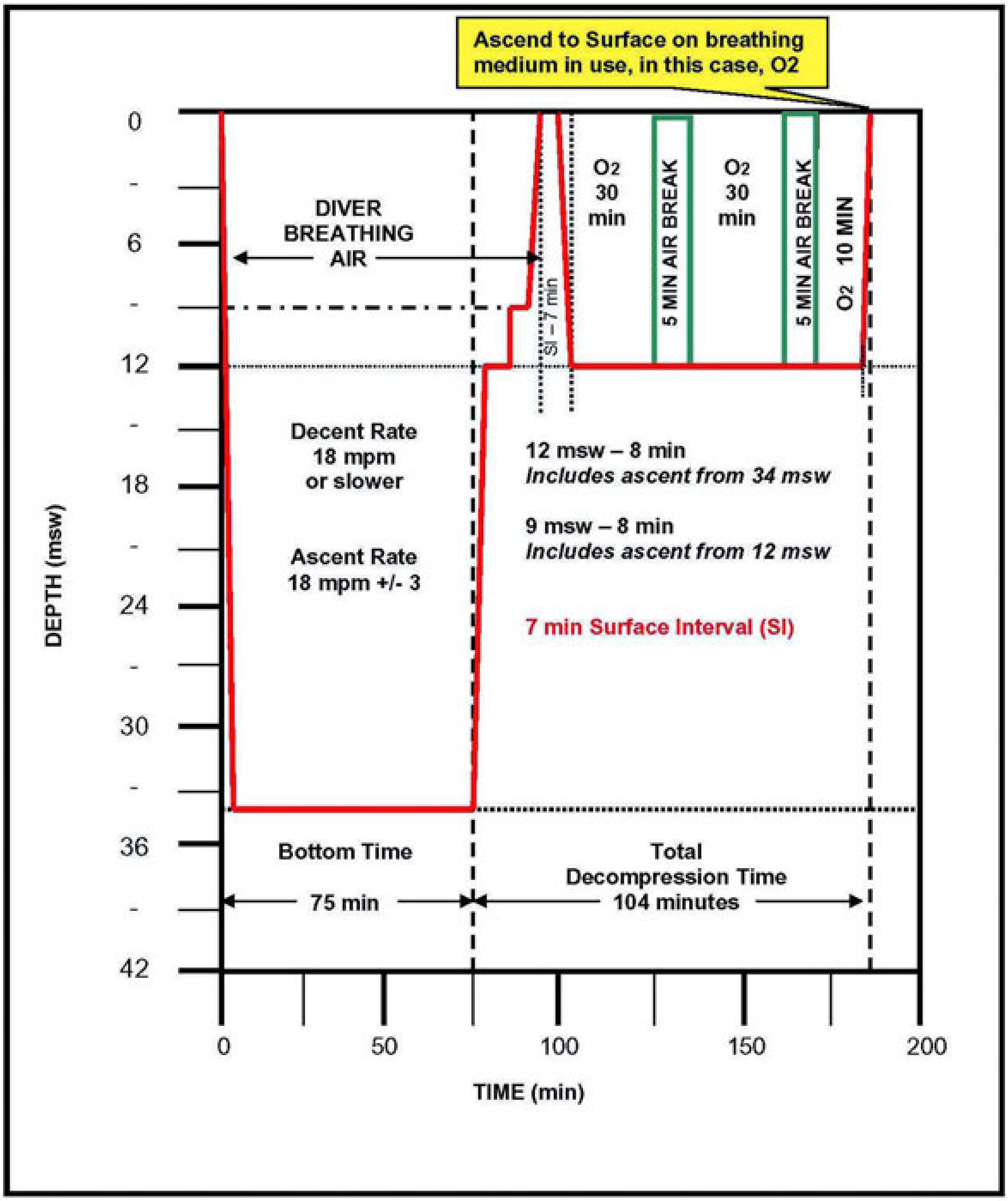

Figure 3-2-5 EXAMPLE 3 (Air)

SurD O2 Dive to 36 msw (34+2) 75 min

DIVER	Rank	Tender	Rank	**Date: 11 Oct 09**	
DIVER	Rank	Tender	Rank	Table Used **2**	
SUPERVISOR	Rank	Schedule Used **36 /75**	O2% **SUR D**	Depth in msw **34 + 2 = 36**	Bottom Time **: 75**
Left Surface (Clock Time) **1330**	Left Bottom **1 :15**	Max. Time to 1st Stop	Reached Surface (Clock Time) **1502 / 1629**		
Total decomp. Time **: 19**	Total time of **dive** **2:59**	Repet. Group	CHARTMAN (Print)	Rank	

REMARKS	STOPS IN MSW	STAND AIR TABLE	Decompression Time Water	Decompression Time Chamber	EMERG AIR		**1 : 32** EVENT TIME **2 : 59** Water	Chamber
	3	86				L		
						S		
	6	31	AIR	O2		L		
						S		
ON O2 :59::36	9	8	8	80		L	1 : 31	
REACHED : 58::36						S	1 : 23	2 : 58
	12		8			L		1 : 38
				70 + 5 * 5		S		
	15					L		
						S		
	18					L		
						S		
REACHED BOTTOM	21					L		
:01::18						S		
	24					L		
						S		
	27					L		
						S		
	30					L		
						S		
34	33					L		
						S		
REACHED BOTTOM	~~36~~					L		1:15
:02						S		
	39					L		
						S		
	42					L		
						S		
	45					L		
						S		
	48					L		
						S		
	51					L		
						S		

Location of Dive	Name / Rank of Standby Diver	Divers (Signatures)
Purpose of Dive	Supervisor (sign)	Chartman (sign)

Figure 3-2-6 EXAMPLE 3 (Air) Dive Record Chart (msw)

SurD O2 Dive to 36 msw (34+2) 75 min

3206 Repetitive Diving Tables (CF Tables 4A and 4B)

1. Residual nitrogen remains in a diver's body after every air dive. This quantity is expressed by the Repetitive Group (RG) letter assigned to the respective dive profile by the aforementioned CF Table 1, 1S, 2, 2S, or 3. This residual nitrogen will gradually reduce to a normal level over a period of eighteen hours. If the diver is to make a second dive within this period, the residual nitrogen level must be considered when planning for the second dive.

2. Repetitive air diving tables have been developed to protect the diver from the effects of residual nitrogen.

   a. CF Table 4, ***Repetitive Diving,*** contained in Annex A, Chapter 3, consists of two parts:

      (1) CF Table 4A, Repetitive Factors / Surface Intervals Table; and

      (2) CF Table 4B, No-Decompression Repetitive Diving Table; and

   b. These tables permit repetitive diving *only within the range of the Normal Air Diving Limits* outlined in Figure 3-1-1.

3. In **CF Table 4A**, Repetitive Factors (RF) are given for each Repetitive Group letter from A to O at selected Surface Intervals (SI's), from 15 minutes to 18 hours. As the SI increases, the RF decreases until it becomes 1.0.

4. **A dive is considered a repetitive dive if it is conducted while the RF from the previous dive is greater than 1.0;**

   a. For example, any dive within 18 hours after surfacing from a RG = H (or higher) dive would be considered a repetitive dive.

5. The RF is used to calculate the Effective Bottom Time (EBT) for the repetitive dive.

6. **EBT is determined by multiplying the actual bottom time of the repetitive dive by the RF.** It is the total of the actual bottom time ***plus*** the time that must be considered to have been already spent at that depth because of the residual nitrogen remaining in the body from the previous dive. The EBT is then used to determine decompression requirements for the repetitive dive.

7. In **CF Table 4B**, the Allowable No-Decompression ("No-D") Limits for Repetitive Dives are shown for different depths as a function of the RF. These No-D limits are actual bottom times and not EBT's. (Note that these No-D limits are less than the No-D limits given in CF Tables 1, 1S, 2, 2S, and 3, which are for first dives only).

8. **For any repetitive dive:**

   a. CF Table 4B, ***No-Decompression Repetitive Diving Table***, should be consulted to determine whether the planned dive could be done as a no-decompression dive or whether decompression will be required.

9. The procedure for using the repetitive dive tables is as follows (a worksheet for calculating the decompression requirements for repetitive dives and multiple repetitive dives is found at Annex B, Chapter 3, and ***Repetitive Diving Worksheet,*** and a flow chart to aid in using this procedure is given in **Figure 3-2-8**, ***Repetitive Diving Flowchart***):

a. Find the RG of the first dive (from CF Tables 1, 1S, 2, 2S, or 3).

Enter CF Table 4A;

b. Proceed down the RG column to locate the matching RG letter from the first dive and then proceed horizontally along the same line to the appropriate Surface Interval (SI) column.

Where the RG and SI intersect, note the Repetitive Factor (RF)

c. Enter CF Table 4B at the RF column and proceed downward in the column to the applicable depth of the planned repetitive dive,

Where the RF and the depth intersect, note the Allowable No-D Limit for this repetitive dive; and

d. ***For No-Decompression Dives***

(1) If the actual bottom time of the second dive is less than or equal to the allowable No-D limit in CF Table 4B, the second dive is a No-D dive,

(2) See EXAMPLE 4 (Air) and sample Repetitive Diving Worksheet, Figure 3-2-7.

EXAMPLE 4 (Air)

First Dive **18 msw (16+2) / 30 min**	**RG = D** ***from CF Table 1S***
Surface Interval : 1 hr	**RF = 1.4** ***from CF Table 4A***
Second Dive **Depth 15 msw (13+2)**	**Repet, No-D limit is** **45 min** ***from CF Table 4B***
Actual Bottom Time: 30 min	**EBT = 42 min** **(30 X 1.4)**
Repetitive Group (RG)	**RG = E** ***from CF Table 1S***

REPETITIVE DIVING WORKSHEET (METRES)

FIRST DIVE:

__18__ msw/ __30__ min   Table Used __1S__

1st Dive Repetitive Group ____D_____

SECOND DIVE:

SI __1__ hr __00__ min   RF __1.4__ (CF Table 4A)

Depth __15__ msw   Table Used __4B__

Allowable No-D Limit (CF Table 4B) __45__ min

Planned Bottom Time (BT) __30__ min

EBT = (RF) __1.4__ x (BT) __30__ = __42__

Decompression required? : Yes ☐ No ☒

DECOMPRESSION SCHEDULE: __15__ msw/ (EBT) __45__ min

______ msw ______ min

______ msw ______ min

______ msw ______ min O_2 Stop (if required)

______ msw ______ min   ______ msw ______ min

2nd Dive Repetitive Group   RG ______ (from Table Used)

2nd Dive Adjusted Repetitive Group RG ____E____

NOTES:

1. If the BT exceeds the allowable No-D Limit in CF Table 4B, but the EBT is less than the No-D Limits in CF Table 1S, 1S, 2 2S, OR 3, than, a 5-minute decompression stop at 3 msw is required.

2. The RG shall be adjusted to the same as that of the decompression schedule requiring the 5-minute stop at 3 msw.

Figure 3-2-7   EXAMPLE 4 (Air)
No-D Repetitive Dive

(3) Finding the minimum surface Interval (SI) for a No-D dive

(a) **Find the RF:**

i. of the repetitive dive, and

ii. Proceed upward in the column Enter CF Table 4B at the depth of the repetitive dive and proceed horizontally to the intended bottom time to find the RF.

(b) **Find the minimum SI:**

i. Enter **CF Table 4A** at the RG of the first dive and proceed horizontally to the appropriate RF, and

ii. Proceed upward in the column to determine the minimum SI.

(c) **See EXAMPLE 5 (Air)**

EXAMPLE 5 (Air)

First Dive **24 msw (22+2) / 25 min**	**RG = E** ***from CF Table 1S***
Second Dive **15 msw (13+2) / 50 min**	**50 min Bottom Time** **(BT) at 15 msw** **RF = 1.3 *from CF Table 4B***
Surface Interval	**For a 1st dive where RG=E** **with an RF of 1.3, a minimum SI of 2 hrs is required *from CF Table 4A***

e. For Repetitive Dives Requiring Decompression:

(1) If the actual bottom time of the repetitive dive is GREATER THAN the allowable No-D limit in CF Table 4B,

(a) The Repetitive dive requires decompression,

i. **EBT = Actual BT X RF**

(b) Multiply the actual bottom time of the repetitive dive by the RG to obtain the EBT,

(c) Use CF Table 1, 1S, 2, 2S or 3 to determine the decompression schedule for the repetitive dive, and

(d) See **EXAMPLE 6 (Air).**

REPETITIVE DIVING WORKSHEET (METRES)

FIRST DIVE:

__24__ msw/ __25__ min   Table Used __1S__

1st Dive Repetitive Group ____E_____

SECOND DIVE:

SI __2__ hr __00__ min   RF __1.3__ (CF Table 4A)

Depth __15____ msw   Table Used __4B__

Allowable No-D Limit (CF Table 4B) __50____ min

Planned Bottom Time (BT) ____50____ min

EBT = (RF) __1.3___ x (BT) __50____ = __65____

Decompression required? : Yes ☐ No ☒

DECOMPRESSION SCHEDULE: __15__ msw/ (EBT) 75__ min

_______ msw _______ min

_______ msw _______ min

_______ msw _______ min O_2 Stop (if required)

_______ msw _______ min   _______ msw ______ min

2nd Dive Repetitive Group RG ______ (from Table Used)

2nd Dive Adjusted Repetitive Group RG _________

NOTES:

1. If the BT exceeds the allowable No-D Limit in CF Table 4B, but the EBT is less than the No-D Limits in CF Table 1S, 1S, 2 2S, OR 3, than, a 5-minute decompression stop at 3 msw is required.

2. The RG shall be adjusted to the same as that of the decompression schedule requiring the 5-minute stop at 3 msw.

Figure 3-2-7A EXAMPLE 5 (Air)
No-D Repetitive Dive

<u>EXAMPLE 6</u> (Air)

<u>First Dive</u> **33 msw (31+2) /15 min**	**RG = D** ***from CF Table 1S***
Surface Interval : **40 min**	**RF = 1.5** **from CF Table 4A**
<u>Second Dive</u> **33 msw (31+2) / 10 min**	**Repet = No-D Limit = 7 min** ***from CF Table 4B*** **Decompression is required** **EBT = 1.5 X 10 = 15 min**
Decompression Schedule	**<u>33 msw / 15 min</u>**

(2) For repetitive bottom times EXCEEDING the Allowable No-D Limits in CF Table 4B, but with EBT's LESS THAN the No-D Limit in CF Table 1, 1S, 2, 2S or 3:

(a) A 5-minute Air Decompression Stop at 3 msw is mandatory,

(b) The RG shall be adjusted to the same as that of the decompression schedule required for the 3 msw / 5 min decompression stop,

(c) The No-D limits in Tables 1, 1S, 2, 2S or 3 are for *first dives only, and*

(d) See **EXAMPLE 7 (Air).**

<u>EXAMPLE 7</u> (Air)

<u>First Dive</u> **18 msw (16+2) / 50 min**	**RG = F** ***from CF Table 1S***
Surface Interval : **1 hr 45 min**	**RF = 1.5** **from CF Table 4A**
<u>Second Dive</u> **18 msw (16+2) / 30 min**	**Repet D=-D Limit = 7 min** ***from CF Table 4B*** **Decompression is required** **EBT = 1.5 X 30 = 45 min**
Repetitive Group **(RG) Adjustment**	**RG = F**
Decompression Required	**3 msw - 5 min** ***from CF Table 1S***

(3) For Surface Intervals LESS THAN 15 minutes:

(a) Using the deepest depth of the first and second dives, add the bottom times from both dives to obtain the EBT of the dive. Time spent on the surface is dead time; and

(b) See **EXAMPLE 8 (Air).**

EXAMPLE 8 (Air)

First Dive **18 msw (16+2) / 30 min**	**RG = D** **SI = 10 min**
Second Dive **18 msw (16+2) / 25 min**	**EBT = 55 MIN** **(30 + 25)**
Decompression Schedule	**18 msw / 60 min**
Decompression Required	**3 msw - 5 min**
Repetitive Group	**RG = G**

(4) **Repetitive diving before the RF reduces to 2.0**

(a) The RF's in CF Table 4A have been cut off – arbitrarily – at 2.0. It is felt that after a strenuous first dive, the SI should be sufficient in length to reduce the residual nitrogen level of the diver to that degree.

(b) If it is necessary to perform a repetitive dive before the RF reduces to 2.0, take the deepest depth of the first and second dives, and then add the bottom times of the first and second dives together to obtain the EBT for the second dive.

(5) **Repetitive Group Adjustments (For multiple repetitive dives):**

(a) Repetitive dive tables, by their nature of having fixed limits, cannot take into account every possible diving situation. Repetitive Group adjustments may be required in some cases if more than one repetitive dive is planned. These adjustments are necessary to avoid problems on repetitive dives after the first repetitive dive,

(b) For example: If a series of similar no-decompression repetitive dives are conducted (e.g. similar depth / bottom time / surface interval), it is possible to get locked into a loop resulting in the same RG and RF after each dive. Because decompression will eventually be required, it is necessary adjust the RG to break out of this loop, and

(c) Similarly, if a short duration dive follows a longer bottom time dive, the RG calculated for the second dive will be too small and will not take into account the influence of the longer first dive. Thus, the second dive RG must be adjusted upward.

(6) **Adjusting the Repetitive Dive RG:**

(a) When whenever repetitive dives are conducted, calculate the RG that corresponds to the Depth and EBT of the just completed repetitive dive from the appropriate decompression CF Table (CF Tables 1, 1S, 2, 2S or 3). If the RG ***is greater than*** the RG from the previous dive, no adjustment is necessary,

No RG adjustment is necessary if

RG Dive 2 > RG Dive 1

(b) If the RG is *lower than or equal to* the RG of the previous dive and the surface interval is *less than* 6 hours, ADJUST the RG of the previous dive, plus one letter. Note: The RG of the repetitive dive must be *higher tha*n that of the preceding dive; and

(c) If the RG is ***lower than*** or equal to the RG of the previous dive, and the surface interval (SI) is ***greater than*** 6 hours, ADJUST the RG of the just-completed dive upward by one letter.

If RG Dive 2 ≤ Dive 1 and if SI > 6 hours

ADJUST the RG of the

Just completed dive upward on letter

e.g. **B →C, C →D**

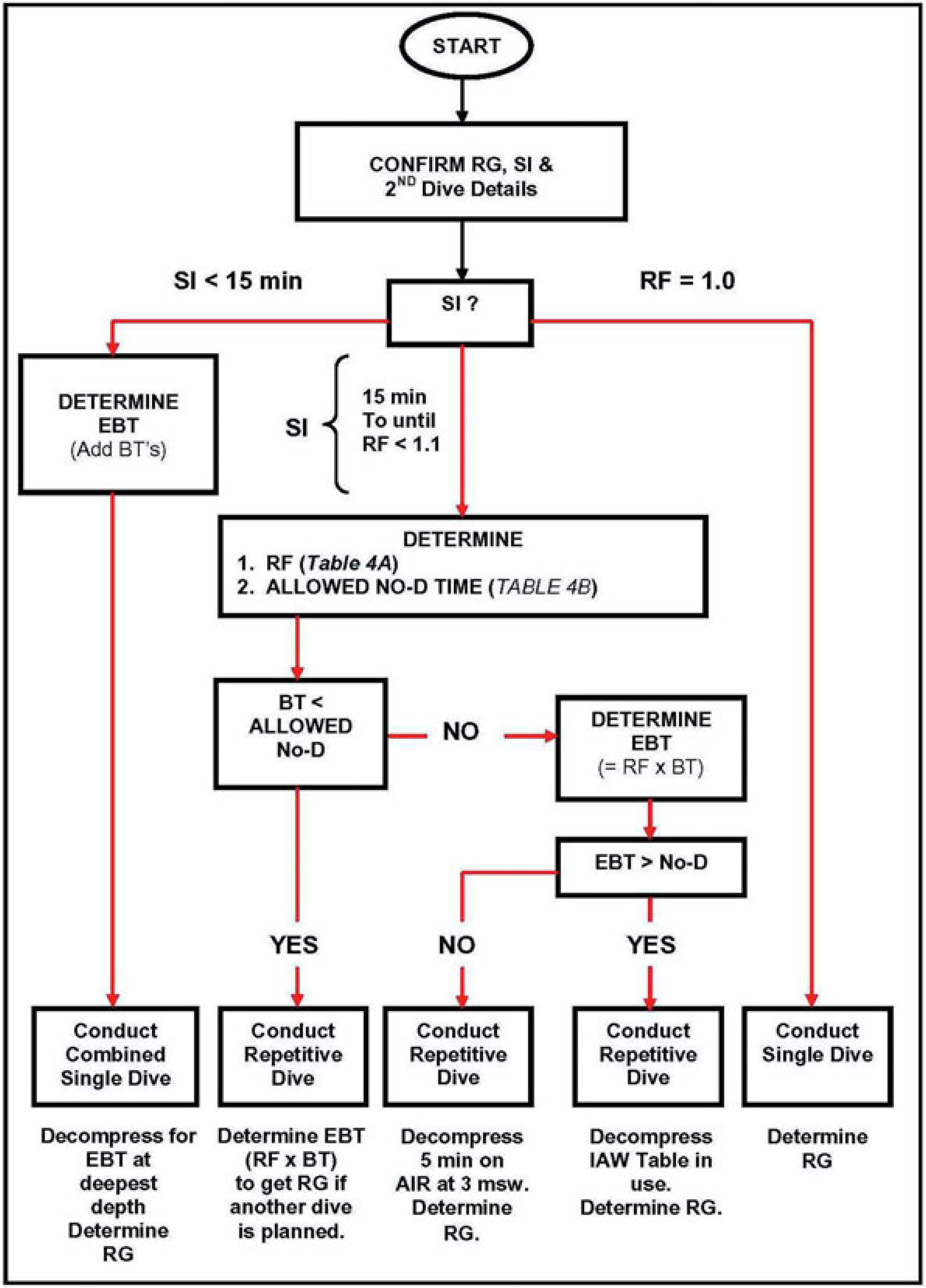

Figure 3-2-8 Repetitive Diving Flowchart

3207 Depth Correction of Diving at Altitude (*CF Table 5*)

1. CF Table 5, ***Depth Corrections – Diving at Altitude*** (Annex A, Chapter 3) provides tabulated depth corrections for determining decompression profiles and decompression stop depths when diving in elevated areas above sea level. These corrections are necessary because the surface pressure and the underwater absolute pressure are less at altitude. Of particular significance is that diving tables and decompression techniques are designed to return a diver safely to a sea level pressure and not to a lesser pressure as at altitude. This reduced atmospheric pressure at the surface makes the dive at altitude equivalent to a deeper dive at sea level.

2. CF Table 5 has been developed accordingly to resolve these differences by providing depth corrections for selected altitudes from 100 metres to 3,000 metres. These depth corrections are added to the actual depth to determine the dive profile to be used for decompression purposes. In addition, CF Table 5 gives the actual stop depths to be used in place of the CF decompression stops.

a. Divers are cautioned that most commonly used depth gauges will not read "actual" water depth at altitudes.

b. Metric shot lines (for sounding) or electronic depth sounders are required.

3. The procedures for using CF Table 5 are as follows:

a. Establish the altitude of the dive site and determine the actual maximum water depth of the dive Actual maximum depth + 3 msw = Adjusted Depth;

b. Depth adjustment for acclimatization,

(1) If diving at altitude is conducted ***within 24 hours of arriving at the altitude of the dive site,*** then apply an additional 3 metres to the actual maximum depth of dive,

(2) Once past the 24-hour acclimatization period, the 3-metre addition is not required;

c. First, find the correction for the adjusted depth according to the altitude from CF Table 5 and add this correction to the adjusted depth to obtain the Effective Depth (ED);

d. Then, determine the decompression schedule from the appropriate schedule from the appropriate decompression table by applying the Effective Depth and the actual planned bottom time;

e. Replace the decompression stop depths from the normal decompression table with the actual stop depths shown at the bottom of CF Table 5 (the stop times are not changed); and

f. Decompress on the altitude schedule IAW normal procedures using the regular travel rates.

4. A worksheet to assist in the calculation of the decompression requirements for diving at altitude is given in Annex B. Chapter 3, ***Altitude Diving Worksheet*:**

a. Sample worksheets for **EXAMPLE 9A (Air), *Acclimatized*,** are shown in **Figure 3-2-9**; and

b. Sample worksheets for **EXAMPLE 9B (Air), *NOT Acclimatized*,** are shown in **Figure 3-2-10.**

<u>EXAMPLE 9A</u> (Air) ***(ACCLIMATIZED)***

- Diving after 24 hours of arrival at altitude

CF Air Dive to 30 msw (28+2) / 23 min at 2195 m Altitude (*ACCLIMATIZED*)

Altitude at Dive Site	**2195 m**
Dive: 28 msw / 23 min ***Decompression by CF Table 1***	**Depth determined** **by metric shot line or** **electronic depth sounder**
Actual Dive Depth	**30 msw (28+2)**
Depth Correction for **2195 m**	**+ 9 msw** **(from CF Table 5)**
Effective Depth (ED) **Actual Dive Depth +** **Depth Correction**	**ED = 39 msw** **(30 + 9)**
Decompression Schedule for **<u>39 msw / 25 msw</u>** **From CF Table 1** **9 msw – 5 min** **6 msw – 7 min** **3 msw – 11 min**	**Actual Decompression Schedule** **-corrected for stop depths-** **from CF Table 5** **7 msw – 5 min** **5 msw – 7 min** **2.5 msw – 11 min**
Repetitive Group	**RG = H**

<u>EXAMPLE 9B</u> (Air) ***(NOT ACCLIMATIZED)***

- Diving within 24 hours of arrival at altitude

CF Air Dive to 30 msw (28+2) / 23 min at 2195 m Altitude (*NOT ACCLIMATIZED*)

Altitude at Dive Site	**2195 m**
Dive: 28 msw / 23 min ***Decompression by CF Table 1***	**Depth determined** **by metric shot line or** **electronic depth sounder**
Actual Dive Depth	**30 msw (28+2)**
Acclimatization **Factor + Actual Depth**	**3 msw + 30 = 33 msw**
Depth Correction for **2195 m**	**+ 12 msw** **(from CF Table 5)**
Effective Depth (ED) ***Actual Dive Depth* +** ***Acclimatization Factor* +** ***Depth Correction***	**ED = 45 msw** **(30 + 3) + 12**
Decompression Schedule for **<u>39 msw / 25 msw</u>** **From CF Table 1** **12 msw – 4 min** **9 msw – 5 min** **6 msw – 8 min** **3 msw – 23 min**	**Actual Decompression Schedule** **-corrected for stop depths-** **from CF Table 5** **9.5 msw – 4 min** **7 msw – 5 min** **3 msw – 8 min** **2.5 msw – 23 min**
Repetitive Group	**RG = J**

ALTITUDE DIVING WORK SHEET (*METRES*)

Altitude of dive Site	2195 m
Actual depth of (See Note below)	(A) 30 msw
Acclimatization Factor (+3 msw if < 24 hrs)	(B) ____ msw
Adjusted Depth (Metres) Sum of A + B	(C) 30 msw
Dive depth correction (from Table 5)	(D) 9 msw
Effective Depth	(C + D) 39 msw
Bottom Time (BT)	23 msw
Scheduled required (ED /BT)	39 msw / 25 msw

Table used 1

NOTE: Actual dive depth must reflect the plus 2 msw rule

ALTITUDE DIVE DECOMPRESSION SCHEDULE

Sea Level Stop Depth	Actual Stop Depth	Stop Time
12 msw	____ msw	____ min
9 msw	7 msw	5 min
6 msw	5 msw	7 min
3 msw	7 msw	11 min
O2	____ msw	____ min

Repetitive Group H

- Dive depth correction is found after adding the actual depth of the dive and the acclimatization factor if the dive has been on site for less than 24 hours.

Figure 3-2-9 EXAMPLE 9A (Air) (Sheet 1 of 2)

Acclimatized CF Air Dive to 30 (28+2) / 23 min at 2195

ALTITUDE DIVING WORK SHEET (*METRES*)

Altitude of dive Site	2195 m
Actual depth of (See Note below)	(A) 30 msw
Acclimatization Factor (+3 msw if < 24 hrs)	(B) 3 msw
Adjusted Depth (Metres) Sum of A + B	(C) 33 msw
Dive depth correction (from Table 5)	(D) +12 msw
Effective Depth	(C + D) 45 msw
Bottom Time (BT)	23 msw
Scheduled required (ED /BT)	45 msw / 25 msw

Table used 1

NOTE: Actual dive depth must reflect the plus 2 msw rule

ALTITUDE DIVE DECOMPRESSION SCHEDULE

Sea Level Stop Depth	Actual Stop Depth	Stop Time
12 msw	9.5 msw	4 min
9 msw	7 msw	5 min
6 msw	5 msw	8 min
3 msw	2.5 msw	23 min
O2	msw	min

Repetitive Group J

- Dive depth correction is found after adding the actual depth of the dive and the acclimatization factor if the dive has been on site for less than 24 hours.

Figure 3-2-9 EXAMPLE 9B (Air) (Sheet 2 of 2)

Not Acclimatized CF Air Dive to 30 (28+2) / 23 min at 2195

3208 - 3299 Not Allocated

SECTION 3

GENERAL PROCEDURES
AIR DECOMPRESSION TABLES

3301 Descent / Ascent Rates, Stop Time and Travel Rate B:

1. **Descent Rate, 18 mpm or slower;**
2. **Ascent Rate, 18 mpm ± 3;**
3. **Stop Time,**
   a. Ascent time to a stop is included in that stop time, except for O2 stops,
      (1) O2 stop time starts when the diver is confirmed on O2 (next whole minute),
   b. Otherwise, the actual time spent at a stop equals the required stop time less the travel time to that stop at 18 mpm, and
   c. See **EXAMPLE 10 (Air).**
4. **Travel Rate (between stops),** 18 mpm ± 3.

<u>EXAMPLE 10</u> (Air) ***- Stop Time Calculation***

Dive: 42 msw / 15 min	**CF Air Decompression** ***from CF Table 1***
First Stop **(*from CF Table 1*)**	**6 msw – 6 min**
Travel Time to First Stop	**2 min @ 18 mpm**
Actual Stop Time at 6-msw Stop	**4 min**

3302 Variation in Rate of Ascent:

1. Ascent Rate Too Slow – Less than 15 mpm;
   a. ***Delay starts deeper than half of the maximum depth of the dive,***
      (1) Delay added to bottom time,
      (2) Decompress IAW new bottom time, and
   b. ***Delay starts shallower than half of the maximum depth of the dive***
      (1) Delay added to stop time of the next stop, and
      (2) If no stop is scheduled, then stop at 3 msw for the duration of the delay.

2. ***Ascent Rate Too Fast – greater than 21 mpm:***

a. Ascent rate to first stop too fast;

(1) No correction required,

(2) Time at stop includes travel time to the stop,

b. Ascent rate too fast (when no stops are required), and

(1) Observe diver for at least one hour.

3303 Oxygen-Related Problems:

1. Oxygen problems In-Water (9 *msw O2 Stop*);

a. Minor Symptoms of O2 Toxicity In-Water (at 9-msw O2 Stop),

(1) **FIRST OPTION:**

(a) Switch diver to air and ventilate,
(b) Wait for symptoms to subside,
(c) Wait 15 minutes more and recommence O2 at point of interruption,
(d) If symptoms recur; and
i. Switch to Table 1, CF Air Decompression.

OR

(2) **SECOND OPTION:**

(a) Switch diver to air and ventilate,
(b) Continue decompression IAW Table 1, CF Air Decompression,
i. The O2 time is, Good Time, for decompression purposes and is subtracted from the 9-msw and / or 6-msw air stop times, and
ii. See Example 11 (Air) and 11A (Air) Fig 3-3-1.

OR

(3) **THIRD OPTION** (***RCC Immediately available***)**:**

(a) Switch diver to air and ventilate,
(b) Upon completion of the 9-msw air stop, SurD O2 (Table 3) may be performed.

<u>EXAMPLE 11</u> (Air)

- **In-Water O_2 Decompression Dive to 34 msw (32+2) / 42 min**
- **Oxygen problems in-water (at 9-msw O_2 stop)**
- **Minor symptoms of O_2 toxicity**
- **Diver switched to air and ventilated**
- **No recommencement of O_2**
- **Continued decompression IAW CF Air Decompression Table (CF Table 1)**

Dive : **34 msw (32+2) / 42 min**	**In-Water O_2 *CF Table 2*** **(36 msw / 45 min) calls for:** **12 msw – 3 min on AIR** **9 msw – 33 min O_2**
Situation:	**After 9 minutes on O_2** **at the 9-msw stop, diver reports** **minor O_2 toxicity symptoms.**
ACTION: **Stops shown in CF Air Table** **(CF Table 1) for** **12 msw – 3 min** **9 msw – 6 min** **6 msw – 10 min** **3 msw – 38 min**	1. **The diver is immediately switched to air and ventilated**. The 9 minutes spent on O2 is "Good Time" The required total (from CF Table 1) of 6 minutes at the 9-msw stop has been satisfied, but only 3 minutes of the required total of 10 minutes at the 6 –msw stop has been satisfied. 2. **Travel diver to 6 msw**. 3. **Complete decompression IAW** **(CF Table 1).** **6 msw – 7 min** **3 msw – 38 min**

DIVER	Rank	Tender	Rank	**Date:** 11 Oct 09	
DIVER	Rank	Tender	Rank	Table Used ~~2~~ 3	
SUPERVISOR	Rank	Schedule Used 36 /45	O2% AIR / 100	Depth in msw 34 + 2 = 36	Bottom Time : 42
Left Surface (Clock Time) 0900	Left Bottom : 42	Max. Time to 1st Stop	Reached Surface (Clock Time) 0957 / 1045		
Total decomp. Time 1 : 03	Total time of **dive** 1:45	Repet. Group J	CHARTMAN (Print)	Rank	

REMARKS	STOPS IN MSW	STAND AIR TABLE	Decompression Time: Water	Decompression Time: Chamber	EMERG AIR		: 57 EVENT TIME 1 : 45: Water	: 57 EVENT TIME 1 : 45: Chamber
	3	38				L		
						S		
O2 Symptom :09 @ 9 msw	6	10	AIR			L		
			9	O2		S		
ON O2 :46::10	9	6				L	: 56	
REACHED : 45::10			Shift O2	41		S	: 47	1 : 44
	12	3	3			L	: 45	1 : 03
				36+5		S		
	15					L		
						S		
	18					L		
						S		
	21					L		
						S		
	24					L		
						S		
	27					L		
						S		
	30					L		
						S		
34	33					L		: 42
						S		
REACHED BOTTOM	~~36~~					L		
:01::52						S		
	39					L		
						S		
	42					L		
						S		
	45					L		
						S		
	48					L		
						S		
	51					L		
						S		

Location of Dive	Name / Rank of Standby Diver	Divers (Signatures)
Purpose of Dive	Supervisor (sign)	Chartman (sign)

Figure 3-3-1 EXAMPLE 11 (Air) Dive Record Chart (msw)

Minor Symptom of O2 Toxicity; RCC* Immediately *Available

In-Water O2 Decompression Dive to 34 msw (32+2) / 42 min

b. Serious, Incapacitating Symptoms of CNS O2 Toxicity In-Water (at 9-msw O2 Stop):

(1) **Take diver off O2, ventilate, and stabilise,**

(a) Maintain depth while the diver is convulsing to prevent embolism,

(2) **Surface diver carefully to reduce the risk of embolism;**

(a) Treat for possible embolism if any uncertainty exists,

(3) **Otherwise, treat for omitted decompression, and**

(4) **Observe carefully**

c. Loss of O2 In-Water (at 9-msw O2 Stop);

(1) **FIRST OPTION;**

(a) Switch diver to air,

(b) Re-establish O2 and resume at the point of interruption,

i. If unsuccessful in re-establishing O2, continue decompression IAW CF Air Decompression Table (CF Table 1), and

ii. The O2 time is Good Time for decompression purposes and is subtracted from the 9-msw and/or 6-msw and/or 3-msw air stop times.

OR

(2) **SECOND OPTION (if O2 is available to RCC);**

(a) Switch diver to air and ventilate, and

(b) Upon completion of the 9-msw air stop, SurD O2 (CF Table 3) may be performed.

2. Oxygen Problems in RCC (SurD O2):

a. Loss of O2 in RCC (SurD O2);

(1) **If unsuccessful in re-establishing O2, decompress IAW CF Table 1 commencing at 12-msw,**

(a) Previous O2 time is Good Time and is subtracted from the 12-msw and/or 9-msw and/or 6-msw and/or 3-msw air stop, and

(b) See Example 12 (Air) and Figure 3-3-2.

<u>EXAMPLE 12</u> (Air)

- **SurD O2 Dive to 42 msw (40+2) / 30 min.**
- **Loss of O2 in RCC during SurD O2.**
- **No success in re-establishing O2.**
- **Continued decompression IAW CF Air Table (CF Table 1).**

Dive: **42 msw (40+2) / 30 min**	**SurD O2 (*CF Table 3*)** **calls for 30 min O2 in RCC**
Situation :	**O2 is lost after 24 min on O2 in RCC at 12 msw**
ACTION : **Stops shown in the CF Air Table (*CF Table 1*) for** **<u>42 msw / 30 min</u>** **12 msw – 4 min** **9 msw – 6 min** **6 msw – 8 min** **3 msw – 28 min**	**1. Ascend to 3 msw.** The 24 minutes spent on O2 satisfied the 12-msw (4 min), 9-msw (6 min), 6-msw (8 min) and 6 minutes of the 28-minute 3-msw stop. **Complete decompression IAW CF Air Table 1.** **3 msw – 22 min**

DIVER	Rank	Tender	Rank	**Date:** 11 Oct 09	
DIVER	Rank	Tender	Rank	Table Used ~~3~~ 1	
SUPERVISOR	Rank	Schedule Used 42 /30	O2% SurD	Depth in msw 40 + 2 = 42	Bottom Time : 30
Left Surface (Clock Time) 0830	Left Bottom : 30	Max. Time to 1st Stop	Reached Surface (Clock Time) 0911 / 1004		
Total decomp. Time 1 : 04	Total time of dive 1:34	Repet. Group K	CHARTMAN (Print)	Rank	

REMARKS	STOPS IN MSW	STAND AIR TABLE	Decompression Time Water	Decompression Time Chamber	EMERG AIR	: 41 EVENT TIME 1 : 34	Water	Chamber
	3			22	~~28~~	L		1:33
						S		
	6		AIR		8	L		
						S		
	9		6	41	6	L	: 40	
						S		1 : 11
Loss O2	12		4	~~30~~	4	L	: 34	: 47
						S		
	15					L		
						S		
	18					L		
						S		
	21					L		
						S		
	24					L		
						S		
	27					L		
						S		
	30					L		
						S		
	33					L		
						S		
	36					L		
						S		
	39					L		
						S		
REACHED BOTTOM 40 :02::20	~~42~~					L		: 30
						S		
	45					L		
						S		
	48					L		
						S		
	51					L		
						S		

Location of Dive	Name / Rank of Standby Diver	Divers (Signatures)
Purpose of Dive	Supervisor (sign)	Chartman (sign)

Figure 3-3-2 EXAMPLE 12 (Air) Dive Record Chart (msw)

Loss of O2 in RCC, No Success in Re-establishing O2

SurD O2 Dive to 42 msw (40+2) / 30 min

b. Minor Symptoms of O2 Toxicity in RCC (*SurD-O2)*

(1) **FIRST OPTION;**

(a) Switch diver to air and ventilate,

(b) After symptoms have subsided,

i. Leave diver on air for an additional 15 minutes,

ii. Resume O2 from time of interruption, and

iii. See EXAMPLE (13) and Figure 3-3-3.

(c) If O2 breathing is resumed and O2 symptoms recur;

i. Switch diver to CF Air Table 1, and

ii. Complete decompression on air.

OR

(2) **SECOND OPTION;**

(a) Switch diver to air and ventilate,

(b) Continue decompression IAW CF Air Table 1, and

i. The O2 time is Good Time for decompression purposes and is subtracted from the 12-msw stop and/or 9-msw and/or 6-msw and/or 3-msw air stop,

c. Serious Incapacitating Symptoms of CNS O2 Toxicity in RCC (SurD O2);

(1) **Take Diver off O2 and stabilise,**

RCC DEPTH IS TO BE MAINTAINED WHILE DIVER IS CONVULSING!

(2) **Continue decompression IAW CF Air Table 1, and**
The O2 time is Good Time for decompression purposes and is subtracted from the 12-msw and/or 9-msw and/or 6-msw and/or 3-msw air stop times.

EXAMPLE 13 (Air)

- **SurD O2 Dive to 36 msw (34+2) / 75 min**
- **Oxygen problems in RCC (SurD O2)**
- **Minor symptoms of O2 toxicity**
- **Resumption of O2 breathing**

Dive: 36 msw (34+2) / 75 min	**SurD O2 CF Table 3 calls for 70 minutes on O2 in the RCC, plus two 5-minutes air breaks.**
Situation :	**After 11 min on O2 in the RCC, the diver develops an O2 symptom.**
ACTION:	***1. Take the diver off O2.*** ***2. Wait until the diver has stabilised.*** ***3. Wait 15 minutes more, then resume O2 breathing.*** ***4. Complete the decompression IAW this schedule.*** ***5. Bring the diver to the surface on breathing medium in use.***
For example, if the diver took 4 minutes to stablise, the 12 msw RCC stop would be 99 munites:	

Initial RCC O2 time before symptoms		*Time required to stabilize.*		*Additional wait period after stabilizing.*		*Remainder of first 30 minutes of O2 in RCC (11 min already completed).*		***1st AIR BREAK.***		*Second 30 min of O2 in RCC.*		***2nd AIR BREAK.***		*Remainder of O2 time in RCC (70 min total O2 time).*		*Total Time at 12 msw RCC Stop.*
11	**+**	**4**	**+**	**15**	**+**	**19**	**+**	**5**	**+**	**30**	**+**	**5**	**+**	**10**	**=**	**99 min**

DIVER	Rank	Tender	Rank	**Date:** 21 Nov 09	
DIVER	Rank	Tender	Rank	Table Used **3**	
SUPERVISOR	Rank	Schedule Used **36 / 75**	O2% **AIR / 100**	Depth in msw **34 + 2 = 36**	Bottom Time **: 75**
Left Surface (Clock Time) **1405**	Left Bottom **1 : 15**	Max. Time to 1st Stop	Reached Surface (Clock Time) **1537 / 1723**		
Total decomp. Time **2 : 03**	Total time of dive **3 :18**	Repet. Group	CHARTMAN (Print)	Rank	

REMARKS	STOPS IN MSW	STAND AIR TABLE	Decompression Time Water	Decompression Time Chamber	EMERG AIR		**1 : 32** EVENT TIME **3 : 18** Water	Chamber
	3	~~86~~				L		
						S		
	6	31	AIR	O2		L		
						S		
	9	8	8	~~80~~ 99		L	1 : 31	
O A A O A O A O						S		3 : 17
11 + 4 + 15 + 19 + 5 + 30 + 5 + 10	12	8	8	70+5+5		L	1 : 23	1 : 38
O2 SYMPTOM :11 in RCC						S		
	15					L		
						S		
	18					L		
						S		
	21					L		
						S		
	24					L		
						S		
	27					L		
						S		
	30					L		
						S		
	33					L		
						S		
REACHED BOTTOM	~~36~~					L		1 : 15
:02						S		
34	39					L		
						S		
	42					L		
						S		
	45					L		
						S		
	48					L		
						S		
	51					L		
						S		

Location of Dive	Name / Rank of Standby Diver	Divers (Signatures)
Purpose of Dive	Supervisor (sign)	Chartman (sign)

Figure 3-3-3 EXAMPLE 13 (Air) Dive Record Chart (msw)

Minor Symptoms of O2 Toxicity in RCC

SurD O2 Dive to 36 msw (34+2) / 75 min

3304 Omitted Decompression – ASYMPTOMATIC:

1. Diver shows NO symptoms;

   a. RCC IMMEDIATELY AVAILABLE (less than 7 min.),

      (1) **<u>If the 9-msw or deeper stops were NOT completed, and</u>**

         (a) In-Water Omitted-D ≤ 30 min, and

         (b) Planned RCC time ≤ 30 min,

         (c) ***Treat Using <u>CF Treatment Table 5</u>***,

            i. See EXAMPLE 14 (Air) and EXAMPLE 15 (Air),

            ii. To maintain simplicity in Omitted-D procedures, the time omitted at 9 msw on O2 (Table 2) is considered equal to time omitted at 9 msw on air (CF Table 1 and 3).

      (2) **<u>If the 9-msw or deeper stops were NOT completed, and</u>**

         (a) In-Water Omitted-D > 30 min, or

         (b) Planned RCC time > 30 min,

         (c) ***Treat using <u>CF Treatment Table 6</u>*** ,

            i. See EXAMPLES 16 (Air) and EXAMPLE 17 (Air),

            ii. To maintain simplicity in Omitted-D procedures, the time omitted at 9 msw on O2 (CF Table 2) is considered equal to time omitted at 9 msw on air (CF Table 1 and 3).

      (3) **<u>If the 9-msw In-Water stop was completed with no previous omitted decompression</u>**

         (a) Recompress the diver in the RCC on O2 to 12 msw, and

         (b) Decompress according to the appropriate Surface Decompression (Sur-D O2) schedule,

         (c) See EXAMPLE 18 (Air).

      (4) **<u>If the RCC must travel from the 12 msw RCC stop prior to completion of the scheduled time during a Sur-D O2 procedure;</u>**

         (a) Treat using CF <u>Treatment Table 6</u>,

      (5) **<u>While conducting a Sur-D, if for any reason the SurD procedure cannot be completed</u>**

         (a) Treat using CF <u>Treatment Table 6</u>,

      (6) **<u>If the 7-minute Surface Interval is violated see Article 3305 and Figure 3-3-4, Violation of 7-minute Surface Interval Flowchart,</u>**

      (7) **<u>If the 7 minute surface interval has been violated in combination with omitted decompression,</u>**

         (a) Treat using CF <u>Treatment Table 6</u>,

(8) **<u>If the Omitted decompression occurred at the first stop,</u>**

(a) Return the diver to a depth one stop deeper and remain there for the time scheduled for the first strop,

(b) Continue decompression IAW the original schedule, and

(c) After decompression, observe diver for one hour,

b. RCC NOT IMMEDIATELY AVAILABLE,

(1) **<u>The preferred action is to get the diver to a recompression chamber (RCC) for treatment,</u>**

(a) The diver should receive 100% O2 by double-seal oral/nasal mask while enroute to the RCC,

(2) **<u>When transit to an RCC is not feasible, the Dive Supervisor has the following two options,</u>**

(a) FIRST OPTION;

i. Return the diver to a depth one stop deeper than where the omission occurred and repeat this stop,

ii. Continue decompression IAW the original schedule, and

iii. See EXAMPLE 19 (Air).

<u>OR</u>

(b) **<u>SECOND OPTION;</u>**

i. If the omission occurred at the first stop, return the diver to a depth one stop deeper, Remain there for the time scheduled for the first stop,

ii. Continue decompression IAW the original schedule,

iii. After decompression, observe the diver for one hour, and

iv. See EXAMPLE 20 (Air).

EXAMPLE 14 (AIR)

- **CF Air Dive to 51 msw (49+2) / 20 min**
- **Omitted decompression – ASYMPTOMATIC**
- **RCC available**
- **9 msw or deeper stops were not completed**
- **In-Water omitted decompression ≤ 30 min**
- **Planned RCC time ≤ 30 min**

	From CF Table 1	STOPS	From CF Table 3
Dive: 51 msw (49+2) / 20 min (CF Table 1)	5 min	12-msw	5 min
	5 min	9-msw	5 min
	8 min	6-msw	
	20 min	3-msw	
		12-msw RCC	25 min on RCC O2
Situation:	**Diver surfaces after completing the 12-msw stop and only 3 minutes of the 9-msw stop. Diver is asymptomatic and RCC is available**		

Action: From CF Table 3, the diver omitted 2 minutes of in-water decompression and has a planned RCC time of 25 minutes

Treat using CF Treatment Table 5

1. **Omitted-D ≤30 minutes and**

2. **Planned RCC time is ≤ 30 minutes.**

<u>EXAMPLE 15</u> (AIR)

- **CF Air Dive to 51 msw (49+2) / 20 min**
- **Omitted decompression – ASYMPTOMATIC**
- **RCC available**
- **9 msw or deeper stops were not completed**
- **In-Water omitted decompression ≤ 30 min**
- **Planned RCC time ≤ 30 min**

<table>
<tr><td rowspan="5">Dive:
51 msw (49+2)
/ 20 min
(CF Table 1)</td><td>From CF Table 1</td><td>STOPS</td><td>From CF Table 3</td></tr>
<tr><td>5 min</td><td>12-msw</td><td>5 min</td></tr>
<tr><td>20 min</td><td>9-msw</td><td>5 min</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td></td><td>12-msw RCC</td><td>25 min on RCC O2</td></tr>
<tr><td>Situation:</td><td colspan="3">Diver surfaces after completing the 12-msw stop and only 3 minutes of the 9-msw stop.
Diver is asymptomatic and RCC is available.</td></tr>
<tr><td colspan="4">Action: From CF Table 3, the diver omitted 2 minutes of in-water decompression and has a planned RCC time of 25 minutes

Treat using CF Treatment Table 5:

1. Omitted-D ≤ 30 minutes; and

2. Planned RCC time is ≤ 30 minutes.

NOTE: To maintain simplicity in Omitted-D procedures, the time omitted at 9 msw on O2 (CF Table 2) is considered equal to time omitted at 9 msw on air (CF tables 1 and 3)</td></tr>
</table>

<u>EXAMPLE 16</u> (AIR)

- **CF Air Dive to 42 msw (40+2) / 35 min**
- **Omitted decompression – ASYMPTOMATIC**
- **RCC available**
- **9 msw or deeper stops were not completed**
- **In-Water omitted decompression ≤ 30 min**
- **Planned RCC time > 30 min**

<table>
<tr><td rowspan="7">Dive:
42 msw (40+2)
/ 20 min
(CF Table 1)</td><td>From CF Table 1</td><td>STOPS</td><td>From CF Table 3</td></tr>
<tr><td>5 min</td><td>12-msw</td><td>5 min</td></tr>
<tr><td>7 min</td><td>9-msw</td><td>7 min</td></tr>
<tr><td>9 min</td><td>6-msw</td><td></td></tr>
<tr><td>37 min</td><td>3-msw</td><td></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td></td><td>12-msw RCC</td><td>34* min on
RCC O2</td></tr>
<tr><td>Situation:</td><td colspan="3">Diver surfaces after completing the 12-msw stop and only 3 minutes of the 9-msw stop.

Diver is asymptomatic and RCC is available</td></tr>
<tr><td colspan="4">Action: From CF Table 3, the diver omitted 31 minutes of in-water decompression and has a planned RCC time of 34* minutes.

Treat using CF Treatment Table 6:

1. Omitted-D < 30 minutes; <u>but</u>

2. Planned RCC time is > 30 minutes.</td></tr>
</table>

<u>EXAMPLE 17</u> (Air)

- **CF Air Dive to 60 msw (58+2) /40 min**
- **Omitted decompression – ASYMPTOMATIC**
- **RCC available**
- **9 msw or deeper stops were not completed**
- **In-Water omitted decompression > 30 min**
- **Planned RCC time > 30 min**

<table>
<tr><td rowspan="10">Dive:
60 msw (58+2)
/ 20 min
(CF Table 1)</td><td>From CF Table 1</td><td>STOPS</td><td>From CF Table 3</td></tr>
<tr><td>6 min</td><td>21-msw</td><td>6 min</td></tr>
<tr><td>4 min</td><td>18-msw</td><td>4 min</td></tr>
<tr><td>6 min</td><td>15-msw</td><td>6 min</td></tr>
<tr><td>7 min</td><td>12-msw</td><td>7 min</td></tr>
<tr><td>15 min</td><td>9-msw</td><td>15 min</td></tr>
<tr><td>38 min</td><td>6-msw</td><td></td></tr>
<tr><td>109 min</td><td>3-msw</td><td></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td></td><td>12-msw RCC</td><td>82** min on
RCC O2</td></tr>
<tr><td>Situation:</td><td colspan="3">Diver surfaces after completing only 1 minute of the 18-msw stop.

Diver is asymptomatic and RCC is available</td></tr>
</table>

Action: From CF Table 3, the diver omitted 31 minutes of in-water decompression and has a planned RCC time of 82** minutes.

Treat using CF Treatment Table 6:

1. **Omitted-D < 30 minutes; *<u>but</u>***
2. **Planned RCC time is > 30 minutes.**

<u>EXAMPLE 18</u> (AIR)

- **CF Air Dive to 39 msw (37+2) /40 min**
- **Omitted decompression – ASYMPTOMATIC**
- **RCC available**
- **9 msw in-water stop completed**
- **NO previous decompression omitted**

<table>
<tr><td rowspan="7">Dive:
39 msw (37+2)
/ 40 min
(CF Table 1)</td><td>From CF Table 1</td><td>STOPS</td><td>From CF Table 3</td></tr>
<tr><td>4 min</td><td>12-msw</td><td>4 min</td></tr>
<tr><td>7 min</td><td>9-msw</td><td>7 min</td></tr>
<tr><td>9 min</td><td>6-msw</td><td></td></tr>
<tr><td>39 min</td><td>3-msw</td><td></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td></td><td>12-msw RCC</td><td>36* min on
RCC O2</td></tr>
<tr><td>Situation:</td><td colspan="3">Diver surfaces after completing the 12-msw stop, the 9-msw stop and only 3 minutes of the 6-msw stop.

Diver is asymptomatic and RCC is available</td></tr>
<tr><td colspan="4">Action: Since the diver completed the 9-msw stop, switch to CF Table 3 (Sur-D O2)</td></tr>
</table>

<u>EXAMPLE 19</u> (AIR) 1st Option

- **CF Air Dive to 39 msw (37+2) /40 min**
- **Omitted decompression – ASYMPTOMATIC**
- **RCC <u>NOT</u> immediately available**
- **Transit to RCC unfeasible**

<table>
<tr><td rowspan="7">Dive:
39 msw (37+2)
/ 40 min
(CF Table 1)</td><td>From CF Table 1</td><td>STOPS</td><td></td></tr>
<tr><td>4 min</td><td>12-msw</td><td></td></tr>
<tr><td>7 min</td><td>9-msw</td><td></td></tr>
<tr><td>9 min</td><td>6-msw</td><td></td></tr>
<tr><td>39 min</td><td>3-msw</td><td></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td></td><td>12-msw RCC</td><td></td></tr>
<tr><td>Situation:</td><td colspan="3">Diver surfaces after completing the 12-msw stop, the 9-msw stop and only 3 minutes of the 6-msw stop.

Diver is asymptomatic and it is not feasible to transit to an RCC.</td></tr>
<tr><td colspan="4">ACTION:
1. Immediately recompress in-water to 9-msw for 7 minutes.

2. Continue decompression in accordance with the original schedule (complete 6-msw and 3-msw stops).</td></tr>
</table>

<u>EXAMPLE 20</u> (AIR) 2nd Option

- **CF Air Dive to 39 msw (37+2) /40 min**
- **Omitted decompression – ASYMPTOMATIC**
- **RCC <u>NOT</u> immediately available**
- **Transit to RCC unfeasible**

	From CF Table 1	STOPS	
Dive: 39 msw (37+2) / 40 min (CF Table 1)	4 min	**12-msw**	
	7 min	**9-msw**	
	9 min	**6-msw**	
	39 min	**3-msw**	
		12-msw RCC	
Situation:	**On ascent to 12-msw stop, diver loses control of ascent and surfaces (Blow-up). Diver is asymptomatic and it is not feasible to transit to an RCC.**		
ACTION: 1. Immediately recompress in-water to 15 msw for 4 minutes. 2. Continue decompression IAW with the original schedule (complete 12, 9, 6 and 3-msw stops).			

3305 Violation of 7-minute Surface Interval (Sur-D O2)

1. If more than 7 minutes elapse between leaving the 9-msw in-water stop and reaching the 12-msw in the RCC,

AND

The diver is <u>ASYMPTOMATIC</u>

a. The diver is in the RCC, under pressure, by the 6 min 20 sec (:06::20) to a maximum delay of :10.

(1) Round the delay up to the next whole minute.

(2) Double it.

(3) Add that time to the 12 msw RCC stop time.

(4) Resume surface decompression using the recalculated time.

(a) See EXAMPLE 21 (Air)

OR

b. The diver is in the RCC, but NOT under pressure by the :06::20 mark of the Surface Interval, Delay time > 3 min and Planned RCC time > 30 min

(1) Treat using CFTreatment Table 5

OR

c. The diver is in the RCC, but NOT under pressure by the :06::20 mark of the Surface Interval, Delay time > 3 min and Planned RCC time ≤ 30 min

(1) Treat using CF Treatment Table 6

2. Refer to Violation of 7-minute Surface Interval Flowchart (**Figure 3-3-4).**

Violation of 7-minute Surface Interval (Sur-D O2)

<table>
<tr><td colspan="3">1. If the diver is under pressure in the RCC by the :06::20 mark of the SI, <u>AND</u></td></tr>
<tr><td colspan="2">a. Any SI stress encountered is FULLY RESOLVED by the time the diver reaches the 12-msw stop and the :07:: mark of the SI</td><td>Decompress IAW
CF Table 3 SurD O2</td></tr>
<tr><td colspan="2">b. Is delayed during descent beyond :07:00. but reaches the 12-msw stop by the :10 mark of the SI without encountering SI stress</td><td>Double the delay and add it to the 12-msw RCC time</td></tr>
<tr><td colspan="3">2. If the diver is <u>NOT</u> under pressure in the RCC by the :06::20 mark of the SI, <u>AND</u></td></tr>
<tr><td rowspan="2">a. The diver shows NO signs of SI, <u>AND</u>
The scheduled RCC time (including any air breaks) is</td><td>≤ 30 min</td><td>Treat using CF TT 5, contact a Diving Medical Officer</td></tr>
<tr><td>> 30 min</td><td rowspan="2">Treat using CF TT 6, contact a Diving Medical Officer</td></tr>
<tr><td colspan="2">b. The diver indicates SI stress</td></tr>
<tr><td colspan="3">3. If the 7-min. SI has been violated in combination with omitted decompression, treat the diver using CF TT 6 and contact a Diving Medical Officer</td></tr>
</table>

<u>EXAMPLE 21</u> (AIR)

- **Sur-D Dive to 42 msw (40+2) /35 min**
- **Violation of 7 minute Surface Interval (Sur-D O2)**
- **The diver is ASYMPTOMATIC**
- **The diver is in the RCC under pressure by the 06::20 mark of the Surface Interval**
- **Delay time ≤ 3 min**

Dive: 42 msw (40+2) / 35 min (CF Table 3)		**STOPS**	**From CF Table 3**
		12-msw	5 min
		9-msw	7 min
		6-msw	Surface Interval (SI)
		12-msw RCC	34* on RCC O2
Situation:	**1. Divers are under pressure in the RCC by :06::20 of the SI.** **2. At 5 msw descent is stopped because Red Diver has an ear problem,** **3. The RCC travels 2 msw back to 3 msw.** **4. Red Diver's ears clear and descent is resumed to 12 msw at a slower rate.** **5. 12-msw stop is reached at 09::43 seconds of the SI.** **6. The delay in reaching the 12-msw stop is :02::43 (:09::43 less :07::00).**		

ACTION:

ROUND UP	**1.**	**Round the delay up to the next whole minute (Delay :02::43 rounded to :03)**
DOUBLE UP	**2.**	**Double the delay time (2 X :03 + :06)**
ADD IT	**3.**	**Add to the time at the RCC stop time (:06 + :34 + = 40*)**
RESUME	**4.**	**Resume Surface decompression using: 40* as the new decompression requirement**

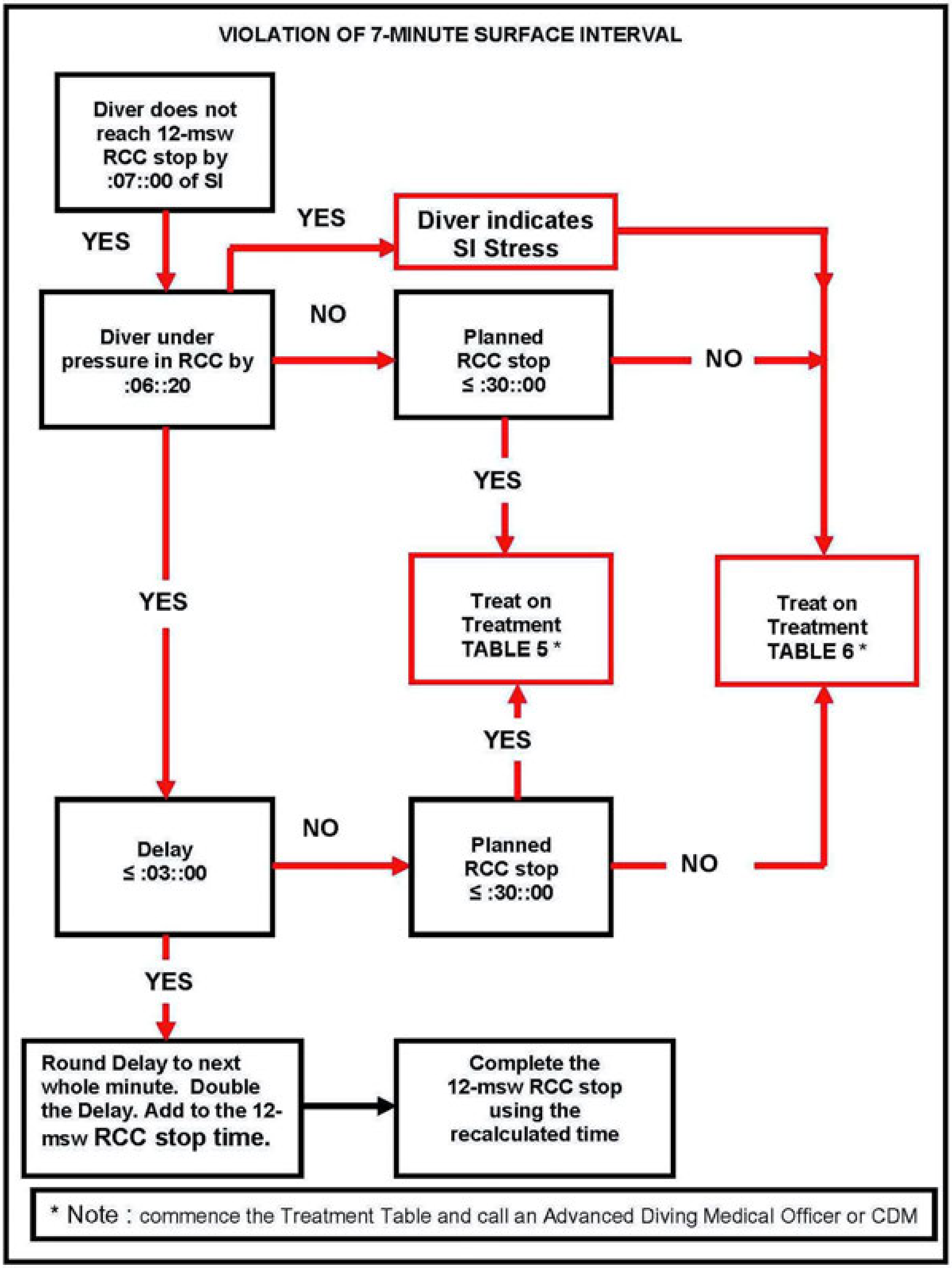

Figure 3-3-4 Violation of 7-Minute Surface Interval Flowchart

3306 Flying After Diving

1. After a No-Decompression Dive

a. Allow enough Surface Interval time, based on the highest RG achieved, applied after the last dive, for the RF to diminish to 1.0 before flying.

b. Example: The diver completes three No-D repetitive dives with RGs of “E”, “F” and “B”. The diver commences the SI from the last dive at 0800 hrs. IAW the rule, the diver’s “time to fly” will be based on the RG = “F”, with the SI starting at 0800 hrs. Therefore, the diver will be clear to fly in 15 hours (2300 hrs clock time).

2. After Decompression dive

a. A minimum SI of **24 hours** is required before flying.

3307 Decompression Stress During Surface Interval

1. During the Surface Interval (SI) of a surface decompression with oxygen profile, the required decompression is intentionally violated. At the completion of the SI, the diver is re-pressurised in a chamber to a depth of 12 msw. This is deeper than called for by the decompression model, and held at depth breathing intermittent oxygen for longer than called for by the decompression model. The diver is given additional decompression during the chamber phase of the SurD O2 profile to compensate for the increased stress of the SI.

2. During the SI the diver is exposed to a higher level of decompression stress than would be encountered if in-water decompression had been executed. Therefore, the diver may experience signs and/or symptoms of decompression stress. Manned validation has indicated that when symptoms do occur during the SI, they are usually very mild and late. In addition, the symptoms usually completely resolve during the press to 12 msw in the chamber. The experimental dives also demonstrated that the divers who experienced SI symptoms had the same incidence of DCS after the completion of the dive as those divers who did not experience signs or symptoms during the SI. During the table development process, the pre-surface interval decompression was adjusted to reduce the occurrence of SI problems.

3. **SurD O2 Diving – SI Stress**

a. All signs and symptoms of SI stress have completely resolved by the time the diver is confirmed on oxygen at 12 msw.

(1) Complete the decompression profile as planned.

b. Signs and symptoms of SI stress have NOT completely resolved by the time the diver is confirmed on oxygen at 12 msw

(1) Treat as decompression sickness.

(a) Immediately press the diver to 18 msw.

(b) Initiate **Treatment Table 6**

(c) Contact the Advanced Diving Medical Officer

Chart of General Procedures
- Air Decompression Tables

<u>VARIATIONS IN RATE OF ASCENT</u> **Art. 3302** **Ascent Rate = 18 mpm ± 3**	
Ascent Rate Too Slow	**(Less than 15 mpm)**
Delay Starts *Deeper Than* Half of the Maximum Depth of the Dive	1. Add delay to bottom time. 2. Decompress IAW new bottom time.
Delay Starts *Shallower Than* Half of the Maximum Depth of the Dive	1. Add delay to stop time of the next stop. 2. If no stop is scheduled, then stop at 3 msw for the time of the delay.
Ascent Rate *Too* Fast	**(More than 21 mpm)**
Ascent Rate to First Stop Too Fast	1. No correction is required. 2. Time at stop includes travel time to the stop.
Ascent Rate Too Fast ***(when no stops required)***	1. Observe diver for at least one hour.

Figure 3-3-5 Chart of General Procedures - Air Decompression Table (*Sheet 1 of 7)*

Chart of General Procedures
– Air Decompression Tables

OXYGEN-RELATED PROBLEMS	**Art. 3303**
Oxygen Problem In-Water (*at 9 msw O_2 Stop)*	
Minor Symptoms of O2 Toxicity In-Water *(at 9 msw O2 Stop)*	1. Switch diver to air and ventilate 2. Wait for symptoms to subside, then wait 15 minutes more. 3. Recommence O_2 at point of interruption a. If *symptoms recur*, switch to CF Air Table 1. ***OR*** 1. Switch diver to air ventilate 2. Continue decompression IAW CF Air Table 1 a. The O_2 time is Good Time for decompression purposes and is subtracted from the 9-msw and/or 6-msw and/or 3-msw stop times. ***OR If an RCC is immediately available*** 1. Switch diver to air and ventilate 2. Upon completion of the 9-msw air stop, SurD O_2 may be performed
Serious, Incapacitating Symptoms of CNS O2 Toxicity In-Water *(at 9 msw O2 Stop)*	1. Take diver off O_2, ventilate and stabilise. a. Maintain depth while the diver is convulsing to prevent embolism. 2. Surface diver carefully to reduce risk of embolism. a. If any uncertainty exists, treat for possible embolism. 3. Otherwise, treat for omitted decompression. 4. Observe carefully.
Loss of O2 In-Water (*at 9 msw O2 Stop*)	1. Switch diver to air. 2. Re-establish O_2 and resume at the point of interruption. a. *If not successful in re-establishing O_2*, continue decompression IAW CF Air Table 1. 1) The O_2 time is Good Time for decompression purposes and is subtracted from the 9-msw and/or 6-msw and/or 3-msw air stop times. ***OR If O_2 available in RCC*** 1. Switch diver to air. 2. Upon completion of the 9-msw air stop, SurD O_2 may be performed.

Figure 3-3-5 Chart of General Procedures - CF Air Table 1 (Sheet 2 of 7)

Chart of General Procedures
CF Air Table 1

<u>OXYGEN-RELATED PROBLEMS (*Cont'd*)</u>	**Art. 3303 *Cont'd***
Oxygen Problem in RCC (*SurD* O_2)	
Loss of O2 in RCC **(*SurD O2*)**	***If no success in re-establishing O_2*** 1. Decompress IAW CF Air Table commencing at 12 msw. a. Previous O_2 time is Good Time and is subtracted from the 12-msw and/or 9-msw and/or 6-msw and/or 3-msw stop times.
Minor Symptoms of **O2 Toxicity in RCC** **(*SurD O2*)**	1. Take diver off O_2. 2. After symptoms have subsided a. Leave diver on air for an additional 15 minutes. b. Resume O_2 from time of interruption. 3. If O_2 breathing is resumed and O_2 symptoms recur a. Switch diver to CF Air Table. b. Complete decompression on air. ***OR*** 1. Take dive off O_2. 2. Continue decompression IAW CF Air Decompression Table. a. The O_2 time is Good Time for decompression purposes and is subtracted from the 9-msw and/or 9-msw and/or 6-msw and/or 3-msw air stop times.
Serious, Incapacitating Symptoms of **CNS O2 Toxicity in RCC** **(*SurD O2*)**	1. Take diver off O_2 and stabilise. 2. Continue decompression IAW CF Air Table. a. The O_2 time is Good Time for decompression purposes and is subtracted from the 12-msw and/or 9-msw and/or 6-msw and/or 3-msw air stop times.

Figure 3-3-5 Chart of General Procedures - CF Air Table 1 (Sheet 3 of 7)

Chart of General Procedures
CF Air Table 1

<table>
<tr><td colspan="2"><u>OMITTED DECOMPRESSION – ASYMPTOMATIC</u> Art. 3304
(Diver shows NO symptoms)</td></tr>
<tr><td colspan="2">RCC IMMEDIATELY AVAILABLE</td></tr>
<tr><td rowspan="2">9-msw or deeper stops
were NOT completed</td><td>In-Water Omitted-D ≤ 30 min <u>AND</u>
Planned RCC time ≤ 30 min
Treat Using Treatment Table 5
NOTE: To maintain simplicity in Omitted-D procedures, the time omitted at 9 msw on O_2 (CF Table 2) is considered equal to time omitted at 9 msw on air (CF Tables 1 and 3).</td></tr>
<tr><td>In-Water Omitted-D > 30 min <u>OR</u>
Planned RCC time > 30 min
Treat Using Treatment Table 6
NOTE: To maintain simplicity in Omitted-D procedures, the time omitted at 9 msw on O_2 (CF Table 2) is considered equal to time omitted at 9 msw on air (CF Tables 1 and 3).</td></tr>
<tr><td>9-msw In-Water Stop
was completed with no previous omitted decompression</td><td>1. Recompress the diver in the RCC on O_2 to 12 msw.
2. Decompress according to the appropriate Surface Decompression (SurD O_2) schedule.
a. On a SurD schedule in which there is no 9-msw in-water stop, the diver cannot incur omitted decompression provided that the Surface Interval is completed within the seven minutes allowed.</td></tr>
<tr><td>If the RCC must travel from the 12-msw RCC stop prior to completion of the scheduled time during a SurD O2 procedure</td><td>Treat Using Treatment Table 6</td></tr>
<tr><td>While conducting a Sur-D,
if any reason the Sur-D procedure cannot be completed</td><td>Treat Using Treatment Table 6</td></tr>
</table>

Figure 3-3-5 Chart of General Procedures - CF Air Table 1 (Sheet 4 of 7)

Chart of General Procedures

CF Air Table 1

OMITTED DECOMPRESSION – *ASYMPTOMATIC* (*Cont'd*) (***Diver shows NO symptoms***)	**Art 3304 *Cont'd***
RCC IMMEDIATELY AVAILABLE (Cont'd)	
Violation of 7-minute Surface Interval	1. ***If the 7-minute Surface Interval was violated*** a. See "Violation of 7-Minute Surface Interval", Art 3305. b. See also Figure 3-3-4, *Violation of 7-Minute Surface Interval Flowchart*.
Omitted decompression in combination with violation of the 7-minute Surface Interval (SI)	***Treat Using Treatment Table 6***
Omitted decompression occurring at the first stop	1. Return the diver to a depth one stop deeper and remain there for the time scheduled for the first stop. 2. Continue decompression IAW the original schedule. 3. After decompression, observe diver for one hour.
RCC NOT IMMEDIATELY AVAILABLE	
Preferred action	1. **Get the diver to an RCC for treatment** a. The diver should receive 100% O_2 by double seal oral/nasal mask while enroute to the RCC.
When transit to an RCC is not feasible, and as a last resort	Return the diver to a depth one stop deeper than where the omission occurred and repeat this stop. Continue decompression IAW the original schedule. ***OR If the omission occurred at the first stop*** 1. Return the diver to a depth one stop deeper and remain there for the time scheduled for the first stop. 2. Continue decompression IAW the original schedule. 3. After decompression, observe for one hour.

Figure 3-3-5 Chart of General Procedures - CF Air Table 1 (Sheet 5 of 7)

Chart of General Procedures
CF Air Table 1

VIOLATION OF 7-MINUTE SURFACE INTERVAL (SurD O_2) **Art. 3305**

<table>
<tr>
<td>

If more than 7 minutes elapse between leaving the 9-msw in-water stop and reach the 12-msw RCC stop and the diver is

ASYMPTOMATIC

See also **Figure 3-3-4**, *Violation of 7-minute Surface Interval Flowchart*

</td>
<td>

- **The diver is in the RCC, under pressure, by the :06::20 mark of the Surface Interval**
- **Delay time ≤ 3 min**
  1. Round the delay up to the next whole minute.
  2. Double the delay time.
  3. Add it to the 12-msw RCC stop time.
  4. Resume surface decompression using the recalculated time.

OR

- **The diver is in the RCC, but NOT under pressure y the :06::20 mark of the Surface Interval**
- **Delay time > 3 min**
- **Planned RCC time ≤ 30 min**

Treat Using Treatment Table 5

OR

- **The diver is in the RCC, but NOT under pressure by :06::20 mark of the Surface Interval**
- **Delay time 3 min**
- **Planned RCC time   30 min**

Treat Using Treatment Table 6

</td>
</tr>
</table>

Figure 3-3-5 Chart of General Procedure - Air Decompression Tables (Sheet 6 of 7)

Chart of General Procedures
- Air Decompression Table

FLYING AFTER DIVING	**Art. 3306**
1. **Flying After No-Diving** After a No-D dive, allow enough surface interval time, based on the highest RG achieved, applied after the last dive, for the RF to diminish to **1.0** before flying 2. **Flying After Decompression Diving** After a Decompression dive, a minimum SI of **24 hours** is required before flying.	

DECOMPRESSION STRESS DURING SURFACE INTERVAL (SI)	**Art. 3307**
SurD O_2 Diving – SI Stress	
All sign and symptoms of SI stress have completely resolved by the time the diver is confirmed on O_2 at 12 msw	1. Complete the decompression profile as planned.
All signs and symptoms of SI stress have NOT completely resolved by the time the diver is confirmed on O_2 at 12 msw.	1. Treat as decompression sickness, a. Immediately press the diver to 18 msw. b. Initiate **CF Treatment Table 6**. c. Contact an Advanced Diving Medical Officer

Figure 3-3-5 Chart of General Procedures - Air Decompression Table (Sheet 7 of 7)

3308 - 3399 Not Allocated

SECTION 4

HELIUM OXYGEN (HeO2) DECOMPRESSION PROCEDURES

3401 Introduction

1. The Canadian Forces Helium-Oxygen 84/16 Decompression Tables were developed by the Experimental Diving Undersea Group (EDUG) at DRDC of Defence Research and Development Canada – Toronto (DRDC-Toronto) during the period June 1986 through March 1991. The development programme was also conducted jointly with the United States Navy and Royal Navy under the, then ABCA-10 (NAVY) Information Exchange Programme.

2. The aim of the programme was to develop a Helium-Oxygen (HeO2) decompression model that would improve the operational efficiency and safety for deep HeO2 mixed gas diving and provide tables and procedures for the Canadian Forces and subsequently, for allied forces.

3. Over the development process, 21 experimental validation dive series (totalling 1471 manned exposures) and one at-sea procedural technical evaluation were conducted. As in the case of the development of the Canadian Forces Air Tables, ultrasonic Doppler monitoring was utilized in the establishment and maintenance of decompression stress acceptance criteria for the model. Manned validation was conducted at the normal and exceptional exposure limits of the model (both In-water and Surface Decompression). Ultimately, an HeO2 – Surface Decompression with Oxygen (Sur-D O2) table and encompassing procedures were developed providing simplicity of operations. Further, they paralleled and complimented the CF Air Diving Tables and Procedures.

4. The model, tables and procedures have significantly reduced the probability of in-water CNS oxygen toxicity and concurrently have reduced the probability and severity of decompression sickness of 2% within the normal limits and less than 4% in the exceptional exposure limit. Further, the utilisation of air decompression techniques has reduced the consumption of helium gas and improved diver communications. The ***HeO2- Emergency Decompression*** table, to be used in the case of loss of oxygen, underwent manned evaluation and was found fully satisfactory,

5. The CF Helium-Oxygen, 84/16 Decompression Tables provide a methodology to negate nitrogen-induced narcosis, provide deep diving operation with significant flexibility and allow for the substantial extension of depth/bottom time limits outside that of the existing CF Air Tables (see **Figure 3-4-1**).

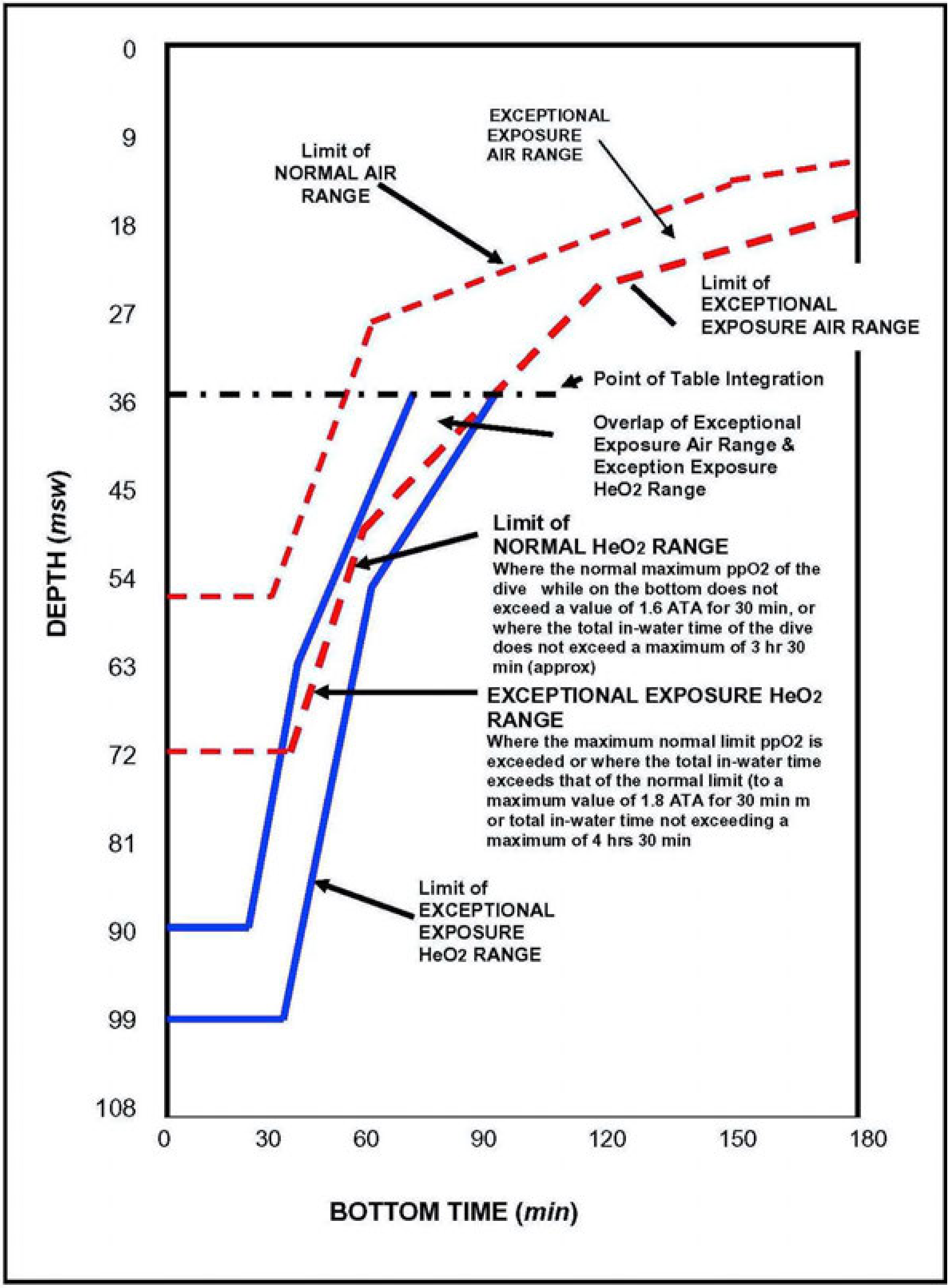

Figure 3-4-1 HeO2 Diving Limits

3402 Definition of Terms

1. The following is the Definition of terms use in HeO2 diving found throughout this manual, they are:

a. **Actual Depth of Dive t**he Actual Depth of a Dive is determined by adding 2 metres to the deepest gauge depth achieved during the dive (plus 2 msw rule). This total is used to determine required decompression. See Article 5207, *On Bottom*

b. **Adjusted Depth** for the purpose of Altitude Diving, adjusted depth is a total of the actual dive depth and the 3 msw that must be added if the diver has not had 24 hours to acclimatize at altitude. This is the figure entered at CF Table 5 to determine the depth correction required.

c. **Ascent Rate** a specified rate of travel that the diver should maintain while ascending. For HeO2 Diving Tables: **the ascent rate is 18 mpm ± 3.**

NOTE

In the context of the Definitions/Rules and Procedures of 84/16 HeO2 Decompression Tables, “mpm” (metres per minute) equals “msw/min” (metres seawater per minute).

d. **Bottom Time (BT)** the total elapsed time from when the diver leaves the surface to the time (next whole minute) that the diver begins ascent.

e. **Decompression Schedule** specific decompression procedure for a given combination of depth and bottom time as listed in a decompression table, normally indicated as maximum depth (msw) / bottom time (min).

f. **Decompression Stop** specific length of time, which a diver must spend at a specified depth to allow for the elimination of sufficient inert gas from the body to allow safe ascent to the next decompression stop or the surface.

g. **Depth** the maximum depth attained, measured in msw.

h. **Descent Rate** the maximum rate of travel allowed in descending to the bottom. For the CF HeO2 Diving Tables: **The maximum descent rate is 18 msw or slower**

i. **Omitted Decompression** omitted Decompression occurs when the actual dive decompression profile does not satisfy the required stop times of the appropriate CF Diving Table(s) Decompression Schedule.

j. **Point of Interuption** the time at which normal decompression was interrupted as a result of an emergency procedure, *e.g.* loss of breathing gas or symptoms of O2 toxicity. Once the situation allows the return to normal decompression procedures, re-entered the table where the interruption occurred.

k. **Recorded Time** record of event times placed on the dive chart record sheet in hours and minutes. Seconds may be recorded in the “Remarks” column. See Article 3104, para “m”, Recorded Time.

l. **Repetitive Dive** any dive conducted within 18 hours of a previous dive. No repetitive dives are allowed execpt as outlined under the Combined Bottom Time / Maximum Depth Option. See Article 3405).

m. **Single Dive** any dive conducted more than 18 hours after the previous dive.

n. **Stop Time** the tabulated time of a decompression stop time commences at the time of leaving the previous stop and ceases when the required time for that stop has been completed, as indicated by the tables.

(1) The exception is the case of breathing gas switches (at the first air stop and the switch to oxygen at 9 msw, where the stop time will not commence until the diver has reached the specified depth and has been confirmed to be breathing the new gas mixture.

o. **Surface Interval – Sur-D O2** when using the CF 84/16 HeO2 Decompression Table (CF Table 8) (Metres) HeO2 – Surface Decompression with Oxygen, the Surface Interval (SI) consist of the time from the diver leaving the 9-msw stop to arriving at the 12-msw Recompression Chamber (RCC) stop. **The maximum time allowed is 7 minutes (refer to Article 3305).**

p. **Total Decompression Time in the Tables** it includes the sum of all ascent times, stop times, O2 periods, air breaks and surface interval times. This time is a GUIDE ONLY.

NOTES

1. Tabulated ascent time from the bottom to the first stop at 18 mpm is rounded to the next whole minute and is included in the Total Decompression time for the profile. Additionally, it appears within the tables as, MAX Time to First Stop.
2. Combine, round up to nearest 1 minute and include in the Total Decompression Time for that profile, the tabulated ascent time (18 mpm) from the 12-msw air stop to the 9-msw O2 stop to the surface.
3. SurD O2 Surface Interval Time is included in the Total Decompression Time of the dive.

3403 Operational Procedures

1. The procedures parallel, as closely as possible, the operational procedures and definitions of the CF Air Tables. They consist of four distinct tables:

CF Table 6	HeO2 – **Abort Table (Metres)**
CF Table 7	HeO2 **– In-Water Oxygen Decompression Table (Metres)**
CF Table 8	HeO2 **– Surface Decompression with Oxygen (Metres)**
CF Table 9	HeO2 **– Emergency Decompression Procedures (Metres)**

2. HeO2 – ***In-Water Oxygen Decompression*** (CF **Table 7**) and HeO2 – ***Surface Decompression with Oxygen (SurD O2*****)** (**Table 8**) profiles contain identical decompression stops from the first stop to the inclusive of the 12-msw stop. HeO2-***Emergency Decompression*** (**Table 9**) provides in-water emergency air decompression from the 9-msw stop to the surface, and provides the option of SurD O2 upon completion of the 9-msw in-water stop on air, and further provides chamber emergency air decompression from 12-msw to the surface.

3. Special Notes

a. An abort direction is provided where the diver ascends from depth, utilizing CF Table 6, HeO2 – ***Abort Table***. See **Article 3404**.

b. Until HeO2 repetitive dive schedules are validated, Dive Supervisors may utilize the ***Combined Bottom Time/Maximum Depth Option*** (see Article 3405 to conduct ***combined*** dives).

c. Emergency procedures available to the Supervisor, as contained within this text, have additionally been compiled into the HeO2 Emergency Flowchart (Figure 3-5-9).

3404 Dive Abort Direction (CF *Table 6)*

1. **Dive Abort**

a. CF Table 6 HeO2 – ***Abort Table*** (Annex C, Chapter 3) is provided for dives that do not attain a depth greater than 36 msw;

b. It provides a No-Decompression capability up to 36 msw/5 min, where the diver may ascend directly to the surface at a rate of 18-mpm ± 3 while breathing 84/16 HeO2 mixed gas;

c. If decompression stops are required, **note**, the stops shown in the Abort Table are **AIR STOPS**; and

d. ***In all cases of depths greater than 36 msw, an appropriate 84/16 HeO2 Decompression Table (In-Water or SurD O2) is to be used.***

3405 Combined Bottom Time / Maximum Depth Option

1. ***In the event of an aborted HeO2 dive.***

<u>OR</u>

In the case of dives where bottom times have not exceeded the normal limit of the table:

a. The diver may dive again on the 84/16 HeO2 tables within 18 hours;

b. The diver is exempt from the repetitive dive restriction;

(1) In this case, the bottom time(s) of the aborted / or previous short dives(s) must be added to the bottom time of the next dive to calculate an appropriate decompression schedule;

c. The diver shall be decompressed IAW both;

(1) Maximum depth attained during any of the dives, and

(2) Total of all bottom times,

(a) However, based on thermal considerations, it is recommended that the total of the combined bottom times should not exceed the normal operational limits of the selected decompression schedule.

NOTE

In this option, all dives are combined and are considered a single dive.

3406 - 3499 Not Allocated

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Section 5

HeO2 DECOMPRESSION PROCEDURES GENERAL

3501 Gases

1. These tables utilize a series of breathing gas mixtures composed of:

   a. 84/16% Helium / oxygen (HeO_2);

   b. Compressed air; and

   c. 100% oxygen.

2. Each gas is utilized independently for a specified depth and time as called for by the tables.

3502 Helium-Oxygen Gas Mixtures

1. The tables were designed using and HeO2 84/16 breathing gas mixture

   a. From the surface to the bottom,

   b. While on the bottom, and

   c. During travel to the first stop.

2. The tables can be used for any HeO2 mixture where the percentage of O2 is 16% or greater, subject to a depth / time limitation based on O2 toxicity (ppO2 while on the bottom not to exceed the operational limit of 1.6 ATA for 30 minutes).

3. Profiles in excess of the normal operational limit for a HeO2 84/16 mix, as contained within these tables, have been validated; refer to Article 3506, Bottom Time Limiting Lines; Normal / Exceptional Exposure, for additional information.

4. Additionally, a caveat is provided where gases up to 16.5% O2 content can be utilized to the normal bottom time limit.

3503 First Stop (Air)

1. Upon arrival at the first stop, switch to air and ventilate until confirmed on air.

2. Remain on air until arrival at the 9-msw stop.

3504 O2 Stop (9-msw)

1. Upon arrival al at the 9-msw O2 stop, switch to O2 and ventilate until confirmed on oxygen.

2. Remain on O2 for the duration of the stop with 30 minute O2 /5-min air break cycle(s) as designated.

   a. Each air break cycle of 5 minute , is indicated by an asterisk (*)

3. The stop time that is indicated for the 9-msw O2 stop is O2 time only. Therefore, the time for each designated air break must be added to the 9-msw TOTAL STOP TIME.

NOTES
for O2 Stop

1. Divers are not ventilated at air breaks. Gas to the breathing umbilical is simply switched to the required breathing medium for the designated time.
2. On completion of the 9-msw stop, travel to the surface is on the breathing medium in use.
3. 5-minute air breaks are part of the required decompression and are included in the total decompression time.

3505 SurD O2 RCC Time

1. The diver descends breathing O2 to the 12-msw RCC stop.

2. 12-msw O2 stop time commences on arrival at 12 msw.

3. At 12 msw the diver remains on O2 for the duration of the stop with 30-minute O2 / 5-minute air break cycle(s) as designated.

4. On completion of the stop, the diver ascends to the surface on the breathing medium in use.

3506 Bottom Time Limiting Lines; Normal / Exceptional Exposure

1. Normal Operational Limit Dives are based on the following profiles:

   a. Where the maximum ppO2 of the dive while on the bottom does not exceed a value of 1.6 ATA for 30 minutes; or

   b. Where the total in-water time of the dive does not exceed a maximum of 3 hours 30 minutes (approximate).

2. However, for operational considerations, the normal limit is extended to include dives to 90 msw for 25 minutes.

3. Additionally, dives utilizing gas mixtures not exceeding an O2 content of 16.5% are considered to fall within the normal limits (90 msw/25 min inclusive).

4. Exceptional Exposure Dives are based on the following profiles:

   a. Where the maximum normal limit ppO2 is exceeded or where the total in-water time exceeds that of the normal limit (to a maximum bottom ppO2 value of 1.8 ATA for 30 minutes, or total in-water time not exceeding a maximum of 4 hours 30 Minutes)

3507 Travel Rates

Ascent Rate	**18 mpm ± 3**
Descent Rate	**18 mpm or slower**
Recommended Ascent / decent Rate of RCC SurD O2 Operations	**18 mpm**

3508 Stop Times / Travel Times

1. **Stop Time** stop Time includes travel time from the previous stop, except when a gas switch occurs at the first stop (air) and 9-msw stop (O2)

2. **Time to First Stop** the "Time to First Stop', as contained in the tables, is provided as a guide only. It indicates the maximum computed time available for the diver to reach the first stop, based on the expiration of an exact bottom time increment.

3. **First Stop – Decompression Time** travel time from the bottom and the time from arrival at the first stop to confirmation that the switch to air is compete, is not included in the first stop decompression time.

NOTE

Gas switching time is ***dead time***

4. **9-msw O2 Stop – Decompression Time** travel time from 12 msw and time from arrival at the 9-msw O2 stop to confirmation that the switch to O2 is complete is not included in the 9-msw O2 stop decompression time.

NOTE

Gas switching time is ***dead time*.**

3509 Delays (Normal Decompression)

1. Delay in Reaching the First Stop

   a. Any delay in reaching the first stop (maximum time to the First Stop exceeded by more than 30 seconds) is added to the bottom time.

   b. Select the appropriate decompression schedule.

2. Delay in Leaving an Air Stop

   a. Any delay in leaving an air stop is considered to be valid decompression time,

   b. Subtract delay time from the next shallower air stop time only.

NOTE

Not applicable to the 9-msw O2 Stop

3510 Oxygen Toxicity at O2 Stop (In-Water and RCC)

1. **Minor Symptoms of O2 Toxicity**

a. **FIRST OPTION**

(1) Stop, switch diver to air and ventilate

(2) Wait for symptoms to subside

(3) Wait an additional 15 minutes

(4) Resume O2 at point of interruption.

(a) If O2 breathing is resumed and O2 toxicity symptoms recur, switch to air and decompress IAW HeO2 –Emergency Decompression (CF Table 9)

i. **In-Water**

1. On completion of the 9-msw air stop of ***HeO2 Emergency Decompression*** **(CF Table 9),** SurD O2 may be performed.

2. All previous 9-msw Air/O2 time can be subtracted form the 9-msw and shallower Emergency Decompression Air Stops

ii. **In RCC**

1. Decompress IAW ***HeO2 – Emergency Decompression*** **(CF Table 9)** commencing at 12 msw

2. Previous Air/O2 times at the 12-msw stop in the chamber can be subtracted from the 12-msw and shallower Emergency Decompression Air Stops.

OR

b. **SECOND OPTION**

(1) Stop, switch diver to air and ventilate.

(2) Decompress IAW ***HeO2 – Emergency Decompression*** **(CF Table 9)**

(a) **In-Water**

i. On completion of the 9-msw air stop of ***HeO2 – Emergency Decompression*** **(CF Table 9),** SurD O2 may be performed.

ii. All previous 9-msw Air/O2 time can be subtracted from the 9-msw and shallower Emergency Decompression Air Stops.

(b) **In RCC**

i. Decompress IAW ***HeO2 – Emergency Decompression*** **(CF Table 9)** commencing at 12 msw.

ii. Previous Air/O2 times at the 12-msw stop in the chamber can subtracted from the 12-msw and shallower Emergency Decompression Air Stops.

2. **Serious Incapacitating symptoms of Oxygen Toxicity**

a. Stop, switch diver to air and ventilate

b. Stabilise

NOTE

The diver is NOT brought to the surface while convulsing!

(1) **In-Water**

(a) If possible, complete 9-msw stop on HeO2 –Emergency Decompression (CF Table 9), the SurD O2.

(b) Surface diver carefully to reduce risk of embolism.

(c) If any uncertainty exists, treat for possible embolism.

(d) Otherwise, treat for omitted decompression and observe carefully.

(2) **In RCC**

(a) Complete decompression IAW ***HeO2 Emergency Decompression*** (CF **Table 9**), commencing at 12 msw.

i. Previous Air/O2 times at the 12-msw stop in the chamber is **Good Time** and can be subtracted from the 12-msw and shallower Emergency Decompression Air Stops

3511 Loss of O2 (In-Water and RCC)

1. **In-Water**

a. Switch to air.

b. Re-establish O2.

c. Resume O2 at point of interruption

(1) If O2 cannot be re-established, decompress IAW *HeO2- Emergency Decompression* (CF Table 9).

(a) **If O2 is available to the RCC**, on completion of the 9-msw Decompression Air Stop, SurD O2 may be employed,

(b) All previous 9-msw Air/O2 time can be subtracted from 9-msw and shallower Emergency Decompression Air stops.

2. **In RCC**

a. Switch to air.

b. Re-establish O2.

c. Resume O2 at point of interruption.

(1) If O2 cannot be re-established, decompress IAW with *HeO2 – Emergency Decompression* (CF Table 9) commencing at 12 msw.

(a) Previous Air/O2 time at 12-msw stop in the chamber is **Good Time** and can be subtracted from the 12-msw and shallower Emergency Decompression air stops.

3512 Lost Gas at Depth (Helium-Oxygen, Air) / Unable to Switch Gases

1. **Lost Helium-Oxygen**

   a. The diver switches to emergency Helium-Oxygen (backpack or stage mount) and the dive is aborted.

   b. The diver then travels to the first stop and switches to air.

2. **Lost Air**

   a. The diver switches to emergency Helium-Oxygen (backpack or stage mount)

   (1) Until air is restored

   (a) If air is restored prior to the 9-msw O2 stop, shift the diver to air.

   OR

   (2) For a maximum of 5 minutes

   (a) ***If air is restored within 5 minutes***

   i. Normal decompression is resumed on air at the point of interruption.

   (b) ***If air in NOT restored within 5 minutes***

   i. If possible, continue decompression on Helium-Oxygen IAW ***HeO2 –In-Water Oxygen Decompression*** (**CF Table 7**)

   b. If upon surfacing, the diver is

   (1) **ASYMPTOMATIC**

   (a) Initiate **CF Treatment Table 5** for omitted decompression.

   (2) **SYMPTOMATIC**

   (a) Treat as appropriate for decompression sickness.

3. **Unable to Switch to Air at First Stop:**

   a. If unable to complete a switch to air at first stop

   (1) The diver may remain on Helium-Oxygen at the first stop for a ***maximum*** of 5 minutes.

   (2) **If air is restored within the 5-minutes interval**

   (a) Resume normal decompression on air at the point of interruption.

   (b) HeO2 time is ***dead time***.

   (3) **If air is NOT restored within 5 minutes**

   (a) Continue decompression on Helium-Oxygen IAW ***HeO2 – In-Water Decompression*** (**CF Table 7**), if possible.

   b. If air is restored prior to the 9-msw O2 stop

   (1) Shift diver to air

c. If upon surfacing, the diver is

(1) **ASYMPTOMATIC**

(a) Commence **CF Treatment Table 5** for omitted decompression

(2) **SYMPTOMATIC**

(a) Treat as appropriate for decompression sickness.

4. **Unable to Switch to O2 at 9 msw stop**

a. Decompress IAW HeO2 – Emergency Decompression (CF Table 9).

(1) If O2 available to RCC, on completion of the 9-msw Emergency Decompression Air Stop, SurD O2 may be employed.

3513 Flying after HeO2 Diving

1. **After No-Decompression HeO2 diving**

a. A minimum Surface Interval of 12 hours is required before flying.

2. **After HeO2 Decompression dives where total dive time is less than or equal to 2 hours.**

a. A minimum Surface Interval of 24 hours is required before flying.

3. **After HeO2 Decompression dives where total dive time exceeds 2 hours**

a. A minimum Surface Interval of 48 hours is required before flying.

3514 Decompression Stress during Surface Interval

1. During the Surface Interval (SI) of a SurD O2 profile, the required decompression is intentionally violated. At the completion of the SI, the diver is repressurized in a chamber to a depth of 12 msw, deeper than called for by the decompression model, and held at depth breathing intermittent oxygen for longer than called for by the decompression model. The diver is given additional decompression during the chamber phase of the SurD O2 profile to compensate for the increased stress of the SI.

2. The diver may experience signs and/or symptoms of decompression sickness (referred to as Decompression Stress) during the SI. During the SI, the diver is exposed to a higher level of decompression stress than would be encountered if the in-water decompression had been executed. Manned validation has indicated that when symptoms do occur during the SI, they are usually vey mild and late. In addition, the symptoms usually completely resolve during the press to 12 msw in the chamber. The experimental dives also demonstrated that the divers who experienced SI symptoms had the same incidence of DCS after the completion of the dive as those divers who did not experience signs or symptoms during the SI. During the table development process, the pre-surface interval decompression was adjusted to reduce the occurrence of SI problems.

3. **During SurD O2 diving, when all signs and symptoms of SI stress have completely resolved by the time the diver is confirmed on oxygen at 12 msw**

a. The decompression profile is to be completed as planned.

4. **When the signs and symptoms of SI stress have not completely resolved by the time the diver is confirmed on oxygen at 12 msw**

a. It should be treated as decompression sickness.

b. The diver must be immediately pressed to 18 msw.

c. Initiate CF Treatment Table 6.

d. Contact an Advanced Diving Medical Officer.

3515 HeO2 – IN-WATER OXYGEN DECOMPRESSION (CF Table 7)

1. CF Table 7 (Metres), *HeO2 – In-Water Oxygen Decompression*, may be found at Annex C, Chapter 3. HeO2 is used from the surface to the bottom, while on the bottom and during travel to the first stop. At the first stop, the breathing gas is switched to air and air is used for all in-water stops to 9 msw. At 9 msw, the breathing gas is switched to O2 and the diver breathes O2 until the decompression requirements are completed. Five-minute air breaks are taken after every 30 minutes on O2.

2. The In-Water Oxygen Decompression procedure for HeO2 dives is as follows:

a. Descend at 18 mpm or slower on HeO2.

b. Ascend at 18 mpm ± 3 on HeO2.

c. Upon arrival at the first stop depth, switch to air. Ventilate until confirmed on air and then begin the first stop.

d. Remain on air until arrival at the 9-msw stop. Stop time includes ascent time to each stop.

e. Upon arrival at the 9-msw O2 stop, switch to O2. Ventilate until confirmed on oxygen.

f. Remain on O2 for the duration of the stop with 30-minute O2 / 5-minute air break cycle as designated.

g. Each air break cycle of 5 minutes is indicated by an asterisk (*). The stop time indicated for the 9-msw O2 stop is ***O2 time only***. The time for each designated air break must be added to the 9 msw Total Stop Time.

h. On completion of the 9-msw stop, travel to the surface is on the breathing medium in use.

NOTES
for O2 Stop

1. Although O2 is only given to divers at the conservative depth of 9 msw, the possibility of O2 toxicity problems still exists. Therefore, the following conditions must be met before using in-water O2 procedures:
   (a) A diver on O2 must be constantly monitored (for example, two divers on O2 monitor each other or one diver on O2 is provided with voice communications) for the period of O2 breathing, and
   (b) A recompression chamber (RCC) must be available as required by **Figure 1-2-3**, ***Table of Authorized Depth Limits.***
2. Divers are not ventilated at air breaks. Gas to the breathing umbilical is simply switched to the required breathing medium for the designated time.
3. 5-minute air breaks are part of the required decompression and therefore are included in the total decompression time.
4. When the O2 stop time is a multiple of 30 minutes, a 5-minute air break may or may not be required before ascent to the surface.

3. Figures 3-5-1 and 3-5-2 show an In - Water O2 Decompression Dive to 42 msw / 39 min (EXAMPLE 1 (HeO2)).

<u>EXAMPLE 1</u> (HeO2) - In-Water O2 Decompression Dive to 42 msw (40+2) / 39 min

Dive	**42 msw (40+2) / 39 min** **see Figures 3-5-1 and 3-5-2**
Decompression Schedule	**42 msw / 40 min** ***from CF Table 7***
Decompression Stops **21 msw – 1 min on air** **18 msw – 3 min on air** **15 msw – 4 min on air** **12 msw – 7 min on air** **9 msw – 60 min on O2** **+ one 5-min air break** ***Travel to surface on breathing medium in use (in this case, oxygen*)**.**	**Ascend to 21 msw on HeO2 at 18 mpm ± 3 Maximum time available to First Stop is 2 min**

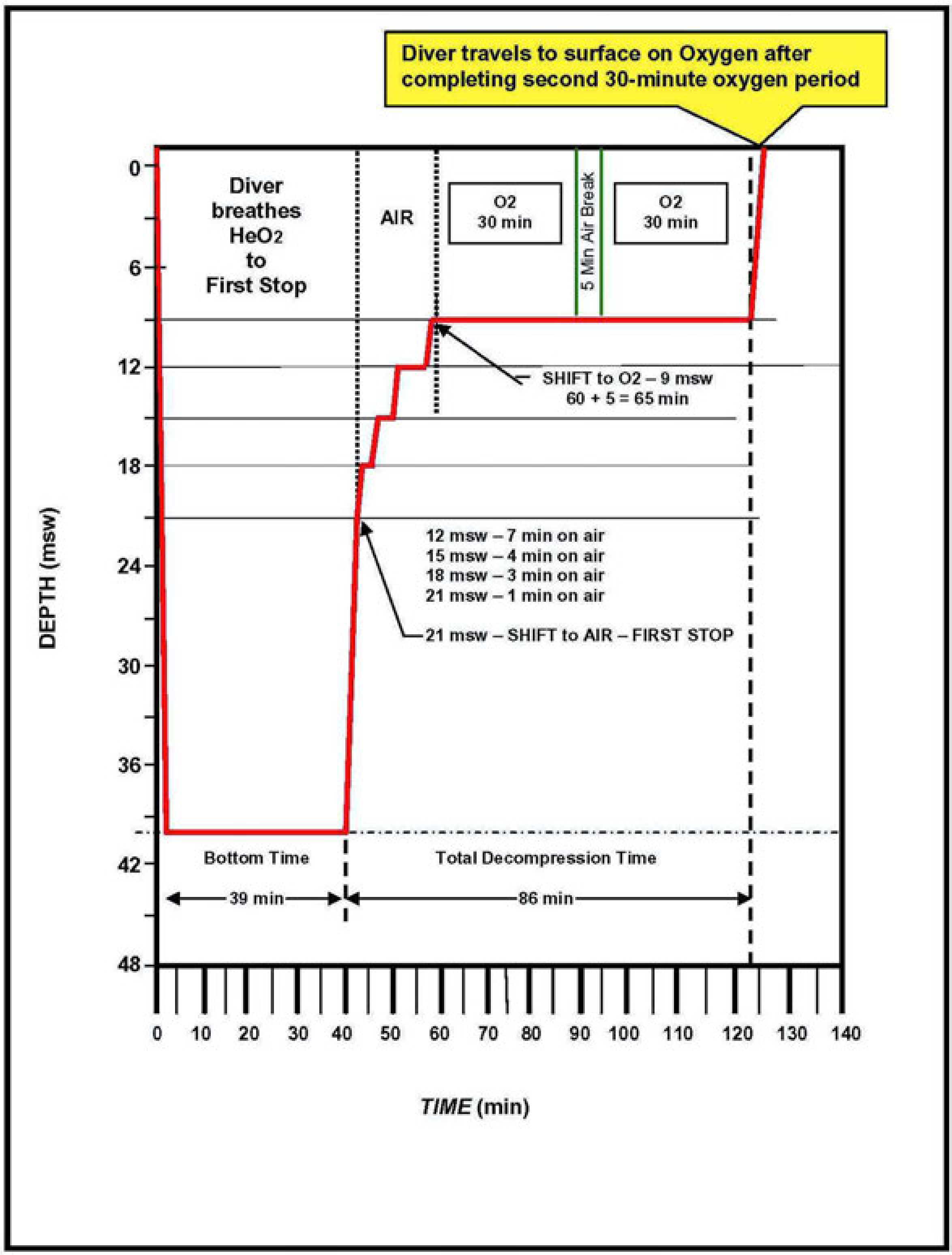

Figure 3-5-1 EXAMPLE 1 (HeO2)
In-Water O2 Decompression Dive 42 msw (40+2) / 39 min

DIVER	Rank	Tender	Rank	Date: **30 Apr 10**
DIVER	Rank	Tender	Rank	Table Used **7**
SUPERVISOR	Rank	Schedule Used **42 /40**	O2% **16**	Depth in msw **40 + 2 = 42** / Bottom Time **: 39**
Left Surface (Clock Time) **1012**	Left Bottom **: 39**	Max. Time to 1st Stop **:02**	Reached Surface (Clock Time) **1217**	
Total decomp. Time **1 : 26**	Total time of **dive** **2:05**	Repet. Group	CHARTMAN (Print)	Rank

REMARKS	STOPS IN MSW	STAND AIR TABLE	Decompression Time Water	Decompression Time Chamber	EMERG AIR	**2:05** EVENT TIME Water	EVENT TIME Chamber
	3				**79**	L S	
	6		O2		**26**	L S	
ON O2 :58::10 **REACHED :57::10**	9		**60+5= 65** **SHIFT O2**		**20**	L **2:04** S **:59**	
	12		**7**		**7**	L **:57** S	
	15		**4**			L **:50** S	
	18		**3**			L **:46** S	
ON AIR :41::05 **REACHED :40::05**	21		**1**			L **:43** S **:42**	
	24					L S	
	27					L S	
	30					L S	
	33					L S	
	36					L S	
	39					L S	
REACHED **BOTTOM :02::15**	~~42~~ 40					L **: 39** S	
	45					L S	
	48					L S	
	51					L S	

Location of Dive	Name / Rank of Standby Diver	Divers (Signatures)
Purpose of Dive	Supervisor (sign)	Chartman (sign)

Figure 3-5-2 EXAMPLE 1 (HeO2) Dive Record Chart (msw)

In-Water O2 Decommpression Dive to 42 msw (40+2) / 39 min

3516 HeO2 – Surface Decompression with Oxygen (SurD O2) (CF Table 8)

1. CF Table 8, Surface Decompression with Oxygen (SurD O2), may be found at Annex C, Chapter 3. The descent to depth and the initial ascent to the end of the 12-msw decompression stop are identical to that of the HeO2 – In-Water Oxygen Decompression Table (CF Table 7). At 9 msw the breathing gas is switched to O2 and the diver breathes O2 until the end of the specified decompression time. The diver ascends to the surface, switches to air, and is then recompressed to 12 msw on O2 in a recompression chamber (RCC) to complete the decompression requirements on O2. The time from leaving the 9-msw in-water stop to the time of reaching 12 msw in the RCC should not exceed 7 minutes. After each 30-minute period on O2 at the 9-msw stop and in the RCC, 5-minute air breaks are taken.

2. The Surface Decompression with Oxygen procedure for HeO2 diving is as follows:

a. Ascend and decompress as for In- Water Oxygen Decompression (Table 7) to the completion of the in water 12-msw stop.

b. Upon arrival at the 9-msw in-water decompression stop, switch to O2 and ventilate until confirmed on O2.

c. Remain on O2 for the duration of the specified stop with a 5-minute air break after 30 minutes on O2 (if required).

d. Ascend to the surface at 18 mpm ± 3 and recompress on O2 to 12 msw in the RCC. The Surface Interval for SurD O2 is the time from leaving the 9-msw in-water stop to reaching the 12-msw RCC stop. This time must not exceed 7 minutes. In operational use, the SI should be kept to a minimum.

3. Figures 3-5-3 and 3-5-4 show a SurD O2 Decompression Dive to 57 msw (55+2) / 15 min (EXAMPLE 2 (HeO2)).

<u>EXAMPLE 2</u> (HeO2) - SurD O2 Decompression Dive to 57 msw (55+2) / 15 min

Dive	**57 msw (55+2) / 15 min see Figures 3-5-3 and 3-5-4**
Decompression Schedule	**57 msw / 15 min from CF Table 8**
Decompression Stops 18 msw – 3 min on air 15 msw – 3 min on air 12 msw – 4 min on air 9 msw – 2 min on O2 Travel to the surface on breathing medium in use, in this case, O2	**Ascend to 18 msw on HeO2 at 18 mpm ± 3 Maximum time available to First Stop is 3 min**
Surface Interval	**Maximum time from leaving 9 msw to reaching 12 msw in RCC is 7 min**
RCC 12 msw – 29 min on O2	**Travel to the surface on breathing medium in use, in this case O2**

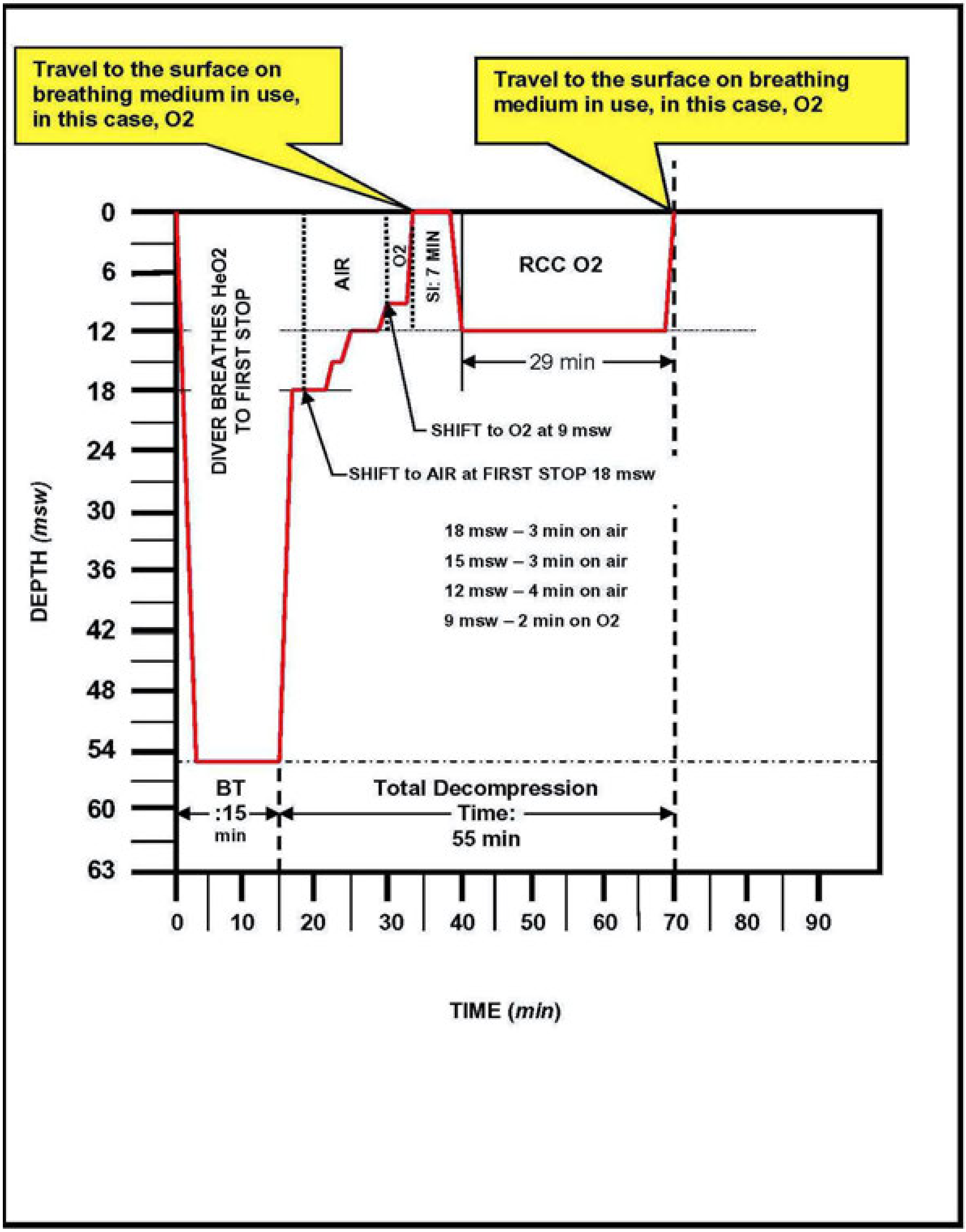

Figure 3-5-3 EXAMPLE 2 (HeO2)

SurD O2 Decompression Dive to 57 msw (55+2) / 15 min

DIVER	Rank	Tender	Rank	Date: 30 Apr 10
DIVER	Rank	Tender	Rank	Table Used 8
SUPERVISOR	Rank	Schedule Used 57 / 15	O2% 16	Depth in msw 55 + 2 = 57 / Bottom Time :15
Left Surface (Clock Time) 0935	Left Bottom :15	Max. Time to 1st Stop :03	Reached Surface (Clock Time) 1010 / 1045	
Total Decomp. Time :55	Total time of dive 1:10	Repet. Group	CHARTMAN (Print)	Rank

REMARKS	STOPS IN MSW	STAND AIR TABLE	Decompression Time Water	Decompression Time Chamber	EMERG AIR		:34 EVENT TIME 1:10 Water	:34 EVENT TIME 1:10 Chamber
	3		↑	↑	28	L		
						S		
	6		O2	O2	13	L		
						S		
ON O2 :30::10	9		2		4	L	:33	
REACHED :29::10			SHIFT O2			S	:31	
	12		4	29	4	L	:29	1:09
						S		:40
	15		3			L	:25	
						S		
ON AIR :18::08	18		3			L	:22	
REACHED :17::08						S	:19	
	21					L		
						S		
	24					L		
						S		
	27					L		
						S		
	30					L		
						S		
	33					L		
						S		
	36					L		
						S		
	39					L		
						S		
	42					L		
						S		
	45					L		
						S		
REACHED BOTTOM	48					L		
						S		
:03::08 55	51					L	:15	
						S		

Location of Dive	Name / Rank of Standby Diver	Divers (Signatures)
Purpose of Dive	Supervisor (sign)	Chartman (sign)

Figure 3-5-4 EXAMPLE 2 (HeO2) Dive Record Chart (msw)

SurD O2 Decompression Dive to 57 msw (55+2) / 15 min

3517 HeO2 – Emergency Decompression (CF Table 9)

1. CF Table 9 HeO2 – Emergency Decompression, may be found at Annex C, Chapter 3.

2. In the case of loss of O2 or oxygen toxicity, Table 9 provides the following decompression options:

a. ***In-Water Emergency Air Decompression***

(1) From the 9-msw stop to the surface.

b. ***SurD O2 in RCC*** * PREFERRED METHOD *

(1) Upon completion of the 9-msw in-water stop on air.

c. ***SurD Air in RCC***

(1) Upon completion of the 9-msw in-water stop on air.

3. Decompression requirements up to and including the 12-msw air decompression stop correspond with the decompression requirements of both In-Water Oxygen Decompression (Table 7) and SurD O2 (Table 8).

4. **In-Water Emergency Air Decompression for HeO2 Diving**

a. On completion of the 9 msw air stop, ascend on air to the 6 and 3 msw stops and remain at these stops for the prescribed times.

b. Figures 3-5-5 and 3-5-6 show an In-Water Emergency Air Decompression Dive to 48 msw (46+2)/ 20 min, No O2 Available (EXAMPLE 3 (HeO2).

EXAMPLE 3 (HeO2)

— In-Water Emergency Air Decompression Dive to 48 msw (46+2) / 20 min)

— No O2 Available

Dive	**48 msw (46+2) / 20 min** ***see Figures 3-5-5 and 3-5-6***
Decompression Schedule	**48 msw / 20 min** ***from CF Table 9***
Decompression Stops ***from CF Tables 7 or 8*** **18 msw – 2 min on air** **15 msw – 3 min on air** **12 msw – 4 min on air**	**Ascend to 18 msw on HeO2** **at 18 mpm ± 3** **Maximum time available to First Stop** **is 2 min**
9 msw – 6 min on air	**From Table 9,** ***"AIR" Column***
6 msw – 14 min on air **3 msw – 30 min on air**	**From CF Table 9,** ***In-Water Stop Times***

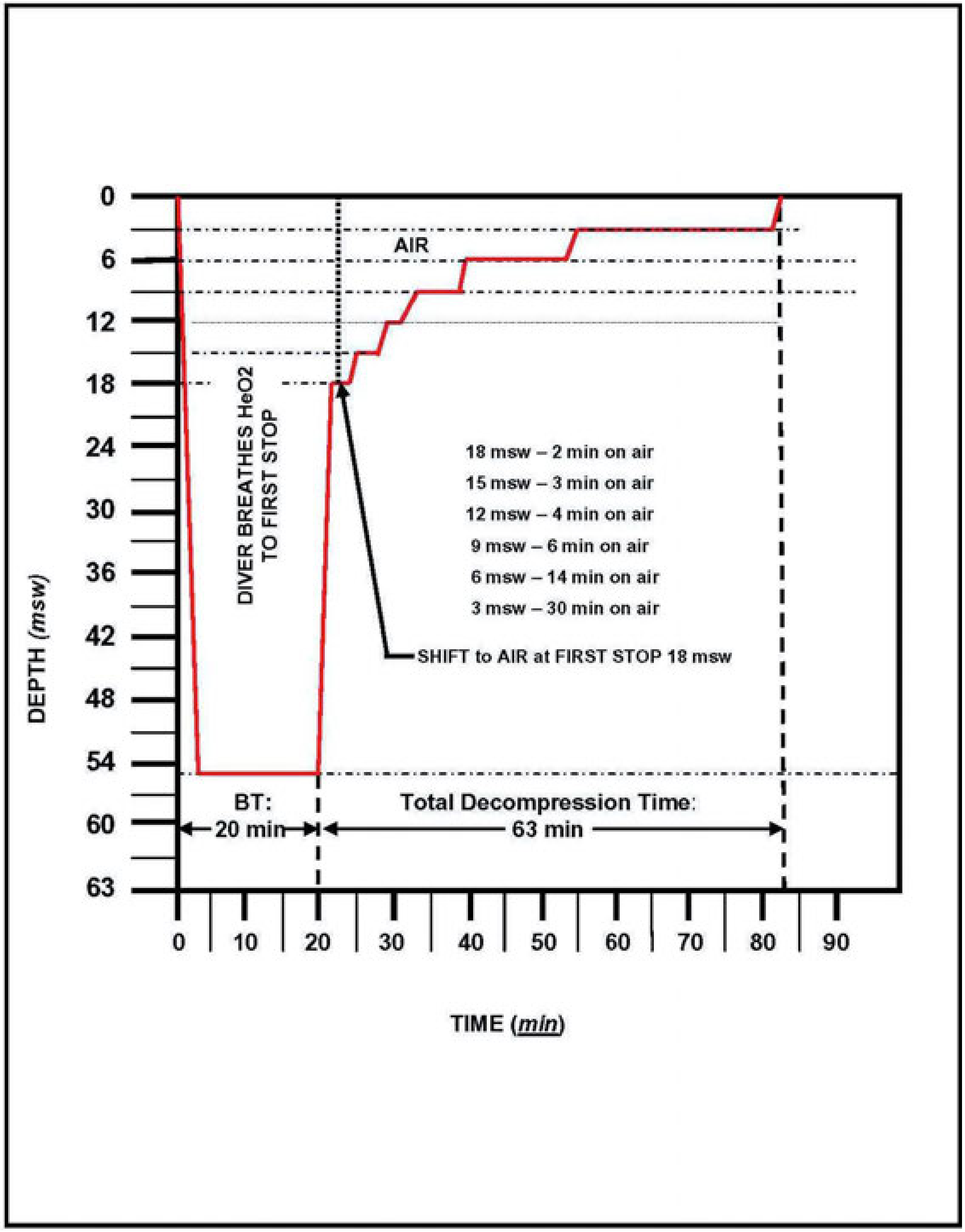

Figure 3-5-5 EXAMPLE 3 (HeO2)

In-Water Emergency Air Decompression Dive to 48 msw (46+2) / 20 min - No O2 Available

DIVER	Rank	Tender	Rank	Date: 30 Apr 10
DIVER	Rank	Tender	Rank	Table Used ~~7~~ 9
SUPERVISOR	Rank	Schedule Used 48 / 20	O2% 16	Depth in msw 46 + 2 = 48 / Bottom Time :20
Left Surface (Clock Time) 1115	Left Bottom :20	Max. Time to 1st Stop :02	Reached Surface (Clock Time) 1238	
Total Decomp. Time 1:05	Total time of dive 1:23	Repet. Group	CHARTMAN (Print)	Rank

REMARKS	STOPS IN MSW	STAND AIR TABLE	Decompression Time Water	Decompression Time Chamber	EMERG AIR	1 : 23 EVENT TIME Water	EVENT TIME Chamber
	3				30	L 1:22 S	
	6				14	L :52 S	
ON O2 :30::10 REACHED :29::10	9				6	L :38 S	
	12		4			L :32 S	
	15		3			L :28 S	
ON AIR :22::33 REACHED :21::33	18		2			L :25 S :23	
	21					L S	
	24					L S	
	27					L S	
	30					L S	
	33					L S	
	36					L S	
	39					L S	
	42					L S	
	45					L S	
REACHED BOTTOM	48					L S	
:02::34 46	51					L :20 S	

Location of Dive	Name / Rank of Standby Diver	Divers (Signatures)
Purpose of Dive	Supervisor (sign)	Chartman (sign)

Figure 3-5-6 EXAMPLE 3 (HeO2) Dive Record Chart (msw)

In-Water Emergency Air Decompression Dive
to 48 msw (46+2) / 20 min

5. Emergency SurD O2 Decompression in RCC for HeO2 Diving

a. On completion of the 9-msw in-water air stop, ascend to the surface for surface decompression on O2 as in CF Table 8.

b. Figures 3-5-7 and 3-5-8 show an Emergency SurD O2 Decompression Dive to 48 msw (46+2) / 20 min (EXAMPLE 4 (HeO2)). (This is the same dive from EXAMPLE 3 carried out as Emergency SurD O2.)

<u>EXAMPLE 4</u> (HeO2)
— Emergency SurD O2 Decompression Dive to 48 msw (46+2) / 20 min

Dive	**48 msw (46+2) / 20 min** ***see Figures 3-5-7 and 3-5-8***
Decompression Schedule	**48 msw / 20 min** ***from Table 9***
Decompression Stops ***from Tables 7 or 8*** **18 msw – 2 min on air** **15 msw – 3 min on air** **12 msw – 4 min on air**	**Ascend to 18 msw on HeO2 at 18 mpm ± 3** **Maximum time available to First Stop is 2 minutes**
9 msw – 6 min on air	**From Table 9, “AIR” Column**
Surface Interval	**Maximum time from leaving 9 msw to reaching 12 msw in RCC is 7 min**
RCC **12 msw – 30 min on O2**	**Travel to the surface on the breathing medium in use (in this case, O2).** **From RCC O2 Section in Table 9**

6. Emergency SurD Air in RCC for HeO2 Diving

a. On completion of the 9-msw in-water air stop, ascend to the surface as for normal SurD O2.

b. Descend on air to 12 msw in the RCC and conduct the prescribed decompression stops at 12, 9, 6 and 3 msw.

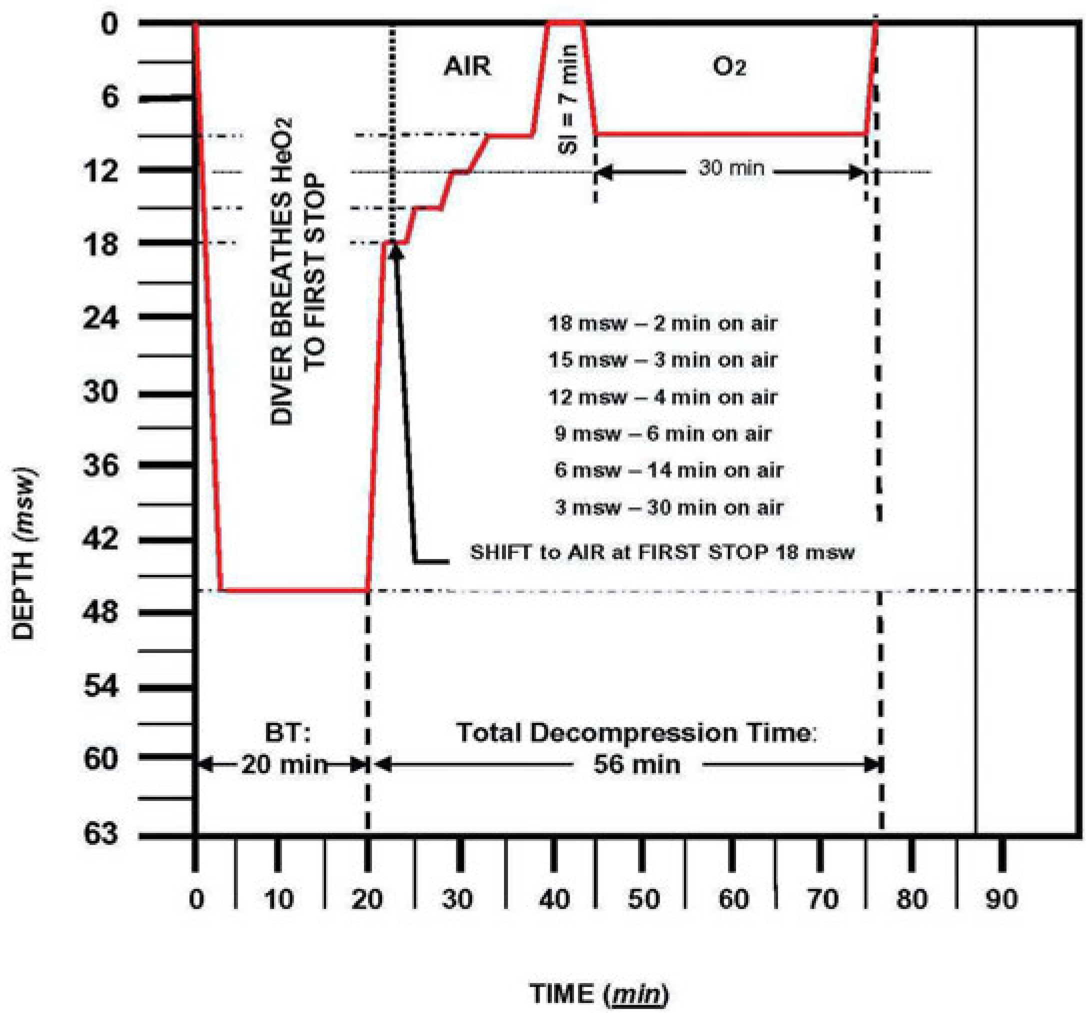

Figure 3-5-7 EXAMPLE 4 (HeO2)

Emergency SurD O2 Decompression Dive to 48 msw (46+2) / 20 min

DIVER	Rank	Tender	Rank	Date: 8 Feb 10	
DIVER	Rank	Tender	Rank	Table Used ~~7~~ 9	
SUPERVISOR	Rank	Schedule Used 48 / 20	O2% 16	Depth in msw 46 + 2 = 48	Bottom Time :20
Left Surface (Clock Time) 1000	Left Bottom :20	Max. Time to 1st Stop :02	Reached Surface (Clock Time) 1039 / 1116		
Total Decomp. Time :56	Total time of dive 1:16	Repet. Group	CHARTMAN (Print)		Rank

REMARKS	STOPS IN MSW	STAND AIR TABLE	Decompression Time Water	Decompression Time Chamber	EMERG AIR		:39 EVENT TIME 1:16 Water	Chamber
	3		AIR		30	L		
						S		
	6			O2	14	L		
						S		
No O2 AVAIL in water at 9 msw stop.	9		30 6 SHIFT O2		6	L	:38	
						S		1:15
SHIFT to TBL 9 (SurD after 9 msw stop)	12		4	30		L	:32	:45
						S		
	15		3			L	:28	
						S		
ON AIR : 22::33 REACHED : 21:33	18		2			L	:25	
						S	:23	
	21					L		
						S		
	24					L		
						S		
	27					L		
						S		
	30					L		
						S		
	33					L		
						S		
	36					L		
						S		
	39					L		
						S		
	42					L		
						S		
	45					L		
						S		
REACHED BOTTOM 46	48					L		
						S		
:02::34	51					L	:20	
						S		

Location of Dive	Name / Rank of Standby Diver	Divers (Signatures)
Purpose of Dive	Supervisor (sign)	Chartman (sign)

Figure 3-5-8 EXAMPLE 4 (HeO2) Dive Record Chart (msw)

Emergency SurD O2 Decompression Dive to 48 msw (46+2) / 20 min

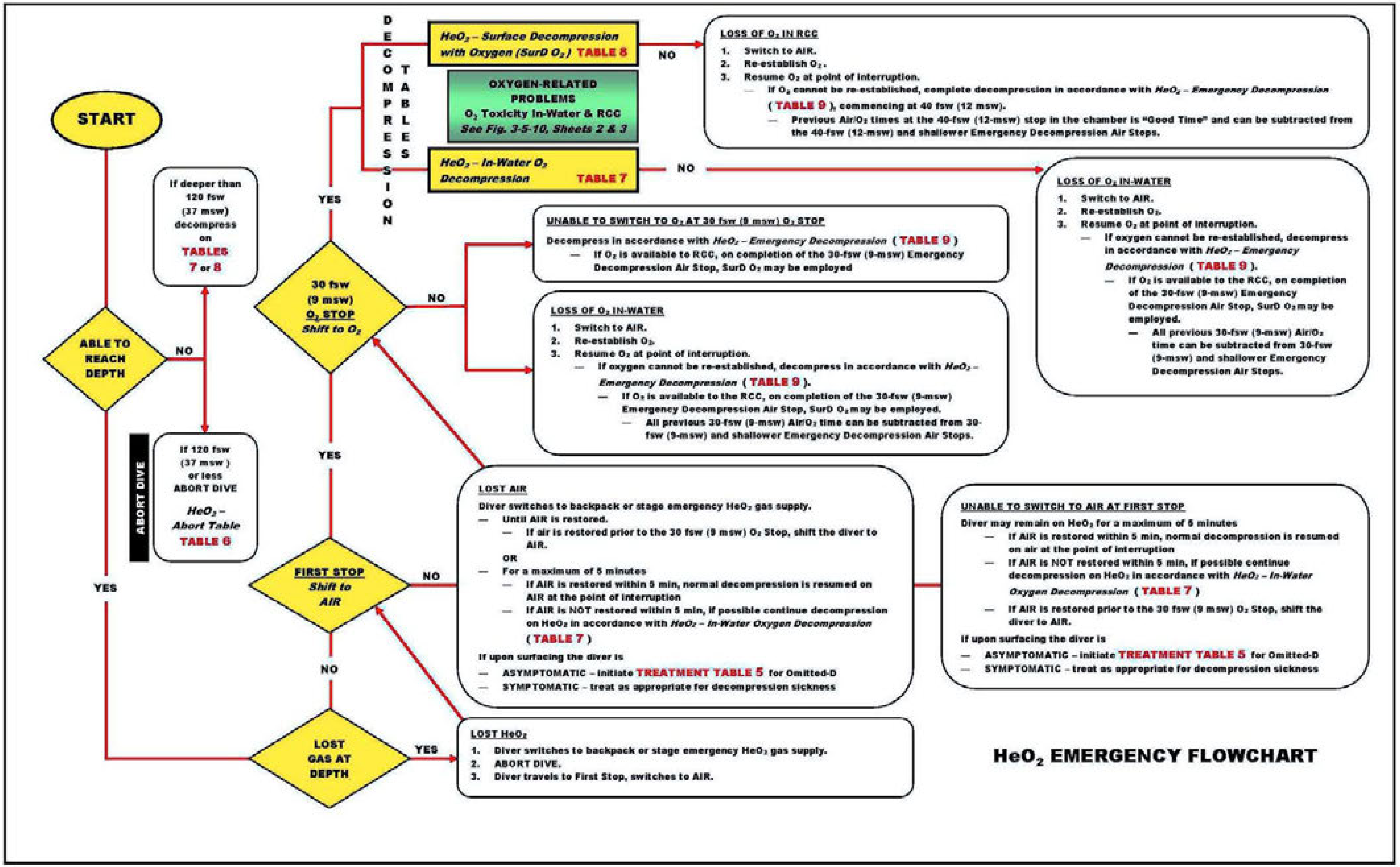

Figure 3-5-9 HeO2 Emergency Flowchart

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Chart of General Procedures
– HeO2 Decompression Tables

<u>DELAYS (Normal Decompression)</u>	**Art. 3509**
Delay in Reaching the First Stop *(Maximum time to first stop exceeded by more than 30 seconds)*	1. Add delay to bottom time. 2. Select appropriate decompression schedule.
Delay in Leaving an Air Stop	1. Considered to be valid decompression time. 2. Subtract delay time from the next shallower air stop time only. ***This does not apply to the 9 msw O2 stop.***

Figure 3-5-10 Chart of General Procedures – HeO2 Decompression Tables (Sheet 1 of 7)

Chart of General Procedures
– HeO2 Decompression Tables

OXYGEN-RELATED PROBLEMS	**Art. 3510**
Oxygen Toxicity at O2 Stop (In-Water and RCC)	
Minor Symptoms of O2 Toxicity	1. Stop, switch diver to air and ventilate. 2. Wait for symptoms to subside, then 3. wait an additional 15 minutes. 4. Recommence O2 at point of interruption. a. **If O2 breathing is resumed and symptoms recur**, switch to AIR and decompress IAW ***HeO2 – Emergency Decompression*** (**CF Table 9**). 1) **In-Water** a) On completion of the 9-msw air stop of the ***Emergency Decompression Table*** (**CF Table 9**), SurD O2 may be performed. b) All previous 9 msw Air/O2 time can be subtracted from the 9-msw and shallower Emergency Decompression Air Stops. 2) **In RCC** *a)* Decompress IAW *HeO2 –* b) ***Emergency Decompression*** (**CF Table 9**) commencing at 12 msw. c) All previous Air/O2 times at the 12-msw stop in d) the chamber can be subtracted from the 12-msw and shallower Emergency Decompression Air Stops. OR 1. Stop, switch diver to air and ventilate. 2. Decompress IAW *HeO2* – ***Emergency Decompression*** (**CF Table 9**). a. **In-Water** 1) On completion of the 9-msw air stop of the 2) Emergency Decompression Table (**CF Table 9**), SurD O2 may be performed. 3) All previous 9 msw Air/O2 time can be subtracted from the 9-msw and shallower Emergency Decompression Air Stops. b. **In RCC** 1) Decompress IAW ***HeO2 – Emergency Decompression (CF Table 9) commencing at 12 msw***. 2) All previous Air/O2 times at the 12-msw stop in the chamber can be subtracted from the 12-msw and shallower Emergency Decompression Air Stops.

Figure 3-5-10 Chart of General Procedures – HeO2 Decompression Tables (Sheet 2 of 7)

Chart of General Procedures
– HeO2 Decompression Tables

OXYGEN-RELATED PROBLEMS (Cont'd)	**Art. 3510** ***Cont'd***
Oxygen Toxicity at O_2 Stop (*In-Water and RCC) (Cont'd*)	
Serious, Incapacitating Symptoms of O_2 Toxicity	1. Stop, switch to air and ventilate. 2. Stabilise ***The diver is NOT to be brought to the surface while convulsing !*** **a. In-Water** 1) If possible, complete 9-msw stop on ***HeO2 – Emergency Decompression*** (**CF Table 9**), then SurD O2. 2) Surface diver carefully to reduce risk of embolism. 3) If any uncertainty exists, *treat for possible embolism*. 4) Otherwise, *treat for omitted decompression* and observe carefully. **b. In RCC** 1) Complete decompression IAW ***HeO2 – Emergency Decompression*** (**CF Table 9**), commencing at 12 msw. a) Previous Air/O2 times at the 12-msw stop in the chamber is **Good Time** and can be subtracted from the 12-msw and shallower Emergency Decompression Air Stops.

Figure 3-5-10 Chart of General Procedures – HeO2 Decompression Tables (Sheet 3 of 7)

Chart of General Procedures
– HeO2 Decompression Tables

LOSS OF O_2	**Art 3511**
Loss of O_2 In-Water	1. Switch to air. 2. Re-establish O2. 3. Resume O2 at point of interruption. **If oxygen cannot be re-established**, decompress IAW ***HeO2 – Emergency Decompression*** (**CF Table 9**). a. If O2 is available to the RCC, on completion of he 9-msw Emergency Decompression Air Stop, SurD O2 may be employed. b. All previous 9-msw Air/O2 time can be subtracted from 9-msw and shallower Emergency Decompression Air Stops.
Loss of O_2 in RCC	1. Switch to air. 2. Re-establish O2. 3. Resume O2 at point of interruption. a. If O2 cannot be re-established, complete decompression IAW HeO2 – Emergency Decompression (CF Table 9), commencing at 12 msw. 1) Previous Air/O2 times at the 12-msw stop in the chamber is **Good Time** and can be subtracted from the 12-msw and shallower Emergency Decompression Air Stops.

Figure 3-5-10 Chart of General Procedures – HeO2 Decompression Tables (Sheet 4 of 7)

Chart of General Procedures
– HeO2 Decompression Tables

LOST GAS AT DEPTH / UNABLE TO SWITCH GASES	**Art. 3512**
Lost Helium-Oxygen	1. The diver switches to emergency Helium-Oxygen (backpack or stage-mounted) and the dive is aborted. 2. The diver travels to the first stop and switches to air.
Lost Air	1. The diver switches to emergency Helium-Oxygen (backpack, stage mount) a. Until air is restored 1) **If air is restored prior to the 9-msw O2 stop**, shift the diver to air. **OR** b) For a maximum of 5 minutes. 1) **If air is restored within 5 minutes,** resume normal decompression is on air at the point of interruption. ***HeO2 time is dead time***. 2) **If air is NOT restored within 5 minutes,** continue decompression on Helium-Oxygen IAW *HeO2 – In-Water Oxygen Decompression* (**CF Table 7**) if possible. 2. **If, upon surfacing, the diver is** a. **Asymptomatic** Commence a **CF Treatment Table 5** for omitted decompression. b. **Symptomatic** Treat as appropriate for decompression sickness.

Figure 3-5-10 Chart of General Procedures – HeO2 Decompression Tables (Sheet 5 of 7)

Chart of General Procedures
– HeO2 Decompression Tables

LOST GAS AT DEPTH / UNABLE TO SWITCH GASES (Cont'd)	Art. 3512 *Cont'd*
Unable to Switch to Air at First Stop	1. **The diver may remain on Helium-Oxygen at the first stop for a maximum of 5 minutes.** a. **If air is restored within the 5-minute interval** Resume normal decompression on air at the point of interruption. ***HeO2 time is dead time***. b. **If air is NOT restored within 5 minutes** Continue decompression on Helium-Oxygen IAW ***HeO2 – In-Water Oxygen Decompression*** (**CF Table 7**) if possible. 2. **If air is restored prior to the 9 msw O2 stop** a. Shift diver to air. 3. **If, upon surfacing, the diver is** a. **Asymptomatic** Commence **CF Treatment Table 5** for omitted decompression. b. **Symptomatic** Treat as appropriate for decompression sickness.
Unable to Switch to O_2 at 9 msw Stop	1. Decompress IAW *HeO2* – ***Emergency Decompression*** (**CF Table 9**). a. **If O2 is available to the RCC**, on completion of the 9-msw Emergency Decompression Air Stop, SurD O2 may be employed.

Figure 3-5-10 Chart of General Procedures – HeO2 Decompression Tables (Sheet 6 of 7)

Chart of General Procedures
– HeO2 Decompression Tables

<u>FLYING AFTER DIVING</u>	**Art. 3513**
1. **After No-D HeO2 diving** A minimum Surface Interval of **12 hours** is required before flying. 2. **After HeO2 decompression dive(s) where total dive time is less than or equal to 2 hours** A minimum Surface Interval of **24 hours** is required before flying. 3. **After HeO2 decompression dive(s) where the total dive time exceeds 2 hours** A minimum Surface Interval of **48 hours** is required before flying.	
<u>DECOMPRESSION STRESS DURING SURFACE INTERVAL (SI)</u>	**Art. 3514**
SurD O2 Diving – *SI stress*	
All signs and symptoms of SI stress have completely resolved by the time the diver is confirmed on oxygen at 12 msw	1. Complete the decompression profile as planned.
All signs and symptoms of SI stress have NOT completely resolved by the time the diver is confirmed on oxygen at 12 msw	1. Treat as decompression sickness. a. Immediately press the diver to 18 msw. b. Initiate **CF Treatment Table 6.** c. Contact an Advanced Diving Medical Officer.

Figure 3-5-10 Chart of General Procedures – HeO2 Decompression Tables (*Sheet 7 of 7*)

3518 - 3599 Not Allocated

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ANNEX A, CHAPTER 3

CF AIR DIVING TABLES (METRES)

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CF TABLE 1
STANDARD AIR DECOMPRESSION
(METRES)

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
6	30	-	-	-	-	-	-	-	-	1	A
	60	-	-	-	-	-	-	-	-	1	B
	90	-	-	-	-	-	-	-	-	1	C
	120	-	-	-	-	-	-	-	-	1	D
	150	-	-	-	-	-	-	-	-	1	E
	180	-	-	-	-	-	-	-	-	1	F
	240	-	-	-	-	-	-	-	-	1	G
	300	-	-	-	-	-	-	-	-	1	H
	360	-	-	-	-	-	-	-	-	1	I
	420	-	-	-	-	-	-	-	-	1	J
	480	-	-	-	-	-	-	-	-	1	K
	600	-	-	-	-	-	-	-	-	1	L
	720	-	-	-	-	-	-	-	-	1	M
9	30	-	-	-	-	-	-	-	-	1	A
	45	-	-	-	-	-	-	-	-	1	B
	60	-	-	-	-	-	-	-	-	1	C
	90	-	-	-	-	-	-	-	-	1	D
	100	-	-	-	-	-	-	-	-	1	E
	120	-	-	-	-	-	-	-	-	1	F
	150	-	-	-	-	-	-	-	-	1	G
	180	-	-	-	-	-	-	-	-	1	H
	190	-	-	-	-	-	-	-	-	1	I
	210	-	-	-	-	-	-	-	-	1	J
	240	-	-	-	-	-	-	-	-	1	K
	270	-	-	-	-	-	-	-	-	1	L
	300	-	-	-	-	-	-	-	-	1	M
	330	-	-	-	-	-	-	-	3	3	N
	360	-	-	-	-	-	-	-	5	5	O
	400	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***7***	***7***	
	420	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***10***	***10***	
	450	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***15***	***15***	
	480	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***20***	***20***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
12	20	-	-	-	-	-	-	-	-	1	A
	30	-	-	-	-	-	-	-	-	1	B
	40	-	-	-	-	-	-	-	-	1	C
	60	-	-	-	-	-	-	-	-	1	D
	70	-	-	-	-	-	-	-	-	1	E
	80	-	-	-	-	-	-	-	-	1	F
	90	-	-	-	-	-	-	-	-	1	G
	120	-	-	-	-	-	-	-	-	1	H
	130	-	-	-	-	-	-	-	-	1	I
	150	-	-	-	-	-	-	-	-	1	J
	160	-	-	-	-	-	-	-	3	3	K
	170	-	-	-	-	-	-	-	4	4	L
	180	-	-	-	-	-	-	-	5	5	M
	200	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***10***	***10***	
	210	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***15***	***15***	
	220	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***19***	***19***	
	240	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***26***	***26***	
	270	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***35***	***35***	
	300	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***44***	***44***	
	330	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***53***	***53***	
	360	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***62***	***62***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
15	10	-	-	-	-	-	-	-	-	1	A
	20	-	-	-	-	-	-	-	-	1	B
	30	-	-	-	-	-	-	-	-	1	C
	40	-	-	-	-	-	-	-	-	1	D
	50	-	-	-	-	-	-	-	-	1	E
	60	-	-	-	-	-	-	-	-	1	F
	75	-	-	-	-	-	-	-	-	1	G
	90	-	-	-	-	-	-	-	3	3	H
	100	-	-	-	-	-	-	-	5	5	I
	110	-	-	-	-	-	-	-	8	8	J
	120	-	-	-	-	-	-	-	10	10	K
	130	-	-	-	-	-	-	-	16	16	L
	140	-	-	-	-	-	-	-	21	21	M
	150	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***26***	***26***	
	160	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***31***	***31***	
	170	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***35***	***35***	
	180	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***40***	***40***	
	200	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***50***	***50***	
	220	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***59***	***59***	
	240	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***70***	***70***	
	260	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***81***	***81***	
	280	***-***	***-***	***-***	***-***	***-***	***-***	***-***	***91***	***91***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
18	10	-	-	-	-	-	-	-	-	1	A
	20	-	-	-	-	-	-	-	-	1	B
	25	-	-	-	-	-	-	-	-	1	C
	30	-	-	-	-	-	-	-	-	1	D
	40	-	-	-	-	-	-	-	-	1	E
	50	-	-	-	-	-	-	-	-	1	F
	60	-	-	-	-	-	-	-	5	5	G
	70	-	-	-	-	-	-	-	8	8	H
	80	-	-	-	-	-	-	-	10	10	I
	90	-	-	-	-	-	-	-	16	16	J
	100	-	-	-	-	-	-	-	24	24	K
	110	-	-	-	-	-	-	-	30	30	L
	120	-	-	-	-	-	-	-	36	36	M
	130	***-***	***-***	***-***	***-***	***-***	***-***	***2***	***40***	***42***	
	140	***-***	***-***	***-***	***-***	***-***	***-***	***2***	***46***	***48***	
	150	***-***	***-***	***-***	***-***	***-***	***-***	***3***	***52***	***55***	
	160	***-***	***-***	***-***	***-***	***-***	***-***	***3***	***59***	***62***	
	170	***-***	***-***	***-***	***-***	***-***	***-***	***4***	***65***	***69***	
	180	***-***	***-***	***-***	***-***	***-***	***-***	***4***	***73***	***77***	
	190	***-***	***-***	***-***	***-***	***-***	***-***	***5***	***80***	***85***	
	200	***-***	***-***	***-***	***-***	***-***	***-***	***7***	***87***	***94***	
	210	***-***	***-***	***-***	***-***	***-***	***-***	***13***	***91***	***104***	
	220	***-***	***-***	***-***	***-***	***-***	***-***	***17***	***97***	***114***	
	230	***-***	***-***	***-***	***-***	***-***	***-***	***21***	***103***	***124***	
	240	***-***	***-***	***-***	***-***	***-***	***-***	***24***	***109***	***133***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
21	10	-	-	-	-	-	-	-	-	2	A
	15	-	-	-	-	-	-	-	-	2	B
	20	-	-	-	-	-	-	-	-	2	C
	25	-	-	-	-	-	-	-	-	2	D
	30	-	-	-	-	-	-	-	-	2	D
	35	-	-	-	-	-	-	-	-	2	E
	40	-	-	-	-	-	-	-	5	5	F
	50	-	-	-	-	-	-	-	10	10	G
	60	-	-	-	-	-	-	-	12	12	H
	65	-	-	-	-	-	-	2	12	14	I
	70	-	-	-	-	-	-	3	17	20	J
	80	-	-	-	-	-	-	4	25	29	K
	90	-	-	-	-	-	-	5	32	37	M
	100	-	-	-	-	-	-	6	39	45	N
	110	***-***	***-***	***-***	***-***	***-***	***-***	***7***	***46***	***53***	
	120	***-***	***-***	***-***	***-***	***-***	***-***	***7***	***54***	***61***	
	130	***-***	***-***	***-***	***-***	***-***	***-***	***8***	***62***	***70***	
	140	***-***	***-***	***-***	***-***	***-***	***-***	***9***	***71***	***80***	
	150	***-***	***-***	***-***	***-***	***-***	***-***	***15***	***77***	***92***	
	160	***-***	***-***	***-***	***-***	***-***	***-***	***20***	***85***	***105***	
	170	***-***	***-***	***-***	***-***	***-***	***-***	***25***	***93***	***118***	
	180	***-***	***-***	***-***	***-***	***-***	***-***	***29***	***101***	***130***	
	190	***-***	***-***	***-***	***-***	***-***	***-***	***34***	***109***	***143***	
	200	***-***	***-***	***-***	***-***	***-***	***-***	***38***	***117***	***155***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
24	10	-	-	-	-	-	-	-	-	2	A
	13	-	-	-	-	-	-	-	-	2	B
	15	-	-	-	-	-	-	-	-	2	C
	20	-	-	-	-	-	-	-	-	2	D
	25	-	-	-	-	-	-	-	-	2	E
	30	-	-	-	-	-	-	-	5	5	F
	35	-	-	-	-	-	-	-	9	9	G
	40	-	-	-	-	-	-	-	11	11	G
	45	-	-	-	-	-	-	3	10	13	H
	50	-	-	-	-	-	-	4	11	15	H
	55	-	-	-	-	-	-	5	15	20	I
	60	-	-	-	-	-	-	6	21	27	J
	65	-	-	-	-	-	-	7	25	32	J
	70	-	-	-	-	-	-	7	30	37	K
	75	-	-	-	-	-	-	8	34	42	L
	80	-	-	-	-	-	-	9	37	46	M
	85	***-***	***-***	***-***	***-***	***-***	***-***	***9***	***42***	***51***	
	90	***-***	***-***	***-***	***-***	***-***	***-***	***10***	***46***	***56***	
	95	***-***	***-***	***-***	***-***	***-***	***-***	***11***	***50***	***61***	
	100	***-***	***-***	***-***	***-***	***-***	***-***	***11***	***55***	***66***	
	110	***-***	***-***	***-***	***-***	***-***	***2***	***12***	***64***	***78***	
	120	***-***	***-***	***-***	***-***	***-***	***3***	***18***	***72***	***93***	
	130	***-***	***-***	***-***	***-***	***-***	***4***	***23***	***82***	***109***	
	140	***-***	***-***	***-***	***-***	***-***	***4***	***28***	***93***	***125***	
	150	***-***	***-***	***-***	***-***	***-***	***5***	***33***	***104***	***142***	
	160	***-***	***-***	***-***	***-***	***-***	***5***	***39***	***114***	***158***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
27	5	-	-	-	-	-	-	-	-	2	A
	10	-	-	-	-	-	-	-	-	2	B
	15	-	-	-	-	-	-	-	-	2	C
	20	-	-	-	-	-	-	-	-	2	D
	25	-	-	-	-	-	-	-	7	7	E
	30	-	-	-	-	-	-	2	9	11	F
	35	-	-	-	-	-	-	4	10	14	G
	40	-	-	-	-	-	-	6	10	16	H
	45	-	-	-	-	-	-	7	14	21	I
	50	-	-	-	-	-	-	8	20	28	J
	55	-	-	-	-	-	-	9	26	35	K
	60	-	-	-	-	-	2	8	31	41	L
	65	***-***	***-***	***-***	***-***	***-***	***3***	***8***	***36***	***47***	
	70	***-***	***-***	***-***	***-***	***-***	***3***	***9***	***40***	***52***	
	75	***-***	***-***	***-***	***-***	***-***	***4***	***9***	***46***	***59***	
	80	***-***	***-***	***-***	***-***	***-***	***4***	***10***	***51***	***65***	
	85	***-***	***-***	***-***	***-***	***-***	***5***	***10***	***56***	***71***	
	90	***-***	***-***	***-***	***-***	***-***	***5***	***14***	***60***	***79***	
	95	***-***	***-***	***-***	***-***	***-***	***6***	***17***	***64***	***87***	
	100	***-***	***-***	***-***	***-***	***-***	***6***	***20***	***70***	***96***	
	110	***-***	***-***	***-***	***-***	***-***	***7***	***26***	***82***	***115***	
	120	***-***	***-***	***-***	***-***	***-***	***8***	***31***	***95***	***134***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
30	5	-	-	-	-	-	-	-	-	2	A
	10	-	-	-	-	-	-	-	-	2	B
	12	-	-	-	-	-	-	-	-	2	C
	15	-	-	-	-	-	-	-	-	2	D
	20	-	-	-	-	-	-	-	8	8	E
	25	-	-	-	-	-	-	3	9	12	F
	30	-	-	-	-	-	-	5	10	15	G
	35	-	-	-	-	-	-	7	11	18	H
	40	-	-	-	-	-	-	9	16	25	I
	45	-	-	-	-	-	3	8	23	34	J
	50	-	-	-	-	-	4	8	29	41	K
	55	-	-	-	-	-	5	9	34	48	L
	60	***-***	***-***	***-***	***-***	***-***	***6***	***9***	***40***	***55***	
	65	***-***	***-***	***-***	***-***	***-***	***6***	***10***	***46***	***62***	
	70	***-***	***-***	***-***	***-***	***-***	***7***	***10***	***52***	***69***	
	75	***-***	***-***	***-***	***-***	***-***	***8***	***14***	***56***	***78***	
	80	***-***	***-***	***-***	***-***	***-***	***8***	***18***	***61***	***87***	
	85	***-***	***-***	***-***	***-***	***-***	***9***	***21***	***67***	***97***	
	90	***-***	***-***	***-***	***-***	***2***	***8***	***24***	***75***	***109***	
	95	***-***	***-***	***-***	***-***	***3***	***8***	***27***	***82***	***120***	
	100	***-***	***-***	***-***	***-***	***3***	***8***	***31***	***90***	***132***	
	105	***-***	***-***	***-***	***-***	***3***	***9***	***34***	***98***	***144***	
	110	***-***	***-***	***-***	***-***	***4***	***8***	***38***	***106***	***156***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
33	5	-	-	-	-	-	-	-	-	2	A
	10	-	-	-	-	-	-	-	-	2	B
	12	-	-	-	-	-	-	-	-	2	C
	15	-	-	-	-	-	-	-	5	5	D
	20	-	-	-	-	-	-	3	9	12	F
	25	-	-	-	-	-	-	6	10	16	G
	30	-	-	-	-	-	-	9	10	19	H
	35	-	-	-	-	-	3	8	16	27	I
	40	-	-	-	-	-	5	8	24	37	J
	45	-	-	-	-	-	6	9	31	46	K
	50	-	-	-	-	-	7	9	38	54	M
	55	-	-	-	-	-	8	10	44	62	N
	60	***-***	***-***	***-***	***-***	***2***	***7***	***10***	***51***	***70***	
	65	***-***	***-***	***-***	***-***	***3***	***7***	***15***	***55***	***80***	
	70	***-***	***-***	***-***	***-***	***4***	***7***	***19***	***62***	***92***	
	75	***-***	***-***	***-***	***-***	***4***	***8***	***23***	***68***	***103***	
	80	***-***	***-***	***-***	***-***	***5***	***8***	***26***	***77***	***116***	
	85	***-***	***-***	***-***	***-***	***5***	***9***	***30***	***86***	***130***	
	90	***-***	***-***	***-***	***-***	***6***	***9***	***34***	***95***	***144***	
	95	***-***	***-***	***-***	***-***	***6***	***9***	***38***	***105***	***158***	
	100	***-***	***-***	***-***	***-***	***7***	***9***	***42***	***114***	***172***	
	105	***-***	***-***	***-***	***-***	***7***	***12***	***45***	***123***	***187***	
	110	***-***	***-***	***-***	***-***	***8***	***15***	***48***	***130***	***201***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
36	5	-	-	-	-	-	-	-	-	2	A
	8	-	-	-	-	-	-	-	-	2	B
	10	-	-	-	-	-	-	-	-	2	C
	15	-	-	-	-	-	-	-	10	10	E
	20	-	-	-	-	-	-	5	10	15	F
	25	-	-	-	-	-	-	9	10	19	G
	30	-	-	-	-	-	4	8	14	26	I
	35	-	-	-	-	-	6	8	24	38	J
	40	-	-	-	-	-	8	8	32	48	K
	45	-	-	-	-	3	6	10	38	57	M
	50	-	-	-	-	4	7	10	46	67	N
	55	***-***	***-***	***-***	***-***	***5***	***7***	***13***	***53***	***78***	
	60	***-***	***-***	***-***	***-***	***6***	***7***	***18***	***59***	***90***	
	65	***-***	***-***	***-***	***-***	***6***	***8***	***22***	***66***	***102***	
	70	***-***	***-***	***-***	***-***	***7***	***8***	***27***	***75***	***117***	
	75	***-***	***-***	***-***	***-***	***8***	***8***	***31***	***86***	***133***	
	80	***-***	***-***	***-***	***2***	***6***	***9***	***35***	***97***	***149***	
	85	***-***	***-***	***-***	***3***	***6***	***10***	***40***	***107***	***166***	
	90	***-***	***-***	***-***	***3***	***7***	***13***	***42***	***118***	***183***	
	95	***-***	***-***	***-***	***4***	***6***	***16***	***46***	***128***	***200***	
	100	***-***	***-***	***-***	***4***	***7***	***19***	***50***	***136***	***216***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
39	5	-	-	-	-	-	-	-	-	3	A
	8	-	-	-	-	-	-	-	-	3	B
	10	-	-	-	-	-	-	-	5	5	C
	15	-	-	-	-	-	-	4	8	12	E
	20	-	-	-	-	-	-	8	10	18	G
	25	-	-	-	-	-	5	7	11	23	H
	30	-	-	-	-	-	7	8	22	37	J
	35	-	-	-	-	3	6	9	30	48	K
	40	-	-	-	-	4	7	9	39	59	M
	45	-	-	-	-	6	7	10	47	70	N
	50	***-***	***-***	***-***	***-***	***7***	***7***	***15***	***53***	***82***	
	55	***-***	***-***	***-***	***2***	***6***	***8***	***20***	***61***	***97***	
	60	***-***	***-***	***-***	***3***	***6***	***8***	***25***	***70***	***112***	
	65	***-***	***-***	***-***	***4***	***6***	***8***	***30***	***82***	***130***	
	70	***-***	***-***	***-***	***4***	***7***	***9***	***34***	***94***	***148***	
	75	***-***	***-***	***-***	***5***	***6***	***11***	***39***	***106***	***167***	
	80	***-***	***-***	***-***	***5***	***7***	***14***	***42***	***118***	***186***	
	85	***-***	***-***	***-***	***6***	***7***	***17***	***47***	***129***	***206***	
	90	***-***	***-***	***-***	***6***	***8***	***20***	***52***	***138***	***224***	
42	5	-	-	-	-	-	-	-	-	3	A
	7	-	-	-	-	-	-	-	-	3	B
	10	-	-	-	-	-	-	-	7	7	D
	15	-	-	-	-	-	-	6	9	15	F
	20	-	-	-	-	-	4	7	10	21	G
	25	-	-	-	-	-	7	8	17	32	I
	30	-	-	-	-	4	6	8	28	46	K
	35	-	-	-	-	5	7	9	37	58	L
	40	-	-	-	-	7	7	10	46	70	N
	45	-	-	-	3	5	8	16	53	85	O
	50	***-***	***-***	***-***	***4***	***6***	***8***	***21***	***62***	***101***	
	55	***-***	***-***	***-***	***5***	***6***	***8***	***27***	***73***	***119***	
	60	***-***	***-***	***-***	***6***	***6***	***9***	***32***	***86***	***139***	
	65	***-***	***-***	***-***	***6***	***7***	***10***	***37***	***99***	***159***	
	70	***-***	***-***	***-***	***7***	***7***	***14***	***40***	***114***	***182***	
	75	***-***	***-***	***3***	***5***	***7***	***18***	***45***	***126***	***204***	
	80	***-***	***-***	***3***	***6***	***7***	***21***	***51***	***137***	***225***	
	85	***-***	***-***	***4***	***5***	***8***	***25***	***57***	***146***	***245***	
	90	***-***	***-***	***4***	***6***	***8***	***28***	***65***	***152***	***263***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
45	4	-	-	-	-	-	-	-	-	3	A
	7	-	-	-	-	-	-	-	-	3	B
	10	-	-	-	-	-	-	-	9	9	D
	15	-	-	-	-	-	-	8	9	17	F
	20	-	-	-	-	-	6	7	11	24	H
	25	-	-	-	-	4	5	8	23	40	J
	30	-	-	-	-	6	6	9	34	55	K
	35	-	-	-	3	5	7	10	44	69	M
	40	-	-	-	4	6	7	15	52	84	O
	45	***-***	***-***	***-***	***5***	***6***	***8***	***21***	***61***	***101***	
	50	***-***	***-***	***-***	***6***	***7***	***8***	***27***	***73***	***121***	
	55	***-***	***-***	***3***	***5***	***6***	***9***	***33***	***88***	***144***	
	60	***-***	***-***	***3***	***5***	***7***	***12***	***38***	***103***	***168***	
	65	***-***	***-***	***4***	***5***	***8***	***16***	***42***	***119***	***194***	
	70	***-***	***-***	***5***	***5***	***8***	***20***	***48***	***132***	***218***	
	75	***-***	***-***	***5***	***6***	***8***	***24***	***55***	***142***	***240***	
	80	***-***	***-***	***6***	***6***	***8***	***28***	***63***	***150***	***261***	
48	6	-	-	-	-	-	-	-	-	3	B
	10	-	-	-	-	-	-	-	11	11	D
	15	-	-	-	-	-	4	6	10	20	G
	20	-	-	-	-	-	8	8	14	30	H
	25	-	-	-	-	6	6	8	29	49	K
	30	-	-	-	3	5	7	9	40	64	M
	35	-	-	-	5	5	8	13	49	80	N
	40	***-***	***-***	***-***	***6***	***6***	***8***	***20***	***59***	***99***	
	45	***-***	***-***	***3***	***5***	***6***	***9***	***26***	***72***	***121***	
	50	***-***	***-***	***4***	***5***	***7***	***9***	***33***	***88***	***146***	
	55	***-***	***-***	***5***	***5***	***7***	***13***	***38***	***105***	***173***	
	60	***-***	***-***	***6***	***5***	***8***	***17***	***43***	***122***	***201***	
	65	***-***	***-***	***7***	***5***	***8***	***22***	***50***	***135***	***227***	
	70	***-***	***3***	***4***	***6***	***8***	***26***	***58***	***146***	***251***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3		
51	6	-	-	-	-	-	-	-	-	3	B
	10	-	-	-	-	-	-	5	8	13	D
	15	-	-	-	-	-	5	7	10	22	G
	20	-	-	-	-	5	5	8	20	38	I
	25	-	-	-	3	5	6	9	33	56	K
	30	-	-	-	5	5	7	10	46	73	M
	35	-	-	3	4	6	8	18	55	94	O
	40	***-***	***-***	***4***	***5***	***6***	***8***	***26***	***68***	***117***	
	45	***-***	***-***	***5***	***5***	***7***	***9***	***32***	***85***	***143***	
	50	***-***	***-***	***6***	***6***	***7***	***13***	***37***	***105***	***174***	
	55	***-***	***3***	***4***	***6***	***7***	***18***	***44***	***122***	***204***	
	60	***-***	***4***	***4***	***6***	***8***	***23***	***51***	***137***	***233***	
	65	***-***	***5***	***4***	***6***	***9***	***27***	***61***	***148***	***260***	
	70	***-***	***5***	***5***	***6***	***12***	***30***	***72***	***155***	***285***	
54	5	-	-	-	-	-	-	-	-	3	B
	10	-	-	-	-	-	-	6	9	15	E
	15	-	-	-	-	-	7	7	11	25	H
	20	-	-	-	-	6	6	8	25	45	J
	25	-	-	-	5	5	7	9	39	65	M
	30	-	-	3	4	6	7	15	50	85	O
	35	***-***	***-***	***5***	***4***	***6***	***8***	***23***	***62***	***108***	
	40	***-***	***-***	***6***	***5***	***7***	***9***	***30***	***80***	***137***	
	45	***-***	***4***	***4***	***5***	***7***	***13***	***36***	***101***	***170***	
	50	***-***	***4***	***5***	***5***	***8***	***18***	***42***	***121***	***203***	
	55	***-***	***5***	***5***	***6***	***8***	***23***	***51***	***137***	***235***	
	60	***-***	***6***	***5***	***6***	***9***	***28***	***61***	***149***	***264***	

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)										Decom. Time (min)
		30	27	24	21	18	15	12	9	6	3	
57	5	-	-	-	-	-	-	-	-	-	-	4
	10	-	-	-	-	-	-	-	-	8	9	17
	15	-	-	-	-	-	-	4	5	7	11	27
	20	-	-	-	-	-	4	4	6	9	29	52
	25	-	-	-	-	-	7	5	7	10	44	73
	30	-	-	-	-	5	4	6	8	19	55	97
	35	-	-	-	3	4	5	6	9	27	72	126
	40	-	-	-	4	4	5	7	11	35	93	159
	45	-	-	-	5	5	5	8	17	41	116	197
	50	-	-	3	3	5	6	8	22	50	135	232
	55	-	-	4	3	5	7	9	27	61	149	265
60	5	-	-	-	-	-	-	-	-	-	-	4
	10	-	-	-	-	-	-	-	-	10	9	19
	15	-	-	-	-	-	-	5	6	8	16	35
	20	-	-	-	-	-	5	5	6	10	33	59
	25	-	-	-	-	5	4	5	7	14	48	83
	30	-	-	-	3	4	4	6	9	23	62	111
	35	-	-	-	5	4	5	6	10	32	84	146
	40	-	-	-	6	4	6	7	15	38	109	185
	45	-	-	4	3	5	6	8	21	47	131	225
	50	-	-	5	4	4	7	9	27	58	147	261
63	5	-	-	-	-	-	-	-	-	-	5	5
	10	-	-	-	-	-	-	-	5	6	10	21
	15	-	-	-	-	-	-	7	6	8	20	41
	20	-	-	-	-	-	7	5	7	9	39	67
	25	-	-	-	-	6	4	6	8	17	52	93
	30	-	-	-	5	4	4	7	8	28	71	127
	35	-	-	3	3	4	6	7	12	35	97	167
	40	-	-	4	4	4	6	8	19	43	123	211
	45	-	-	5	4	5	6	9	25	54	142	250
	50	-	3	3	4	6	6	13	29	70	154	288

CF TABLE 1: STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)										Decom. Time (min)
		30	27	24	21	18	15	12	9	6	3	
66	5	-	-	-	-	-	-	-	-	-	7	7
	10	-	-	-	-	-	-	-	7	6	10	23
	15	-	-	-	-	-	4	5	5	9	24	47
	20	-	-	-	-	5	4	5	7	10	43	74
	25	-	-	-	4	4	4	6	8	21	58	105
	30	-	-	3	3	4	5	7	9	32	81	144
	35	-	-	5	3	4	6	7	16	39	110	190
	40	-	3	3	4	4	7	8	23	49	135	236
	45	-	4	3	4	5	7	11	28	65	151	278
69	5	-	-	-	-	-	-	-	-	-	8	8
	10	-	-	-	-	-	-	-	8	7	10	25
	15	-	-	-	-	-	6	4	6	9	28	53
	20	-	-	-	-	6	4	6	7	12	47	82
	25	-	-	-	6	3	5	6	9	24	65	118
	30	-	-	5	3	4	5	7	12	35	93	164
	35	-	3	3	4	4	6	8	19	44	123	214
	40	-	5	3	4	5	6	9	27	57	146	262
72	5	-	-	-	-	-	-	-	-	-	9	9
	10	-	-	-	-	-	-	4	5	7	11	27
	15	-	-	-	-	-	7	5	6	9	32	59
	20	-	-	-	4	4	4	5	8	16	50	91
	25	-	-	4	3	4	5	6	9	28	73	132
	30	-	-	6	3	5	5	8	15	37	106	185
	35	-	5	3	4	4	6	9	23	49	135	238
	40	3	3	3	4	6	6	13	28	67	153	286

CF TABLE 1S
SHORT STANDARD AIR DECOMPRESSION
(METRES)

CF TABLE 1S: SHORT STANDARD AIR DECOMPRESSION (METRES)

Depth (msw)	No-Decompression Bottom Times (min)				Decompression Required Bottom Times (min)			
6	30 A 60 B 90 C 120 D	150 E 180 F 240 G 300 H	360 I 420 J 480 K 600 L	720 M ∞				
9	30 A 45 B 60 C 90 D	100 E 120 F 150 G 180 H	190 I 210 J 240 K 270 L	300 M	330 N 360 O	400	420	480
12	22 A 30 B 40 C	60 D 70 E 80 F	90 G 120 H 130 I	150 J	160 K 170 L 180 M	200	210	220
15	18 A 25 B	30 C 40 D	50 E 60 F	75 G	90 H 100 I	110 J 120 K	128 L	137 M
18	14 A 20 B	25 C 30 D	40 E	50 F	60 G	70 H 80 I	88 J	95 K
Decompression Time in minutes at			3 msw		5	10	15	20
21	12 A 15 B	20 C	25 D	35 E	40 F	53 H	65 I	68 J
24	10 A 13 B	15 C	20 D	25 E	30 F	37 G	50 H	54 I
27	9 A	12 B	15 C	20 D	24 E	28 F	35 G	44 I
30	7 A	10 B	12 C	15 D	18 D	22 F	30 G	37 H
33		6 A	10 B	12 C	15 D	18 E	24 G	31 H
36		6 A	8 B	10 C	12 D	15 E	19 F	25 G
39			5 A	8 B	10 C	13 D	17 F	21 G
42			5 A	7 B	9 C	12 D	14 F	18 G
45			4 A	7 B	8 C	10 D	13 F	16 G
Decompression Time in minutes at			6 msw		-	-	5	10
			3 msw		5	10	10	10

CF TABLE 2
IN-WATER OXYGEN DECOMPRESSION
(METRES)

CF TABLE 2: IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)						Decom. Time (min)	Repet. Group
		Air					O_2		
		24	21	18	15	12	9		
15	75	-	-	-	-	-	-	1	G
	120	-	-	-	-	-	5	7	J
	130	-	-	-	-	-	10	12	J
	140	-	-	-	-	-	14	16	K
	160	-	-	-	-	-	***19***	***21***	
	180	-	-	-	-	-	***23***	***25***	
	200	-	-	-	-	-	***27***	***29***	
	220	-	-	-	-	-	***31***	***33***	
	240	-	-	-	-	-	***35***	***37***	
	260	-	-	-	-	-	***38***	***40***	
	280	-	-	-	-	-	***41***	***43***	
18	50	-	-	-	-	-	-	1	F
	80	-	-	-	-	-	5	7	H
	90	-	-	-	-	-	10	12	J
	100	-	-	-	-	-	15	17	J
	110	-	-	-	-	-	19	21	K
	120	-	-	-	-	-	22	24	K
	140	-	-	-	-	-	***28***	***30***	
	160	-	-	-	-	-	***33***	***35***	
	180	-	-	-	-	-	***38***	***40***	
	200	-	-	-	-	-	***43***	***45***	
	220	-	-	-	-	-	***48***	***50***	
	240	-	-	-	-	-	***53***	***55***	

O_2 stop times do not include ascent time to 9 msw.

CF TABLE 2: IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)						Decom. Time (min)	Repet. Group
		Air					O_2		
		24	21	18	15	12	9		
21	35	-	-	-	-	-	**-**	2	E
	50	-	-	-	-	-	**6**	8	G
	70	-	-	-	-	-	**12**	14	I
	80	-	-	-	-	-	**18**	20	J
	90	-	-	-	-	-	**23**	25	K
	100	-	-	-	-	-	**27**	29	K
	110	***-***	***-***	***-***	***-***	***-***	***30***	***32***	
	120	***-***	***-***	***-***	***-***	***-***	***34***	***36***	
	130	***-***	***-***	***-***	***-***	***-***	***37***	***39***	
	140	***-***	***-***	***-***	***-***	***-***	***41***	***43***	
	150	***-***	***-***	***-***	***-***	***-***	***44***	***46***	
	160	***-***	***-***	***-***	***-***	***-***	***47***	***49***	
	170	***-***	***-***	***-***	***-***	***-***	***51***	***53***	
	180	***-***	***-***	***-***	***-***	***-***	***54***	***56***	
	190	***-***	***-***	***-***	***-***	***-***	***57***	***59***	
	200	***-***	***-***	***-***	***-***	***-***	***60***	***62***	
24	25	-	-	-	-	-	**-**	2	E
	35	-	-	-	-	-	**6**	8	G
	50	-	-	-	-	-	**8**	10	H
	55	-	-	-	-	-	**12**	14	H
	60	-	-	-	-	-	**16**	18	I
	70	-	-	-	-	-	**23**	25	J
	80	-	-	-	-	-	**28**	30	K
	90	***-***	***-***	***-***	***-***	***-***	***32***	***34***	
	100	***-***	***-***	***-***	***-***	***-***	***37***	***39***	
	110	***-***	***-***	***-***	***-***	***-***	***41***	***43***	
	120	***-***	***-***	***-***	***-***	***-***	***45***	***47***	
	130	***-***	***-***	***-***	***-***	***-***	***49***	***51***	
	140	***-***	***-***	***-***	***-***	***-***	***53***	***55***	
	150	***-***	***-***	***-***	***-***	***-***	***58***	***60***	
	160	***-***	***-***	***-***	***-***	***-***	***62***	***64***	

O_2 stop times do not include ascent time to 9 msw.

CF TABLE 2: IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)						Decom. Time (min)	Repet. Group
		Air					O_2		
		24	21	18	15	12	9		
27	20	-	-	-	-	-	-	2	D
	25	-	-	-	-	-	5	7	E
	40	-	-	-	-	-	9	11	G
	45	-	-	-	-	-	11	13	H
	50	-	-	-	-	-	17	19	H
	55	-	-	-	-	-	22	24	I
	60	-	-	-	-	-	25	27	J
	70	-	-	-	-	-	***31***	***33***	
	80	-	-	-	-	-	***36***	***38***	
	90	-	-	-	-	-	***42***	***44***	
	100	-	-	-	-	-	***47***	***49***	
	110	-	-	-	-	-	***52***	***54***	
	120	-	-	-	-	-	***57***	***59***	
30	15	-	-	-	-	-	-	2	D
	20	-	-	-	-	-	5	8	E
	30	-	-	-	-	-	9	12	F
	35	-	-	-	-	-	10	13	G
	40	-	-	-	-	-	14	17	H
	45	-	-	-	-	-	20	23	I
	50	-	-	-	-	-	25	23	I
	55	-	-	-	-	-	29	32	J
	60	-	-	-	-	-	***32***	***35***	
	70	-	-	-	-	-	***39***	***42***	
	80	-	-	-	-	-	***45***	***48***	
	90	-	-	-	-	***2***	***51***	***54***	
	100	-	-	-	-	***3***	***56***	***60***	
	110	-	-	-	-	***4***	***62***	***67***	

O_2 stop times do not include ascent time to 9 msw.

CF TABLE 2: IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)						Decom. Time (min)	Repet. Group
		Air					O_2		
		24	21	18	15	12	9		
33	12	-	-	-	-	-	**-**	2	C
	20	-	-	-	-	-	**7**	10	E
	25	-	-	-	-	-	**9**	12	F
	30	-	-	-	-	-	**11**	14	G
	35	-	-	-	-	-	**15**	18	H
	40	-	-	-	-	-	**22**	25	I
	45	-	-	-	-	-	**27**	30	J
	50	-	-	-	-	-	**32**	35	K
	55	-	-	-	-	-	**36**	39	K
	60	***-***	***-***	***-***	***-***	***2***	***39***	***42***	
	65	***-***	***-***	***-***	***-***	***3***	***42***	***46***	
	70	***-***	***-***	***-***	***-***	***4***	***46***	***51***	
	75	***-***	***-***	***-***	***-***	***4***	***49***	***54***	
	80	***-***	***-***	***-***	***-***	***5***	***52***	***58***	
	85	***-***	***-***	***-***	***-***	***5***	***56***	***62***	
	90	***-***	***-***	***-***	***-***	***6***	***59***	***66***	
	95	***-***	***-***	***-***	***-***	***6***	***62***	***69***	
	100	***-***	***-***	***-***	***-***	***7***	***66***	***74***	
	105	***-***	***-***	***-***	***-***	***7***	***69***	***77***	
	110	***-***	***-***	***-***	***-***	***8***	***73***	***82***	

O_2 stop times do not include ascent time to 9 msw.

CF TABLE 2: IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)						Decom. Time (min)	Repet. Group
		Air					O_2		
		24	21	18	15	12	9		
36	10	-	-	-	-	-	-	2	C
	15	-	-	-	-	-	5	8	E
	20	-	-	-	-	-	8	11	F
	25	-	-	-	-	-	11	14	G
	30	-	-	-	-	-	13	16	H
	35	-	-	-	-	-	22	25	H
	40	-	-	-	-	-	28	31	I
	45	-	-	-	-	3	33	37	J
	50	-	-	-	-	4	37	42	K
	55	-	-	-	-	*5*	*41*	*47*	
	60	-	-	-	-	*6*	*45*	*52*	
	65	-	-	-	-	*6*	*49*	*56*	
	70	-	-	-	-	*7*	*52*	*60*	
	75	-	-	-	-	*8*	*56*	*65*	
	80	-	-	-	*2*	*6*	*60*	*69*	
	85	-	-	-	*3*	*6*	*64*	*74*	
	90	-	-	-	*3*	*7*	*68*	*79*	
	95	-	-	-	*4*	*6*	*72*	*83*	
	100	-	-	-	*4*	*7*	*76*	*88*	

O_2 stop times do not include ascent time to 9 msw.

CF TABLE 2: IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)						Decom. Time (min)	Repet. Group
		Air					O_2		
		24	21	18	15	12	9		
39	8	-	-	-	-	-	**-**	3	B
	15	-	-	-	-	-	**7**	10	E
	20	-	-	-	-	-	**10**	13	G
	25	-	-	-	-	-	**13**	16	G
	30	-	-	-	-	-	**21**	24	H
	35	-	-	-	-	3	**28**	32	I
	40	-	-	-	-	4	**33**	38	J
	45	-	-	-	-	6	**38**	45	L
	50	***-***	***-***	***-***	***-***	***7***	***42***	***50***	
	55	***-***	***-***	***-***	***2***	***6***	***46***	***55***	
	60	***-***	***-***	***-***	***3***	***6***	***51***	***61***	
	65	***-***	***-***	***-***	***4***	***6***	***55***	***66***	
	70	***-***	***-***	***-***	***4***	***7***	***59***	***71***	
	75	***-***	***-***	***-***	***5***	***6***	***64***	***76***	
	80	***-***	***-***	***-***	***5***	***7***	***68***	***81***	
	85	***-***	***-***	***-***	***6***	***7***	***73***	***87***	
	90	***-***	***-***	***-***	***6***	***8***	***78***	***93***	
42	7	-	-	-	-	-	**-**	3	B
	10	-	-	-	-	-	**4**	7	D
	15	-	-	-	-	-	**8**	11	D
	20	-	-	-	-	-	**12**	15	G
	25	-	-	-	-	-	**17**	20	H
	30	-	-	-	-	4	**26**	31	I
	35	-	-	-	-	5	**32**	38	J
	40	-	-	-	-	7	**37**	45	K
	45	-	-	-	3	5	**43**	52	M
	50	***-***	***-***	***-***	***4***	***6***	***47***	***58***	
	55	***-***	***-***	***-***	***5***	***6***	***52***	***64***	
	60	***-***	***-***	***-***	***6***	***6***	***57***	***70***	
	65	***-***	***-***	***-***	***6***	***7***	***62***	***76***	
	70	***-***	***-***	***-***	***7***	***7***	***67***	***82***	
	75	***-***	***-***	***3***	***5***	***7***	***72***	***88***	
	80	***-***	***-***	***3***	***6***	***7***	***77***	***94***	
	85	***-***	***-***	***4***	***5***	***8***	***83***	***101***	
	90	***-***	***-***	***4***	***6***	***8***	***89***	***108***	

O_2 stop times do not include ascent time to 9 msw.

CF TABLE 2: IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)						Decom. Time (min)	Repet. Group
		Air					O_2		
		24	21	18	15	12	9		
45	7	-	-	-	-	-	-	3	B
	10	-	-	-	-	-	5	8	D
	15	-	-	-	-	-	10	13	F
	20	-	-	-	-	-	13	16	G
	25	-	-	-	-	4	22	27	H
	30	-	-	-	-	6	30	37	I
	35	-	-	-	3	5	36	45	K
	40	-	-	-	4	6	42	53	M
	45	***-***	***-***	***-***	***5***	***6***	***47***	***59***	
	50	***-***	***-***	***-***	***6***	***7***	***52***	***66***	
	55	***-***	***-***	***3***	***5***	***6***	***58***	***73***	
	60	***-***	***-***	***3***	***5***	***7***	***63***	***79***	
	65	***-***	***-***	***4***	***5***	***8***	***69***	***87***	
	70	***-***	***-***	***5***	***5***	***8***	***75***	***94***	
	75	***-***	***-***	***5***	***6***	***8***	***81***	***101***	
	80	***-***	***-***	***6***	***6***	***8***	***87***	***108***	
48	6	-	-	-	-	-	-	3	B
	10	-	-	-	-	-	6	10	E
	15	-	-	-	-	-	11	15	F
	20	-	-	-	-	-	15	19	G
	25	-	-	-	-	6	26	33	I
	30	-	-	-	3	5	34	43	J
	35	-	-	-	5	5	40	51	L
	40	***-***	***-***	***-***	***6***	***6***	***46***	***59***	
	45	***-***	***-***	***3***	***5***	***6***	***52***	***67***	
	50	***-***	***-***	***4***	***5***	***7***	***58***	***75***	
	55	***-***	***-***	***5***	***5***	***7***	***64***	***82***	
	60	***-***	***-***	***6***	***5***	***8***	***70***	***90***	
	65	***-***	***-***	***7***	***5***	***8***	***77***	***98***	
	70	***-***	***3***	***4***	***6***	***8***	***84***	***106***	

O_2 stop times do not include ascent time to 9 msw.

CF TABLE 2: IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)						Decom. Time (min)	Repet. Group
		Air					O_2		
		24	21	18	15	12	9		
51	6	-	-	-	-	-	-	3	B
	10	-	-	-	-	-	7	11	E
	15	-	-	-	-	-	12	16	G
	20	-	-	-	-	5	20	26	H
	25	-	-	-	3	5	30	39	J
	30	-	-	-	5	5	38	49	K
	35	-	-	3	4	6	44	58	M
	40	*-*	*-*	*4*	*5*	*6*	*51*	*67*	
	45	*-*	*-*	*5*	*5*	*7*	*57*	*75*	
	50	*-*	*-*	*6*	*6*	*7*	*64*	*84*	
	55	*-*	*3*	*4*	*6*	*7*	*71*	*92*	
	60	*-*	*4*	*4*	*6*	*8*	*78*	*101*	
	65	*-*	*5*	*4*	*6*	*9*	*86*	*111*	
	70	*-*	*5*	*5*	*6*	*12*	*93*	*122*	
54	5	-	-	-	-	-	-	3	B
	10	-	-	-	-	-	8	12	E
	15	-	-	-	-	-	14	18	G
	20	-	-	-	-	6	24	31	H
	25	-	-	-	5	5	34	45	J
	30	-	-	3	4	6	41	55	M
	35	*-*	*-*	*5*	*4*	*6*	*48*	*64*	
	40	*-*	*-*	*6*	*5*	*7*	*55*	*74*	
	45	*-*	*4*	*4*	*5*	*7*	*63*	*84*	
	50	*-*	*4*	*5*	*5*	*8*	*70*	*93*	
	55	*-*	*5*	*5*	*6*	*8*	*78*	*103*	
	60	*-*	*6*	*5*	*6*	*9*	*86*	*113*	

O_2 stop times do not include ascent time to 9 msw.

CF TABLE 2: IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)
		Air							O_2	
		30	27	24	21	18	15	12	9	
57	5	-	-	-	-	-	-	-	-	4
	10	-	-	-	-	-	-	-	9	13
	15	-	-	-	-	-	-	4	14	19
	20	-	-	-	-	-	4	4	28	37
	25	-	-	-	-	-	7	5	37	50
	30	-	-	-	-	5	4	6	45	61
	35	-	-	-	3	4	5	6	52	71
	40	-	-	-	4	4	5	7	60	81
	45	-	-	-	5	5	5	8	68	92
	50	-	-	3	3	5	6	8	77	103
	55	-	-	4	3	5	7	9	86	115
60	5	-	-	-	-	-	-	-	-	4
	10	-	-	-	-	-	-	-	10	14
	15	-	-	-	-	-	-	5	16	22
	20	-	-	-	-	-	5	5	31	42
	25	-	-	-	-	5	4	5	40	55
	30	-	-	-	3	4	4	6	49	67
	35	-	-	-	5	4	5	6	57	78
	40	-	-	-	6	4	6	7	65	89
	45	-	-	4	3	5	6	8	75	102
	50	-	-	5	4	4	7	9	84	114
63	10	-	-	-	-	-	-	-	11	15
	15	-	-	-	-	-	-	7	21	29
	20	-	-	-	-	-	7	5	33	46
	25	-	-	-	-	6	4	6	43	60
	30	-	-	-	5	4	4	7	52	73
	35	-	-	3	3	4	6	7	61	85
	40	-	-	4	4	4	6	8	71	98
	45	-	-	5	4	5	6	9	81	111
	50	-	3	3	4	6	6	13	91	127

O_2 stop times do not include ascent time to 9 msw.

CF TABLE 2: IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)
		Air							O_2	
		30	27	24	21	18	15	12	9	
66	10	-	-	-	-	-	-	-	12	17
	15	-	-	-	-	-	4	5	24	34
	20	-	-	-	-	5	4	5	36	51
	25	-	-	-	4	4	4	6	47	66
	30	-	-	3	3	4	5	7	56	79
	35	-	-	5	3	4	6	7	66	92
	40	-	3	3	4	4	7	8	77	107
	45	-	4	3	4	5	7	11	88	123
69	10	-	-	-	-	-	-	-	14	19
	15	-	-	-	-	-	6	4	27	38
	20	-	-	-	-	6	4	6	39	56
	25	-	-	-	6	3	5	6	50	71
	30	-	-	5	3	4	5	7	60	85
	35	-	3	3	4	4	6	8	72	101
	40	-	5	3	4	5	6	9	84	117
72	5	-	-	-	-	-	-	-	4	9
	10	-	-	-	-	-	-	4	14	19
	15	-	-	-	-	-	7	5	29	42
	20	-	-	-	4	4	4	5	42	60
	25	-	-	4	3	4	5	6	53	76
	30	-	-	6	3	5	5	8	65	93
	35	-	5	3	4	4	6	9	77	109
	40	3	3	3	4	6	6	13	90	129

O_2 stop times do not include ascent time to 9 msw.

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CF TABLE 2S
SHORT IN-WATER OXYGEN DECOMPRESSION
(METRES)

CF TABLE 2S: SHORT IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	No-Decompression Bottom Times (min)			Decompression Required Bottom Times (min)			
15	18 A 25 B 30 C	40 D 50 E 60 F	75 G	120 J	130 J	145	165
18	14 A 20 B 25 C	30 D 40 E	50 F	80 H	90 J	100 J	115 K
21	12 A 15 B	20 C 25 D	35 E	47 F	67 H	74 I	84 J
24	10 A 13 B	15 C 20 D	25 E	34 F	53 H	58 H	65 I
27	9 A 12 B	15 C	20 D	26 E	42 G	48 H	53 I
30	7 A 10 B	12 C	15 D	21 E	35 G	40 H	45 I
33	6 A	10 B	12 C	17 D	29 G	35 H	38 H
36	6 A	8 B	10 C	15 D	24 G	30 H	33 H
39		5 A	8 B	13 D	20 G	27 G	29 H
42		5 A	7 B	11 D	18 F	24 G	26 H
45		4 A	7 B	10 D	16 F	22 G	24 H
48			6 B	9 D	14 F	20 G	21 H
51			6 B	8 C	13 E	18 G	20 H
54			5 B	8 C	11 E	16 G	18 G
Decompression Time (min) Oxygen at 9 msw				5	10	15	20

Note: Decompression stop times do not include ascent time to 9 msw.

CF TABLE 3
SURFACE DECOMPRESSION WITH OXYGEN
(METRES)

CF TABLE 3: SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		In-Water Stops						Surface Interval	RCC		
		Air							O_2		
		24	21	18	15	12	9		12		
18	50	-	-	-	-	-	-	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes	-	1	F
	70	-	-	-	-	-	1		10	19	H
	80	-	-	-	-	-	1		16	25	H
	90	-	-	-	-	-	1		20	29	I
	100	-	-	-	-	-	1		24	33	J
	110	-	-	-	-	-	1		28	37	K
	120	-	-	-	-	-	1		30	39	K
	130	-	-	-	-	-	1		32*	46	
	140	-	-	-	-	-	1		38*	52	
	150	-	-	-	-	-	1		42*	56	
	160	-	-	-	-	-	1		46*	60	
	170	-	-	-	-	-	1		50*	64	
	180	-	-	-	-	-	1		54*	68	
	190	-	-	-	-	-	1		57*	71	
	200	-	-	-	-	-	1		60*	74	
	210	-	-	-	-	-	1		63**	82	
	220	-	-	-	-	-	1		69**	88	
	230	-	-	-	-	-	1		73**	92	
	240	-	-	-	-	-	1		77**	96	

Note: asterisk (*) indicates number of 5 minute air breaks required.

CF TABLE 3: SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		In-Water Stops						Surface Interval	RCC		
		Air							O_2		
		24	21	18	15	12	9		12		
21	35	-	-	-	-	-	-	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes	-	2	E
	50	-	-	-	-	-	1		6	15	H
	60	-	-	-	-	-	1		15	24	H
	70	-	-	-	-	-	1		21	30	I
	80	-	-	-	-	-	1		26	35	J
	90	-	-	-	-	-	1		30	39	K
	100	-	-	-	-	-	1		34*	48	K
	110	-	-	-	-	-	***1***		***40****	***54***	
	120	-	-	-	-	-	***1***		***45****	***59***	
	130	-	-	-	-	-	***1***		***50****	***64***	
	140	-	-	-	-	-	***1***		***55****	***69***	
	150	-	-	-	-	-	***1***		***59****	***73***	
	160	-	-	-	-	-	***1***		***63*****	***82***	
	170	-	-	-	-	-	***1***		***71*****	***90***	
	180	-	-	-	-	-	***1***		***76*****	***95***	
	190	-	-	-	-	-	***1***		***81*****	***100***	
	200	-	-	-	-	-	***1***		***85*****	***104***	
24	25	-	-	-	-	-	-		-	2	E
	45	-	-	-	-	-	1		12	21	H
	50	-	-	-	-	-	1		17	26	H
	55	-	-	-	-	-	1		21	30	H
	60	-	-	-	-	-	1		24	33	I
	70	-	-	-	-	-	1		30	39	J
	80	-	-	-	-	-	1		35*	49	K
	90	-	-	-	-	-	***1***		***42****	***56***	
	100	-	-	-	-	-	***2***		***47****	***62***	
	110	-	-	-	-	-	***2***		***53****	***68***	
	120	-	-	-	-	-	***3***		***58****	***74***	
	130	-	-	-	-	-	***4***		***62*****	***84***	
	140	-	-	-	-	-	***4***		***72*****	***94***	
	150	-	-	-	-	-	***5***		***78*****	***101***	
	160	-	-	-	-	-	***5***		***84*****	***107***	

Note: asterisk (*) indicates number of 5 minute air breaks required.

CF TABLE 3: SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		In-Water Stops						Surface Interval	RCC		
		Air							O_2		
		24	21	18	15	12	9		12		
27	20	-	-	-	-	-	-	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes	-	2	D
	35	-	-	-	-	-	1		8	17	G
	40	-	-	-	-	-	1		16	25	G
	45	-	-	-	-	-	1		21	30	H
	50	-	-	-	-	-	1		25	34	H
	55	-	-	-	-	-	1		28	37	I
	60	-	-	-	-	-	2		30*	45	J
	70	-	-	-	-	-	*3*		*37**	*53*	
	80	-	-	-	-	-	*4*		*45**	*62*	
	90	-	-	-	-	-	*5*		*52**	*70*	
	100	-	-	-	-	-	*6*		*58**	*77*	
	110	-	-	-	-	-	*7*		*65***	*90*	
	120	-	-	-	-	-	*8*		*74***	*100*	
30	15	-	-	-	-	-	-		-	2	D
	30	-	-	-	-	-	2		8	18	G
	35	-	-	-	-	-	2		17	27	G
	40	-	-	-	-	-	2		22	32	H
	45	-	-	-	-	-	3		27	38	I
	50	-	-	-	-	-	4		30	42	I
	55	-	-	-	-	-	5		31*	49	J
	60	-	-	-	-	-	*6*		*37**	*56*	
	70	-	-	-	-	-	*7*		*46**	*66*	
	80	-	-	-	-	-	*8*		*54**	*75*	
	90	-	-	-	-	*2*	*8*		*60**	*83*	
	100	-	-	-	-	*3*	*8*		*72***	*101*	
	110	-	-	-	-	*4*	*8*		*81***	*111*	

Note: asterisk (*) indicates number of 5 minute air breaks required.

CF TABLE 3: SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		In-Water Stops						Surface Interval	RCC		
		Air							O_2		
		24	21	18	15	12	9		12		
33	12	-	-	-	-	-	-	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes	-	2	C
	25	-	-	-	-	-	2		7	17	G
	30	-	-	-	-	-	2		16	26	G
	35	-	-	-	-	-	3		22	33	H
	40	-	-	-	-	-	5		27	40	I
	45	-	-	-	-	-	6		30*	49	J
	50	-	-	-	-	-	7		35*	55	K
	55	-	-	-	-	-	8		40*	61	K
	60	-	-	-	-	2	7		45*	67	
	65	-	-	-	-	3	7		50*	73	
	70	-	-	-	-	4	7		54*	78	
	75	-	-	-	-	4	8		59*	84	
	80	-	-	-	-	5	8		60**	91	
	85	-	-	-	-	5	9		69**	101	
	90	-	-	-	-	6	9		75**	108	
	95	-	-	-	-	6	9		80**	113	
	100	-	-	-	-	7	9		85**	119	
	105	-	-	-	-	7	12		89**	126	
	110	-	-	-	-	8	15		93***	139	

Note: asterisk (*) indicates number of 5 minute air breaks required.

CF TABLE 3: SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		In-Water Stops						Surface Interval	RCC		
		Air							O_2		
		24	21	18	15	12	9		12		
36	10	-	-	-	-	-	-	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes	-	2	C
	20	-	-	-	-	-	2		7	17	F
	25	-	-	-	-	-	2		13	23	G
	30	-	-	-	-	-	4		21	33	G
	35	-	-	-	-	-	6		27	41	H
	40	-	-	-	-	-	8		30*	51	I
	45	-	-	-	-	3	6		36*	58	J
	50	-	-	-	-	4	7		42*	66	K
	55	***-***	***-***	***-***	***-***	***5***	***7***		***48****	***73***	
	60	***-***	***-***	***-***	***-***	***6***	***7***		***53****	***79***	
	65	***-***	***-***	***-***	***-***	***6***	***8***		***58****	***85***	
	70	***-***	***-***	***-***	***-***	***7***	***8***		***60*****	***93***	
	75	***-***	***-***	***-***	***-***	***8***	***8***		***70*****	***104***	
	80	***-***	***-***	***-***	***2***	***6***	***9***		***76*****	***111***	
	85	***-***	***-***	***-***	***3***	***6***	***10***		***82*****	***119***	
	90	***-***	***-***	***-***	***3***	***7***	***13***		***87*****	***128***	
	95	***-***	***-***	***-***	***4***	***6***	***16***		***90*****	***134***	
	100	***-***	***-***	***-***	***4***	***7***	***19***		***100******	***153***	

Note: asterisk (*) indicates number of 5 minute air breaks required.

CF TABLE 3: SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		In-Water Stops						Surface Interval	RCC		
		Air							O_2		
		24	21	18	15	12	9		12		
39	8	-	-	-	-	-	-	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes	-	3	B
	20	-	-	-	-	-	2		8	18	G
	25	-	-	-	-	-	5		18	31	G
	30	-	-	-	-	-	7		26	41	H
	35	-	-	-	-	3	6		30*	52	I
	40	-	-	-	-	4	7		36*	60	J
	45	-	-	-	-	6	7		43*	69	K
	50	-	-	-	-	7	7		49*	76	
	55	-	-	-	2	6	8		54*	83	
	60	-	-	-	3	6	8		60*	90	
	65	-	-	-	4	6	8		67**	103	
	70	-	-	-	4	7	9		75**	113	
	75	-	-	-	5	6	11		81**	121	
	80	-	-	-	5	7	14		87**	131	
	85	-	-	-	6	7	17		90***	143	
	90	-	-	-	6	8	20		101***	158	
42	7	-	-	-	-	-	-		-	3	B
	15	-	-	-	-	-	2		7	17	F
	20	-	-	-	-	-	4		12	24	G
	25	-	-	-	-	-	7		23	38	H
	30	-	-	-	-	4	6		30	48	I
	35	-	-	-	-	5	7		34*	59	J
	40	-	-	-	-	7	7		42*	69	K
	45	-	-	-	3	5	8		49*	78	M
	50	-	-	-	4	6	8		55*	86	
	55	-	-	-	5	6	8		60**	97	
	60	-	-	-	6	6	9		70**	109	
	65	-	-	-	6	7	10		78**	119	
	70	-	-	-	7	7	14		84**	130	
	75	-	-	3	5	7	18		90**	141	
	80	-	-	3	6	7	21		100***	160	
	85	-	-	4	5	8	25		107***	172	
	90	-	-	4	6	8	28		113***	182	

Note: asterisk (*) indicates number of 5 minute air breaks required.

CF TABLE 3: SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		In-Water Stops						Surface Interval	RCC		
		Air							O_2		
		24	21	18	15	12	9		12		
45	7	-	-	-	-	-	-	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes	-	3	B
	15	-	-	-	-	-	2		8	18	G
	20	-	-	-	-	-	6		17	31	G
	25	-	-	-	-	4	5		27	44	H
	30	-	-	-	-	6	6		30*	55	I
	35	-	-	-	3	5	7		40*	68	K
	40	-	-	-	4	6	7		48*	78	M
	45	-	-	-	5	6	8		55*	87	
	50	-	-	-	6	7	8		60**	99	
	55	-	-	3	5	6	9		72**	113	
	60	-	-	3	5	7	12		80**	125	
	65	-	-	4	5	8	16		87**	138	
	70	-	-	5	5	8	20		95***	156	
	75	-	-	5	6	8	24		105***	171	
	80	-	-	6	6	8	28		111***	182	
48	6	-	-	-	-	-	-		-	3	B
	15	-	-	-	-	-	4		7	19	G
	20	-	-	-	-	-	8		21	37	G
	25	-	-	-	-	6	6		30	50	I
	30	-	-	-	3	5	7		37*	65	J
	35	-	-	-	5	5	8		46*	77	L
	40	-	-	-	6	6	8		54*	87	
	45	-	-	3	5	6	9		60*	96	
	50	-	-	4	5	7	9		72**	115	
	55	-	-	5	5	7	13		81**	129	
	60	-	-	6	5	8	17		88**	142	
	65	-	-	7	5	8	22		99***	164	
	70	-	3	4	6	8	26		108***	178	

Note: asterisk (*) indicates number of 5 minute air breaks required.

CF TABLE 3: SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)	Repet. Group
		In-Water Stops						Surface Interval	RCC		
		Air							O_2		
		24	21	18	15	12	9		12		
51	6	-	-	-	-	-	-	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes	-	3	B
	10	-	-	-	-	-	3		6	17	D
	15	-	-	-	-	-	5		11	24	G
	20	-	-	-	-	5	5		25	43	H
	25	-	-	-	3	5	6		30*	57	J
	30	-	-	-	5	5	7		42*	72	K
	35	-	-	3	4	6	8		51*	85	M
	40	-	-	4	5	6	8		60*	96	
	45	-	-	5	5	7	9		70**	114	
	50	-	-	6	6	7	13		80**	130	
	55	-	3	4	6	7	18		89**	145	
	60	-	4	4	6	8	23		101***	169	
	65	-	5	4	6	9	27		110***	184	
	70	-	5	5	6	12	30		117***	198	
54	5	-	-	-	-	-	-		-	3	B
	10	-	-	-	-	-	3		7	18	E
	15	-	-	-	-	-	7		15	30	G
	20	-	-	-	-	6	6		28	48	H
	25	-	-	-	5	5	7		36*	66	J
	30	-	-	3	4	6	7		47*	80	M
	35	-	-	5	4	6	8		56*	92	
	40	-	-	6	5	7	9		66**	111	
	45	-	4	4	5	7	13		78**	129	
	50	-	4	5	5	8	18		88**	146	
	55	-	5	5	6	8	23		101***	171	
	60	-	6	5	6	9	28		110***	187	

Note: asterisk (*) indicates number of 5 minute air breaks required.

CF TABLE 3: SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)										Decom. Time (min)
		In-Water Stops								Surface Interval	RCC	
		Air									O_2	
		30	27	24	21	18	15	12	9		12	
57	5	-	-	-	-	-	-	-	-	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes	-	4
	10	-	-	-	-	-	-	-	3		8	19
	15	-	-	-	-	-	-	4	5		19	36
	20	-	-	-	-	-	4	4	6		30	52
	25	-	-	-	-	-	7	5	7		41*	73
	30	-	-	-	-	5	4	6	8		52*	88
	35	-	-	-	3	4	5	6	9		60*	100
	40	-	-	-	4	4	5	7	11		75**	124
	45	-	-	-	5	5	5	8	17		85**	143
	50	-	-	3	3	5	6	8	22		99***	169
	55	-	-	4	3	5	7	9	27		110***	188
60	5	-	-	-	-	-	-	-	-		-	4
	10	-	-	-	-	-	-	-	3		9	20
	15	-	-	-	-	-	-	5	6		22	41
	20	-	-	-	-	-	5	5	6		31*	60
	25	-	-	-	-	5	4	5	7		45*	79
	30	-	-	-	3	4	4	6	9		56*	95
	35	-	-	-	5	4	5	6	10		69**	117
	40	-	-	-	6	4	6	7	15		82**	138
	45	-	-	4	3	5	6	8	21		92***	162
	50	-	-	5	4	4	7	9	27		108***	187
63	10	-	-	-	-	-	-	-	5		7	20
	15	-	-	-	-	-	-	7	6		25	46
	20	-	-	-	-	-	7	5	7		36*	68
	25	-	-	-	-	6	4	6	8		49*	86
	30	-	-	-	5	4	4	7	8		60*	101
	35	-	-	3	3	4	6	7	12		76**	129
	40	-	-	4	4	4	6	8	19		88**	151
	45	-	-	5	4	5	6	9	25		105***	182
	50	-	3	3	4	6	6	13	29		116***	203

Note: asterisk (*) indicates number of 5 minute air breaks required.

CF TABLE 3: SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)										Decom. Time (min)
		In-Water Stops								Surface Interval	RCC	
		Air									O$_2$	
		30	27	24	21	18	15	12	9		12	
66	10	-	-	-	-	-	-	-	7	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes	7	22
	15	-	-	-	-	-	4	5	5		28	50
	20	-	-	-	-	5	4	5	7		40*	74
	25	-	-	-	4	4	4	6	8		54*	93
	30	-	-	3	3	4	5	7	9		68**	117
	35	-	-	5	3	4	6	7	16		83**	142
	40	-	3	3	4	4	7	8	23		99***	174
	45	-	4	3	4	5	7	11	28		112***	197
69	10	-	-	-	-	-	-	-	8		11	27
	15	-	-	-	-	-	6	4	6		30	54
	20	-	-	-	-	6	4	6	7		44*	80
	25	-	-	-	6	3	5	6	9		58*	100
	30	-	-	5	3	4	5	7	12		75**	129
	35	-	3	3	4	4	6	8	19		89**	154
	40	-	5	3	4	5	6	9	27		107***	189
72	10	-	-	-	-	-	-	4	5		14	31
	15	-	-	-	-	-	7	5	6		30*	61
	20	-	-	-	4	4	4	5	8		48*	86
	25	-	-	4	3	4	5	6	9		60**	109
	30	-	-	6	3	5	5	8	15		80**	140
	35	-	5	3	4	4	6	9	23		98***	175
	40	3	3	3	4	6	6	13	28		114***	203

Note: asterisk (*) indicates number of 5 minute air breaks required.

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COMBINED AIR TABLES
1, 2 and 3
(METRES)

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)					Table 1 – Standard Air					Table 2 – In-Water Oxygen Decompression			Table 3 – Surface Decompression with Oxygen				
		Air					Air			Decom. Time (min)	Repet. Group	IW O_2	Decom. Time (min)	Repet. Group	IW Air	Surface Interval	RCC O_2	Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3			9			9		12		
6	30	-	-	-	-	-	-	-	-	1	A								
	60	-	-	-	-	-	-	-	-	1	B								
	90	-	-	-	-	-	-	-	-	1	C								
	120	-	-	-	-	-	-	-	-	1	D								
	150	-	-	-	-	-	-	-	-	1	E								
	180	-	-	-	-	-	-	-	-	1	F								
	240	-	-	-	-	-	-	-	-	1	G								
	300	-	-	-	-	-	-	-	-	1	H								
	360	-	-	-	-	-	-	-	-	1	I								
	420	-	-	-	-	-	-	-	-	1	J								
	480	-	-	-	-	-	-	-	-	1	K								
	600	-	-	-	-	-	-	-	-	1	L								
	720	-	-	-	-	-	-	-	-	1	M								
9	30	-	-	-	-	-	-	-	-	1	A								
	45	-	-	-	-	-	-	-	-	1	B								
	60	-	-	-	-	-	-	-	-	1	C								
	90	-	-	-	-	-	-	-	-	1	D								
	10	-	-	-	-	-	-	-	-	1	E								
	120	-	-	-	-	-	-	-	-	1	F								
	150	-	-	-	-	-	-	-	-	1	G								
	180	-	-	-	-	-	-	-	-	1	H								
	190	-	-	-	-	-	-	-	-	1	I								
	210	-	-	-	-	-	-	-	-	1	J								
	240	-	-	-	-	-	-	-	-	1	K								
	270	-	-	-	-	-	-	-	-	1	L								
	300	-	-	-	-	-	-	-	-	1	M								
	330	-	-	-	-	-	-	-	3	3	N								
	360	-	-	-	-	-	-	-	5	5	O								
	400	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***7***	***7***									
	420	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***10***	***10***									
	450	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***15***	***15***									
	480	**-**	**-**	**-**	**-**	**-**	**-**	**-**	***20***	***20***									

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw) – Air 24	21	18	15	12	Table 1 – Standard Air – Air 9	6	3	Decom. Time (min)	Repet. Group	Table 2 – In-Water Oxygen Decompression – IW O_2 9	Decom. Time (min)	Repet. Group	Table 3 – Surface Decompression with Oxygen – IW Air 9	Surface Interval	RCC O_2 12	Decom. Time (min)	Repet. Group
12	20	-	-	-	-	-	-	-	-	1	A								
	30	-	-	-	-	-	-	-	-	1	B								
	40	-	-	-	-	-	-	-	-	1	C								
	60	-	-	-	-	-	-	-	-	1	D								
	70	-	-	-	-	-	-	-	-	1	E								
	80	-	-	-	-	-	-	-	-	1	F								
	90	-	-	-	-	-	-	-	-	1	G								
	120	-	-	-	-	-	-	-	-	1	H								
	130	-	-	-	-	-	-	-	-	1	I								
	150	-	-	-	-	-	-	-	-	1	J								
	160	-	-	-	-	-	-	-	3	3	K								
	170	-	-	-	-	-	-	-	4	4	L								
	180	-	-	-	-	-	-	-	5	5	M								
	200	-	-	-	-	-	-	-	***10***	***10***									
	210	-	-	-	-	-	-	-	***15***	***15***									
	220	-	-	-	-	-	-	-	***19***	***19***									
	240	-	-	-	-	-	-	-	***26***	***26***									
	270	-	-	-	-	-	-	-	***35***	***35***									
	300	-	-	-	-	-	-	-	***44***	***44***									
	330	-	-	-	-	-	-	-	***53***	***53***									
	360	-	-	-	-	-	-	-	***62***	***62***									

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw) – Air 24	21	18	15	12	Table 1 – Standard Air – Air 9	6	3	Decom. Time (min)	Repet. Group	Table 2 – In-Water Oxygen Decompression – IW O_2 9	Decom. Time (min)	Repet. Group	Table 3 – Surface Decompression with Oxygen – IW Air 9	Surface Interval	RCC O_2 12	Decom. Time (min)	Repet. Group
15	10	-	-	-	-	-	-	-	-	1	A								
	20	-	-	-	-	-	-	-	-	1	B								
	30	-	-	-	-	-	-	-	-	1	C								
	40	-	-	-	-	-	-	-	-	1	D								
	50	-	-	-	-	-	-	-	-	1	E								
	60	-	-	-	-	-	-	-	-	1	F								
	75	-	-	-	-	-	-	-	-	1	G								
	90	-	-	-	-	-	-	-	3	3	H								
	100	-	-	-	-	-	-	-	5	5	I								
	110	-	-	-	-	-	-	-	8	8	J								
	120	-	-	-	-	-	-	-	10	10	K	**5**	7	J					
	130	-	-	-	-	-	-	-	16	16	L	**10**	12	J					
	140	-	-	-	-	-	-	-	21	21	M	**14**	16	K					
	150	-	-	-	-	-	-	-	***26***	***26***									
	160	-	-	-	-	-	-	-	***31***	***31***		***19***	***21***						
	170	-	-	-	-	-	-	-	***35***	***35***									
	180	-	-	-	-	-	-	-	***40***	***40***		***23***	***25***						
	200	-	-	-	-	-	-	-	***50***	***50***		***27***	***29***						
	220	-	-	-	-	-	-	-	***59***	***59***		***31***	***33***						
	240	-	-	-	-	-	-	-	***70***	***70***		***35***	***37***						
	260	-	-	-	-	-	-	-	***81***	***81***		***38***	***40***						
	280	-	-	-	-	-	-	-	***91***	***91***		***41***	***43***						

Note 1; Table 2 – O_2 stop times do not include ascent time to 9 msw.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)					Table 1 – Standard Air					Table 2 – In-Water Oxygen Decompression			Table 3 – Surface Decompression with Oxygen				
		Air					Air			Decom. Time (min)	Repet. Group	IW O_2	Decom. Time (min)	Repet. Group	IW Air	Surface Interval	RCC O_2	Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3			9			9		12		
18	10	-	-	-	-	-	-	-	-	1	A					Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes			
	20	-	-	-	-	-	-	-	-	1	B								
	25	-	-	-	-	-	-	-	-	1	C								
	30	-	-	-	-	-	-	-	-	1	D								
	40	-	-	-	-	-	-	-	-	1	E				-				
	50	-	-	-	-	-	-	-	-	1	F								
	60	-	-	-	-	-	-	-	5	5	G								
	70	-	-	-	-	-	-	-	8	8	H				1		**10**	19	H
	80	-	-	-	-	-	-	-	10	10	I	**5**	7	H	1		**16**	25	H
	90	-	-	-	-	-	-	-	16	16	J	**10**	12	J	1		**20**	29	I
	100	-	-	-	-	-	-	-	24	24	K	**15**	17	J	1		**24**	33	J
	110	-	-	-	-	-	-	-	30	30	L	**19**	21	K	1		**28**	37	K
	120	-	-	-	-	-		-	36	36	M	**22**	24	K	1		**30**	39	K
	130	-	-	-	-	-	-	***2***	***40***	***42***					***1***		***32****	***46***	
	140	-	-	-	-	-	-	***2***	***46***	***48***		***28***	***30***		***1***		***38****	***52***	
	150	-	-	-	-	-	-	***3***	***52***	***55***					***1***		***42****	***56***	
	160	-	-	-	-	-	-	***3***	***59***	***62***		***33***	***35***		***1***		***46****	***60***	
	170	-	-	-	-	-	-	***4***	***65***	***69***					***1***		***50****	***64***	
	180	-	-	-	-	-	-	***4***	***73***	***77***		***38***	***40***		***1***		***54****	***68***	
	190	-	-	-	-	-	-	***5***	***80***	***85***					***1***		***57****	***71***	
	200	-	-	-	-	-	-	***7***	***87***	***94***		***43***	***45***		***1***		***60****	***74***	
	210	-	-	-	-	-	-	***13***	***91***	***104***					***1***		***63*****	***82***	
	220	-	-	-	-	-	-	***17***	***97***	***114***		***48***	***50***		***1***		***69*****	***88***	
	230	-	-	-	-	-	-	***21***	***103***	***124***					***1***		***73*****	***92***	
	240	-	-	-	-	-	-	***24***	***109***	***133***		***53***	***55***		***1***		***77*****	***96***	

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw) — Air					Table 1 – Standard Air — Air			Table 1 Decom. Time (min)	Table 1 Repet. Group	Table 2 – In-Water Oxygen Decompression — IW O_2	Table 2 Decom. Time (min)	Table 2 Repet. Group	Table 3 – Surface Decompression with Oxygen — IW Air	Surface Interval	RCC O_2	Table 3 Decom. Time (min)	Table 3 Repet. Group
		24	21	18	15	12	9	6	3			9			9		12		
21	10	-	-	-	-	-	-	-	-	2	A					Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes			
	15	-	-	-	-	-	-	-	-	2	B								
	20	-	-	-	-	-	-	-	-	2	C								
	25	-	-	-	-	-	-	-	-	2	D								
	30	-	-	-	-	-	-	-	-	2	D								
	35	-	-	-	-	-	-	-	-	2	E				-				
	40	-	-	-	-	-	-	-	5	5	F								
	50	-	-	-	-	-	-	-	10	10	G	6	8	G	1		6	15	H
	60	-	-	-	-	-	-	-	12	12	H				1		15	24	H
	65	-	-	-	-	-	-	2	12	14	I								
	70	-	-	-	-	-	-	3	17	20	J	12	14	I	1		21	30	I
	80	-	-	-	-	-	-	4	25	29	K	18	20	J	1		26	35	J
	90	-	-	-	-	-	-	5	32	37	M	23	25	K	1		30	39	K
	100	-	-	-	-	-	-	6	39	45	N	27	29	K	1		34*	48	K
	110	-	-	-	-	-	-	7	46	53		30	32		1		40*	54	
	120	-	-	-	-	-	-	7	54	61		34	36		1		45*	59	
	130	-	-	-	-	-	-	8	62	70		37	39		1		50*	64	
	140	-	-	-	-	-	-	9	71	80		41	43		1		55*	69	
	150	-	-	-	-	-	-	15	77	92		44	46		1		59*	73	
	160	-	-	-	-	-	-	20	85	105		47	49		1		63**	82	
	170	-	-	-	-	-	-	25	93	118		51	53		1		71**	90	
	180	-	-	-	-	-	-	29	101	130		54	56		1		76**	95	
	190	-	-	-	-	-	-	34	109	143		57	59		1		81**	100	
	200	-	-	-	-	-	-	38	117	155		60	62		1		85**	104	

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw) – Air 24	21	18	15	12	Table 1 – Standard Air: Air 9	6	3	Decom. Time (min)	Repet. Group	Table 2 – In-Water Oxygen Decompression: IW O₂ 9	Decom. Time (min)	Repet. Group	Table 3 – Surface Decompression with Oxygen: IW Air 9	Surface Interval	RCC O₂ 12	Decom. Time (min)	Repet. Group
24	10	-	-	-	-	-	-	-	-	2	A					Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes			
	13	-	-	-	-	-	-	-	-	2	B								
	15	-	-	-	-	-	-	-	-	2	C								
	20	-	-	-	-	-	-	-	-	2	D								
	25	-	-	-	-	-	-	-	-	2	E				-				
	30	-	-	-	-	-	-	-	5	5	F								
	35	-	-	-	-	-	-	-	9	9	G	6	8	G					
	40	-	-	-	-	-	-	-	11	11	G								
	45	-	-	-	-	-	-	3	10	13	H				1		12	21	H
	50	-	-	-	-	-	-	4	11	15	H	8	10	H	1		17	26	H
	55	-	-	-	-	-	-	5	15	20	I	12	14	H	1		21	30	H
	60	-	-	-	-	-	-	6	21	27	J	16	18	I	1		24	33	I
	65	-	-	-	-	-	-	7	25	32	J								
	70	-	-	-	-	-	-	7	30	37	K	23	25	J	1		30	39	J
	75	-	-	-	-	-	-	8	34	42	L								
	80	-	-	-	-	-	-	9	37	46	M	28	30	K	1		35*	49	K
	85	-	-	-	-	-	-	***9***	***42***	***51***									
	90	-	-	-	-	-	-	***10***	***46***	***56***		***32***	***34***				***42****	***56***	
	95	-	-	-	-	-	-	***11***	***50***	***61***									
	100	-	-	-	-	-	-	***11***	***55***	***66***		***37***	***39***		***2***		***47****	***62***	
	110	-	-	-	-	-	***2***	***12***	***64***	***78***		***41***	***43***		***2***		***53****	***68***	
	120	-	-	-	-	-	***3***	***18***	***72***	***93***		***45***	***47***		***3***		***58****	***74***	
	130	-	-	-	-	-	***4***	***23***	***82***	***109***		***49***	***51***		***4***		***62*****	***84***	
	140	-	-	-	-	-	***4***	***28***	***93***	***125***		***53***	***55***		***4***		***72*****	***94***	
	150	-	-	-	-	-	***5***	***33***	***104***	***142***		***58***	***60***		***5***		***78*****	***101***	
	160	-	-	-	-	-	***5***	***39***	***114***	***158***		***62***	***64***		***5***		***84*****	***107***	

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)					Table 1 – Standard Air					Table 2 – In-Water Oxygen Decompression			Table 3 – Surface Decompression with Oxygen				
		Air					Air			Decom. Time (min)	Repet. Group	IW O_2	Decom. Time (min)	Repet. Group	IW Air	Surface Interval	RCC O_2	Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3			9			9		12		
27	5	-	-	-	-	-	-	-	-	2	A					Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes			
	10	-	-	-	-	-	-	-	-	2	B								
	15	-	-	-	-	-	-	-	-	2	C								
	20	-	-	-	-	-	-	-	-	2	D				-				
	25	-	-	-	-	-	-	-	7	7	E	5	7	E					
	30	-	-	-	-	-	-	2	9	11	F								
	35	-	-	-	-	-	-	4	10	14	G				1		8	17	G
	40	-	-	-	-	-	-	6	10	16	H	9	11	G	1		16	25	G
	45	-	-	-	-	-	-	7	14	21	I	11	13	H	1		21	30	H
	50	-	-	-	-	-	-	8	20	28	J	17	19	H	1		25	34	H
	55	-	-	-	-	-	-	9	26	35	K	22	24	I	1		28	37	I
	60	-	-	-	-	-	2	8	31	41	L	25	27	J	2		30*	45	J
	65	-	-	-	-	-	***3***	***8***	***36***	***47***									
	70	-	-	-	-	-	***3***	***9***	***40***	***52***		***31***	***33***		***3***		***37****	***53***	
	75	-	-	-	-	-	***4***	***9***	***46***	***59***									
	80	-	-	-	-	-	***4***	***10***	***51***	***65***		***36***	***38***		***4***		***45****	***62***	
	85	-	-	-	-	-	***5***	***10***	***56***	***71***									
	90	-	-	-	-	-	***5***	***14***	***60***	***79***		***42***	***44***		***5***		***52****	***70***	
	95	-	-	-	-	-	***6***	***17***	***64***	***87***									
	100	-	-	-	-	-	***6***	***20***	***70***	***96***		***47***	***49***		***6***		***58****	***77***	
	110	-	-	-	-	-	***7***	***26***	***82***	***115***		***52***	***54***		***7***		***65*****	***90***	
	120	-	-	-	-	-	***8***	***31***	***95***	***134***		***57***	***59***		***8***		***74*****	***100***	

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw) – Air					Table 1 – Standard Air – Air			Table 1 – Decom. Time (min)	Table 1 – Repet. Group	Table 2 – In-Water Oxygen Decompression – IW O_2	Table 2 – Decom. Time (min)	Table 2 – Repet. Group	Table 3 – Surface Decompression with Oxygen – IW Air	Table 3 – Surface Interval	Table 3 – RCC O_2	Table 3 – Decom. Time (min)	Table 3 – Repet. Group
		24	21	18	15	12	9	6	3			9			9		12		
30	5	-	-	-	-	-	-	-	-	2	A					Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes			
	10	-	-	-	-	-	-	-	-	2	B								
	12	-	-	-	-	-	-	-	-	2	C								
	15	-	-	-	-	-	-	-	-	2	D				-				
	20	-	-	-	-	-	-	-	8	8	E	**5**	8	E					
	25	-	-	-	-	-	-	3	9	12	F								
	30	-	-	-	-	-	-	5	10	15	G	**9**	12	F	2		**8**	18	G
	35	-	-	-	-	-	-	7	11	18	H	**10**	13	G	2		**17**	27	G
	40	-	-	-	-	-	-	9	16	25	I	**14**	17	H	2		**22**	32	H
	45	-	-	-	-	-	3	8	23	34	J	**20**	23	I	3		**27**	38	I
	50	-	-	-	-	-	4	8	29	41	K	**25**	28	I	4		**30**	42	I
	55	-	-	-	-	-	5	9	34	48	L	**29**	32	J	5		**31***	49	J
	60	-	-	-	-	-	***6***	***9***	***40***	***55***		***32***	***35***		***6***		***37****	***56***	
	65	-	-	-	-	-	***6***	***10***	***46***	***62***									
	70	-	-	-	-	-	***7***	***10***	***52***	***69***		***39***	***42***		***7***		***46****	***66***	
	75	-	-	-	-	-	***8***	***14***	***56***	***78***									
	80	-	-	-	-	-	***8***	***18***	***61***	***87***		***45***	***48***		***8***		***54****	***75***	
	85	-	-	-	-	-	***9***	***21***	***67***	***97***									
	90	-	-	-	-	***2***	***8***	***24***	***75***	***109***		***51***	***54***		***8***		***60****	***83***	
	95	-	-	-	-	***3***	***8***	***27***	***82***	***120***									
	100	-	-	-	-	***3***	***8***	***31***	***90***	***132***		***56***	***60***		***8***		***72*****	***101***	
	105	-	-	-	-	***3***	***9***	***34***	***98***	***144***									
	110	-	-	-	-	***4***	***8***	***38***	***106***	***156***		***62***	***67***		***8***		***81*****	***111***	

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)					Table 1 – Standard Air					Table 2 – In-Water Oxygen Decompression			Table 3 – Surface Decompression with Oxygen				
		Air					Air			Decom. Time (min)	Repet. Group	IW O_2	Decom. Time (min)	Repet. Group	IW Air	Surface Interval	RCC O_2	Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3			9			9		12		
33	5	-	-	-	-	-	-	-	-	2	A					Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes			
	10	-	-	-	-	-	-	-	-	2	B								
	12	-	-	-	-	-	-	-	-	2	C								
	15	-	-	-	-	-	-	-	5	5	D								
	20	-	-	-	-	-	-	3	9	12	F	7	10	E					
	25	-	-	-	-	-	-	6	10	16	G	9	12	F	2		7	17	G
	30	-	-	-	-	-	-	9	10	19	H	11	14	G	2		16	26	G
	35	-	-	-	-	-	3	8	16	27	I	15	18	H	3		22	33	H
	40	-	-	-	-	-	5	8	24	37	J	22	25	I	5		27	40	I
	45	-	-	-	-	-	6	9	31	46	K	27	30	J	6		30*	49	J
	50	-	-	-	-	-	7	9	38	54	M	32	35	K	7		35*	55	K
	55	-	-	-	-	-	8	10	44	62	N	36	39	K	8		40*	61	K
	60	-	-	-	-	2	7	10	51	70		39	42		7		45*	67	
	65	-	-	-	-	3	7	15	55	80		42	46		7		50*	73	
	70	-	-	-	-	4	7	19	62	92		46	51		7		54*	78	
	75	-	-	-	-	4	8	23	68	103		49	54		8		59*	84	
	80	-	-	-	-	5	8	26	77	116		52	58		8		60**	91	
	85	-	-	-	-	5	9	30	86	130		56	62		9		69**	101	
	90	-	-	-	-	6	9	34	95	144		59	66		9		75**	108	
	95	-	-	-	-	6	9	38	105	158		62	69		9		80**	113	
	100	-	-	-	-	7	9	42	114	172		66	74		9		85**	119	
	105	-	-	-	-	7	12	45	123	187		69	77		12		89**	126	
	110	-	-	-	-	8	15	48	130	201		73	82		15		93***	139	

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)					Table 1 – Standard Air					Table 2 – In-Water Oxygen Decompression			Table 3 – Surface Decompression with Oxygen				
		Air					Air			Decom. Time (min)	Repet. Group	IW O_2	Decom. Time (min)	Repet. Group	IW Air	Surface Interval	RCC O_2	Decom. Time (min)	Repet. Group
		24	21	18	15	12	9	6	3			9			9		12		
36	5	-	-	-	-	-	-	-	-	2	A					Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes			
	8	-	-	-	-	-	-	-	-	2	B								
	10	-	-	-	-	-	-	-	-	2	C								
	15	-	-	-	-	-	-	-	10	10	E	5	8	E					
	20	-	-	-	-	-	-	5	10	15	F	8	11	F	2		7	17	F
	25	-	-	-	-	-	-	9	10	19	G	11	14	G	2		13	23	G
	30	-	-	-	-	-	4	8	14	26	I	13	16	H	4		21	33	G
	35	-	-	-	-	-	6	8	24	38	J	22	25	H	6		27	41	H
	40	-	-	-	-	-	8	8	32	48	K	28	31	I	8		30*	51	I
	45	-	-	-	-	3	6	10	38	57	M	33	37	J	6		36*	58	J
	50	-	-	-	-	4	7	10	46	67	N	37	42	K	7		42*	66	K
	55	-	-	-	-	***5***	***7***	***13***	***53***	***78***		***41***	***47***		***7***		***48****	***73***	
	60	-	-	-	-	***6***	***7***	***18***	***59***	***90***		***45***	***52***		***7***		***53****	***79***	
	65	-	-	-	-	***6***	***8***	***22***	***66***	***102***		***49***	***56***		***8***		***58****	***85***	
	70	-	-	-	-	***7***	***8***	***27***	***75***	***117***		***52***	***60***		***8***		***60*****	***93***	
	75	-	-	-	-	***8***	***8***	***31***	***86***	***133***		***56***	***65***		***8***		***70*****	***104***	
	80	-	-	-	***2***	***6***	***9***	***35***	***97***	***149***		***60***	***69***		***9***		***76*****	***111***	
	85	-	-	-	***3***	***6***	***10***	***40***	***107***	***166***		***64***	***74***		***10***		***82*****	***119***	
	90	-	-	-	***3***	***7***	***13***	***42***	***118***	***183***		***68***	***79***		***13***		***87*****	***128***	
	95	-	-	-	***4***	***6***	***16***	***46***	***128***	***200***		***72***	***83***		***16***		***90*****	***134***	
	100	-	-	-	***4***	***7***	***19***	***50***	***136***	***216***		***76***	***88***		***19***		***100******	***153***	

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw) – Air					Table 1 – Standard Air: Air			Table 1: Decom. Time (min)	Table 1: Repet. Group	Table 2 – In-Water Oxygen Decompression: IW O_2	Table 2: Decom. Time (min)	Table 2: Repet. Group	Table 3 – Surface Decompression with Oxygen: IW Air	Table 3: Surface Interval	Table 3: RCC O_2	Table 3: Decom. Time (min)	Table 3: Repet. Group
		24	21	18	15	12	9	6	3			9			9		12		
39	5	-	-	-	-	-	-	-	-	3	A					Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes			
	8	-	-	-	-	-	-	-	-	3	B								
	10	-	-	-	-	-	-	-	5	5	C								
	15	-	-	-	-	-	-	4	8	12	E	**7**	10	E					
	20	-	-	-	-	-	-	8	10	18	G	**10**	13	G	2		**8**	18	G
	25	-	-	-	-	-	5	7	11	23	H	**13**	16	G	5		**18**	31	G
	30	-	-	-	-	-	7	8	22	37	J	**21**	24	H	7		**26**	41	H
	35	-	-	-	-	3	6	9	30	48	K	**28**	32	I	6		**30***	52	I
	40	-	-	-	-	4	7	9	39	59	M	**33**	38	J	7		**36***	60	J
	45	-	-	-	-	6	7	10	47	70	N	**38**	45	L	7		**43***	69	K
	50	-	-	-	-	***7***	***7***	***15***	***53***	***82***		***42***	***50***		***7***		***49****	***76***	
	55	-	-	-	***2***	***6***	***8***	***20***	***61***	***97***		***46***	***55***		***8***		***54****	***83***	
	60	-	-	-	***3***	***6***	***8***	***25***	***70***	***112***		***51***	***61***		***8***		***60****	***90***	
	65	-	-	-	***4***	***6***	***8***	***30***	***82***	***130***		***55***	***66***		***8***		***67*****	***103***	
	70	-	-	-	***4***	***7***	***9***	***34***	***94***	***148***		***59***	***71***		***9***		***75*****	***113***	
	75	-	-	-	***5***	***6***	***11***	***39***	***106***	***167***		***64***	***76***		***11***		***81*****	***121***	
	80	-	-	-	***5***	***7***	***14***	***42***	***118***	***186***		***68***	***81***		***14***		***87*****	***131***	
	85	-	-	-	***6***	***7***	***17***	***47***	***129***	***206***		***73***	***87***		***17***		***90******	***143***	
	90	-	-	-	***6***	***8***	***20***	***52***	***138***	***224***		***78***	***93***		***20***		***101******	***158***	

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw) Air					Table 1 – Standard Air: Air			Table 1: Decom. Time (min)	Table 1: Repet. Group	Table 2 – In-Water Oxygen Decompression: IW O₂	Table 2: Decom. Time (min)	Table 2: Repet. Group	Table 3 – Surface Decompression with Oxygen: IW Air	Table 3: Surface Interval	Table 3: RCC O₂	Table 3: Decom. Time (min)	Table 3: Repet. Group
		24	21	18	15	12	9	6	3			9			9		12		
	5	-	-	-	-	-	-	-	-	3	A					Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes			
	7	-	-	-	-	-	-	-	-	3	B								
	10	-	-	-	-	-	-	-	7	7	D	4	7	D					
	15	-	-	-	-	-	-	6	9	15	F	8	11	D	2		7	17	F
	20	-	-	-	-	-	4	7	10	21	G	12	15	G	4		12	24	G
	25	-	-	-	-	-	7	8	17	32	I	17	20	H	7		23	38	H
	30	-	-	-	-	4	6	8	28	46	K	26	31	I	6		30	48	I
	35	-	-	-	-	5	7	9	37	58	L	32	38	J	7		34*	59	J
	40	-	-	-	-	7	7	10	46	70	N	37	45	K	7		42*	69	K
42	45	-	-	-	3	5	8	16	53	85	O	43	52	M	8		49*	78	M
	50	-	-	-	4	6	8	21	62	101		47	58		8		55*	86	
	55	-	-	-	5	6	8	27	73	119		52	64		8		60**	97	
	60	-	-	-	6	6	9	32	86	139		57	70		9		70**	109	
	65	-	-	-	6	7	10	37	99	159		62	76		10		78**	119	
	70	-	-	-	7	7	14	40	114	182		67	82		14		84**	130	
	75	-	-	3	5	7	18	45	126	204		72	88		18		90**	141	
	80	-	-	3	6	7	21	51	137	225		77	94		21		100***	160	
	85	-	-	4	5	8	25	57	146	245		83	101		25		107***	172	
	90	-	-	4	6	8	28	65	152	263		89	108		28		113***	182	

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw) – Air					Table 1 – Standard Air – Air					Table 2 – In-Water Oxygen Decompression			Table 3 – Surface Decompression with Oxygen				
		24	21	18	15	12	9	6	3	Decom. Time (min)	Repet. Group	IW O_2 9	Decom. Time (min)	Repet. Group	IW Air 9	Surface Interval	RCC O_2 12	Decom. Time (min)	Repet. Group
45	4	-	-	-	-	-	-	-	-	3	A					Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes			
	7	-	-	-	-	-	-	-	-	3	B								
	10	-	-	-	-	-	-	-	9	9	D	5	8	D					
	15	-	-	-	-	-	-	8	9	17	F	10	13	F	2		8	18	G
	20	-	-	-	-	-	6	7	11	24	H	13	16	G	6		17	31	G
	25	-	-	-	-	4	5	8	23	40	J	22	27	H	5		27	44	H
	30	-	-	-	-	6	6	9	34	55	K	30	37	I	6		30*	55	I
	35	-	-	-	3	5	7	10	44	69	M	36	45	K	7		40*	68	K
	40	-	-	-	4	6	7	15	52	84	O	42	53	M	7		48*	78	M
	45	-	-	-	***5***	***6***	***8***	***21***	***61***	***101***		***47***	***59***		***8***		***55****	***87***	
	50	-	-	-	***6***	***7***	***8***	***27***	***73***	***121***		***52***	***66***		***8***		***60*****	***99***	
	55	-	-	***3***	***5***	***6***	***9***	***33***	***88***	***144***		***58***	***73***		***9***		***72*****	***113***	
	60	-	-	***3***	***5***	***7***	***12***	***38***	***103***	***168***		***63***	***79***		***12***		***80*****	***125***	
	65	-	-	***4***	***5***	***8***	***16***	***42***	***119***	***194***		***69***	***87***		***16***		***87*****	***138***	
	70	-	-	***5***	***5***	***8***	***20***	***48***	***132***	***218***		***75***	***94***		***20***		***95******	***156***	
	75	-	-	***5***	***6***	***8***	***24***	***55***	***142***	***240***		***81***	***101***		***24***		***105******	***171***	
	80	-	-	***6***	***6***	***8***	***28***	***63***	***150***	***261***		***87***	***108***		***28***		***111******	***182***	
48	6	-	-	-	-	-	-	-	-	3	B				-				
	10	-	-	-	-	-	-	-	11	11	D	6	10	E					
	15	-	-	-	-	-	4	6	10	20	G	11	15	F	4		7	19	G
	20	-	-	-	-	-	8	8	14	30	H	15	19	G	8		21	37	G
	25	-	-	-	-	6	6	8	29	49	K	26	33	I	6		30	50	I
	30	-	-	-	3	5	7	9	40	64	M	34	43	J	7		37*	65	J
	35	-	-	-	5	5	8	13	49	80	N	40	51	L	8		46*	77	L
	40	-	-	-	***6***	***6***	***8***	***20***	***59***	***99***		***46***	***59***		***8***		***54****	***87***	
	45	-	-	***3***	***5***	***6***	***9***	***26***	***72***	***121***		***52***	***67***		***9***		***60****	***96***	
	50	-	-	***4***	***5***	***7***	***9***	***33***	***88***	***146***		***58***	***75***		***9***		***72*****	***115***	
	55	-	-	***5***	***5***	***7***	***13***	***38***	***105***	***173***		***64***	***82***		***13***		***81*****	***129***	
	60	-	-	***6***	***5***	***8***	***17***	***43***	***122***	***201***		***70***	***90***		***17***		***88*****	***142***	
	65	-	-	***7***	***5***	***8***	***22***	***50***	***135***	***227***		***77***	***98***		***22***		***99******	***164***	
	70	-	***3***	***4***	***6***	***8***	***26***	***58***	***146***	***251***		***84***	***106***		***26***		***108******	***178***	

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw) – Air					Table 1 – Standard Air – Air			Table 1 – Decom. Time (min)	Table 1 – Repet. Group	Table 2 – In-Water Oxygen Decompression – IW O_2	Table 2 – Decom. Time (min)	Table 2 – Repet. Group	Table 3 – Surface Decompression with Oxygen – IW Air	Table 3 – Surface Interval	Table 3 – RCC O_2	Table 3 – Decom. Time (min)	Table 3 – Repet. Group
		24	21	18	15	12	9	6	3			9			9		12		
51	6	-	-	-	-	-	-	-	-	3	B				-	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes			
51	10	-	-	-	-	-	-	5	8	13	D	**7**	11	E	3		**6**	17	D
51	15	-	-	-	-	-	5	7	10	22	G	**12**	16	G	5		**11**	24	G
51	20	-	-	-	-	5	5	8	20	38	I	**20**	26	H	5		**25**	43	H
51	25	-	-	-	3	5	6	9	33	56	K	**30**	39	J	6		**30***	57	J
51	30	-	-	-	5	5	7	10	46	73	M	**38**	49	K	7		**42***	72	K
51	35	-	-	3	4	6	8	18	55	94	O	**44**	58	M	8		**51***	85	M
51	***40***	-	-	***4***	***5***	***6***	***8***	***26***	***68***	***117***		***51***	***67***		***8***		***60****	***96***	
51	***45***	-	-	***5***	***5***	***7***	***9***	***32***	***85***	***143***		***57***	***75***		***9***		***70*****	***114***	
51	***50***	-	-	***6***	***6***	***7***	***13***	***37***	***105***	***174***		***64***	***84***		***13***		***80*****	***130***	
51	***55***	-	***3***	***4***	***6***	***7***	***18***	***44***	***122***	***204***		***71***	***92***		***18***		***89*****	***145***	
51	***60***	-	***4***	***4***	***6***	***8***	***23***	***51***	***137***	***233***		***78***	***101***		***23***		***101******	***169***	
51	***65***	-	***5***	***4***	***6***	***9***	***27***	***61***	***148***	***260***		***86***	***111***		***27***		***110******	***184***	
51	***70***	-	***5***	***5***	***6***	***12***	***30***	***72***	***155***	***285***		***93***	***122***		***30***		***117******	***198***	
54	5	-	-	-	-	-	-	-	-	3	B				-				
54	10	-	-	-	-	-	-	6	9	15	E	**8**	12	E	3		**7**	18	E
54	15	-	-	-	-	-	7	7	11	25	H	**14**	18	G	7		**15**	30	G
54	20	-	-	-	-	6	6	8	25	45	J	**24**	31	H	6		**28**	48	H
54	25	-	-	-	5	5	7	9	39	65	M	**34**	45	J	7		**36***	66	J
54	30	-	-	3	4	6	7	15	50	85	O	**41**	55	M	7		**47***	80	M
54	***35***	-	-	***5***	***4***	***6***	***8***	***23***	***62***	***108***		***48***	***64***		***8***		***56****	***92***	
54	***40***	-	-	***6***	***5***	***7***	***9***	***30***	***80***	***137***		***55***	***74***		***9***		***66*****	***111***	
54	***45***	-	***4***	***4***	***5***	***7***	***13***	***36***	***101***	***170***		***63***	***84***		***13***		***78*****	***129***	
54	***50***	-	***4***	***5***	***5***	***8***	***18***	***42***	***121***	***203***		***70***	***93***		***18***		***88*****	***146***	
54	***55***	-	***5***	***5***	***6***	***8***	***23***	***51***	***137***	***235***		***78***	***103***		***23***		***101******	***171***	
54	***60***	-	***6***	***5***	***6***	***9***	***28***	***61***	***149***	***264***		***86***	***113***		***28***		***110******	***187***	

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw) – Air 30	27	24	21	18	15	12	Table 1 – Standard Air – Air 9	6	3	Decom. Time (min)	Table 2 – In-Water Oxygen Decompression – IW O$_2$ 9	Decom. Time (min)	Table 3 – Surface Decompression with Oxygen – IW Air 9	Surface Interval	RCC O$_2$ 12	Decom. Time (min)
57	5	-	-	-	-	-	-	-	-	-	-	4				Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes		
	10	-	-	-	-	-	-	-	-	8	9	17	9	13	3		8	19
	15	-	-	-	-	-	-	4	5	7	11	27	14	19	5		19	36
	20	-	-	-	-	-	4	4	6	9	29	52	28	37	6		30	52
	25	-	-	-	-	-	7	5	7	10	44	73	37	50	7		41*	73
	30	-	-	-	-	5	4	6	8	19	55	97	45	61	8		52*	88
	35	-	-	-	3	4	5	6	9	27	72	126	52	71	9		60*	100
	40	-	-	-	4	4	5	7	11	35	93	159	60	81	11		75**	124
	45	-	-	-	5	5	5	8	17	41	116	197	68	92	17		85**	143
	50	-	-	3	3	5	6	8	22	50	135	232	77	103	22		99***	169
	55	-	-	4	3	5	7	9	27	61	149	265	86	115	27		110***	188
60	5	-	-	-	-	-	-	-	-	-	-	4						
	10	-	-	-	-	-	-	-	-	10	9	19	10	14	3		9	20
	15	-	-	-	-	-	-	5	6	8	16	35	16	22	6		22	41
	20	-	-	-	-	-	5	5	6	10	33	59	31	42	6		31*	60
	25	-	-	-	-	5	4	5	7	14	48	83	40	55	7		45*	79
	30	-	-	-	3	4	4	6	9	23	62	111	49	67	9		56*	95
	35	-	-	-	5	4	5	6	10	32	84	146	57	78	10		69**	117
	40	-	-	-	6	4	6	7	15	38	109	185	65	89	15		82**	138
	45	-	-	4	3	5	6	8	21	47	131	225	75	102	21		92***	162
	50	-	-	5	4	4	7	9	27	58	147	261	84	114	27		108***	187
63	5	-	-	-	-	-	-	-	-	-	5	5						
	10	-	-	-	-	-	-	-	5	6	10	21	11	15	5		7	20
	15	-	-	-	-	-	-	7	6	8	20	41	21	29	6		25	46
	20	-	-	-	-	-	7	5	7	9	39	67	33	46	7		36*	68
	25	-	-	-	-	6	4	6	8	17	52	93	43	60	8		49*	86
	30	-	-	-	5	4	4	7	8	28	71	127	52	73	8		60*	101
	35	-	-	3	3	4	6	7	12	35	97	167	61	85	12		76**	129
	40	-	-	4	4	4	6	8	19	43	123	211	71	98	19		88**	151
	45	-	-	5	4	5	6	9	25	54	142	250	81	111	25		105***	182
	50	-	3	3	4	6	6	13	29	70	154	288	91	127	29		116***	203

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

CF AIR TABLES 1 – 3

Depth (msw)	Bottom Time (min)	Stop Times (min) at Different Depths (msw)							Table 1 – Standard Air				Table 2 – In-Water Oxygen Decompression		Table 3 – Surface Decompression with Oxygen			
		Air							Air			Decom. Time (min)	IW O_2	Decom. Time (min)	IW Air	Surface Interval	RCC O_2	Decom. Time (min)
		30	27	24	21	18	15	12	9	6	3		9		9		12	
66	5	-	-	-	-	-	-	-	-	-	7	7				Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minutes		
	10	-	-	-	-	-	-	-	7	6	10	23	12	17	7		7	22
	15	-	-	-	-	-	4	5	5	9	24	47	24	34	5		28	50
	20	-	-	-	-	5	4	5	7	10	43	74	36	51	7		40*	74
	25	-	-	-	4	4	4	6	8	21	58	105	47	66	8		54*	93
	30	-	-	3	3	4	5	7	9	32	81	144	56	79	9		68**	117
	35	-	-	5	3	4	6	7	16	39	110	190	66	92	16		83**	142
	40	-	3	3	4	4	7	8	23	49	135	236	77	107	23		99***	174
	45	-	4	3	4	5	7	11	28	65	151	278	88	123	28		112***	197
69	5	-	-	-	-	-	-	-	-	-	8	8						
	10	-	-	-	-	-	-	-	8	7	10	25	14	19	8		11	27
	15	-	-	-	-	-	6	4	6	9	28	53	27	38	6		30	54
	20	-	-	-	-	6	4	6	7	12	47	82	39	56	7		44*	80
	25	-	-	-	6	3	5	6	9	24	65	118	50	71	9		58*	100
	30	-	-	5	3	4	5	7	12	35	93	164	60	85	12		75**	129
	35	-	3	3	4	4	6	8	19	44	123	214	72	101	19		89**	154
	40	-	5	3	4	5	6	9	27	57	146	262	84	117	27		107***	189
72	5	-	-	-	-	-	-	-	-	-	9	9	4	9				
	10	-	-	-	-	-	-	4	5	7	11	27	14	19	5		14	31
	15	-	-	-	-	-	7	5	6	9	32	59	29	42	6		30*	61
	20	-	-	-	4	4	4	5	8	16	50	91	42	60	8		48*	86
	25	-	-	4	3	4	5	6	9	28	73	132	53	76	9		60**	109
	30	-	-	6	3	5	5	8	15	37	106	185	65	93	15		80**	140
	35	-	5	3	4	4	6	9	23	49	135	238	77	109	23		98***	175
	40	3	3	3	4	6	6	13	28	67	153	286	90	129	28		114***	203

Note 1: Table 2 – O_2 stop times do not include ascent time to 9 msw; Note 2: Table 3 – asterisk (*) indicates number of 5 minute air breaks required.

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CF TABLE 4
REPETITIVE DIVING
(METRES)

A. REPETITIVE FACTORS/SURFACE INTERVALS TABLE
B. NO-DECOMPRESSION REPETITIVE DIVING TABLE

CF TABLE 4: REPETITIVE DIVING (METRES)

A. REPETITIVE FACTORS/SURFACE INTERVALS TABLE

Repet. Group (RG)	Repetitive Factors (RF) for Surface Intervals (SI) in hr:min										
	0:15 → 0:29	0:30 → 0:59	1:00 → 1:29	1:30 → 1:59	2:00 → 2:59	3:00 → 3:59	4:00 → 5:59	6:00 → 8:59	9:00 → 11:59	12:00 → 14:59	15:00 → 18:00
A	1.4	1.2	1.1	1.1	1.1	1.1	1.1	1.1	**1.0**	**1.0**	**1.0**
B	1.5	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.1	**1.0**	**1.0**
C	1.6	1.4	1.3	1.2	1.2	1.2	1.1	1.1	1.1	**1.0**	**1.0**
D	1.8	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1	**1.0**	**1.0**
E	1.9	1.6	1.5	1.4	1.3	1.3	1.2	1.2	1.1	1.1	**1.0**
F	2.0	1.7	1.6	1.5	1.4	1.3	1.3	1.2	1.1	1.1	**1.0**
G	-	1.9	1.7	1.6	1.5	1.4	1.3	1.2	1.1	1.1	**1.0**
H	-	-	1.9	1.7	1.6	1.5	1.4	1.3	1.1	1.1	1.1
I	-	-	2.0	1.8	1.7	1.5	1.4	1.3	1.1	1.1	1.1
J	-	-	-	1.9	1.8	1.6	1.5	1.3	1.2	1.1	1.1
K	-	-	-	2.0	1.9	1.7	1.5	1.3	1.2	1.1	1.1
L	-	-	-	-	2.0	1.7	1.6	1.4	1.2	1.1	1.1
M	-	-	-	-	-	1.8	1.6	1.4	1.2	1.1	1.1
N	-	-	-	-	-	1.9	1.7	1.4	1.2	1.1	1.1
O	-	-	-	-	-	2.0	1.7	1.4	1.2	1.1	1.1

B. NO-DECOMPRESSION REPETITIVE DIVING TABLE

Depth (msw)	Allowable No-D Limits (min) for Repetitive Factors (RF)									
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
9	272	250	230	214	200	187	176	166	157	150
12	136	125	115	107	100	93	88	83	78	75
15	60	55	50	45	41	38	36	34	32	31
18	40	35	31	29	27	26	24	23	22	21
21	30	25	21	19	18	17	16	15	14	13
24	20	18	16	15	14	13	12	12	11	11
27	16	14	12	11	11	10	9	9	8	8
30	13	11	10	9	9	8	8	7	7	7
33	10	9	8	8	7	7	6	6	6	6
36	8	7	7	6	6	6	5	5	5	5
39	7	6	6	5	5	5	4	4	4	4
42	6	5	5	5	4	4	4	3	3	3
45	5	5	4	4	4	3	3	3	3	3

CF TABLE 5
DEPTH CORRECTIONS FOR DIVING AT ALTITUDE
(METRES)

CF TABLE 5: DEPTH CORRECTIONS - DIVING AT ALTITUDE (METRES)

Actual Depth (metres)	Depth Correction at Altitude (metres)								
	100 → 299	300 → 599	600 → 899	900 → 1199	1200 → 1499	1500 → 1799	1800 → 2099	2100 → 2399	2400 → 3000
9	+0	+3	+3	+3	+3	+3	+3	+6	+6
12	+0	+3	+3	+3	+3	+3	+6	+6	+6
15	+0	+3	+3	+3	+3	+6	+6	+6	+6
18	+0	+3	+3	+3	+6	+6	+6	+6	+9
21	+0	+3	+3	+3	+6	+6	+6	+9	+9
24	+0	+3	+3	+6	+6	+6	+9	+9	+12
27	+0	+3	+3	+6	+6	+6	+9	+9	+12
30	+0	+3	+3	+6	+6	+9	+9	+9	+12
33	+0	+3	+6	+6	+6	+9	+9	+12	+15
36	+0	+3	+6	+6	+6	+9	+9	+12	+15
39	+0	+3	+6	+6	+9	+9	+12	+12	+15
42	+0	+3	+6	+6	+9	+9	+12	+12	+18
45	+3	+3	+6	+6	+9	+9	+12	+15	+18
48	+3	+6	+6	+9	+9	+12	+12	+15	+18
51	+3	+6	+6	+9	+9	+12	+15	+15	+21
54	+3	+6	+6	+9	+9	+12	+15	+15	
57	+3	+6	+6	+9	+12	+12	+15		
60	+3	+6	+6	+9	+12	+12			
63	+3	+6	+6	+9					
66	+3	+6							
69	+3								

Sea Level Stop Depth (metres)	Actual Decompression Stop Depth at Altitude (metres)								
	100 → 299	300 → 599	600 → 899	900 → 1199	1200 → 1499	1500 → 1799	1800 → 2099	2100 → 2399	2400 → 3000
3	3.0	3.0	3.0	3.0	3.0	2.5	2.5	2.5	2.5
6	6.0	6.0	6.0	5.5	5.5	5.0	5.0	5.0	4.5
9	9.0	9.0	8.5	8.5	8.0	7.5	7.5	7.0	7.0
12	12.0	12.0	11.5	11.0	10.5	10.0	10.0	9.5	9.0
15	15.0	14.5	14.0	13.5	13.0	12.5	12.0	12.0	11.5
18	18.0	17.5	17.0	16.5	16.0	15.0	14.5	14.0	13.5
21	21.0	20.5	20.0	19.0	18.5	17.5	17.0	16.5	16.0
24	24.0	23.5	22.5	21.5	21.0	20.0	19.5	19.0	18.0
27	27.0	26.0	25.5	24.5	23.5	22.5	22.0	21.0	20.0

ANNEX B,

CHAPTER 3

WORKSHEETS

Dive Record Chart (metres)
Repetitive Diving Worksheet (metres)
Altitude Diving Worksheet (metres)

CF DIVE RECORD CHART IN METRES

DIVER	Rank	Tender	Rank	**Date:**	
DIVER	Rank	Tender	Rank	Table Used	
SUPERVISOR	Rank	Schedule Used	O2%	Depth in msw	Bottom Time
Left Surface (Clock Time)	Left Bottom	Max. Time to 1st Stop	Reached Surface (Clock Time)		
Total decomp. time	Total time of dive	Repet. Group	CHARTMAN (Print)		Rank

REMARKS	STOPS IN MSW	STAND AIR TABLE	Decompression Time		EMERG AIR	EVENT TIME	
			Water	Chamber		Water	Chamber
	3					L	
						S	
	6					L	
						S	
	9					L	
						S	
	12					L	
						S	
	15					L	
						S	
	18					L	
						S	
	21					L	
						S	
	24					L	
						S	
	27					L	
						S	
	30					L	
						S	
	33					L	
						S	
	36					L	
						S	
	39					L	
						S	
	42					L	
						S	
	45					L	
						S	
	48					L	
						S	
	51					L	
						S	

Purpose of Dive	Supervisor (sign)	Chartman (sign)

DIVE RECORD CHART IN MSW

REPETITIVE DIVING WORKSHEET (METRES)

FIRST DIVE:

______msw/______min   Table Used_______

1st Dive Repetitive Group ________

SECOND DIVE:

SI _____hr _____min   RF_______ (Table 4A)

Depth _________msw   Table Used________

Allowable No-D Limit (Table 4B) _________min

Planned Bottom Time (BT) _________min

EBT = (RF)_______ x (BT)________ = ________

Decompression required: Yes ☐ No ☐

DECOMPRESSION SCHEDULE: ______msw/(EBT)_____min

________msw ________min

________msw ________min

________msw ________min O_2 Stop (if required)

________msw ________min   _______msw ______min

2nd Dive Repetitive Group______ (from Table Used)

2nd Dive Adjusted Repetitive Group __________

NOTE: If the BT exceeds the allowable No-D Limit in Table 4B, but the EBT is less than the No-D Lilmit in Table 1S, a 5-minute decompression stop at 3 msw is required.

ALTITUDE DIVING WORKSHEET (METRES)

ALTITUDE OF DIVE SITE		___________ m
ACTUAL DEPTH OF DIVE	(a)	___________ msw
DIVE DEPTH CORRECTION	(b)	+___________ msw
EFFECTIVE DEPTH (ED)	(a+b)	___________ msw
BOTTOM TIME (BT)		___________ min
Schedule Required (ED/BT)		_______msw/_______ min

Table Used ___________

ALTITUDE DECOMPRESSION SCHEDULE

Sea Level Stop Depth	Actual Stop Depth	Stop Time
15 msw	_________ msw	_________ min
12 msw	_________ msw	_________ min
9 msw	_________ msw	_________ min
6 msw	_________ msw	_________ min
3 msw	_________ msw	_________ min
O_2 Stop	_________ msw	_________ min

Repetitive Group _______________

ANNEX C, CHAPTER 3

HeO_2 DIVING TABLES (METRES)

CF Table 6	*(metres)*	*HeO_2 – Abort Table*
CF Table 7	*(metres)*	*HeO_2 – In-Water Oxygen Decompression*
CF Table 8	*(metres)*	*HeO_2 – Surface Decompression with Oxygen*
CF Table 9	*(metres)*	*HeO_2 – Emergency Decompression*
Combined CF Tables	*(metres)*	*Tables 6, 7 and 8 Surface-Supplied HeO2 tables and Table 9 – Emergency Decompression*

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CF TABLE 6
HEO_2 ABORT
(METRES)

CF TABLE 6: HEO_2 - ABORT TABLE (METRES)

Depth (msw)	Bottom Time (min)	Max Time to 1st Stop (min)	Stop Times (min) at Different Depths (msw)								Decom. Time (min)
			Air								
			24	21	18	15	12	9	6	3	
9	55	1	-	-	-	-	-	-	-	-	1
12	20	1	-	-	-	-	-	-	-	-	1
	30	1	-	-	-	-	-	-	-	3	4
	40	1	-	-	-	-	-	-	-	12	13
15	13	1	-	-	-	-	-	-	-	-	1
	20	1	-	-	-	-	-	-	-	4	5
	30	1	-	-	-	-	-	-	-	12	13
18	10	1	-	-	-	-	-	-	-	-	1
	20	1	-	-	-	-	-	-	-	7	8
	25	1	-	-	-	-	-	-	2	13	16
	30	1	-	-	-	-	-	-	3	16	20
21	8	2	-	-	-	-	-	-	-	-	2
	12	1	-	-	-	-	-	-	-	5	6
	20	1	-	-	-	-	-	-	3	11	15
	30	1	-	-	-	-	-	-	6	19	26
24	6	2	-	-	-	-	-	-	-	-	2
	10	2	-	-	-	-	-	-	-	6	8
	15	1	-	-	-	-	-	-	3	7	11
	20	1	-	-	-	-	-	-	5	14	20
	25	1	-	-	-	-	-	-	7	18	26
27	5	2	-	-	-	-	-	-	-	-	2
	10	2	-	-	-	-	-	-	-	8	10
	15	2	-	-	-	-	-	-	5	10	17
	20	1	-	-	-	-	-	2	6	16	25
30	5	2	-	-	-	-	-	-	-	-	2
	10	2	-	-	-	-	-	-	3	7	12
	15	2	-	-	-	-	-	2	5	13	22
33	5	2	-	-	-	-	-	-	-	-	2
	10	2	-	-	-	-	-	-	4	7	13
	15	2	-	-	-	-	-	3	6	14	25
36	5	2	-	-	-	-	-	-	-	-	2
	10	2	-	-	-	-	-	-	6	7	15

TABLE 7
HEO_2 IN-WATER
OXYGEN DECOMPRESSION
(METRES)

CF TABLE 7: HEO_2 - IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)												Decom. Time (min)
			Air											O_2	
			42	39	36	33	30	27	24	21	18	15	12	9	
36	10	2	-	-	-	-	-	-	-	-	-	-	-	6	9
	15	2	-	-	-	-	-	-	-	-	-	-	1	16	20
	20	2	-	-	-	-	-	-	-	-	-	-	3	21	27
	30	2	-	-	-	-	-	-	-	-	-	2	4	30*	44
	40	2	-	-	-	-	-	-	-	-	-	4	4	45*	61
	50	1	-	-	-	-	-	-	-	-	1	4	7	60**	84
	60	1	-	-	-	-	-	-	-	-	2	5	11	70**	100
	70	1	-	-	-	-	-	-	-	-	3	7	13	80**	115
	75	1	-	-	-	-	-	-	-	-	4	8	13	84**	121
	80	1	-	-	-	-	-	-	-	-	4	11	13	87**	127
	90	1	-	-	-	-	-	-	-	1	4	13	17	90***	142
	100	1	-	-	-	-	-	-	-	2	7	13	23	90***	152
39	10	2	-	-	-	-	-	-	-	-	-	-	-	7	10
	15	2	-	-	-	-	-	-	-	-	-	-	2	18	23
	20	2	-	-	-	-	-	-	-	-	-	1	4	23	31
	30	2	-	-	-	-	-	-	-	-	1	3	4	30*	46
	40	2	-	-	-	-	-	-	-	-	2	4	5	53*	72
	50	2	-	-	-	-	-	-	-	-	3	4	10	65**	95
	60	1	-	-	-	-	-	-	-	1	4	5	13	77**	112
	70	1	-	-	-	-	-	-	-	2	4	10	12	86**	126
	80	1	-	-	-	-	-	-	-	3	4	13	16	90***	143
	90	1	-	-	-	-	-	-	-	3	9	12	24	90***	155
	95	1	-	-	-	-	-	-	-	4	10	12	27	90***	160
42	10	2	-	-	-	-	-	-	-	-	-	-	-	9	12
	15	2	-	-	-	-	-	-	-	-	-	-	3	19	25
	20	2	-	-	-	-	-	-	-	-	-	2	4	25	34
	30	2	-	-	-	-	-	-	-	-	2	4	4	37*	55
	40	2	-	-	-	-	-	-	-	1	3	4	7	60*	83
	50	2	-	-	-	-	-	-	-	2	4	4	11	72**	106
	60	2	-	-	-	-	-	-	-	3	4	8	12	84**	124
	65	2	-	-	-	-	-	-	-	3	4	11	12	88**	131
	70	1	-	-	-	-	-	-	1	3	5	11	14	90***	141
	80	1	-	-	-	-	-	-	1	4	9	11	23	90***	155
	90	1	-	-	-	-	-	-	2	4	12	14	28	92***	169

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 7: HEO_2 - IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)												Decom. Time (min)
			Air											O_2	
			42	39	36	33	30	27	24	21	18	15	12	9	
45	10	2	-	-	-	-	-	-	-	-	-	-	1	12	16
	15	2	-	-	-	-	-	-	-	-	-	1	4	21	29
	20	2	-	-	-	-	-	-	-	-	1	3	4	27	38
	25	2	-	-	-	-	-	-	-	-	2	4	4	30*	48
	30	2	-	-	-	-	-	-	-	1	3	3	4	44*	63
	35	2	-	-	-	-	-	-	-	2	3	4	6	57*	80
	40	2	-	-	-	-	-	-	-	2	4	4	8	62**	93
	45	2	-	-	-	-	-	-	-	3	4	4	11	70**	105
	50	2	-	-	-	-	-	-	1	3	4	6	11	78**	116
	55	2	-	-	-	-	-	-	1	3	4	9	11	84**	125
	60	2	-	-	-	-	-	-	2	3	4	10	13	89**	134
	70	2	-	-	-	-	-	-	2	4	8	11	19	90***	152
	80	2	-	-	-	-	-	-	3	4	11	13	28	93***	170
	85	1	-	-	-	-	-	1	3	6	11	16	29	94***	177
48	10	2	-	-	-	-	-	-	-	-	-	-	2	14	19
	15	2	-	-	-	-	-	-	-	-	-	2	4	23	32
	20	2	-	-	-	-	-	-	-	-	2	3	4	30	42
	25	2	-	-	-	-	-	-	-	1	3	3	4	34*	53
	30	2	-	-	-	-	-	-	-	2	3	4	4	51*	72
	35	2	-	-	-	-	-	-	-	3	3	4	8	60**	91
	40	2	-	-	-	-	-	-	1	3	4	3	11	68**	103
	45	2	-	-	-	-	-	-	2	3	4	6	10	77**	115
	50	2	-	-	-	-	-	-	2	4	3	9	11	84**	126
	55	2	-	-	-	-	-	-	3	3	4	10	13	89**	135
	60	2	-	-	-	-	-	1	3	3	7	10	14	90***	146
	70	2	-	-	-	-	-	1	4	3	10	11	26	93***	166
	80	2	-	-	-	-	-	2	4	7	10	18	30	96***	185

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 7: HEO_2 - IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)												Decom. Time (min)
			Air											O_2	
			42	39	36	33	30	27	24	21	18	15	12	9	
51	10	3	-	-	-	-	-	-	-	-	-	-	3	16	23
	15	2	-	-	-	-	-	-	-	-	1	3	3	25	35
	20	2	-	-	-	-	-	-	-	1	2	4	4	30*	49
	25	2	-	-	-	-	-	-	-	2	3	4	3	41*	61
	30	2	-	-	-	-	-	-	1	3	3	4	6	57*	82
	35	2	-	-	-	-	-	-	2	3	3	4	9	64**	98
	40	2	-	-	-	-	-	-	2	4	3	6	10	74**	112
	45	2	-	-	-	-	-	1	2	4	4	7	11	83**	125
	50	2	-	-	-	-	-	1	3	3	5	9	12	89**	135
	55	2	-	-	-	-	-	2	3	3	7	9	15	90***	147
	60	2	-	-	-	-	-	2	3	4	8	10	21	92***	158
	65	2	-	-	-	-	-	3	3	4	10	11	27	94***	170
	70	2	-	-	-	-	-	3	3	7	9	15	30	95***	180
	75	2	-	-	-	-	1	3	3	8	10	19	33	96***	191
54	5	3	-	-	-	-	-	-	-	-	-	-	-	5	9
	10	3	-	-	-	-	-	-	-	-	-	1	3	17	25
	15	2	-	-	-	-	-	-	-	-	2	3	4	26	38
	20	2	-	-	-	-	-	-	-	2	3	3	4	30*	50
	25	2	-	-	-	-	-	-	1	3	3	3	4	48*	70
	30	2	-	-	-	-	-	-	2	3	3	4	7	60**	92
	35	2	-	-	-	-	-	1	2	3	4	4	10	70**	107
	40	2	-	-	-	-	-	1	3	3	4	7	10	80**	121
	45	2	-	-	-	-	-	2	3	3	4	9	12	88**	134
	50	2	-	-	-	-	-	3	3	3	6	10	14	90***	147
	55	2	-	-	-	-	1	2	3	4	8	10	20	92***	158
	60	2	-	-	-	-	1	3	3	5	9	11	26	95***	171
	65	2	-	-	-	-	2	3	3	7	9	15	30	97***	184
	70	2	-	-	-	-	2	3	3	9	9	21	34	97***	196

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 7: HEO_2 - IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)												Decom. Time (min)
			Air											O_2	
			42	39	36	33	30	27	24	21	18	15	12	9	
57	5	3	-	-	-	-	-	-	-	-	-	-	-	6	10
	10	3	-	-	-	-	-	-	-	-	-	2	3	19	28
	15	3	-	-	-	-	-	-	-	-	3	3	4	28	42
	20	2	-	-	-	-	-	-	-	3	3	3	4	34*	55
	25	2	-	-	-	-	-	-	2	3	3	3	6	53*	78
	30	2	-	-	-	-	-	1	2	3	4	3	9	63**	98
	35	2	-	-	-	-	-	2	3	3	3	6	10	75**	115
	40	2	-	-	-	-	-	3	3	3	3	9	11	85**	130
	45	2	-	-	-	-	1	3	3	3	5	9	14	90***	146
	50	2	-	-	-	-	2	2	3	4	7	10	18	92***	156
	55	2	-	-	-	-	2	3	3	5	8	11	25	95***	170
	60	2	-	-	-	-	3	3	3	7	8	15	30	97***	184
	65	2	-	-	-	1	2	3	4	8	9	21	35	97***	198
60	5	3	-	-	-	-	-	-	-	-	-	-	-	6	10
	10	3	-	-	-	-	-	-	-	-	-	2	4	20	30
	15	3	-	-	-	-	-	-	-	1	3	3	4	29	44
	20	2	-	-	-	-	-	-	1	3	3	3	4	39*	61
	25	2	-	-	-	-	-	1	2	3	3	3	7	59*	86
	30	2	-	-	-	-	-	2	3	2	4	4	10	68**	106
	35	2	-	-	-	-	1	2	3	3	3	7	11	80**	123
	40	2	-	-	-	-	2	2	3	3	5	8	13	89**	138
	45	2	-	-	-	-	2	3	3	3	7	9	16	91***	152
	50	2	-	-	-	1	2	3	3	4	8	11	23	95***	168
	55	2	-	-	-	1	3	3	3	6	9	12	31	97***	183
	60	2	-	-	-	2	2	3	4	8	9	19	36	98***	199
63	5	3	-	-	-	-	-	-	-	-	-	-	-	7	11
	10	3	-	-	-	-	-	-	-	-	1	2	4	21	32
	15	3	-	-	-	-	-	-	-	2	3	3	4	30*	51
	20	3	-	-	-	-	-	-	2	3	3	3	4	45*	69
	25	2	-	-	-	-	-	2	2	3	3	3	8	60**	94
	30	2	-	-	-	-	1	2	3	3	3	5	10	74**	114
	35	2	-	-	-	-	2	2	3	3	3	9	11	85**	131
	40	2	-	-	-	1	2	3	2	3	6	9	15	90***	149
	45	2	-	-	-	1	3	2	3	4	8	10	20	94***	163
	50	2	-	-	-	2	2	3	3	6	8	12	29	97***	180
	55	2	-	-	-	2	3	3	3	8	9	18	35	98***	197

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required. (Dated 91-04-10)

CF TABLE 7: HEO_2 - IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)												Decom. Time (min)
			Air											O_2	
			42	39	36	33	30	27	24	21	18	15	12	9	
66	5	4	-	-	-	-	-	-	-	-	-	-	-	7	12
	10	3	-	-	-	-	-	-	-	-	1	3	4	22	34
	15	3	-	-	-	-	-	-	1	2	3	3	4	30*	52
	20	3	-	-	-	-	-	1	2	3	3	3	5	50*	76
	25	2	-	-	-	-	1	2	3	2	3	4	9	63**	100
	30	2	-	-	-	-	2	2	3	3	3	7	10	78**	121
	35	2	-	-	-	1	2	3	2	3	5	9	12	89**	139
	40	2	-	-	-	2	2	3	3	2	8	9	17	92***	156
	45	***2***	***-***	***-***	***1***	***2***	***2***	***3***	***3***	***5***	***8***	***11***	***25***	***96******	***174***
	50	***2***	***-***	***-***	***1***	***2***	***3***	***3***	***3***	***7***	***9***	***15***	***34***	***98******	***193***
	55	***2***	***-***	***-***	***2***	***2***	***3***	***3***	***5***	***7***	***10***	***23***	***39***	***99******	***211***
69	5	4	-	-	-	-	-	-	-	-	-	-	-	7	12
	10	3	-	-	-	-	-	-	-	-	2	3	3	24	36
	15	3	-	-	-	-	-	-	2	2	3	3	3	32*	54
	20	3	-	-	-	-	-	2	2	3	3	3	6	55*	83
	25	3	-	-	-	-	2	2	2	3	3	5	9	68**	108
	30	2	-	-	-	1	2	3	2	3	3	8	11	83**	129
	35	2	-	-	-	2	2	3	3	2	6	9	14	90***	149
	40	***2***	***-***	***-***	***1***	***2***	***2***	***3***	***3***	***4***	***8***	***10***	***21***	***95******	***167***
	45	***2***	***-***	***-***	***2***	***2***	***2***	***3***	***3***	***6***	***8***	***13***	***31***	***98******	***186***
	50	***2***	***-***	***-***	***2***	***2***	***3***	***3***	***4***	***8***	***9***	***20***	***38***	***99******	***206***
72	5	4	-	-	-	-	-	-	-	-	-	-	-	8	13
	10	3	-	-	-	-	-	-	-	1	2	3	4	25	39
	15	3	-	-	-	-	-	1	2	2	3	3	3	35*	58
	20	3	-	-	-	-	1	2	2	3	3	3	7	59*	89
	25	3	-	-	-	1	2	2	3	3	2	6	9	73**	115
	30	3	-	-	-	2	2	2	3	3	4	8	12	87**	137
	35	2	-	-	1	2	2	3	3	2	8	9	16	91***	155
	40	***2***	***-***	***-***	***2***	***2***	***2***	***3***	***3***	***5***	***8***	***11***	***26***	***97******	***177***
	45	***2***	***-***	***1***	***2***	***2***	***3***	***3***	***3***	***7***	***9***	***15***	***37***	***99******	***199***

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 7: HEO_2 - IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)														Decom. Time (min)
			Air													O_2	
			48	45	42	39	36	33	30	27	24	21	18	15	12	9	
75	10	3	-	-	-	-	-	-	-	-	-	1	3	3	3	26	40
	15	3	-	-	-	-	-	-	-	1	2	3	3	3	3	38*	62
	20	3	-	-	-	-	-	-	2	2	2	3	3	3	8	60**	97
	25	3	-	-	-	-	-	2	2	2	3	2	3	7	10	78**	123
	30	3	-	-	-	-	1	2	2	3	3	2	5	9	13	90***	149
	35	3	-	-	-	-	2	2	2	3	3	4	7	10	20	94***	166
	40	2	-	-	-	1	2	2	3	3	2	7	8	13	32	98***	189
	45	2	-	-	-	2	2	2	3	2	5	7	10	20	40	100***	211
78	10	4	-	-	-	-	-	-	-	-	-	2	2	3	4	27	43
	15	3	-	-	-	-	-	-	-	2	2	3	3	2	4	43*	68
	20	3	-	-	-	-	-	1	2	2	2	3	3	3	9	63**	102
	25	3	-	-	-	-	1	2	2	2	3	2	3	8	10	82**	129
	30	3	-	-	-	-	2	2	2	3	2	3	6	9	15	90***	153
	35	3	-	-	-	1	2	2	2	3	2	6	7	11	24	96***	175
	40	2	-	-	1	1	2	2	3	2	4	7	8	16	37	99***	200
81	10	4	-	-	-	-	-	-	-	-	-	2	3	3	3	29	45
	15	3	-	-	-	-	-	-	1	2	2	2	4	2	5	47*	74
	20	3	-	-	-	-	-	2	1	3	2	3	2	5	9	67**	108
	25	3	-	-	-	-	2	1	3	2	3	2	4	8	11	86**	136
	30	3	-	-	-	1	2	2	2	3	2	3	7	9	18	92***	160
	35	3	-	-	1	1	2	2	3	2	3	6	8	12	30	97***	186
	40	3	-	-	1	2	2	2	3	2	5	7	9	19	41	100***	212
84	10	4	-	-	-	-	-	-	-	-	1	2	3	3	3	30	47
	15	3	-	-	-	-	-	-	2	1	3	2	3	3	5	51*	79
	20	3	-	-	-	-	1	1	2	2	3	2	3	6	9	71**	114
	25	3	-	-	-	1	2	1	2	3	2	3	5	8	12	89**	142
	30	3	-	-	1	1	2	2	2	3	2	4	7	10	21	94***	168
	35	3	-	-	1	2	2	2	3	2	3	7	8	14	35	98***	196
	40	3	-	1	1	2	2	2	3	2	6	7	11	23	43	101***	223

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 7: HEO_2 - IN-WATER OXYGEN DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)														Decom Time (min)
			Air													O_2	
			48	45	42	39	36	33	30	27	24	21	18	15	12	9	
87	10	4	-	-	-	-	-	-	-	-	2	2	3	3	3	30*	53
	15	3	-	-	-	-	-	1	1	2	2	3	3	3	6	55*	85
	20	3	-	-	-	-	1	2	2	2	3	2	3	6	10	75**	120
	25	3	-	-	-	2	1	2	2	3	2	3	5	9	14	90***	152
	30	3	-	-	1	2	2	2	2	2	3	5	7	11	25	96***	177
	35	3	-	1	1	2	2	2	3	2	4	7	9	17	39	99***	207
90	10	4	-	-	-	-	-	-	-	-	2	2	3	3	3	30*	53
	15	4	-	-	-	-	-	1	2	2	2	3	2	3	7	59*	91
	20	3	-	-	-	1	1	2	2	2	3	2	3	7	10	79**	126
	25	3	-	-	1	1	2	2	2	3	2	3	6	9	16	90***	156
	30	3	-	1	1	2	2	2	2	2	3	6	7	13	29	98***	187
	35	3	-	2	1	2	2	2	2	3	5	7	10	21	41	101***	218
93	10	4	-	-	-	-	-	-	-	1	2	2	3	3	3	30*	54
	15	4	-	-	-	-	-	2	1	2	3	3	2	3	8	60**	99
	20	3	-	-	-	1	2	2	2	2	2	3	3	8	10	83**	132
	25	3	-	-	2	1	2	2	2	2	2	4	7	9	19	92***	163
	30	3	-	1	2	2	1	3	2	2	3	7	8	14	34	99***	197
	35	3	1	1	2	2	2	2	2	3	6	7	11	25	43	102***	228
96	10	4	-	-	-	-	-	-	-	2	1	3	2	3	4	32*	57
	15	4	-	-	-	-	1	1	2	2	3	2	3	3	9	61**	102
	20	3	-	-	1	1	2	2	2	2	2	3	4	7	12	86**	138
	25	3	-	1	1	2	2	2	2	2	2	5	7	10	21	95***	171
	30	3	1	1	2	2	1	3	2	2	4	6	9	17	37	100***	206
100	10	4	-	-	-	-	-	-	1	1	2	3	3	2	4	35*	61
	15	4	-	-	-	-	2	1	2	2	2	3	2	5	9	65**	108
	20	4	-	-	1	2	1	2	2	3	2	2	6	7	13	90**	146
	25	3	-	2	1	2	2	2	2	2	2	6	7	11	27	97***	182
	30	3	2	1	2	2	2	2	2	2	5	7	10	21	41	101***	219

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 8
SURFACE DECOMPRESSION
WITH OXYGEN
(METRES)

CF TABLE 8: HEO_2 - SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)														Decom. Time (min)
			In-Water Stops													RCC	
			Air											O_2	Surface Interval	O_2	
			42	39	36	33	30	27	24	21	18	15	12	9		12	
36	10	2	-	-	-	-	-	-	-	-	-	-	-	1	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minute	8	19
	15	2	-	-	-	-	-	-	-	-	-	-	1	2		14	27
	20	2	-	-	-	-	-	-	-	-	-	-	3	2		20	35
	30	2	-	-	-	-	-	-	-	-	-	2	4	3		30*	54
	40	2	-	-	-	-	-	-	-	-	-	4	4	9		46*	78
	50	1	-	-	-	-	-	-	-	-	1	4	7	11		60**	102
	60	1	-	-	-	-	-	-	-	-	2	5	11	12		69**	118
	70	1	-	-	-	-	-	-	-	-	3	7	13	18		72**	132
	75	1	-	-	-	-	-	-	-	-	4	8	13	27		72**	143
	80	***1***	-	-	-	-	-	-	-	-	***4***	***11***	***13***	***30***		***72*****	***149***
	90	***1***	-	-	-	-	-	-	-	***1***	***4***	***13***	***17***	***34****		***74*****	***167***
	100	***1***	-	-	-	-	-	-	-	***2***	***7***	***13***	***23***	***35****		***75*****	***179***
39	10	2	-	-	-	-	-	-	-	-	-	-	-	1		10	21
	15	2	-	-	-	-	-	-	-	-	-	-	2	2		16	30
	20	2	-	-	-	-	-	-	-	-	-	1	4	2		23	40
	30	2	-	-	-	-	-	-	-	-	1	3	4	6		33*	62
	40	2	-	-	-	-	-	-	-	-	2	4	5	10		54*	90
	50	2	-	-	-	-	-	-	-	-	3	4	10	11		64**	112
	60	1	-	-	-	-	-	-	-	1	4	5	13	14		74**	130
	70	1	-	-	-	-	-	-	-	2	4	10	12	29		73**	149
	80	***1***	-	-	-	-	-	-	-	***3***	***4***	***13***	***16***	***30****		***75*****	***165***
	90	***1***	-	-	-	-	-	-	-	***3***	***9***	***12***	***24***	***35****		***76*****	***183***
	95	***1***	-	-	-	-	-	-	-	***4***	***10***	***12***	***27***	***36****		***77*****	***190***
42	10	2	-	-	-	-	-	-	-	-	-	-	-	2		10	22
	15	2	-	-	-	-	-	-	-	-	-	-	3	2		18	33
	20	2	-	-	-	-	-	-	-	-	-	2	4	2		25	43
	30	2	-	-	-	-	-	-	-	-	2	4	4	7		40*	72
	40	2	-	-	-	-	-	-	-	1	3	4	7	10		60**	105
	50	2	-	-	-	-	-	-	-	2	4	4	11	12		71**	124
	60	2	-	-	-	-	-	-	-	3	4	8	12	26		73**	146
	65	2	-	-	-	-	-	-	-	3	4	11	12	30		74**	154
	70	***1***	-	-	-	-	-	-	***1***	***3***	***5***	***11***	***14***	***30****		***75*****	***163***
	80	***1***	-	-	-	-	-	-	***1***	***4***	***9***	***11***	***23***	***36****		***76*****	***184***
	90	***1***	-	-	-	-	-	-	***2***	***4***	***12***	***14***	***28***	***37****		***78*****	***199***

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 8: HEO_2 - SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)														Decom. Time (min)
			In-Water Stops												Surface Interval	RCC	
			Air											O_2		O_2	
			42	39	36	33	30	27	24	21	18	15	12	9		12	
45	10	2	-	-	-	-	-	-	-	-	-	-	1	2	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minute	11	24
	15	2	-	-	-	-	-	-	-	-	-	1	4	2		20	37
	20	2	-	-	-	-	-	-	-	-	1	3	4	2		28	48
	25	2	-	-	-	-	-	-	-	-	2	4	4	6		32*	63
	30	2	-	-	-	-	-	-	-	1	3	3	4	9		46*	81
	35	2	-	-	-	-	-	-	-	2	3	4	6	10		58*	98
	40	2	-	-	-	-	-	-	-	2	4	4	8	11		62**	111
	45	2	-	-	-	-	-	-	-	3	4	4	11	12		70**	124
	50	2	-	-	-	-	-	-	1	3	4	6	11	14		76**	135
	55	2	-	-	-	-	-	-	1	3	4	9	11	26		74**	148
	60	2	-	-	-	-	-	-	2	3	4	10	13	30*		72**	159
	70	2	-	-	-	-	-	-	2	4	8	11	19	36*		77**	182
	80	2	-	-	-	-	-	-	3	4	11	13	28	37*		79**	200
	85	1	-	-	-	-	-	1	3	6	11	16	29	38*		80**	208
48	10	2	-	-	-	-	-	-	-	-	-	-	2	2		13	27
	15	2	-	-	-	-	-	-	-	-	-	2	4	2		22	40
	20	2	-	-	-	-	-	-	-	-	2	3	4	3		30	52
	25	2	-	-	-	-	-	-	-	1	3	3	4	7		38*	71
	30	2	-	-	-	-	-	-	-	2	3	4	4	10		52*	90
	35	2	-	-	-	-	-	-	-	3	3	4	8	10		60**	108
	40	2	-	-	-	-	-	-	1	3	4	3	11	11		68**	121
	45	2	-	-	-	-	-	-	2	3	4	6	10	13		76**	134
	50	2	-	-	-	-	-	-	2	4	3	9	11	25		75**	149
	55	2	-	-	-	-	-	-	3	3	4	10	13	30		75**	158
	60	2	-	-	-	-	-	1	3	3	7	10	14	30*		78**	171
	70	2	-	-	-	-	-	1	4	3	10	11	26	38*		78**	196
	80	2	-	-	-	-	-	2	4	7	10	18	30	39*		81**	216

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 8: HEO_2 - SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)														Decom. Time (min)
			In-Water Stops												Surface Interval	RCC	
			Air											O_2		O_2	
			42	39	36	33	30	27	24	21	18	15	12	**9**		**12**	
51	10	3	-	-	-	-	-	-	-	-	-	-	3	**2**	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minute	**14**	30
	15	2	-	-	-	-	-	-	-	-	1	3	3	**3**		**23**	43
	20	2	-	-	-	-	-	-	-	1	2	4	4	**4**		**30***	60
	25	2	-	-	-	-	-	-	-	2	3	4	3	**9**		**43***	79
	30	2	-	-	-	-	-	-	1	3	3	4	6	**10**		**58***	100
	35	2	-	-	-	-	-	-	2	3	3	4	9	**11**		**64****	116
	40	2	-	-	-	-	-	-	2	4	3	6	10	**13**		**73****	131
	45	2	-	-	-	-	-	1	2	4	4	7	11	**23**		**76****	148
	50	2	-	-	-	-	-	1	3	3	5	9	12	**30**		**75****	158
	55	2	-	-	-	-	-	2	3	3	7	9	15	30*		79**	173
	60	2	-	-	-	-	-	2	3	4	8	10	21	37*		78**	188
	65	2	-	-	-	-	-	3	3	4	10	11	27	38*		79**	200
	70	2	-	-	-	-	-	3	3	7	9	15	30	38*		81**	211
	75	2	-	-	-	-	1	3	3	8	10	19	33	38*		83**	223
54	5	3	-	-	-	-	-	-	-	-	-	-	-	**1**		**7**	19
	10	3	-	-	-	-	-	-	-	-	-	1	3	**2**		**16**	33
	15	2	-	-	-	-	-	-	-	-	2	3	4	**2**		**26**	47
	20	2	-	-	-	-	-	-	-	2	3	3	4	**6**		**32***	65
	25	2	-	-	-	-	-	-	1	3	3	3	4	**9**		**50***	88
	30	2	-	-	-	-	-	-	2	3	3	4	7	**10**		**60****	109
	35	2	-	-	-	-	-	1	2	3	4	4	10	**12**		**69****	125
	40	2	-	-	-	-	-	1	3	3	4	7	10	**20**		**77****	145
	45	2	-	-	-	-	-	2	3	3	4	9	12	**28**		**76****	157
	50	2	-	-	-	-	-	3	3	3	6	10	14	**30***		**78****	172
	55	2	-	-	-	-	1	2	3	4	8	10	20	37*		78**	188
	60	2	-	-	-	-	1	3	3	5	9	11	26	38*		80**	201
	65	2	-	-	-	-	2	3	3	7	9	15	30	39*		81**	214
	70	2	-	-	-	-	2	3	3	9	9	21	34	38*		84**	228

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 8: HEO_2 - SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)														Decom. Time (min)
			In-Water Stops												Surface Interval	RCC	
			Air											O_2		O_2	
			42	39	36	33	30	27	24	21	18	15	12	9		12	
57	5	3	-	-	-	-	-	-	-	-	-	-	-	1	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minute	8	20
	10	3	-	-	-	-	-	-	-	-	-	2	3	2		17	35
	15	3	-	-	-	-	-	-	-	-	3	3	4	2		29	52
	20	2	-	-	-	-	-	-	-	3	3	3	4	7		37*	72
	25	2	-	-	-	-	-	-	2	3	3	3	6	9		55*	96
	30	2	-	-	-	-	-	1	2	3	4	3	9	11		63**	116
	35	2	-	-	-	-	-	2	3	3	3	6	10	13		74**	134
	40	2	-	-	-	-	-	3	3	3	3	9	11	24		78**	154
	45	2	-	-	-	-	1	3	3	3	5	9	14	30*		76**	169
	50	2	-	-	-	-	2	2	3	4	7	10	18	37*		78**	186
	55	2	-	-	-	-	2	3	3	5	8	11	25	39*		79**	200
	60	2	-	-	-	-	3	3	3	7	8	15	30	39*		82**	215
	65	2	-	-	-	1	2	3	4	8	9	21	35	38*		84**	230
60	5	3	-	-	-	-	-	-	-	-	-	-	-	1		10	22
	10	3	-	-	-	-	-	-	-	-	-	2	4	2		18	37
	15	3	-	-	-	-	-	-	-	1	3	3	4	3		30	55
	20	2	-	-	-	-	-	-	1	3	3	3	4	8		42*	79
	25	2	-	-	-	-	-	1	2	3	3	3	7	10		60*	104
	30	2	-	-	-	-	-	2	3	2	4	4	10	11		69**	125
	35	2	-	-	-	-	1	2	3	3	3	7	11	19		79**	148
	40	2	-	-	-	-	2	2	3	3	5	8	13	29		77**	162
	45	2	-	-	-	-	2	3	3	3	7	9	16	36*		78**	182
	50	2	-	-	-	1	2	3	3	4	8	11	23	38*		80**	198
	55	2	-	-	-	1	3	3	3	6	9	12	31	39*		82**	214
	60	2	-	-	-	2	2	3	4	8	9	19	36	38*		85**	231
63	5	3	-	-	-	-	-	-	-	-	-	-	-	1		10	22
	10	3	-	-	-	-	-	-	-	-	1	2	4	2		20	40
	15	3	-	-	-	-	-	-	-	2	3	3	4	4		30*	62
	20	3	-	-	-	-	-	-	2	3	3	3	4	9		47*	87
	25	2	-	-	-	-	-	2	2	3	3	3	8	11		60**	112
	30	2	-	-	-	-	1	2	3	3	3	5	10	13		72**	132
	35	2	-	-	-	-	2	2	3	3	3	9	11	24		78**	155
	40	2	-	-	-	1	2	3	2	3	6	9	15	32*		80**	178
	45	2	-	-	-	1	3	2	3	4	8	10	20	38*		79**	193
	50	2	-	-	-	2	2	3	3	6	8	12	29	39*		82**	211
	55	2	-	-	-	2	3	3	3	8	9	18	35	38*		85**	229

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 8: HEO_2 - SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)														Decom. Time (min)
			In-Water Stops												Surface Interval	RCC	
			Air											O_2		O_2	
			42	39	36	33	30	27	24	21	18	15	12	9		12	
66	5	4	-	-	-	-	-	-	-	-	-	-	-	1	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minute	10	23
	10	3	-	-	-	-	-	-	-	-	1	3	4	2		21	42
	15	3	-	-	-	-	-	-	1	2	3	3	4	5		30*	64
	20	3	-	-	-	-	-	1	2	3	3	3	5	9		52*	94
	25	2	-	-	-	-	1	2	3	2	3	4	9	11		64**	119
	30	2	-	-	-	-	2	2	3	3	3	7	10	17		79**	146
	35	2	-	-	-	1	2	3	2	3	5	9	12	28		78**	163
	40	2	-	-	-	2	2	3	3	2	8	9	17	36*		80**	187
	45	2	-	-	1	2	2	3	3	5	8	11	25	39*		81**	205
	50	2	-	-	1	2	3	3	3	7	9	15	34	39*		84**	225
	55	2	-	-	2	2	3	3	5	7	10	23	39	38*		87**	244
69	5	4	-	-	-	-	-	-	-	-	-	-	-	2		15	29
	10	3	-	-	-	-	-	-	-	-	2	3	3	3		22	44
	15	3	-	-	-	-	-	-	2	2	3	3	3	7		32*	68
	20	3	-	-	-	-	-	2	2	3	3	3	6	10		56*	101
	25	3	-	-	-	-	2	2	2	3	3	5	9	12		68**	127
	30	2	-	-	-	1	2	3	2	3	3	8	11	21		79**	153
	35	2	-	-	-	2	2	3	3	2	6	9	14	32*		80**	178
	40	2	-	-	1	2	2	3	3	4	8	10	21	37*		81**	197
	45	2	-	-	2	2	2	3	3	6	8	13	31	39*		83**	217
	50	2	-	-	2	2	3	3	4	8	9	20	38	38*		87**	239
72	5	4	-	-	-	-	-	-	-	-	-	-	-	2		15	29
	10	3	-	-	-	-	-	-	-	1	2	3	4	2		25	48
	15	3	-	-	-	-	-	1	2	2	3	3	3	8		36*	74
	20	3	-	-	-	-	1	2	2	3	3	3	7	10		60**	112
	25	3	-	-	-	1	2	2	3	3	2	6	9	13		72**	134
	30	3	-	-	-	2	2	2	3	3	4	8	12	25		79**	161
	35	2	-	-	1	2	2	3	3	2	8	9	16	35*		80**	186
	40	2	-	-	2	2	2	3	3	5	8	11	26	38*		83**	208
	45	2	-	1	2	2	3	3	3	7	9	15	37	38*		86**	231

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 8: HEO_2 - SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)																
			In-Water Stops														RCC	Decom Time (min)
			Air													O_2	Surface Interval	O_2	
			48	45	42	39	36	33	30	27	24	21	18	15	12	9		12	
75	10	3	-	-	-	-	-	-	-	-	-	1	3	3	3	**3**	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	**25**	49
	15	3	-	-	-	-	-	-	-	1	2	3	3	3	3	**8**		**41***	80
	20	3	-	-	-	-	-	-	2	2	2	3	3	3	8	**11**		**60****	115
	25	3	-	-	-	-	-	2	2	2	3	2	3	7	10	**17**		**78****	147
	30	3	-	-	-	-	1	2	2	3	3	2	5	9	13	**30***		**80****	176
	35	3	-	-	-	-	2	2	2	3	3	4	7	10	20	**37***		**81****	197
	40	***2***	-	-	-	***1***	***2***	***2***	***3***	***3***	***2***	***7***	***8***	***13***	***32***	***38****		***85*****	***221***
	45	***2***	-	-	-	***2***	***2***	***2***	***3***	***2***	***5***	***7***	***10***	***20***	***40***	***38****		***88*****	***244***
78	10	4	-	-	-	-	-	-	-	-	-	2	2	3	4	**2**		**28**	52
	15	3	-	-	-	-	-	-	-	2	2	3	3	2	4	**9**		**45***	86
	20	3	-	-	-	-	-	1	2	2	2	3	3	3	9	**11**		**64****	121
	25	3	-	-	-	-	1	2	2	2	3	2	3	8	10	**19**		**81****	154
	30	3	-	-	-	-	2	2	2	3	2	3	6	9	15	**32***		**81****	183
	35	***3***	-	-	-	***1***	***2***	***2***	***2***	***3***	***2***	***6***	***7***	***11***	***24***	***38****		***83*****	***207***
	40	***2***	-	-	***1***	***1***	***2***	***2***	***3***	***2***	***4***	***7***	***8***	***16***	***37***	***38****		***86*****	***232***
81	10	4	-	-	-	-	-	-	-	-	-	2	3	3	3	**3**		**29**	55
	15	3	-	-	-	-	-	-	1	2	2	2	4	2	5	**9**		**49***	92
	20	3	-	-	-	-	-	2	1	3	2	3	2	5	9	**12**		**67****	127
	25	3	-	-	-	-	2	1	3	2	3	2	4	8	11	**23**		**80****	160
	30	3	-	-	-	1	2	2	2	3	2	3	7	9	18	**34***		**82****	191
	35	***3***	-	-	***1***	***1***	***2***	***2***	***3***	***2***	***3***	***6***	***8***	***12***	***30***	***38****		***84*****	***218***
	40	***3***	-	-	***1***	***2***	***2***	***2***	***3***	***2***	***5***	***7***	***9***	***19***	***41***	***38****		***88*****	***245***
84	10	4	-	-	-	-	-	-	-	-	1	2	3	3	3	**3**		**30**	57
	15	3	-	-	-	-	-	-	2	1	3	2	3	3	5	**10**		**53***	98
	20	3	-	-	-	-	1	1	2	2	3	2	3	6	9	**12**		**71****	133
	25	3	-	-	-	1	2	1	2	3	2	3	5	8	12	**26**		**81****	167
	30	3	-	-	1	1	2	2	2	3	2	4	7	10	21	**36***		**83****	200
	35	***3***	-	-	***1***	***2***	***2***	***2***	***3***	***2***	***3***	***7***	***8***	***14***	***35***	***38****		***86*****	***229***
	40	***3***	-	***1***	***1***	***2***	***2***	***2***	***3***	***2***	***6***	***7***	***11***	***23***	***43***	***38****		***90*****	***257***

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 8: HEO_2 - SURFACE DECOMPRESSION WITH OXYGEN (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	Stop Times (min) at Different Depths (msw)																Decom Time (min)
			In-Water Stops														Surface Interval	RCC	
			Air													O_2		O_2	
			48	45	42	39	36	33	30	27	24	21	18	15	12	9		12	
87	10	4	-	-	-	-	-	-	-	-	2	2	3	3	3	4	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	30*	64
	15	3	-	-	-	-	-	1	1	2	2	3	3	3	6	10		57*	104
	20	3	-	-	-	-	1	2	2	2	3	2	3	6	10	16		77**	145
	25	3	-	-	-	2	1	2	2	3	2	3	5	9	14	30*		81**	180
	30	*3*	-	-	*1*	*2*	*2*	*2*	*2*	*2*	*3*	*5*	*7*	*11*	*25*	*37**		*84***	*209*
	35	*3*	-	*1*	*1*	*2*	*2*	*2*	*3*	*2*	*4*	*7*	*9*	*17*	*39*	*37**		*89***	*241*
90	10	4	-	-	-	-	-	-	-	-	2	2	3	3	3	5		30*	65
	15	4	-	-	-	-	-	1	2	2	2	3	2	3	7	10		60*	109
	20	3	-	-	-	1	1	2	2	2	3	2	3	7	10	18		79**	151
	25	3	-	-	1	1	2	2	2	3	2	3	6	9	16	32*		82**	187
	30	*3*	-	*1*	*1*	*2*	*2*	*2*	*2*	*2*	*3*	*6*	*7*	*13*	*29*	*38**		*85***	*219*
	35	*3*	-	*2*	*1*	*2*	*2*	*2*	*2*	*3*	*5*	*7*	*10*	*21*	*41*	*38**		*90***	*252*
93	*10*	*4*	-	-	-	-	-	-	-	*1*	*2*	*2*	*3*	*3*	*3*	*6*		*30**	*67*
	15	*4*	-	-	-	-	-	*2*	*1*	*2*	*3*	*3*	*2*	*3*	*8*	*10*		*60***	*116*
	20	*3*	-	-	-	*1*	*2*	*2*	*2*	*2*	*2*	*3*	*3*	*8*	*10*	*19*		*82***	*157*
	25	*3*	-	-	*2*	*1*	*2*	*2*	*2*	*2*	*2*	*4*	*7*	*9*	*19*	*34**		*83***	*195*
	30	*3*	-	*1*	*2*	*2*	*1*	*3*	*2*	*2*	*3*	*7*	*8*	*14*	*34*	*38**		*86***	*229*
	35	*3*	*1*	*1*	*2*	*2*	*2*	*2*	*2*	*3*	*6*	*7*	*11*	*25*	*43*	*38**		*90****	*266*
96	*10*	*4*	-	-	-	-	-	-	-	*2*	*1*	*3*	*2*	*3*	*4*	*6*		*33**	*71*
	15	*4*	-	-	-	-	*1*	*1*	*2*	*2*	*3*	*2*	*3*	*3*	*9*	*10*		*63***	*121*
	20	*3*	-	-	*1*	*1*	*2*	*2*	*2*	*2*	*2*	*3*	*4*	*7*	*12*	*22*		*82***	*163*
	25	*3*	-	*1*	*1*	*2*	*2*	*2*	*2*	*2*	*2*	*5*	*7*	*10*	*21*	*36**		*84***	*203*
	30	*3*	*1*	*1*	*2*	*2*	*1*	*3*	*2*	*2*	*4*	*6*	*9*	*17*	*37*	*38**		*88***	*239*
100	*10*	*4*	-	-	-	-	-	-	*1*	*1*	*2*	*3*	*3*	*2*	*4*	*7*		*37**	*77*
	15	*4*	-	-	-	-	*2*	*1*	*2*	*2*	*2*	*3*	*2*	*5*	*9*	*11*		*67***	*128*
	20	*4*	-	-	*1*	*2*	*1*	*2*	*2*	*3*	*2*	*2*	*6*	*7*	*13*	*26*		*82***	*171*
	25	*3*	-	*2*	*1*	*2*	*2*	*2*	*2*	*2*	*2*	*6*	*7*	*11*	*27*	*37**		*85***	*214*
	30	*3*	*2*	*1*	*2*	*2*	*2*	*2*	*2*	*2*	*5*	*7*	*10*	*21*	*41*	*38**		*90***	*253*

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 9
HEO_2 EMERGENCY DECOMPRESSION
(METRES)

CF TABLE 9: HEO_2 - EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)		In-Water Air 9	In-Water Air 6	In-Water Air 3	In-Water Dec. Time (min)	Recompression Chamber Surf. Int.	Recompression Chamber O_2 12	Recompression Chamber Dec. Time (min)	Recompression Chamber Surf. Int.	Recompression Chamber Air 12	Recompression Chamber Air 9	Recompression Chamber Air 6	Recompression Chamber Air 3	Recompression Chamber Dec. Time (min)
36	15	Decompression in accordance with Table 7 – In-Water Oxygen or Table 8 – Surface Decompression with Oxygen Tables	4	5	16	28	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	14	29	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	1	4	5	16	40
	20		4	7	20	36		20	37		3	4	7	20	50
	30		6	15	33	62		30*	57		4	6	15	33	79
	40		18	18	61	107		46*	87		4	18	18	61	136
	50		22	26	79	140		60**	113		7	22	26	79	176
	60		24	42	84	169		69**	130		11	24	42	84	211
	70		36	55	84	199		72**	150		13	36	55	84	255
	75		54	59	84	223		72**	170		13	54	59	84	297
	80		***60***	***61***	***84***	***234***		***72******	***179***		***13***	***60***	***61***	***84***	***314***
	90		***73***	***65***	***84***	***258***		***74******	***201***		***17***	***73***	***65***	***84***	***355***
	100		***75***	***63***	***86***	***270***		***75******	***214***		***23***	***75***	***63***	***86***	***375***
39	10		2	5	9	18		10	22		1	2	5	9	28
	15		4	5	17	30		16	32		2	4	5	17	43
	20		4	9	21	41		23	42		4	4	9	21	56
	30		12	15	42	79		33*	67		4	12	15	42	102
	40		20	20	72	125		54*	100		5	20	20	72	157
	50		22	35	83	159		64**	123		10	22	35	83	198
	60		28	53	85	190		74**	144		13	28	53	85	238
	70		58	61	85	233		73**	178		12	58	61	85	310
	80		***65***	***64***	***86***	***252***		***75******	***195***		***16***	***65***	***64***	***86***	***340***
	90		***75***	***64***	***87***	***275***		***76******	***218***		***24***	***75***	***64***	***87***	***381***
	95		***77***	***64***	***88***	***283***		***77******	***226***		***27***	***77***	***64***	***88***	***394***
42	10		4	5	11	22		10	24		1	4	5	11	34
	15		4	5	19	33		18	35		3	4	5	19	47
	20		4	11	23	46		25	45		4	4	11	23	61
	30		14	16	52	94		40*	79		4	14	16	52	119
	40		20	26	79	142		60**	115		7	20	26	79	176
	50		24	45	85	177		71**	136		11	24	45	85	219
	60		52	60	85	226		73**	172		12	52	60	85	297
	65		60	63	86	241		74**	184		12	60	63	86	320
	70		***65***	***65***	***86***	***251***		***75******	***193***		***14***	***65***	***65***	***86***	***337***
	80		***77***	***64***	***88***	***278***		***76******	***220***		***23***	***77***	***64***	***88***	***385***
	90		***79***	***64***	***90***	***294***		***78******	***236***		***28***	***79***	***64***	***90***	***408***

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 9: HEO_2 - EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)		Air	In-Water				Recompression Chamber							
				Air		Dec. Time (min)	Surf. Int.	O2	Dec. Time (min)	Surf. Int.	Air				Dec. Time (min)
			9	6	3			12			12	9	6	3	
45	10	Decompression in accordance with Table 7 – In-Water Oxygen or Table 8 – Surface Decompression with Oxygen Tables	4	6	12	25	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	**11**	26	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	1	4	6	12	37
	15		4	6	20	37		**20**	39		4	4	6	20	52
	20		4	13	26	53		**28**	50		4	4	13	26	68
	25		12	15	43	82		**32***	69		4	12	15	43	105
	30		18	18	62	111		**46***	90		4	18	18	62	140
	35		20	23	76	136		**58***	108		6	20	23	76	169
	40		22	32	83	157		**62****	122		8	22	32	83	194
	45		24	44	85	177		**70****	136		11	24	44	85	219
	50		28	54	86	195		**76****	149		11	28	54	86	241
	55		52	61	86	229		**74****	174		11	52	61	86	299
	60		65	64	86	249		**72****	189		13	65	64	86	334
	70		***77***	***65***	***88***	***276***		***77****	***218***		***19***	***77***	***65***	***88***	***379***
	80		***79***	***64***	***91***	***295***		***79****	***237***		***28***	***79***	***64***	***91***	***409***
	85		***81***	***65***	***93***	***306***		***80****	***246***		***29***	***81***	***65***	***93***	***423***
48	10		4	5	14	27		**13**	29		2	4	5	14	40
	15		4	8	21	41		**22**	42		4	4	8	21	56
	20		6	14	30	61		**30**	55		4	6	14	30	78
	25		14	16	51	94		**38***	78		4	14	16	51	119
	30		20	19	71	125		**52***	100		4	20	19	71	156
	35		20	28	81	149		**60****	118		8	20	28	81	184
	40		22	41	85	172		**68****	132		11	22	41	85	212
	45		26	53	86	192		**76****	147		10	26	53	86	235
	50		50	61	86	228		**75****	174		11	50	61	86	296
	55		60	64	87	246		**75****	188		13	60	64	87	326
	60		***65***	***65***	***88***	***258***		***78****	***201***		***14***	***65***	***65***	***88***	***344***
	70		***81***	***65***	***91***	***294***		***78****	***234***		***26***	***81***	***65***	***91***	***408***
	80		***83***	***66***	***94***	***316***		***81****	***255***		***30***	***83***	***66***	***94***	***436***

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 9: HEO_2 - EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)		In-Water Air			In-Water Dec. Time (min)	Recompression Chamber Surf. Int.	O2	Dec. Time (min)	Surf. Int.	Air				Dec. Time (min)
			9	6	3			12			12	9	6	3	
51	10	Decompression in accordance with Table 7 – In-Water Oxygen or Table 8 – Surface Decompression with Oxygen Tables	4	5	15	30	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	14	31	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	3	4	5	15	44
	15		6	10	22	47		23	46		3	6	10	22	63
	20		8	14	37	72		30*	64		4	8	14	37	91
	25		18	17	60	109		43*	88		3	18	17	60	137
	30		20	24	77	140		58*	110		6	20	24	77	173
	35		22	36	84	165		64**	127		9	22	36	84	203
	40		26	50	86	189		73**	144		10	26	50	86	232
	45		46	59	87	223		76**	171		11	46	59	87	287
	50		60	64	88	247		75**	188		12	60	64	88	326
	55		65	65	89	260		79**	203		15	65	65	89	347
	60		79	65	90	284		78**	225		21	79	65	90	391
	65		81	65	93	299		79**	238		27	81	65	93	414
	70		81	65	95	310		81**	249		30	81	65	95	428
	75		81	66	97	323		83**	261		33	81	66	97	444
54	5		1	3	7	14		7	19		1	1	3	7	23
	10		4	5	17	33		16	35		3	4	5	17	47
	15		4	11	24	50		26	49		4	4	11	24	65
	20		12	14	45	85		32*	71		4	12	14	45	108
	25		18	19	68	121		50*	97		4	18	19	68	150
	30		20	29	82	152		60**	119		7	20	29	82	186
	35		24	45	85	180		69**	137		10	24	45	85	221
	40		40	57	86	213		77**	165		10	40	57	86	270
	45		56	63	88	242		76**	185		12	56	63	88	317
	50		65	65	89	260		78**	202		14	65	65	89	346
	55		79	65	91	285		78**	225		20	79	65	91	391
	60		81	65	93	299		80**	239		26	81	65	93	413
	65		83	66	96	316		81**	253		30	83	66	96	436
	70		81	67	98	329		84**	266		34	81	67	98	451

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 9: HEO_2 - EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)		In-Water Air	In-Water Air		In-Water Dec. Time (min)	Recompression Chamber Surf. Int.	O2	Dec. Time (min)	Surf. Int.	Air				Dec. Time (min)
			9	6	3			12			12	9	6	3	
57	5	Decompression in accordance with Table 7 – In-Water Oxygen or Table 8 – Surface Decompression with Oxygen Tables	1	4	8	16	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	8	20	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	1	1	4	8	25
	10		4	4	18	34		17	37		3	4	4	18	48
	15		4	12	27	56		29	54		4	4	12	27	71
	20		14	16	51	96		37*	79		4	14	16	51	121
	25		18	22	74	133		55*	105		6	18	22	74	164
	30		22	36	84	166		63**	127		9	22	36	84	204
	35		26	52	86	193		74**	147		10	26	52	86	236
	40		48	61	88	231		78**	178		11	48	61	88	297
	45		65	65	89	259		76**	199		14	65	65	89	345
	50		79	65	91	283		78**	223		18	79	65	91	387
	55		83	66	93	301		79**	239		25	83	66	93	416
	60		83	66	96	316		82**	254		30	83	66	96	436
	65		81	67	99	332		84**	268		35	81	67	99	455
60	5		2	4	8	17		10	23		1	2	4	8	27
	10		4	4	19	36		18	39		4	4	4	19	51
	15		6	13	31	64		30	58		4	6	13	31	81
	20		16	16	59	107		42*	87		4	16	16	59	134
	25		20	26	79	146		60*	114		7	20	26	79	180
	30		22	43	86	178		69**	136		10	22	43	86	217
	35		38	58	87	215		79**	167		11	38	58	87	271
	40		58	64	89	249		77**	191		13	58	64	89	327
	45		77	65	91	278		78**	218		16	77	65	91	378
	50		81	66	94	298		80**	236		23	81	66	94	409
	55		83	66	97	316		82**	253		31	83	66	97	437
	60		81	67	100	333		85**	269		36	81	67	100	457
63	5		2	5	8	18		10	23		1	2	5	8	28
	10		4	6	20	40		20	42		4	4	6	20	55
	15		8	14	35	72		30*	66		4	8	14	35	91
	20		18	18	65	119		47*	96		4	18	18	65	148
	25		22	31	82	158		60**	123		8	22	31	82	195
	30		26	50	86	191		72**	145		10	26	50	86	234
	35		48	62	88	233		78**	179		11	48	62	88	299
	40		69	65	90	267		80**	210		15	69	65	90	358
	45		81	66	93	293		79**	231		20	81	66	93	401
	50		83	66	97	313		82**	250		29	83	66	97	432
	55		81	67	100	331		85**	267		35	81	67	100	454

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 9: HEO_2 - EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)		In-Water Air 9	In-Water Air 6	In-Water Air 3	In-Water Dec. Time (min)	Recompression Chamber Surf. Int.	Recompression Chamber O2 12	Recompression Chamber Dec. Time (min)	Recompression Chamber Surf. Int.	Recompression Chamber Air 12	Recompression Chamber Air 9	Recompression Chamber Air 6	Recompression Chamber Air 3	Recompression Chamber Dec. Time (min)
66	5	Decompression in accordance with Table 7 – In-Water Oxygen or Table 8 – Surface Decompression with Oxygen Tables	2	5	8	19	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	10	24	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	1	2	5	8	29
	10		4	8	20	43		21	44		4	4	8	20	58
	15		10	15	41	82		30*	69		4	10	15	41	103
	20		18	21	71	130		52*	103		5	18	21	71	160
	25		22	38	84	170		64**	130		9	22	38	84	208
	30		34	55	88	209		79**	163		10	34	55	88	260
	35		56	64	89	248		78**	191		12	56	64	89	323
	40		77	66	92	283		80**	223		17	77	66	92	384
	45		83	67	96	308		81**	244		25	83	67	96	423
	50		83	67	100	329		84**	264		34	83	67	100	453
	55		81	69	104	350		87**	282		39	81	69	104	477
69	5		4	5	12	25		15	31		2	4	5	12	38
	10		6	9	21	47		22	47		3	6	9	21	63
	15		14	15	47	92		32*	75		3	14	15	47	116
	20		20	24	76	142		56*	111		6	20	24	76	175
	25		24	44	86	183		68**	139		9	24	44	86	223
	30		42	60	88	225		79**	174		11	42	60	88	285
	35		69	65	91	268		80**	210		14	69	65	91	358
	40		79	66	95	296		81**	234		21	79	66	95	403
	45		83	67	98	320		83**	256		31	83	67	98	441
	50		81	69	103	344		87**	277		38	81	69	103	470
72	5		4	5	16	29		15	31		2	4	5	16	42
	10		4	10	23	50		25	50		4	4	10	23	65
	15		16	15	53	101		36*	82		3	16	15	53	127
	20		20	28	80	152		60**	122		7	20	28	80	186
	25		26	50	86	193		72**	147		9	26	50	86	235
	30		50	62	90	241		79**	186		12	50	62	90	310
	35		75	65	93	281		80**	221		16	75	65	93	379
	40		81	66	97	308		83**	246		26	81	66	97	422
	45		81	68	102	335		86**	269		37	81	68	102	460

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 9: HEO_2 - EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)		In-Water Air			In-Water Dec. Time (min)	Surf. Int.	Recompression Chamber O2	Dec. Time (min)	Surf. Int.	Recompression Chamber Air				Dec. Time (min)
			9	6	3			12			12	9	6	3	
75	10	Decompression in accordance with Table 7 – In-Water Oxygen or Table 8 – Surface Decompression with Oxygen Tables	6	11	24	54	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	**25**	52	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	3	6	11	24	70
	15		16	17	59	110		**41***	88		3	16	17	59	136
	20		22	33	82	163		**60****	126		8	22	33	82	200
	25		34	55	88	211		**78****	164		10	34	55	88	262
	30		65	65	91	264		**80****	206		13	65	65	91	349
	35		79	66	95	296		**81****	234		20	79	66	95	402
	40		***81***	***68***	***100***	***324***		***85*****	***259***		***32***	***81***	***68***	***100***	***444***
	45		***81***	***69***	***104***	***349***		***88*****	***282***		***40***	***81***	***69***	***104***	***477***
78	10		4	12	26	57		**28**	55		4	4	12	26	72
	15		18	19	64	120		**45***	95		4	18	19	64	149
	20		22	38	84	172		**64****	132		9	22	38	84	210
	25		38	59	88	221		**81****	173		10	38	59	88	276
	30		69	65	92	273		**81****	215		15	69	65	92	364
	35		***81***	***67***	***97***	***308***		***83*****	***245***		***24***	***81***	***67***	***97***	***420***
	40		***81***	***68***	***103***	***337***		***86*****	***270***		***37***	***81***	***68***	***103***	***462***
81	10		6	12	29	62		**29**	58		3	6	12	29	78
	15		18	20	69	128		**49***	101		5	18	20	69	158
	20		24	43	86	183		**67****	139		9	24	43	86	223
	25		46	62	90	237		**80****	183		11	46	62	90	301
	30		73	66	94	285		**82****	225		18	73	66	94	383
	35		***81***	***68***	***99***	***321***		***84*****	***256***		***30***	***81***	***68***	***99***	***439***
	40		***81***	***70***	***105***	***352***		***88*****	***283***		***41***	***81***	***70***	***105***	***481***
84	10		6	13	32	67		**30**	60		3	6	13	32	83
	15		20	23	73	138		**53***	108		5	20	23	73	170
	20		24	48	87	191		**71****	145		9	24	48	87	231
	25		52	63	91	248		**81****	193		12	52	63	91	319
	30		77	67	96	298		**83****	236		21	77	67	96	403
	35		***81***	***68***	***102***	***333***		***86*****	***267***		***35***	***81***	***68***	***102***	***456***
	40		***81***	***71***	***108***	***366***		***90*****	***295***		***43***	***81***	***71***	***108***	***497***

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

CF TABLE 9: HEO_2 - EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)		Air	In-Water			Recompression Chamber								
				Air		Dec. Time (min)	Surf. Int.	O2	Dec. Time (min)	Surf. Int.	Air				Dec. Time (min)
			9	6	3			12			12	9	6	3	
87	10	Decompression in accordance with Table 7 – In-Water Oxygen or Table 8 – Surface Decompression with Oxygen Tables	8	14	35	74	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	30*	68	Time from leaving the 9 msw in-water stop to reaching the 12 msw chamber stop must not exceed 7 minutes	3	8	14	35	92
	15		20	25	77	146		57*	114		6	20	25	77	179
	20		32	53	87	206		77**	161		10	32	53	87	255
	25		65	65	92	268		81**	210		14	65	65	92	354
	30		79	67	98	309		84**	246		25	79	67	98	420
	35		79	70	104	345		89**	278		39	79	70	104	470
90	10		10	14	38	79		30*	70		3	10	14	38	99
	15		20	29	79	154		60*	119		7	20	29	79	188
	20		36	57	88	217		79**	169		10	36	57	88	270
	25		69	65	94	278		82**	219		16	69	65	94	370
	30		81	68	100	322		85**	257		29	81	68	100	439
	35		81	71	107	360		90**	290		41	81	71	107	489
93	10		12	15	42	87		30*	73		3	12	15	42	109
	15		20	32	82	162		60**	126		8	20	32	82	197
	20		38	59	90	225		82**	176		10	38	59	90	280
	25		73	66	96	290		83**	229		19	73	66	96	389
	30		81	69	103	335		86**	267		34	81	69	103	457
	35		81	72	110	373		90***	304		43	81	72	110	504
96	10		12	15	47	93		33*	77		4	12	15	47	116
	15		20	36	84	170		63**	131		9	20	36	84	206
	20		44	62	91	238		82**	185		12	44	62	91	301
	25		77	67	97	301		84**	239		21	77	67	97	406
	30		81	70	105	346		88**	277		37	81	70	105	471
100	10		14	16	53	103		37*	84		4	14	16	53	128
	15		22	41	86	181		67**	139		9	22	41	86	219
	20		52	64	92	253		82**	197		13	52	64	92	325
	25		79	68	100	316		85**	251		27	79	68	100	429
	30		81	72	108	363		90**	291		41	81	72	108	492

Stop times include travel time from the previous stop except when a gas switch occurs.
Asterisk (*) indicates number of 5-minute air breaks required.

Combined Surface-Supplied HeO2 tables (Tables 6, 7 and 8) and Table 9

Emergency Decompression

CF HEO$_2$TABLES 6 – 8 (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw)						Table 6				Table 7		Table 8			
			Air						In-water stops			Decom. Time (min)	In-water	Decom. Time (min)	In-water	Surface Interval	RCC	Decom. Time (min)
									Air				O_2		O_2		O_2	
			27	24	21	18	15	12	9	6	3		9		9		12	
9	55	1	-	-	-	-	-	-	-	-	-	1						
12	20	1	-	-	-	-	-	-	-	-	-	1						
	30	1	-	-	-	-	-	-	-	-	3	4						
	40	1	-	-	-	-	-	-	-	-	12	13						
15	13	1	-	-	-	-	-	-	-	-	-	1						
	20	1	-	-	-	-	-	-	-	-	4	5						
	30	1	-	-	-	-	-	-	-	-	12	13						
18	10	1	-	-	-	-	-	-	-	-	-	1						
	20	1	-	-	-	-	-	-	-	-	7	8						
	25	1	-	-	-	-	-	-	-	2	13	16						
	30	1	-	-	-	-	-	-	-	3	16	20						
21	8	2	-	-	-	-	-	-	-	-	-	2						
	12	1	-	-	-	-	-	-	-	-	5	6						
	20	1	-	-	-	-	-	-	-	3	11	15						
	30	1	-	-	-	-	-	-	-	6	19	26						
24	6	2	-	-	-	-	-	-	-	-	-	2						
	10	2	-	-	-	-	-	-	-	-	6	8						
	15	1	-	-	-	-	-	-	-	3	7	11						
	20	1	-	-	-	-	-	-	-	5	14	20						
	25	1	-	-	-	-	-	-	-	7	18	26						
27	5	2	-	-	-	-	-	-	-	-	-	2						
	10	2	-	-	-	-	-	-	-	-	8	10						
	15	2	-	-	-	-	-	-	-	5	10	17						
	20	1	-	-	-	-	-	-	2	6	16	25						

CF HEO_2TABLES 6 – 8 (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw)						Table 6				Table 7		Table 8			
			Air						In-water stops			Decom. Time (min)	In-water	Decom. Time (min)	In-water	Surface Interval	RCC	Decom. Time (min)
									Air				O_2		O_2		O_2	
			27	24	21	18	15	**12**	9	6	3		**9**		**9**		**12**	
30	5	2	-	-	-	-	-	-	-	-	-	2				Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute		
	10	2	-	-	-	-	-	-	-	3	7	12						
	15	2	-	-	-	-	-	-	2	5	13	22						
33	5	2	-	-	-	-	-	-	-	-	-	2						
	10	2	-	-	-	-	-	-	-	4	7	13						
	15	2	-	-	-	-	-	-	3	6	14	25						
36	5	2	-	-	-	-	-	-	-	-	-	2						
	10	2	-	-	-	-	-	-	-	6	7	15	**6**	9	**1**		**8**	19
	15	2	-	-	-	-	-	1					**16**	20	**2**		**14**	27
	20	2	-	-	-	-	-	3					**21**	27	**2**		**20**	35
	30	2	-	-	-	-	2	4					**30***	44	**3**		**30***	54
	40	2	-	-	-	-	4	4					**45***	61	**9**		**46***	78
	50	1	-	-	-	1	4	7					**60****	84	**11**		**60****	102
	60	1	-	-	-	2	5	11					**70****	100	**12**		**69****	118
	70	1	-	-	-	3	7	13					**80****	115	**18**		**72****	132
	75	1	-	-	-	4	8	13					**84****	121	**27**		**72****	143
	80	***1***	***-***	***-***	***-***	***4***	***11***	***13***					***87*****	***127***	***30***		***72*****	***149***
	90	***1***	***-***	***-***	***1***	***4***	***13***	***17***					***90******	***142***	***34****		***74*****	***167***
	100	***1***	***-***	***-***	***2***	***7***	***13***	***23***					***90******	***152***	***35****		***75*****	***179***

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLES 7 – 8 (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw)											Table 7		Table 8			
			Air											In-water O_2	Decom. Time (min)	In-water O_2	Surface Interval	RCC O_2	Decom. Time (min)
			42	39	36	33	30	27	24	21	18	15	12	9		9		12	
39	10	2	-	-	-	-	-	-	-	-	-	-	-	**7**	10	**1**	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	**10**	21
	15	2	-	-	-	-	-	-	-	-	-	-	2	**18**	23	**2**		**16**	30
	20	2	-	-	-	-	-	-	-	-	-	1	4	**23**	31	**2**		**23**	40
	30	2	-	-	-	-	-	-	-	-	1	3	4	**30***	46	**6**		**33***	62
	40	2	-	-	-	-	-	-	-	-	2	4	5	**53***	72	**10**		**54***	90
	50	2	-	-	-	-	-	-	-	-	3	4	10	**65****	95	**11**		**64****	112
	60	1	-	-	-	-	-	-	-	1	4	5	13	**77****	112	**14**		**74****	130
	70	1	-	-	-	-	-	-	-	2	4	10	12	**86****	126	**29**		**73****	149
	80	***1***	-	-	-	-	-	-	-	***3***	***4***	***13***	***16***	***90******	***143***	***30****		***75*****	***165***
	90	***1***	-	-	-	-	-	-	-	***3***	***9***	***12***	***24***	***90******	***155***	***35****		***76*****	***183***
	95	***1***	-	-	-	-	-	-	-	***4***	***10***	***12***	***27***	***90******	***160***	***36****		***77*****	***190***
42	10	2	-	-	-	-	-	-	-	-	-	-	-	**9**	12	**2**		**10**	**22**
	15	2	-	-	-	-	-	-	-	-	-	-	3	**19**	25	**2**		**18**	33
	20	2	-	-	-	-	-	-	-	-	-	2	4	**25**	34	**2**		**25**	43
	30	2	-	-	-	-	-	-	-	-	2	4	4	**37***	55	**7**		**40***	72
	40	2	-	-	-	-	-	-	-	1	3	4	7	**60***	83	**10**		**60****	105
	50	2	-	-	-	-	-	-	-	2	4	4	11	**72****	106	**12**		**71****	124
	60	2	-	-	-	-	-	-	-	3	4	8	12	**84****	124	**26**		**73****	146
	65	2	-	-	-	-	-	-	-	3	4	11	12	**88****	131	**30**		**74****	154
	70	***1***	-	-	-	-	-	-	***1***	***3***	***5***	***11***	***14***	***90******	***141***	***30****		***75*****	***163***
	80	***1***	-	-	-	-	-	-	***1***	***4***	***9***	***11***	***23***	***90******	***155***	***36****		***76*****	***184***
	90	***1***	-	-	-	-	-	-	***2***	***4***	***12***	***14***	***28***	***92******	***169***	***37****		***78*****	***199***

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLES 6 – 8 (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw) – Air											Table 7 In-water O_2	Table 7 Decom. Time (min)	Table 8 In-water O_2	Table 8 Surface Interval	Table 8 RCC O_2	Table 8 Decom. Time (min)
			42	39	36	33	30	27	24	21	18	15	12	9		9		12	
45	10	2	-	-	-	-	-	-	-	-	-	-	1	12	16	2	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	11	24
	15	2	-	-	-	-	-	-	-	-	-	1	4	21	29	2		20	37
	20	2	-	-	-	-	-	-	-	-	1	3	4	27	38	2		28	48
	25	2	-	-	-	-	-	-	-	-	2	4	4	30*	48	6		32*	63
	30	2	-	-	-	-	-	-	-	1	3	3	4	44*	63	9		46*	81
	35	2	-	-	-	-	-	-	-	2	3	4	6	57*	80	10		58*	98
	40	2	-	-	-	-	-	-	-	2	4	4	8	62**	93	11		62**	111
	45	2	-	-	-	-	-	-	-	3	4	4	11	70**	105	12		70**	124
	50	2	-	-	-	-	-	-	1	3	4	6	11	78**	116	14		76**	135
	55	2	-	-	-	-	-	-	1	3	4	9	11	84**	125	26		74**	148
	60	2	-	-	-	-	-	-	2	3	4	10	13	89**	134	30*		72**	159
	70	*2*	-	-	-	-	-	-	*2*	*4*	*8*	*11*	*19*	90***	*152*	36*		77**	*182*
	80	*2*	-	-	-	-	-	-	*3*	*4*	*11*	*13*	*28*	93***	*170*	37*		79**	*200*
	85	*1*	-	-	-	-	-	*1*	*3*	*6*	*11*	*16*	*29*	94***	*177*	38*		80**	*208*
48	10	2	-	-	-	-	-	-	-	-	-	-	2	14	19	2		13	27
	15	2	-	-	-	-	-	-	-	-	-	2	4	23	32	2		22	40
	20	2	-	-	-	-	-	-	-	-	2	3	4	30	42	3		30	52
	25	2	-	-	-	-	-	-	-	1	3	3	4	34*	53	7		38*	71
	30	2	-	-	-	-	-	-	-	2	3	4	4	51*	72	10		52*	90
	35	2	-	-	-	-	-	-	-	3	3	4	8	60**	91	10		60**	108
	40	2	-	-	-	-	-	-	1	3	4	3	11	68**	103	11		68**	121
	45	2	-	-	-	-	-	-	2	3	4	6	10	77**	115	13		76**	134
	50	2	-	-	-	-	-	-	2	4	3	9	11	84**	126	25		75**	149
	55	2	-	-	-	-	-	-	3	3	4	10	13	89**	135	30		75**	158
	60	*2*	-	-	-	-	-	*1*	*3*	*3*	*7*	*10*	*14*	90***	*146*	30*		78**	*171*
	70	*2*	-	-	-	-	-	*1*	*4*	*3*	*10*	*11*	*26*	93***	*166*	38*		78**	*196*
	80	*2*	-	-	-	-	-	*2*	*4*	*7*	*10*	*18*	*30*	96***	*185*	39*		81**	*216*

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLES 7 – 8 (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw) – Air: 42	39	36	33	30	27	24	21	18	15	12	Table 7 In-water O_2 9	Table 7 Decom. Time (min)	Table 8 In-water O_2 9	Table 8 Surface Interval	Table 8 RCC O_2 12	Table 8 Decom. Time (min)
51	10	3	-	-	-	-	-	-	-	-	-	-	3	16	23	2	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	14	30
	15	2	-	-	-	-	-	-	-	-	1	3	3	25	35	3		23	43
	20	2	-	-	-	-	-	-	-	1	2	4	4	30*	49	4		30*	60
	25	2	-	-	-	-	-	-	-	2	3	4	3	41*	61	9		43*	79
	30	2	-	-	-	-	-	-	1	3	3	4	6	57*	82	10		58*	100
	35	2	-	-	-	-	-	-	2	3	3	4	9	64**	98	11		64**	116
	40	2	-	-	-	-	-	-	2	4	3	6	10	74**	112	13		73**	131
	45	2	-	-	-	-	-	1	2	4	4	7	11	83**	125	23		76**	148
	50	2	-	-	-	-	-	1	3	3	5	9	12	89**	135	30		75**	158
	55	***2***	***-***	***-***	***-***	***-***	***-***	***2***	***3***	***3***	***7***	***9***	***15***	***90****	***147***	***30****		***79****	***173***
	60	***2***	***-***	***-***	***-***	***-***	***-***	***2***	***3***	***4***	***8***	***10***	***21***	***92****	***158***	***37****		***78****	***188***
	65	***2***	***-***	***-***	***-***	***-***	***-***	***3***	***3***	***4***	***10***	***11***	***27***	***94****	***170***	***38****		***79****	***200***
	70	***2***	***-***	***-***	***-***	***-***	***-***	***3***	***3***	***7***	***9***	***15***	***30***	***95****	***180***	***38****		***81****	***211***
	75	***2***	***-***	***-***	***-***	***-***	***1***	***3***	***3***	***8***	***10***	***19***	***33***	***96****	***191***	***38****		***83****	***223***
54	5	3	-	-	-	-	-	-	-	-	-	-	-	5	9	1		7	19
	10	3	-	-	-	-	-	-	-	-	-	1	3	17	25	2		16	33
	15	2	-	-	-	-	-	-	-	-	2	3	4	26	38	2		26	47
	20	2	-	-	-	-	-	-	-	2	3	3	4	30*	50	6		32*	65
	25	2	-	-	-	-	-	-	1	3	3	3	4	48*	70	9		50*	88
	30	2	-	-	-	-	-	-	2	3	3	4	7	60**	92	10		60**	109
	35	2	-	-	-	-	-	1	2	3	4	4	10	70**	107	12		69**	125
	40	2	-	-	-	-	-	1	3	3	4	7	10	80**	121	20		77**	145
	45	2	-	-	-	-	-	2	3	3	4	9	12	88**	134	28		76**	157
	50	2	-	-	-	-	-	3	3	3	6	10	14	90***	147	30*		78**	172
	55	***2***	***-***	***-***	***-***	***-***	***1***	***2***	***3***	***4***	***8***	***10***	***20***	***92****	***158***	***37****		***78****	***188***
	60	***2***	***-***	***-***	***-***	***-***	***1***	***3***	***3***	***5***	***9***	***11***	***26***	***95****	***171***	***38****		***80****	***201***
	65	***2***	***-***	***-***	***-***	***-***	***2***	***3***	***3***	***7***	***9***	***15***	***30***	***97****	***184***	***39****		***81****	***214***
	70	***2***	***-***	***-***	***-***	***-***	***2***	***3***	***3***	***9***	***9***	***21***	***34***	***97****	***196***	***38****		***84****	***228***

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLES 7 – 8 (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw) — Air: 42	39	36	33	30	27	24	21	18	15	12	Table 7 In-water O_2 9	Table 7 Decom. Time (min)	Table 8 In-water O_2 9	Table 8 Surface Interval	Table 8 RCC O_2 12	Table 8 Decom. Time (min)
57	5	3	-	-	-	-	-	-	-	-	-	-	-	6	10	1	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	8	20
	10	3	-	-	-	-	-	-	-	-	-	2	3	19	28	2		17	35
	15	3	-	-	-	-	-	-	-	-	3	3	4	28	42	2		29	52
	20	2	-	-	-	-	-	-	-	3	3	3	4	34*	55	7		37*	72
	25	2	-	-	-	-	-	-	2	3	3	3	6	53*	78	9		55*	96
	30	2	-	-	-	-	-	1	2	3	4	3	9	63**	98	11		63**	116
	35	2	-	-	-	-	-	2	3	3	3	6	10	75**	115	13		74**	134
	40	2	-	-	-	-	-	3	3	3	3	9	11	85**	130	24		78**	154
	45	2	-	-	-	-	1	3	3	3	5	9	14	90***	146	30*		76**	169
	50	2	-	-	-	-	2	2	3	4	7	10	18	92***	156	37*		78**	186
	55	2	-	-	-	-	2	3	3	5	8	11	25	95***	170	39*		79**	200
	60	2	-	-	-	-	3	3	3	7	8	15	30	97***	184	39*		82**	215
	65	2	-	-	-	1	2	3	4	8	9	21	35	97***	198	38*		84**	230
60	5	3	-	-	-	-	-	-	-	-	-	-	-	6	10	1		10	22
	10	3	-	-	-	-	-	-	-	-	-	2	4	20	30	2		18	37
	15	3	-	-	-	-	-	-	-	1	3	3	4	29	44	3		30	55
	20	2	-	-	-	-	-	-	1	3	3	3	4	39*	61	8		42*	79
	25	2	-	-	-	-	-	1	2	3	3	3	7	59*	86	10		60*	104
	30	2	-	-	-	-	-	2	3	2	4	4	10	68**	106	11		69**	125
	35	2	-	-	-	-	1	2	3	3	3	7	11	80**	123	19		79**	148
	40	2	-	-	-	-	2	2	3	3	5	8	13	89**	138	29		77**	162
	45	2	-	-	-	-	2	3	3	3	7	9	16	91***	152	36*		78**	182
	50	2	-	-	-	1	2	3	3	4	8	11	23	95***	168	38*		80**	198
	55	2	-	-	-	1	3	3	3	6	9	12	31	97***	183	39*		82**	214
	60	2	-	-	-	2	2	3	4	8	9	19	36	98***	199	38*		85**	231

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO$_2$ TABLES 7 – 8 (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw) – Air											Table 7 In-water O_2	Table 7 Decom. Time (min)	Table 8 In-water O_2	Table 8 Surface Interval	Table 8 RCC O_2	Table 8 Decom. Time (min)
			42	39	36	33	30	27	24	21	18	15	12	9		9		12	
63	5	3	-	-	-	-	-	-	-	-	-	-	-	**7**	11	**1**	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	**10**	22
	10	3	-	-	-	-	-	-	-	-	1	2	4	**21**	32	**2**		**20**	40
	15	3	-	-	-	-	-	-	-	2	3	3	4	**30***	51	**4**		**30***	62
	20	3	-	-	-	-	-	-	2	3	3	3	4	**45***	69	**9**		**47***	87
	25	2	-	-	-	-	-	2	2	3	3	3	8	**60****	94	**11**		**60****	112
	30	2	-	-	-	-	1	2	3	3	3	5	10	**74****	114	**13**		**72****	132
	35	2	-	-	-	-	2	2	3	3	3	9	11	**85****	131	**24**		**78****	155
	40	2	-	-	-	1	2	3	2	3	6	9	15	**90*****	149	**32***		**80****	178
	45	***2***	-	-	-	***1***	***3***	***2***	***3***	***4***	***8***	***10***	***20***	***94******	***163***	***38****		***79*****	***193***
	50	***2***	-	-	-	***2***	***2***	***3***	***3***	***6***	***8***	***12***	***29***	***97******	***180***	***39****		***82*****	***211***
	55	***2***	-	-	-	***2***	***3***	***3***	***3***	***8***	***9***	***18***	***35***	***98******	***197***	***38****		***85*****	***229***
66	5	4	-	-	-	-	-	-	-	-	-	-	-	**7**	12	**1**		**10**	23
	10	3	-	-	-	-	-	-	-	-	1	3	4	**22**	34	**2**		**21**	42
	15	3	-	-	-	-	-	-	1	2	3	3	4	**30***	52	**5**		**30***	64
	20	3	-	-	-	-	-	1	2	3	3	3	5	**50***	76	**9**		**52***	94
	25	2	-	-	-	-	1	2	3	2	3	4	9	**63****	100	**11**		**64****	119
	30	2	-	-	-	-	2	2	3	3	3	7	10	**78****	121	**17**		**79****	146
	35	2	-	-	-	1	2	3	2	3	5	9	12	**89****	139	**28**		**78****	163
	40	2	-	-	-	2	2	3	3	2	8	9	17	**92*****	156	**36***		**80****	187
	45	***2***	-	-	***1***	***2***	***2***	***3***	***3***	***5***	***8***	***11***	***25***	***96******	***174***	***39****		***81*****	***205***
	50	***2***	-	-	***1***	***2***	***3***	***3***	***3***	***7***	***9***	***15***	***34***	***98******	***193***	***39****		***84*****	***225***
	55	***2***	-	-	***2***	***2***	***3***	***3***	***5***	***7***	***10***	***23***	***39***	***99******	***211***	***38****		***87*****	***244***

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLES 7 – 8 (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw)											Table 7		Table 8			
			Air											In-water	Decom. Time (min)	In-water	Surface Interval	RCC	Decom. Time (min)
			42	39	36	33	30	27	24	21	18	15	12	O_2 9		O_2 9		O_2 12	
69	5	4	-	-	-	-	-	-	-	-	-	-	-	7	12	2	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	15	29
	10	3	-	-	-	-	-	-	-	-	2	3	3	24	36	3		22	44
	15	3	-	-	-	-	-	-	2	2	3	3	3	32*	54	7		32*	68
	20	3	-	-	-	-	-	2	2	3	3	3	6	55*	83	10		56*	101
	25	3	-	-	-	-	2	2	2	3	3	5	9	68**	108	12		68**	127
	30	2	-	-	-	1	2	3	2	3	3	8	11	83**	129	21		79**	153
	35	2	-	-	-	2	2	3	3	2	6	9	14	90***	149	32*		80**	178
	40	2	-	-	1	2	2	3	3	4	8	10	21	95***	167	37*		81**	197
	45	2	-	-	2	2	2	3	3	6	8	13	31	98***	186	39*		83**	217
	50	2	-	-	2	2	3	3	4	8	9	20	38	99***	206	38*		87**	239
72	5	4	-	-	-	-	-	-	-	-	-	-	-	8	13	2		15	29
	10	3	-	-	-	-	-	-	-	1	2	3	4	25	39	2		25	48
	15	3	-	-	-	-	-	1	2	2	3	3	3	35*	58	8		36*	74
	20	3	-	-	-	-	1	2	2	3	3	3	7	59*	89	10		60**	112
	25	3	-	-	-	1	2	2	3	3	2	6	9	73**	115	13		72**	134
	30	3	-	-	-	2	2	2	3	3	4	8	12	87**	137	25		79**	161
	35	2	-	-	1	2	2	3	3	2	8	9	16	91***	155	35*		80**	186
	40	2	-	-	2	2	2	3	3	5	8	11	26	97***	177	38*		83**	208
	45	2	-	1	2	2	3	3	3	7	9	15	37	99***	199	38*		86**	231

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO$_2$ TABLES 7 – 8 (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw) — Air 42	39	36	33	30	27	24	21	18	15	12	Table 7 In-water O_2 9	Table 7 Decom. Time (min)	Table 8 In-water O_2 9	Table 8 Surface Interval	Table 8 RCC O_2 12	Table 8 Decom. Time (min)
75	10	3	-	-	-	-	-	-	-	1	3	3	3	26	40	3	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	25	49
	15	3	-	-	-	-	-	1	2	3	3	3	3	38*	62	8		41*	80
	20	3	-	-	-	-	2	2	2	3	3	3	8	60**	97	11		60**	115
	25	3	-	-	-	2	2	2	3	2	3	7	10	78**	123	17		78**	147
	30	3	-	-	1	2	2	3	3	2	5	9	13	90***	149	30*		80**	176
	35	3	-	-	2	2	2	3	3	4	7	10	20	94***	166	37*		81**	197
	40	2	-	1	2	2	3	3	2	7	8	13	32	98***	189	38*		85**	221
	45	2	-	2	2	2	3	2	5	7	10	20	40	100***	211	38*		88**	244
78	10	4	-	-	-	-	-	-	-	2	2	3	4	27	43	2		28	52
	15	3	-	-	-	-	-	2	2	3	3	2	4	43*	68	9		45*	86
	20	3	-	-	-	1	2	2	2	3	3	3	9	63**	102	11		64**	121
	25	3	-	-	1	2	2	2	3	2	3	8	10	82**	129	19		81**	154
	30	3	-	-	2	2	2	3	2	3	6	9	15	90***	153	32*		81**	183
	35	3	-	1	2	2	2	3	2	6	7	11	24	96***	175	38*		83**	207
	40	2	1	1	2	2	3	2	4	7	8	16	37	99***	200	38*		86**	232
81	10	4	-	-	-	-	-	-	-	2	3	3	3	29	45	3		29	55
	15	3	-	-	-	-	1	2	2	2	4	2	5	47*	74	9		49*	92
	20	3	-	-	-	2	1	3	2	3	2	5	9	67**	108	12		67**	127
	25	3	-	-	2	1	3	2	3	2	4	8	11	86**	136	23		80**	160
	30	3	-	1	2	2	2	3	2	3	7	9	18	92***	160	34*		82**	191
	35	3	1	1	2	2	3	2	3	6	8	12	30	97***	186	38*		84**	218
	40	3	1	2	2	2	3	2	5	7	9	19	41	100***	212	38*		88**	245

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLES 7 – 8 (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw)													Table 7		Table 8			
			Air													In-water	Decom. Time (min)	In-water	Surface Interval	RCC	Decom. Time (min)
			48	45	42	39	36	33	30	27	24	21	18	15	12	O_2 9		O_2 9		O_2 12	
84	10	4	-	-	-	-	-	-	-	-	1	2	3	3	3	30	47	3	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	30	57
	15	3	-	-	-	-	-	-	2	1	3	2	3	3	5	51*	79	10		53*	98
	20	3	-	-	-	-	1	1	2	2	3	2	3	6	9	71**	114	12		71**	133
	25	3	-	-	-	1	2	1	2	3	2	3	5	8	12	89**	142	26		81**	167
	30	3	-	-	1	1	2	2	2	3	2	4	7	10	21	94***	168	36*		83**	200
	35	3	-	-	1	2	2	2	3	2	3	7	8	14	35	98***	196	38*		86**	229
	40	3	-	1	1	2	2	2	3	2	6	7	11	23	43	101***	223	38*		90**	257
87	10	4	-	-	-	-	-	-	-	-	2	2	3	3	3	30*	53	4		30*	64
	15	3	-	-	-	-	-	1	1	2	2	3	3	3	6	55*	85	10		57*	104
	20	3	-	-	-	-	1	2	2	2	3	2	3	6	10	75**	120	16		77**	145
	25	3	-	-	-	2	1	2	2	3	2	3	5	9	14	90***	152	30*		81**	180
	30	3	-	-	1	2	2	2	2	2	3	5	7	11	25	96***	177	37*		84**	209
	35	3	-	1	1	2	2	2	3	2	4	7	9	17	39	99***	207	37*		89**	241
90	10	4	-	-	-	-	-	-	-	-	2	2	3	3	3	30*	53	5		30*	65
	15	4	-	-	-	-	-	1	2	2	2	3	2	3	7	59*	91	10		60*	109
	20	3	-	-	-	1	1	2	2	2	3	2	3	7	10	79**	126	18		79**	151
	25	3	-	-	1	1	2	2	2	3	2	3	6	9	16	90***	156	32*		82**	187
	30	3	-	1	1	2	2	2	2	2	3	6	7	13	29	98***	187	38*		85**	219
	35	3	-	2	1	2	2	2	2	3	5	7	10	21	41	101***	218	38*		90**	252

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLES 7 – 8 (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw)													Table 7		Table 8			
			Air													In-water O_2	Decom. Time (min)	In-water O_2	Surface Interval	RCC O_2	Decom. Time (min)
			48	45	42	39	36	33	30	27	24	21	18	15	12	9		9		12	
93	10	4	-	-	-	-	-	-	-	1	2	2	3	3	3	30*	54	6	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	30*	67
	15	4	-	-	-	-	-	2	1	2	3	3	2	3	8	60**	99	10		60**	116
	20	3	-	-	-	1	2	2	2	2	2	3	3	8	10	83**	132	19		82**	157
	25	3	-	-	2	1	2	2	2	2	2	4	7	9	19	92***	163	34*		83**	195
	30	3	-	1	2	2	1	3	2	2	3	7	8	14	34	99***	197	38*		86**	229
	35	3	1	1	2	2	2	2	2	3	6	7	11	25	43	102***	228	38*		90***	266
96	10	4	-	-	-	-	-	-	-	2	1	3	2	3	4	32*	57	6		33*	71
	15	4	-	-	-	-	1	1	2	2	3	2	3	3	9	61**	102	10		63**	121
	20	3	-	-	1	1	2	2	2	2	2	3	4	7	12	86**	138	22		82**	163
	25	3	-	1	1	2	2	2	2	2	2	5	7	10	21	95***	171	36*		84**	203
	30	3	1	1	2	2	1	3	2	2	4	6	9	17	37	100***	206	38*		88**	239
100	10	4	-	-	-	-	-	-	1	1	2	3	3	2	4	35*	61	7		37*	77
	15	4	-	-	-	-	2	1	2	2	2	3	2	5	9	65**	108	11		67**	128
	20	4	-	-	1	2	1	2	2	3	2	2	6	7	13	90**	146	26		82**	171
	25	3	-	2	1	2	2	2	2	2	2	6	7	11	27	97***	182	37*		85**	214
	30	3	2	1	2	2	2	2	2	2	5	7	10	21	41	101***	219	38*		90**	253

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLE 9 – EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw)												In-water			Recompression Chamber								
			Air												Air		Decom. Time (min)	Surface Interval	O_2	Decom. Time (min)	Surface Interval	Air				Decom. Time (min)
			42	39	36	33	30	27	24	21	18	15	12	9	6	3			12			12	9	6	3	
36	15	2	-	-	-	-	-	-	-	-	-	-	1	4	5	16	28	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	14	29	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	1	4	5	16	40
	20	2	-	-	-	-	-	-	-	-	-	-	3	4	7	20	36		20	37		3	4	7	20	50
	30	2	-	-	-	-	-	-	-	-	-	2	4	6	15	33	62		30*	57		4	6	15	33	79
	40	2	-	-	-	-	-	-	-	-	-	4	4	18	18	61	107		46*	87		4	18	18	61	136
	50	1	-	-	-	-	-	-	-	-	1	4	7	22	26	79	140		60**	113		7	22	26	79	176
	60	1	-	-	-	-	-	-	-	-	2	5	11	24	42	84	169		69**	130		11	24	42	84	211
	70	1	-	-	-	-	-	-	-	-	3	7	13	36	55	84	199		72**	150		13	36	55	84	255
	75	1	-	-	-	-	-	-	-	-	4	8	13	54	59	84	223		72**	170		13	54	59	84	297
	80	***1***	-	-	-	-	-	-	-	-	***4***	***11***	***13***	***60***	***61***	***84***	***234***		72**	***179***		***13***	***60***	***61***	***84***	***314***
	90	***1***	-	-	-	-	-	-	-	***1***	***4***	***13***	***17***	***73***	***65***	***84***	***258***		74**	***201***		***17***	***73***	***65***	***84***	***355***
	100	***1***	-	-	-	-	-	-	-	***2***	***7***	***13***	***23***	***75***	***63***	***86***	***270***		75**	***214***		***23***	***75***	***63***	***86***	***375***
39	10	2	-	-	-	-	-	-	-	-	-	-	-	2	5	9	18		10	22		1	2	5	9	28
	15	2	-	-	-	-	-	-	-	-	-	-	2	4	5	17	30		16	32		2	4	5	17	43
	20	2	-	-	-	-	-	-	-	-	-	1	4	4	9	21	41		23	42		4	4	9	21	56
	30	2	-	-	-	-	-	-	-	-	1	3	4	12	15	42	79		33*	68		4	12	15	42	102
	40	2	-	-	-	-	-	-	-	-	2	4	5	20	20	72	125		54*	100		5	20	20	72	157
	50	2	-	-	-	-	-	-	-	-	3	4	10	22	35	83	159		64**	123		10	22	35	83	198
	60	1	-	-	-	-	-	-	-	1	4	5	13	28	53	85	190		74**	144		13	28	53	85	238
	70	1	-	-	-	-	-	-	-	2	4	10	12	58	61	85	233		73**	178		12	58	61	85	310
	80	***1***	-	-	-	-	-	-	-	***3***	***4***	***13***	***16***	***65***	***64***	***86***	***252***		75**	***195***		***16***	***65***	***64***	***86***	***340***
	90	***1***	-	-	-	-	-	-	-	***3***	***9***	***12***	***24***	***75***	***64***	***87***	***275***		76**	***218***		***24***	***75***	***64***	***87***	***381***
	95	***1***	-	-	-	-	-	-	-	***4***	***10***	***12***	***27***	***77***	***64***	***88***	***283***		77**	***226***		***27***	***77***	***64***	***88***	***394***

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLE 9 – EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw) – Air												In-water			Recompression Chamber								
			42	39	36	33	30	27	24	21	18	15	12	9	Air 6	Air 3	Decom. Time (min)	Surface Interval	O_2 12	Decom. Time (min)	Surface Interval	Air 12	Air 9	Air 6	Air 3	Decom. Time (min)
42	10	2	-	-	-	-	-	-	-	-	-	-	-	4	5	11	22	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	10	24	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	1	4	5	11	34
	15	2	-	-	-	-	-	-	-	-	-	-	3	4	5	19	33		18	35		3	4	5	19	47
	20	2	-	-	-	-	-	-	-	-	-	2	4	4	11	23	46		25	45		4	4	11	23	61
	30	2	-	-	-	-	-	-	-	-	2	4	4	14	16	52	94		40*	79		4	14	16	52	119
	40	2	-	-	-	-	-	-	-	1	3	4	7	20	26	79	142		60**	115		7	20	26	79	176
	50	2	-	-	-	-	-	-	-	2	4	4	11	24	45	85	177		71**	136		11	24	45	85	219
	60	2	-	-	-	-	-	-	-	3	4	8	12	52	60	85	226		73**	172		12	52	60	85	297
	65	2	-	-	-	-	-	-	-	3	4	11	12	60	63	86	241		74**	184		12	60	63	86	320
	70	***1***	-	-	-	-	-	-	***1***	***3***	***5***	***11***	***14***	***65***	***65***	***86***	***251***		***75*****	***193***		***14***	***65***	***65***	***86***	***337***
	80	***1***	-	-	-	-	-	-	***1***	***4***	***9***	***11***	***23***	***77***	***64***	***88***	***278***		***76*****	***220***		***23***	***77***	***64***	***88***	***385***
	90	***1***	-	-	-	-	-	-	***2***	***4***	***12***	***14***	***28***	***79***	***64***	***90***	***294***		***78*****	***236***		***28***	***79***	***64***	***90***	***408***
45	10	2	-	-	-	-	-	-	-	-	-	-	1	4	6	12	25		11	26		1	4	6	12	37
	15	2	-	-	-	-	-	-	-	-	-	1	4	4	6	20	37		20	39		4	4	6	20	52
	20	2	-	-	-	-	-	-	-	-	1	3	4	4	13	26	53		28	50		4	4	13	26	68
	25	2	-	-	-	-	-	-	-	-	2	4	4	12	15	43	82		32*	69		4	12	15	43	105
	30	2	-	-	-	-	-	-	-	1	3	3	4	18	18	62	111		46*	90		4	18	18	62	140
	35	2	-	-	-	-	-	-	-	2	3	4	6	20	23	76	136		58*	108		6	20	23	76	169
	40	2	-	-	-	-	-	-	-	2	4	4	8	22	32	83	157		62**	122		8	22	32	83	194
	45	2	-	-	-	-	-	-	-	3	4	4	11	24	44	85	177		70**	136		11	24	44	85	219
	50	2	-	-	-	-	-	-	1	3	4	6	11	28	54	86	195		76**	149		11	28	54	86	241
	55	2	-	-	-	-	-	-	1	3	4	9	11	52	61	86	229		74**	174		11	52	61	86	299
	60	2	-	-	-	-	-	-	2	3	4	10	13	65	64	86	249		72**	189		13	65	64	86	334
	70	***2***	-	-	-	-	-	-	***2***	***4***	***8***	***11***	***19***	***77***	***65***	***88***	***276***		***77*****	***218***		***19***	***77***	***65***	***88***	***379***
	80	***2***	-	-	-	-	-	-	***3***	***4***	***11***	***13***	***28***	***79***	***64***	***91***	***295***		***79*****	***237***		***28***	***79***	***64***	***91***	***409***
	85	***1***	-	-	-	-	-	***1***	***3***	***6***	***11***	***16***	***29***	***81***	***65***	***93***	***306***		***80*****	***246***		***29***	***81***	***65***	***93***	***423***

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLE 9 – EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw) — Air												In-water			Recompression Chamber								
			42	39	36	33	30	27	24	21	18	15	12	9	Air 6	Air 3	Decom. Time (min)	Surface Interval	O_2 12	Decom. Time (min)	Surface Interval	Air 12	Air 9	Air 6	Air 3	Decom. Time (min)
48	10	2	-	-	-	-	-	-	-	-	-	-	2	4	5	14	27	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	13	29	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	2	4	5	14	40
	15	2	-	-	-	-	-	-	-	-	-	2	4	4	8	21	41		22	42		4	4	8	21	56
	20	2	-	-	-	-	-	-	-	-	2	3	4	6	14	30	61		30	55		4	6	14	30	78
	25	2	-	-	-	-	-	-	-	1	3	3	4	14	16	51	94		38*	78		4	14	16	51	119
	30	2	-	-	-	-	-	-	-	2	3	4	4	20	19	71	125		52*	100		4	20	19	71	156
	35	2	-	-	-	-	-	-	-	3	3	4	8	20	28	81	149		60**	118		8	20	28	81	184
	40	2	-	-	-	-	-	-	1	3	4	3	11	22	41	85	172		68**	132		11	22	41	85	212
	45	2	-	-	-	-	-	-	2	3	4	6	10	26	53	86	192		76**	147		10	26	53	86	235
	50	2	-	-	-	-	-	-	2	4	3	9	11	50	61	86	228		75**	174		11	50	61	86	296
	55	2	-	-	-	-	-	-	3	3	4	10	13	60	64	87	246		75**	188		13	60	64	87	326
	60	2	-	-	-	-	-	1	3	3	7	10	14	65	65	88	258		78**	201		14	65	65	88	344
	70	2	-	-	-	-	-	1	4	3	10	11	26	81	65	91	294		78**	234		26	81	65	91	408
	80	2	-	-	-	-	-	2	4	7	10	18	30	83	66	94	316		81**	255		30	83	66	94	436
51	10	3	-	-	-	-	-	-	-	-	-	-	3	4	5	15	30		14	32		3	4	5	15	44
	15	2	-	-	-	-	-	-	-	-	1	3	3	6	10	22	47		23	46		3	6	10	22	63
	20	2	-	-	-	-	-	-	-	1	2	4	4	8	14	37	72		30*	64		4	8	14	37	91
	25	2	-	-	-	-	-	-	-	2	3	4	3	18	17	60	109		43*	88		3	18	17	60	137
	30	2	-	-	-	-	-	-	1	3	3	4	6	20	24	77	140		58*	110		6	20	24	77	173
	35	2	-	-	-	-	-	-	2	3	3	4	9	22	36	84	165		64**	127		9	22	36	84	203
	40	2	-	-	-	-	-	-	2	4	3	6	10	26	50	86	189		73**	144		10	26	50	86	232
	45	2	-	-	-	-	-	1	2	4	4	7	11	46	59	87	223		76**	171		11	46	59	87	287
	50	2	-	-	-	-	-	1	3	3	5	9	12	60	64	88	247		75**	188		12	60	64	88	326
	55	2	-	-	-	-	-	2	3	3	7	9	15	65	65	89	260		79**	203		15	65	65	89	347
	60	2	-	-	-	-	-	2	3	4	8	10	21	79	65	90	284		78**	225		21	79	65	90	391
	65	2	-	-	-	-	-	3	3	4	10	11	27	81	65	93	299		79**	238		27	81	65	93	414
	70	2	-	-	-	-	-	3	3	7	9	15	30	81	65	95	310		81**	249		30	81	65	95	428
	75	2	-	-	-	-	1	3	3	8	10	19	33	81	66	97	323		83**	261		33	81	66	97	444

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO$_2$TABLE 9 – EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw)												In-water			Recompression Chamber								
			Air												Air		Decom. Time (min)	Surface Interval	O_2	Decom. Time (min)	Surface Interval	Air				Decom. Time (min)
			42	39	36	33	30	27	24	21	18	15	12	9	6	3			12			12	9	6	3	
54	5	3	-	-	-	-	-	-	-	-	-	-	-	1	3	7	14	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	7	19	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	1	1	3	7	23
	10	3	-	-	-	-	-	-	-	-	-	1	3	4	5	17	33		16	35		3	4	5	17	47
	15	2	-	-	-	-	-	-	-	-	2	3	4	4	11	24	50		26	49		4	4	11	24	65
	20	2	-	-	-	-	-	-	-	2	3	3	4	12	14	45	85		32*	71		4	12	14	45	108
	25	2	-	-	-	-	-	-	1	3	3	3	4	18	19	68	121		50*	97		4	18	19	68	150
	30	2	-	-	-	-	-	-	2	3	3	4	7	20	29	82	152		60**	119		7	20	29	82	186
	35	2	-	-	-	-	-	1	2	3	4	4	10	24	45	85	180		69**	137		10	24	45	85	221
	40	2	-	-	-	-	-	1	3	3	4	7	10	40	57	86	213		77**	165		10	40	57	86	270
	45	2	-	-	-	-	-	2	3	3	4	9	12	56	63	88	242		76**	185		12	56	63	88	317
	50	2	-	-	-	-	-	3	3	3	6	10	14	65	65	89	260		78**	202		14	65	65	89	346
	55	***2***	-	-	-	-	***1***	***2***	***3***	***4***	***8***	***10***	***20***	***79***	***65***	***91***	***285***		***78******	***225***		***20***	***79***	***65***	***91***	***391***
	60	***2***	-	-	-	-	***1***	***3***	***3***	***5***	***9***	***11***	***26***	***81***	***65***	***93***	***299***		***80******	***239***		***26***	***81***	***65***	***93***	***413***
	65	***2***	-	-	-	-	***2***	***3***	***3***	***7***	***9***	***15***	***30***	***83***	***66***	***96***	***316***		***81******	***253***		***30***	***83***	***66***	***96***	***436***
	70	***2***	-	-	-	-	***2***	***3***	***3***	***9***	***9***	***21***	***34***	***81***	***67***	***98***	***329***		***84******	***266***		***34***	***81***	***67***	***98***	***451***
57	5	3	-	-	-	-	-	-	-	-	-	-	-	1	4	8	16	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	8	20	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	1	1	4	8	25
	10	3	-	-	-	-	-	-	-	-	-	2	3	4	4	18	34		17	37		3	4	4	18	48
	15	3	-	-	-	-	-	-	-	-	3	3	4	4	12	27	56		29	54		4	4	12	27	71
	20	2	-	-	-	-	-	-	-	3	3	3	4	14	16	51	96		37*	79		4	14	16	51	121
	25	2	-	-	-	-	-	-	2	3	3	3	6	18	22	74	133		55*	105		6	18	22	74	164
	30	2	-	-	-	-	-	1	2	3	4	3	9	22	36	84	166		63**	127		9	22	36	84	204
	35	2	-	-	-	-	-	2	3	3	3	6	10	26	52	86	193		74**	147		10	26	52	86	236
	40	2	-	-	-	-	-	3	3	3	3	9	11	48	61	88	231		78**	178		11	48	61	88	297
	45	2	-	-	-	-	1	3	3	3	5	9	14	65	65	89	259		76**	199		14	65	65	89	345
	50	***2***	-	-	-	-	***2***	***2***	***3***	***4***	***7***	***10***	***18***	***79***	***65***	***91***	***283***		***78******	***223***		***18***	***79***	***65***	***91***	***387***
	55	***2***	-	-	-	-	***2***	***3***	***3***	***5***	***8***	***11***	***25***	***83***	***66***	***93***	***301***		***79******	***239***		***25***	***83***	***66***	***93***	***416***
	60	***2***	-	-	-	-	***3***	***3***	***3***	***7***	***8***	***15***	***30***	***83***	***66***	***96***	***316***		***82******	***254***		***30***	***83***	***66***	***96***	***436***
	65	***2***	-	-	-	***1***	***2***	***3***	***4***	***8***	***9***	***21***	***35***	***81***	***67***	***99***	***332***		***84******	***268***		***35***	***81***	***67***	***99***	***455***

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLE 9 – EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw)												In-water			Recompression Chamber								
			Air												Air		Decom. Time (min)	Surface Interval	O_2	Decom. Time (min)	Surface Interval	Air				Decom. Time (min)
			42	39	36	33	30	27	24	21	18	15	12	9	6	3			12			12	9	6	3	
60	5	3	-	-	-	-	-	-	-	-	-	-	-	2	4	8	17	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	10	23	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	1	2	4	8	27
	10	3	-	-	-	-	-	-	-	-	-	2	4	4	4	19	36		18	39		4	4	4	19	51
	15	3	-	-	-	-	-	-	-	1	3	3	4	6	13	31	64		30	58		4	6	13	31	81
	20	2	-	-	-	-	-	-	1	3	3	3	4	16	16	59	107		42*	87		4	16	16	59	134
	25	2	-	-	-	-	-	1	2	3	3	3	7	20	26	79	146		60*	114		7	20	26	79	180
	30	2	-	-	-	-	-	2	3	2	4	4	10	22	43	86	178		69**	136		10	22	43	86	217
	35	2	-	-	-	-	1	2	3	3	3	7	11	38	58	87	215		79**	167		11	38	58	87	271
	40	2	-	-	-	-	2	2	3	3	5	8	13	58	64	89	249		77**	191		13	58	64	89	327
	45	2	-	-	-	-	2	3	3	3	7	9	16	77	65	91	278		78**	218		16	77	65	91	378
	50	***2***	-	-	-	***1***	***2***	***3***	***3***	***4***	***8***	***11***	***23***	***81***	***66***	***94***	***298***		***80*****	***236***		***23***	***81***	***66***	***94***	***409***
	55	***2***	-	-	-	***1***	***3***	***3***	***3***	***6***	***9***	***12***	***31***	***83***	***66***	***97***	***316***		***82*****	***253***		***31***	***83***	***66***	***97***	***437***
	60	***2***	-	-	-	***2***	***2***	***3***	***4***	***8***	***9***	***19***	***36***	***81***	***67***	***100***	***333***		***85*****	***269***		***36***	***81***	***67***	***100***	***457***
63	5	3	-	-	-	-	-	-	-	-	-	-	-	2	5	8	18		10	23		1	2	5	8	28
	10	3	-	-	-	-	-	-	-	-	1	2	4	4	6	20	40		20	42		4	4	6	20	55
	15	3	-	-	-	-	-	-	-	2	3	3	4	8	14	35	72		30*	66		4	8	14	35	91
	20	3	-	-	-	-	-	-	2	3	3	3	4	18	18	65	119		47*	96		4	18	18	65	148
	25	2	-	-	-	-	-	2	2	3	3	3	8	22	31	82	158		60**	123		8	22	31	82	195
	30	2	-	-	-	-	1	2	3	3	3	5	10	26	50	86	191		72**	145		10	26	50	86	234
	35	2	-	-	-	-	2	2	3	3	3	9	11	48	62	88	233		78**	179		11	48	62	88	299
	40	2	-	-	-	1	2	3	2	3	6	9	15	69	65	90	267		80**	210		15	69	65	90	358
	45	***2***	-	-	-	***1***	***3***	***2***	***3***	***4***	***8***	***10***	***20***	***81***	***66***	***93***	***293***		***79*****	***231***		***20***	***81***	***66***	***93***	***401***
	50	***2***	-	-	-	***2***	***2***	***3***	***3***	***6***	***8***	***12***	***29***	***83***	***66***	***97***	***313***		***82*****	***250***		***29***	***83***	***66***	***97***	***432***
	55	***2***	-	-	-	***2***	***3***	***3***	***3***	***8***	***9***	***18***	***35***	***81***	***67***	***100***	***331***		***85*****	***267***		***35***	***81***	***67***	***100***	***454***

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLE 9 – EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw)												In-water			Recompression Chamber								
			Air												Air		Decom. Time (min)	Surface Interval	O_2	Decom. Time (min)	Surface Interval	Air				Decom. Time (min)
			42	39	36	33	30	27	24	21	18	15	12	9	6	3			12			12	9	6	3	
66	5	4	-	-	-	-	-	-	-	-	-	-	-	2	5	8	19	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	10	24	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	1	2	5	8	29
	10	3	-	-	-	-	-	-	-	-	1	3	4	4	8	20	43		21	44		4	4	8	20	58
	15	3	-	-	-	-	-	-	1	2	3	3	4	10	15	41	82		30*	69		4	10	15	41	103
	20	3	-	-	-	-	-	1	2	3	3	3	5	18	21	71	130		52*	103		5	18	21	71	160
	25	2	-	-	-	-	1	2	3	2	3	4	9	22	38	84	170		64**	130		9	22	38	84	208
	30	2	-	-	-	-	2	2	3	3	3	7	10	34	55	88	209		79**	163		10	34	55	88	260
	35	2	-	-	-	1	2	3	2	3	5	9	12	56	64	89	248		78**	191		12	56	64	89	323
	40	2	-	-	-	2	2	3	3	2	8	9	17	77	66	92	283		80**	223		17	77	66	92	384
	45	***2***	***-***	***-***	***1***	***2***	***2***	***3***	***3***	***5***	***8***	***11***	***25***	***83***	***67***	***96***	***308***		***81*****	***244***		***25***	***83***	***67***	***96***	***423***
	50	***2***	***-***	***-***	***1***	***2***	***3***	***3***	***3***	***7***	***9***	***15***	***34***	***83***	***67***	***100***	***329***		***84*****	***264***		***34***	***83***	***67***	***100***	***453***
	55	***2***	***-***	***-***	***2***	***2***	***3***	***3***	***5***	***7***	***10***	***23***	***39***	***81***	***69***	***104***	***350***		***87*****	***282***		***39***	***81***	***69***	***104***	***477***
69	5	4	-	-	-	-	-	-	-	-	-	-	-	4	5	12	25		15	31		2	4	5	12	38
	10	3	-	-	-	-	-	-	-	-	2	3	3	6	9	21	47		22	47		3	6	9	21	63
	15	3	-	-	-	-	-	-	2	2	3	3	3	14	15	47	92		32*	75		3	14	15	47	116
	20	3	-	-	-	-	-	2	2	3	3	3	6	20	24	76	142		56*	111		6	20	24	76	175
	25	3	-	-	-	-	2	2	2	3	3	5	9	24	44	86	183		68**	139		9	24	44	86	223
	30	2	-	-	-	1	2	3	2	3	3	8	11	42	60	88	225		79**	174		11	42	60	88	285
	35	2	-	-	-	2	2	3	3	2	6	9	14	69	65	91	268		80**	210		14	69	65	91	358
	40	***2***	***-***	***-***	***1***	***2***	***2***	***3***	***3***	***4***	***8***	***10***	***21***	***79***	***66***	***95***	***296***		***81*****	***234***		***21***	***79***	***66***	***95***	***403***
	45	***2***	***-***	***-***	***2***	***2***	***2***	***3***	***3***	***6***	***8***	***13***	***31***	***83***	***67***	***98***	***320***		***83*****	***256***		***31***	***83***	***67***	***98***	***441***
	50	***2***	***-***	***-***	***2***	***2***	***3***	***3***	***4***	***8***	***9***	***20***	***38***	***81***	***69***	***103***	***344***		***87*****	***277***		***38***	***81***	***69***	***103***	***470***

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLE 9 – EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw) — Air												In-water			Recompression Chamber								
			42	39	36	33	30	27	24	21	18	15	12	9	Air 6	Air 3	Decom. Time (min)	Surface Interval	O_2 12	Decom. Time (min)	Surface Interval	Air 12	Air 9	Air 6	Air 3	Decom. Time (min)
72	5	4	-	-	-	-	-	-	-	-	-	-	-	4	5	16	29	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	15	31	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	2	4	5	16	42
	10	3	-	-	-	-	-	-	-	1	2	3	4	4	10	23	50		25	50		4	4	10	23	65
	15	3	-	-	-	-	-	1	2	2	3	3	3	16	15	53	101		36*	82		3	16	15	53	127
	20	3	-	-	-	-	1	2	2	3	3	3	7	20	28	80	152		60**	122		7	20	28	80	186
	25	3	-	-	-	1	2	2	3	3	2	6	9	26	50	86	193		72**	147		9	26	50	86	235
	30	3	-	-	-	2	2	2	3	3	4	8	12	50	62	90	241		79**	186		12	50	62	90	310
	35	2	-	-	1	2	2	3	3	2	8	9	16	75	65	93	281		80**	221		16	75	65	93	379
	40	***2***	***-***	***-***	***2***	***2***	***2***	***3***	***3***	***5***	***8***	***11***	***26***	***81***	***66***	***97***	***308***		***83*****	***246***		***26***	***81***	***66***	***97***	***422***
	45	***2***	***-***	***1***	***2***	***2***	***3***	***3***	***3***	***7***	***9***	***15***	***37***	***81***	***68***	***102***	***335***		***86*****	***269***		***37***	***81***	***68***	***102***	***460***
75	10	3	-	-	-	-	-	-	-	1	3	3	3	6	11	24	54		25	52		3	6	11	24	70
	15	3	-	-	-	-	-	1	2	3	3	3	3	16	17	59	110		41*	88		3	16	17	59	136
	20	3	-	-	-	-	2	2	2	3	3	3	8	22	33	82	163		60**	126		8	22	33	82	200
	25	3	-	-	-	2	2	2	3	2	3	7	10	34	55	88	211		78**	164		10	34	55	88	262
	30	3	-	-	1	2	2	3	3	2	5	9	13	65	65	91	264		80**	206		13	65	65	91	349
	35	3	-	-	2	2	2	3	3	4	7	10	20	79	66	95	296		81**	234		20	79	66	95	402
	40	***2***	***-***	***1***	***2***	***2***	***3***	***3***	***2***	***7***	***8***	***13***	***32***	***81***	***68***	***100***	***324***		***85*****	***259***		***32***	***81***	***68***	***100***	***444***
	45	***2***	***-***	***2***	***2***	***2***	***3***	***2***	***5***	***7***	***10***	***20***	***40***	***81***	***69***	***104***	***349***		***88*****	***282***		***40***	***81***	***69***	***104***	***477***
78	10	4	-	-	-	-	-	-	-	2	2	3	4	4	12	26	57		28	55		4	4	12	26	72
	15	3	-	-	-	-	-	2	2	3	3	2	4	18	19	64	120		45*	95		4	18	19	64	149
	20	3	-	-	-	1	2	2	2	3	3	3	9	22	38	84	172		64**	132		9	22	38	84	210
	25	3	-	-	1	2	2	2	3	2	3	8	10	38	59	88	221		81**	173		10	38	59	88	276
	30	3	-	-	2	2	2	3	2	3	6	9	15	69	65	92	273		81**	215		15	69	65	92	364
	35	***3***	***-***	***1***	***2***	***2***	***2***	***3***	***2***	***6***	***7***	***11***	***24***	***81***	***67***	***97***	***308***		***83*****	***245***		***24***	***81***	***67***	***97***	***420***
	40	***2***	***1***	***1***	***2***	***2***	***3***	***2***	***4***	***7***	***8***	***16***	***37***	***81***	***68***	***103***	***337***		***86*****	***270***		***37***	***81***	***68***	***103***	***462***

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO$_2$TABLE 9 – EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw)														In-Water			Recompression Chamber								
			Air														Air		Decom. Time (min)	Surface Interval	O_2	Decom. Time (min)	Surface Interval	Air				Decom. Time (min)
			48	45	42	39	36	33	30	27	24	21	18	15	12	9	6	3			12			12	9	6	3	
81	10	4	-	-	-	-	-	-	-	-	-	2	3	3	3	6	12	29	62	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	29	58	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	3	6	12	29	78
	15	3	-	-	-	-	-	-	1	2	2	2	4	2	5	18	20	69	128		49*	101		5	18	20	69	158
	20	3	-	-	-	-	-	2	1	3	2	3	2	5	9	24	43	86	183		67**	139		9	24	43	86	223
	25	3	-	-	-	-	2	1	3	2	3	2	4	8	11	46	62	90	237		80**	183		11	46	62	90	301
	30	3	-	-	-	1	2	2	2	3	2	3	7	9	18	73	66	94	285		82**	225		18	73	66	94	383
	35	3	-	-	1	1	2	2	3	2	3	6	8	12	30	81	68	99	321		84**	256		30	81	68	99	439
	40	3	-	-	1	2	2	2	3	2	5	7	9	19	41	81	70	105	352		88**	283		41	81	70	105	481
84	10	4	-	-	-	-	-	-	-	-	1	2	3	3	3	6	13	32	67		30	60		3	6	13	32	83
	15	3	-	-	-	-	-	-	2	1	3	2	3	3	5	20	23	73	138		53*	108		5	20	23	73	170
	20	3	-	-	-	-	1	1	2	2	3	2	3	6	9	24	48	87	191		71**	145		9	24	48	87	231
	25	3	-	-	-	1	2	1	2	3	2	3	5	8	12	52	63	91	248		81**	193		12	52	63	91	319
	30	3	-	-	1	1	2	2	2	3	2	4	7	10	21	77	67	96	298		83**	236		21	77	67	96	403
	35	3	-	-	1	2	2	2	3	2	3	7	8	14	35	81	68	102	333		86**	267		35	81	68	102	456
	40	3	-	1	1	2	2	2	3	2	6	7	11	23	43	81	71	108	366		90**	295		43	81	71	108	497
87	10	4	-	-	-	-	-	-	-	-	2	2	3	3	3	8	14	35	74		30*	68		3	8	14	35	92
	15	3	-	-	-	-	-	1	1	2	2	3	3	3	6	20	25	77	146		57*	114		6	20	25	77	179
	20	3	-	-	-	-	1	2	2	2	3	2	3	6	10	32	53	87	206		77**	161		10	32	53	87	255
	25	3	-	-	-	2	1	2	2	3	2	3	5	9	14	65	65	92	268		81**	210		14	65	65	92	354
	30	3	-	-	1	2	2	2	2	2	3	5	7	11	25	79	67	98	309		84**	246		25	79	67	98	420
	35	3	-	1	1	2	2	2	3	2	4	7	9	17	39	79	70	104	345		89**	278		39	79	70	104	470
90	10	4	-	-	-	-	-	-	-	-	2	2	3	3	3	10	14	38	79		30*	70		3	10	14	38	99
	15	4	-	-	-	-	-	1	2	2	2	3	2	3	7	20	29	79	154		60*	119		7	20	29	79	188
	20	3	-	-	-	1	1	2	2	2	3	2	3	7	10	36	57	88	217		79**	169		10	36	57	88	270
	25	3	-	-	1	1	2	2	2	3	2	3	6	9	16	69	65	94	278		82**	219		16	69	65	94	370
	30	3	-	1	1	2	2	2	2	2	3	6	7	13	29	81	68	100	322		85**	257		29	81	68	100	439
	35	3	-	2	1	2	2	2	2	3	5	7	10	21	41	81	71	107	360		90**	290		41	81	71	107	489

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

CF HEO_2 TABLE 9 – EMERGENCY DECOMPRESSION (METRES)

Depth (msw)	Bottom Time (min)	Max Time to First Stop (min)	In-water Stop Times (min) at Different Depths (msw) – Air: 48	45	42	39	36	33	30	27	24	21	18	15	12	9	In-Water – Air: 6	3	In-Water Decom. Time (min)	Recompression Chamber – Surface Interval	O_2 12	Decom. Time (min)	Surface Interval	Air: 12	9	6	3	Decom. Time (min)
93	10	4	-	-	-	-	-	-	-	1	2	2	3	3	3	12	15	42	87	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	30*	73	Time from leaving the 9 msw in-water stop to reaching the12 msw chamber stop must not exceed 7 minute	3	12	15	42	109
	15	4	-	-	-	-	-	2	1	2	3	3	2	3	8	20	32	82	162		60**	126		8	20	32	82	197
	20	3	-	-	-	1	2	2	2	2	2	3	3	8	10	38	59	90	225		82**	176		10	38	59	90	280
	25	3	-	-	2	1	2	2	2	2	2	4	7	9	19	73	66	96	290		83**	229		19	73	66	96	389
	30	3	-	1	2	2	1	3	2	2	3	7	8	14	34	81	69	103	335		86**	267		34	81	69	103	457
	35	3	1	1	2	2	2	2	2	3	6	7	11	25	43	81	72	110	373		90***	304		43	81	72	110	504
96	10	4	-	-	-	-	-	-	-	2	1	3	2	3	4	12	15	47	93		33*	77		4	12	15	47	116
	15	4	-	-	-	-	1	1	2	2	3	2	3	3	9	20	36	84	170		63**	131		9	20	36	84	206
	20	3	-	-	1	1	2	2	2	2	2	3	4	7	12	44	62	91	238		82**	185		12	44	62	91	301
	25	3	-	1	1	2	2	2	2	2	2	5	7	10	21	77	67	97	301		84**	239		21	77	67	97	406
	30	3	1	1	2	2	1	3	2	2	4	6	9	17	37	81	70	105	346		88**	277		37	81	70	105	471
100	10	4	-	-	-	-	-	-	1	1	2	3	3	2	4	14	16	53	103		37*	84		4	14	16	53	128
	15	4	-	-	-	-	2	1	2	2	2	3	2	5	9	22	41	86	181		67**	139		9	22	41	86	219
	20	4	-	-	1	2	1	2	2	3	2	2	6	7	13	52	64	92	253		82**	197		13	52	64	92	325
	25	3	-	2	1	2	2	2	2	2	2	6	7	11	27	79	68	100	316		85**	251		27	79	68	100	429
	30	3	2	1	2	2	2	2	2	2	5	7	10	21	41	81	72	108	363		90**	291		41	81	72	108	492

Note: 1. Stop times include travel time from the previous stop except when a gas switch occurs. 2. Asterisk (*) indicates number of 5-minute air breaks required.

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CHAPTER 4
SURFACE SUPPLIED
DIVING EQUIPMENT

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CHAPTER 4
SURFACE-SUPPLIED
DIVING EQUIPMENT

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CHAPTER 4
SURFACE SUPPLIED DIVING EQUIPMENT

SECTION 1

GENERAL

4101 Introduction

1. In this chapter, the operating principles and planned maintenance of the components of the SSBA diving system are described. These include:

a. Breathing apparatus (helmet or mask), including normal and emergency breathing gas supply and exhaust arrangements;

b. Diving suits and miscellaneous accessories, including weights, harness, boots and underwater lights;

c. Underwater communication equipment; and

d. Support equipment, including umbilicals, hot water heater, diving stage, winch and handling arrangements.

2. Details of maintenance and repairs are covered in Canadian Forces Technical Orders (CFTO).

3. CFTOs are listed in Annex A, Chapter 4, Orders and References Pertaining to Diving.

4102 – 4199 Not Allocated

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SECTION 2

BREATHING APPARATUS

4201 SSBA Helmet Superlite 17B (SL17-B)

1. The Superlite helmet fits directly over the diver's head. (See Figure 4-2-1.) It moves with the diver's head and so handles very much like a diving mask. There are two primary advantages to this helmet compared to a mask:

   a. The diver's entire head is dry. The dry environment surrounding the diver's head eliminates the need to have a water-tight seal on the face. This provides more comfort to the diver. Communications are dramatically improved between diver and surface personnel; and

   b. It is very unlikely that the helmet could be accidentally pulled from the diver's head, even if the diver were unconscious.

2. The helmet shell is constructed of woven fibreglass and polyester resin. This material is very strong, is resistant to cracking, and will not carry an electrical charge, thereby protecting the diver from mechanical injury and electric shock.

4202 Helmet Weights

1. The dry environment in the helmet causes buoyancy, which must be neutralized by the addition of weights on the helmet. Four brass weights are bolted externally to the sides and front of the helmet. In addition, the carrying handle also serves as a weight. The handle can be used to mount a helmet light if required.

CAUTION

An incorrectly balanced helmet may cause poor alignment of the oral-nasal to the diver's face, leading to CO2 build-up. In addition, lengthy tasks performed in an unbalanced helmet will cause the diver considerable discomfort and neck strain.

4203 Helmet Interior

1. The interior of the helmet is lined with an open-celled polyester foam inside a nylon liner, which comfortably surrounds the diver's head and upper neck, with the exception of the face and ears. This firmly attaches the helmet to the divers head. Any movement of the diver's head results in an identical movement of the helmet.

2. The helmet liner does not change shape or compress with depth. It is available with different thicknesses of foam for different head sizes; however, the regular size liner will fit most head sizes. Some adjustment is possible by thinning or adding foam material to the helmet inside of the liner. Each diver should obtain an individually fitted and adjusted liner.

3. The liner is attached to the helmet with snap fasteners and can be removed quickly without tools. This provides a clean interior in the Superlite helmet, which makes the communications and other components accessible for maintenance.

4. A nose block device allows the diver to block their nose to provide an overpressure in the sinuses and middle ears for equalization. Individual rubber nose pads may be added to the block device to best suit each diver. Due to increased concerns about hygiene, divers should retain a personalized nose clearing device.

5. The port retainer is easily removable for rapid replacement of the face port. An O-ring provides the watertight seal.

4204 Welding Faceplate

1. During underwater welding, a welding faceplate is fitted over the helmet faceplate. This welding faceplate has a metal frame with interchangeable lenses, which are supplied in two densities: designated as No.6 and No.8. The selection of lens is determined primarily by the degree of turbidity of the water. Relatively clear water will require the use of the darker No. 8 lens. See Article 4310.

4205 Helmet Breathing System

1. The breathing gas flows through the gas supply hose, to the main gas inlet port on the non-return valve on the side valve block of the helmet. The side block is in effect a manifold that receives breathing gas from the main gas supply or emergency cylinder then directs the flow to the demand regulator or through the steady flow valve to the interior of the helmet.

2. The flow continues through the adapter and one-way valve into the side block. A passage in the side block is always open to supply the regulator assembly whenever the gas supply hose is pressurized. The steady flow valve (located on side block) supplies breathing gas in the interior face port of the helmet and can (via the check valve in the oral-nasal) supply breathing gas in the event that the demand regulator should malfunction.

3. The demand regulator has an adjustment knob, which allows the diver to control the regulator setting for a wide range of gas supply pressures. It is important for the diver to adjust the regulator setting for the least breathing resistance. An oral-nasal mask is fitted to reduce dead air space, reducing the possibility of CO2 build-up. Regulated breathing gas is directed into this oral nasal region.

4. It is extremely important that the mushroom valve in the oral-nasal mask be properly fitted to allow gas supply from the steady flow valve to enter the oral-nasal mask.

5. Another inlet to the side block is fitted with an emergency valve, which leads from the diver's emergency gas cylinder. The gas flow from the emergency valve enters the side block and follows the same routes as the main gas supply.

6. It is also extremely important that the non-return valve should function properly. If the main gas supply fails and the non-return valve does not seat, the emergency gas supply will be lost.

7. The main and emergency gas supplies are provided to the diver at an over bottom pressure. See Figure 5-2-5, Depth for Superlite Helmet / LWSSDE vs. Gas Supply Pressure.

4206 Regulator Adjustment

1. Improper regulator internal adjustment can cause both excessively high inhalation effort and at the same time produce an inadequate gas supply.

2. Should the purge button have 6mm of free travel rather than the 3mm maximum, the lever will have insufficient leverage to operate the inlet valve properly and the diver could starve for air. If this condition exists, it is necessary for only qualified personnel to remove the regulator cover and adjust the lever.

4207 Emergency Gas

1. The diver's emergency cylinder (with a rated capacity of no less than 2550 litres) is filled with compressed air or HeO2 and mounted on the diver's back on the diving vest. The first stage of a regulator, with an intermediate pressure hose leading to the emergency valve located on the side block body.

2. The emergency cylinder valve is opened prior to a dive, to pressurize the first stage regulator and the low-pressure hose. In the case of loss of the main air supply, the helmet emergency supply valve is opened, supplying emergency gas to the side block body.

4208 Oral-Nasal

1. Different sizes of oral-nasal masks are available to ensure a tight, leak-free seal on the diver's face.

2. Each individual diver must ensure that the utilization of a proper fitting oral-nasal mask and helmet packing material that provides the required fit.

WARNING

Proper fit and alignment of the oral-nasal is essential, as a poor fit will allow leakage of exhaled gas and poor helmet alignment will defeat a well-fitted oral-nasal. Both may lead to CO2 build-up.

4209 Neck Clamp, Yoke and Dam

1. Neck dams are made of various sizes and rubber thicknesses. These provide additional insulation when diving in cold water. The cam action of the neck clamp squeezes the neck dam against the O-ring around the base of the helmet. The O-ring allows total mechanical compression of the rubber neck dam material. This results in no change of adjustment during a diver's descent. Without the O-ring the clamp would become loose and leak.

2. Opening the lever mechanically spreads the clamp creating a positive break in the neck dam seal against the helmet. This is very important in the event of low pressure inside the helmet. Another important factor is that this rapid removal of the neck dam and yoke is done with one hand in one motion. The lever is large enough to accommodate a gloved hand.

3. The rear hinge tab allows positioning the rear of the neck clamp properly even with a gloved hand. The neck clamp is then locked in place. The fibreglass yoke is pushed up in front after or during the locking of the neck clamp. The cam lever slides over the latch catch on the yoke so that

the front of the yoke is held in place by the neck clamp cam lever and the latch catch on the yoke locks the clamp lever in place. The yoke has a smaller opening than a diver's head, and pushes against the neck dam and lower portion of the head cushion, firmly securing the helmet to the diver's head so that it cannot be dislodged. The yoke also prevents the neck dam ballooning.

4. Securing lynch pins are used to lock the neck dam to helmet as described in Article 4211, Donning the Helmet.

5. Essentially, the yoke functions in three ways:

a. First, the slot that fits around the diver's neck is smaller than the divers head. It is improbable that the helmet could accidentally be pulled from the head with the yoke in place;

b. Second, the yoke hinges into place around the diver's upper neck and the lower part of his head. The lower part of the neck cushion is pushed in by the yoke, securing the hat comfortably onto the diver's head; and

c. Third, the neck dam is sandwiched between the yoke and the lower part of the head cushion preventing ballooning or any bellows effect from the breathing cycle. Without a yoke (or face seal) the demand regulator would turn on when lower than the neck dam (diver face down) and balloon it, usually breaking the seal. The neck dam must always be turned up and should fit snugly about the neck.

WARNING

At no time shall a hood be worn inside the helmet.

4210 Helmet Communication Components

1. The SSBA Communications uses a whip assembly, which includes a stainless steel compression fitting with a waterproof plug, fitted to the helmet. Inside of the helmet, the wires lead to a terminal board and connect to the earphones and microphone. Outside of the helmet, the whip assembly terminates in a watertight connector, for hooking to the communications cable of the umbilical. See Figures 4-2-3 and 4-2-4.

2. When the helmet communication whip is connected to the communication cable by means of the watertight connector. A "pop" of escaping air indicates that a good connection has been made.

3. If the helmet internal communication components should be flooded out, they should be removed from the helmet, rinsed in clean fresh water (twice), and allowed to dry at room temperature.

4. A light film of approved silicone grease must be applied to the connection penetrators and exposed leads to prevent corrosion. Should corrosion build-up occur, the penetrator and leads must be removed and carefully cleaned. Do not use abrasive tools or materials to clean these delicate components.

4211 Donning the Helmet

1. First the neck dam/yoke assembly is hinged open and the neck dam is pulled over the diver's head. This should be done by the diver alone. The yoke can be hinged open and left hanging down the back while the rubber neck dam is pulled into place, or it can be first fitted on the diver's neck, then the rubber neck dam pulled into place.

NOTE

The neck dam is always left turned up.

2. The attendant picks up the helmet and places it above the diver's head. The diver should look up to provide clearance under the chin area of the hat. The diver assists by holding the protruding head liner with their thumbs and guiding the helmet as it is lowered. The diver then pulls the helmet down and from side to side until it is aligned and comfortable.

3. The tender checks alignment at the back of the helmet with the tab and sleeve, and fits the tab on the sleeve. The neck ring is pulled forward then up, steadying the helmet while the neck ring is pushed up into place. Once the neck ring is in place, the latch lever is swung to the left, which pushes up on the yoke, closing the lever over the latch catch.

4. With the latch correctly positioned, insert the side lynch pin, which keeps the latch catch assembly securely closed when the helmet is latched to the neck clamp. Ensure the lynch pin is inserted from the top to prevent it from falling out in the event of failure of the holding spring. See Figure 4-2-5.

4212 – 4299 Not Allocated

Figure 4-2-1 The SSBA Helmet

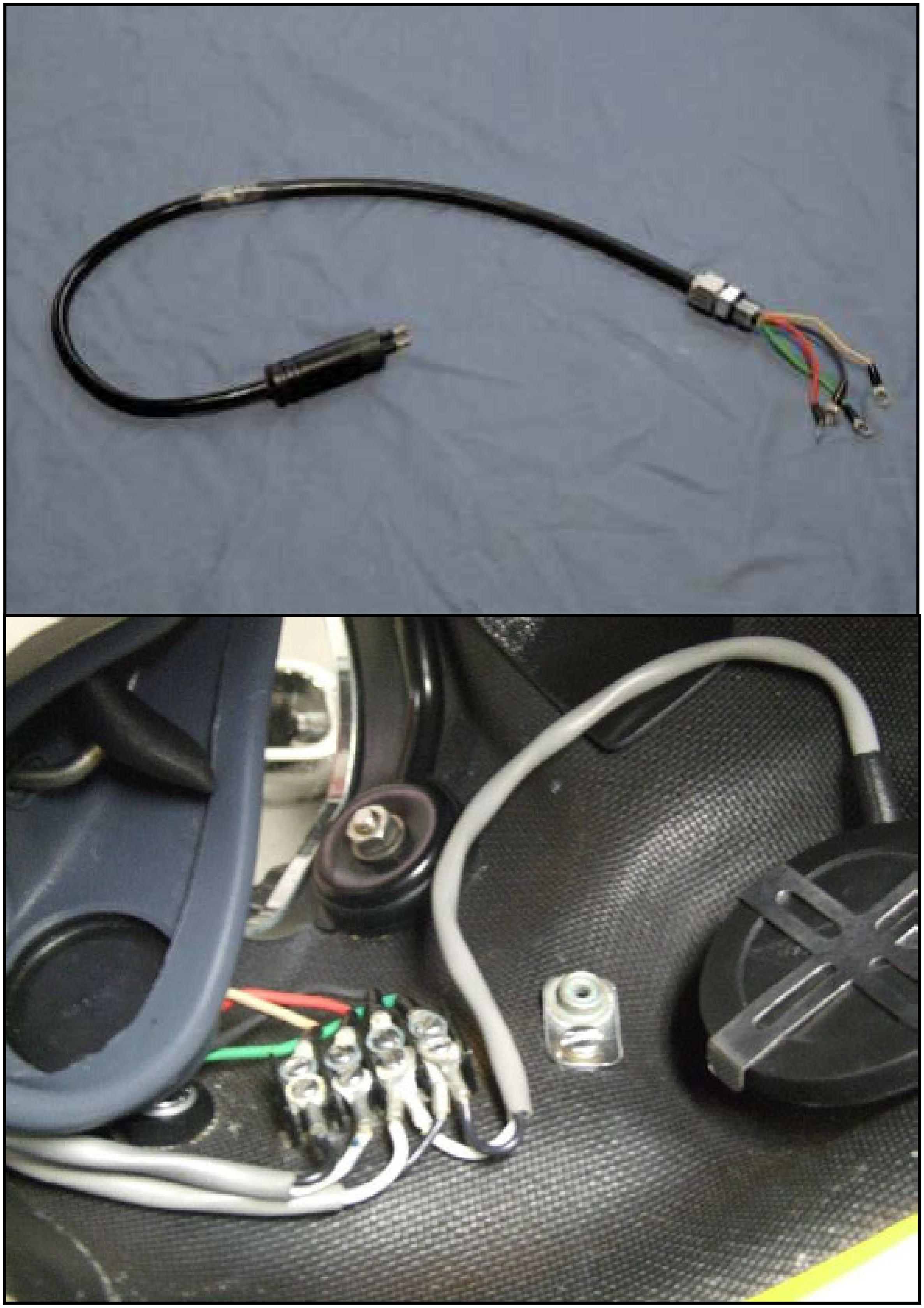

Figure 4-2-2 Communication Whip Assembly

Figure 4-2-3 Earphones and Microphone

Figure 4-2-4 Donning the Helmet

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SECTION 3

DIVING SUITS AND ACCESSORIES

4301 Types of Suit

1. Dependent upon the water temperature, water contamination and depth, any one of four types of diving suits may be worn:

a. neoprene wet suit;

b. neoprene dry suit (with underwear);

c. Incompressible dry suit (with underwear); and

d. Neoprene hot-water-heated suit (with neoprene liner).

2. The types of suits described above are described in detail in Volume 2 of the CF Diving Manual.

4302 Hot Water Suit

1. Surface-supplied diving sometimes requires that supplementary heat be supplied to the diver. Diving deep, cold water when using HeO2, and prolonged in-water decompression after deep dives or long bottom times, causes a much greater heat loss than the diver's body can replace. In order to compensate for heat loss under such circumstances, a hot water suit is used.

2. The suit shown in Figures 4-3-1 is a 6 mm neoprene wet suit, nylon backed on both sides, fitted with perforated hoses along the limbs, chest and back. Hot water is supplied by hose via the diver's umbilical, to an inlet control (ball) valve at the diver's right hip. This ball valve controls the flow of warm water to the perforated tubes in the suit and also allows the suit to be bypassed by dumping water to the sea.

3. The suit is loose fitting, is one piece (other than the gloves, booties and hood), and acts as the container for a warm water bath which surrounds the diver. A single zipper extends up the diver's front from crotch to neck. The suit has protective patches at the knees and elbows, and thigh pockets for tools. It requires no assistance to don and doff and is very durable.

4. ***The diver always wears a liner under the suit.*** This is a full length, long sleeved, 3 mm neoprene smooth-skinned wet under-garment. It servers to prevent local overheating of the diver from the hot water flow and also acts as a passive insulated wet suit in case the hot water supply from the surface should be cut off. When dives including water stops are conducted, and when the water temperature is particularly low, a 6 mm personal wet suit can be worn as the hot water suit liner.

5. The perforated hoses terminate open-ended at the diver's ankles and wrists, and at the back of his neck. The hose ends are inserted into the diver's boots and gloves so as to route water to the soles of the feet and palms of the hands, while the hose end at the neck is tucked back down into the suit. The warm water is discharged from the suit at the wrist and ankle cuffs, at the neck, and partially through the zipper. The hot water suit should be maintained in the same way as a wet suit. It is more durable that the average wet suit, but it is also much more expensive. The required

maintenance procedures must be followed meticulously. The suit and liner should be rinsed thoroughly in fresh water after each dive, then hung on hangers in a full-length locker, unfolded, in a cool, dry storage area away from high heat sources, electric motors and generators.

6. The Teflon inlet ball valves must be lubricated with silicon grease before storing. They must be checked for ease of operation before each diver and, if necessary, lubricated again.

7. Proper stowage of a hot water suit will considerably increase its life expectancy. Ideally, the suit should be rinsed with fresh water and suspended on a hanger in a ventilated compartment. For stowage in confined spaces, the suit should be carefully rolled, avoiding sharp folds. Heavy weights such as weight belts, which will break down the unicellular structure of the neoprene, must never be placed on top of the suit. The life of the suit will be shortened if it is dried with excessive heat or stored in very warm areas. Do not store suits in areas where electric motors are running. The ozone gas produced by the sparking of the electric motors and generators is harmful to the molecular structure of the suit material.

4303 Hot Water Supply to Suit

1. The hot water is supplied by way of a 12 mm I.D. hose from a kerosene-fired (#2 diesel) heater on the support vessel or platform. See Articles 4406 for a description of the function of the hot water heater. Sea water is pumped to the heater, where it is heated to a temperature that depends upon the diver's thermal demand, then pumped to the diver by way of a hot water hose incorporated into the umbilical.

2. The heat lost in the transport of water through the diver's supply hoses is influenced by numerous factors including composition of the hose material, rate of flow, and the temperature and circulation of the sea-water surrounding the hose.

3. The water temperature at the inlet to the diver's suit should be kept at 37°C to 40°C, dependent upon the surrounding water temperature, type of breathing gas, and how hard the diver is working.

4. .A diver is normally furnished with 11 litres per minute (lpm) of warm water. Two divers would therefore, require 22 lpm.

5. **If hot water heating is essential to the safety of the diver, a secondary hot water supply must be available.**

4304 Weighted Vest

1. The vest provides the following functions:

   a. Emergency cylinders harness;

   b. Harness for securing the divers end of the umbilical; and

   c. Pockets for lead weights, to compensate for suit buoyancy.

2. The Canadian Forces divers vest is shown in Figure 4-3-3. The diver is helped to don the vest after the suit and before the helmet is placed. The vest is secured by chest, waist and crotch straps for a snug fit. The chest straps should be loose enough to allow free circulation of inflation gas when used with a dry suit. ***The vest is not intended for release underwater.***

3. The emergency cylinder is secured, valve upright, on the back of the vest. Two D-rings are provided, one at each side, for securing the diver's umbilical. The umbilical is secured to the D-ring on the vest at the left hip by means of a Carabiner clip and, running from the lower right side of the diver (where the hose connections are made), under the emergency cylinder to the left front. See Figure 4-4-1. The hot water whip is passed around the diver's back, secured to the divers right hip D-ring, and coupled to the hot water suit inlet.

4. Three pockets on each side of the vest are provided for lead weights. Each pocket can accept a 1.35 kg or 2.7 kg weight, therefore the maximum weighting of the vest is 16.3 kg. This is sufficient to compensate for the normal buoyancy of any suit in current use by the Canadian Forces. If additional weight is required, weighted boots must be worn. A separate weight belt is not to be worn with the vest. The weights on each side of the vest can be jettisoned independently, by means of nylon quick-release at each hip. These are prevented from accidental operation by Velcro straps.

5. The vest requires little maintenance; however, it must be washed down with fresh water after each dive, and the harness straps, cylinder harness, weight-release mechanisms and securing fittings checked for any possible damage.

4305 Boots

1. The diver's boots are used in conjunction with the weighted diving belt or vest to overcome the positive buoyancy of the inflated diving suit and to give the diver stability.

2. The boot is a lace-up style with a reinforced toe-cap and heavy duty ribbed sole. The lead insoles may be stacked or removed entirely, if sufficient space is available, to provide varying degrees of weight. Each boot with one lead insole weights approximately 3.6 kg.

4306 Knife

1. The diving knife has a tough stainless steel blade with one cutting and one saw edged. The cutting edge of the knife must be sharp and a thin layer of grease applied to prevent corrosion..

2. The actual positioning of the knife is left to the diver but it must be readily accessible if the diver becomes entangled as outlined in Vol 2 Article 129

4307 Underwater Lights / Camera

1. **Hand-carried, batter-powered lights have a sealed plastic housing and toggle switch, containing a 6-volt battery and a sealed bulb**. The light has positive buoyancy and will float beam up. When a replacement sealed beam lamp is fitted it is essential to ensure that is the correct, waterproof model, or the lamp will flood and fail.

2. More powerful lights, powered via electric cable from topside, may be mounted on the diving stage or be hand-carried. Generally, these are so powerful that they must only be turned on underwater, to prevent rapid overheating and failure. A quick on/off check on the surface is permissible, to ensure that the lamp is working. ***On surfacing, the lamps must be turned off before leaving the water.***

3. A Helmet Camera and Light System have been catalogued for use with the SSBA. This system improves the supervisor's appreciation of the bottom conditions and may enhance the safety of the dive in certain conditions. The camera and light are easily attached to the SSBA helmet. The cables can be attached to the existing umbilicals. The umbilicals will come with the TV and light cable included. The use of the camera and light system is optional.

4308 Swim Fins

1. Swim fins may be worn in lieu of weighted boots.

4309 Welding Faceplate

1. The welding faceplate fits over the regular helmet faceplate. The faceplate has a metal frame with interchangeable lenses and a spring clip for holding the lens in an "open" or "closed" position.

4310 – 4399 Not Allocated

Figure 4-3-1 Hot Water Suit

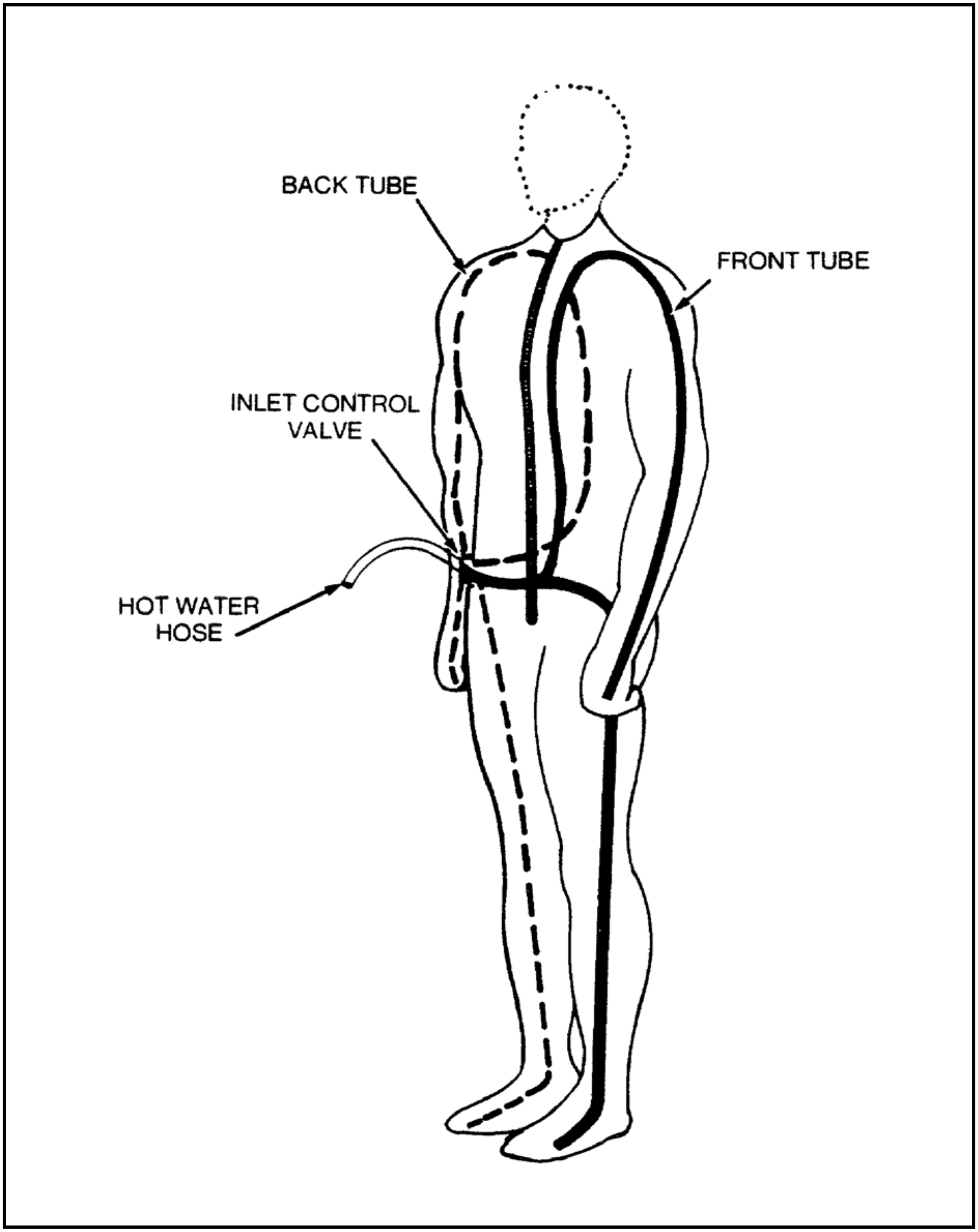

Figure 4-3-2 Flow Schematic, Hot Water

Figure 4-3-3 Diver’s Vest

Figure 4-3-4 Diver's Dress

Figure 4-3-5 Welding Faceplate

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SECTION 4

SUPPORT EQUIPMENT

4401 Communication Equipment

1. Communication between the diver and the surface control position is of the utmost importance for the safety of the diver and for efficient performance of work.

2. The CF currently uses the Helle 3342A for underwater communications. This model includes a built-in helium voice unscrambler.

3. Field maintenance and repair of the communication sets should be limited to periodic maintenance and troubleshooting as described in C-78-161-000/MS-001 ***Instruction Manual: Helle Model 3340 and 3342 (A&B), Helium Voice Unscrambler***.

4. No special cleaning procedures are required for these communication sets except to remove salt water residue by wiping with at cloth saturated I fresh water and a mild detergent if necessary. Check the front panel connectors periodically for corrosion build-up. If corrosion is present, scrape away the corrosion and coat the terminals lightly with an approved electrical lubricant.

5. For more detailed information refer to the CFTO in **Annex A, Chapter 4**.

4402 Twisted Hose Umbilical

1. The twisted hose umbilical used in SSBA operations contains the hoses and cable for supplying the diver with breathing air or gas, hot water (for heating), underwater communication, and pneumofathometer depth sensing. The configuration also includes camera and lighting cables. The umbilical is manufactured as a complete assembly, in 150 metre lengths with the components laid together like a multi-strand rope. Each part of the assembly is designed to take the strain and when made up as an umbilical no separate strain member is required. Additionally, the umbilical is brightly coloured, and is highly visible underwater as well as on the surface. ***The umbilical must be mark for depths outlined in the CF Diving Manual Volume 2 Article 124, Lifelines, Float Diving, Marked Swimming & Marking of Lines.***

2. The advantages of this umbilical are:

   a. It is light and easily handled;

   b. In water it is neutrally buoyant (if the hot water hose is blanked when not in use, the umbilical is positively buoyant);

   c. The twist of the umbilical prevents it from unlaying and snagging on objects;

   d. It is very flexible and readily passes around corners or under the crossbar at the stage; and

   e. Hydrodynamic drag is low.

3. The umbilical has certain disadvantages, which must be taken into account:

   a. The jacket chafes on rough decks and areas of high wear; A protective deck covering is required in such areas;

b. Should a leak or failure in a component of the umbilical develops, it is more difficult to repair or replace than it would be if the umbilical were made of unlayed components; and

c. It is somewhat bulky and requires more stowage space.

4. Components of the umbilical are:

a. Gas hose 9.5mm I.D. red yellow;

b. Pneumofathometer hose 6.5 mm coloured blue;

c. Hot water hose 12.5 mm I.D. coloured red;

d. Communication cable:3 pairs twisted wires, shielded and coloured orange; and

e. Electrical cables for the camera and lighting system may also be included.

5. When not in use, the pneumofathometer hose and hot water hose are blanked off at the diver's end. The communication cable connector does not require sealing or a protective cap when not in use.

6. The working pressure of the gas supply hose is 66 bar. Its minimum burst pressure exceeds 333 bar.

7. The breaking load of the umbilical (when fittings pull out) exceeds 900 kg.

8. The configuration of the umbilical and couplings at the divers end are such that:

a. It is quick and easy to connect and disconnect;

b. Once connected it cannot be released accidentally underwater; and

c. It can support the full weight of the diver in any diving dress.

9. At monthly intervals the twisted hose umbilical should be uncoiled, faked on deck and recoiled, if it is not in regular use, to prevent it from assuming a permanent set. It should never be coiled tightly on reels, especially where it would be subjected to wide ranges of temperature, or the umbilical will be seriously damaged.

10. The gas hose of the umbilical should be flushed through with air and capped after use.

11. Every 6 months the gas hose of the umbilical should be pressurized to 35 bar, and the entire assembly, including all hoses, cabling, and connections, be inspected for leaks, damage, deterioration and general cleanliness. This procedure will also suffice as a test after the installation of a new coupling.

12. The umbilical should be stowed in a clean, dry ventilated area when not in use.

13. Further details can be found in the appropriate CFTO at Annex A, Chapter 4.

4403 Umbilical End Tailing

1. The pneumofathometer hose is open-ended and terminates level to the diver's chest, in which case it must be periodically purged of water from the Gas Panel.

2. The communication cable terminates in a waterproof connector, which plugs into the helmet communication whip.

3. The CFTO lists and describes the components required to make up the umbilical end railing.

4. One example of how the umbilical is secured to the diver is shown in Figure 4-4-1.

4404 Hot Water Heater

1. The Hot Water Heater is a compact, light weight water heater designed for maximum portability and minimum power requirements. It supplies water at a controlled temperature to the diver's hot water suit.

2. The unit is designed to operate on 110 volts 60 cycles, 220 volts 60 cycle or 220 volts 50 cycle and No.2 diesel or kerosene fuel. Units are marked for proper voltage. The system has its own submersible pump and is capable of delivering 22 litres per minute of hot water to the divers. The units microprocessor control module will control water temperature within ±one degree. The system is designed to shut off the boiler if the flow of water is interrupted.

3. To avoid distress to the diver, wide temperature fluctuations must be prevented. Remember that although the diver may report satisfactory comfort, he may still be losing body heat. In addition, although the diver may report excessive heat, it is possible that hyperthermia has already started and the divers senses may be deceived. For these reasons, the temperature sensations reported by the diver must be regarded with caution.

4. The preventive maintenance schedule for the hot water heater should be followed to ensure maximum service life of the equipment. Special circumstances such as weather condition, duration of operations, and quality of fuel may require more frequent maintenance of some components.

WARNING

Do not check fuel with burner in operation or with the power on

5. For more details, refer to appropriate CFTO.

4405 Diving Stage

1. A stage is used for transporting divers to and from the undersea worksite. It is raised and lowered by a deck winch, and functions as an elevator for the diver (or divers) and tools but may provide an emergency gas supply (bailout). See Figure 5-2-4.

2. The stage lifting wire must meet the standard for testing and lifting appliances. See Annex A, Chapter 4 for appropriate CFTO.

4406 Descending Line

1. If a stage is not used, a descending line is required to guide the diver to and from the bottom and for transporting tools and equipment to the diver. In shallow depths and other special circumstances, the descending line may be foregone, provided safety is not jeopardized. See Article 1303, Marking of Lines.

2. The end of the line may be fastened to a fixed underwater object, or it may be anchored with a shot weight heavy enough to withstand the force of the current. See Figure 5-2-3.

3. Descending lines anchored by clumps are also used as steadying lines to prevent spinning of the stage during transit to and from the seabed. See Figure 5-2-4.

4407 Diving Ladder

1. Except with a boat of very low freeboard a ladder is required to enable divers to climb out of the water after surfacing by way of a descending line.

2. Ensure that the ladder is firmly secured to the boat or diving platform and rigged to prevent lateral movement. The ladder should extend into the water sufficiently to enable the diver to start climbing without excessive effort.

3. The bottom of the ladder should be rounded or padded to prevent injury to a surfacing diver.

4408 Air Compressors and Storage

1. High Pressure compressors provide a low volume of compressed air at high pressure (138+ bar) and may be driven by a gas, diesel, or electric power source. HP compressors are primarily used to supply compressed air for charging diving cylinders and air storage banks, and will support SSBA operations. Electric-powered and gasoline-powered portable models are used by mobile teams.

2. Low Pressure air compressors provide large volumes of compressed air at pressures ranging from 10 to 16 bar. This air cannot be dried or purified to the same degree as high pressure air. The use of wetter air from a low pressure air compressor may lead to regular freeze up, especially in cold weather operations, therefore LP compressors are not recommended for providing air for breathing underwater. LP compressors should only be used to provide air for hyperbaric chambers and for pneumatic tools, where large volumes are required and freeze-up is not a problem.

3. A HP air compressor shall be used in conjunction with a HP air storage bank when supporting air diving operations:

   a. At the start of any dive the bank must hold enough air to support the maximum bottom time and decompression requirement of the divers and the standby should there be a compressor stoppage (including a reserve in case of an emergency); and

   b. If a separate compressor and bank is not used to provide air for the hyperbaric chamber, the HP air storage bank must also contain sufficient reserve air to support operation of the chamber to conduct a **modified CF Treatment Table 6A (CF TT6A);**

4. For planning purposes, a diver using the SSBA helmet may use an estimated consumption rate of 45 ambient litres per minute. This must be multiplied by the diver's absolute ambient pressure (in bar) to obtain his consumption rate in actual litres per minute.

5. Compressors are furnished with complete instruction manuals containing information on their operation, maintenance, storage and accessories. The manual should accompany the compressor at all times. Personnel using an air compressor must be completely familiar with the information contained in the manual.

6. Each compressor shall have a Log. The log will be used to record the running time of the compressor and include all sampling, filter changes and maintenance performed on the compressor. All entries are to be accompanied by the signature of the operator or maintainer who performed the action.

7. Never use a compressor for other than the designated purpose. Use it only in accordance with the appropriated handbooks or technical manuals.

8. Compressed air samples are to be tested for purity in accordance with CFTOs D-87-003-000/SG-001 and C-87-020-001/NG-001 on divers' breathing air purity standards and sampling requirements.

4409 HeO2 and Oxygen Storage

1. The design and capacity of the mixed gas and oxygen storage banks and gas distribution system may vary, but each serves the same purpose: to provide the divers with the appropriate breathing gases for their normal and emergency needs.

2. Two independent banks of HeO2 of the required oxygen percentage, separately plumbed to the Diving Control Panel, should always be on-line during any HeO2 dive. Each bank should contain sufficient gas at the start of the dive for the planned bottom time requirements of the diver(s), with an emergency reserve for their standby.

3. A primary and reserve bank of oxygen should always be on-line to the Diving Control Panel and to the hyperbaric chamber throughout a SSBA dive. Each bank should contain sufficient oxygen, for the dive profile and a reserve for the standby. Additionally, approximately 34 cubic metres (34,000 litres) of oxygen should be available to the hyperbaric chamber. This amount will be enough to conduct a CF Treatment Table 6A (Modified) with two patients.

4410 Diving Control Panel ("Diving Console")

1. The diver's breathing air and gases are routed from the storage banks to the Diving Console. Here the pressures of breathing air, oxygen and HeO2 are reduced and then routed onward to the divers' umbilicals. In addition, the diver's in-water depths are monitored by pneumofathometer. Different panels vary somewhat in design and configuration, but their application is identical. Figure 4-4-4 shows a typical Diving Console.

2. There are two HeO2 inlets (primary and secondary) at the Diving Console, two oxygen inlets (primary and secondary) and one breathing air inlet. The air and gases enter the Diving Console at storage bank pressures, which are monitored by inlet pressure gauges. The air and HeO2 inlet valves and cross-connect valves are high-pressure ball valves, whereas those for oxygen are multi-turn needle valves.

3. The air and gas routing at the Diving Console is indicated by colour coding on the panel front as follows:

AIR	**BLACK** **Lines and valve handles**
AIR EXHAUST	**SILVER** **lines**
OXYGEN	**DARK GREEN** **Lines and valve handles**
HeO2	**RED** **Lines and valve handles**
COMMON LINES	**BLUE**

4. There are five pressure regulators at the panel, one for each inlet line, allowing independent pressure reduction of each inlet gas. The two oxygen inlet lines may be cross-connected upstream of the regulators, by a crossover valve. The two HeO2 inlet lines may be similarly cross-connected, while a further crossover valve allows cross-connection of the inlet air and HeO2. Downstream of the regulators are pressure gauges that indicate the over-bottom pressure supplied to the divers, to monitor their output pressures, which must be manually controlled. See Figure 5-2-5

5. The air and gases are then routed through a manifold to outlets for:

a. ***Diver 1*** ***(Red Diver);***

b. ***Diver 2*** ***(Yellow Diver); and***

c. ***Diver 3*** ***(Standby Diver).***

6. Pressure gauges at the Diving Control Panel monitor the pressures of the three outlet lines.

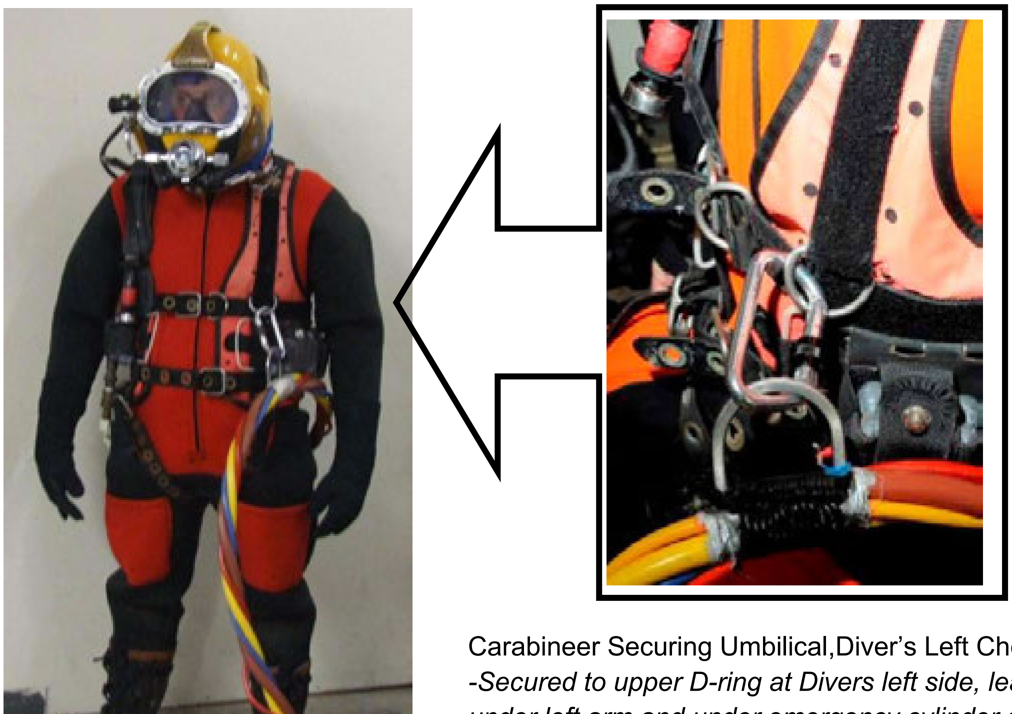
7. The console inlet and outlet fittings must be sealed when the console is not in use, to prevent contamination.

4411 Pneumofathometer

1. The diver’s pneumofathometer hose is connected via inlets to the pneumofathometer pressure gauge at the Diving Control Panel. The pneumofathometer gauge is calibrated in metres of sea water. The gauge monitors the pressure in the umbilical pneumofathometer hose that terminates open-ended level with the diver’s chest. Purging the hose with breathing gas in use keeps the hose free of water. Consequently, hose pressure is identical to the diver’s ambient pressure where the hose terminates.

2. The purge lines for the three pneumofathometers of the Diving Control Panel tee off the divers' breathing air line downstream of the air pressure regulator at the Diving Control Panel. A valve on each line is used for purging the hose to the diver.

4412 – 4499 Not Allocate



Carabineer Securing Umbilical,Diver's Left Chest:
-Secured to upper D-ring at Divers left side, leading under left arm and under emergency cylinder at back.

Carabineer Securing Umbilical, Diver's Right Hip

-Secured to rear D-ring at Diver's right side
- The Loop from the right rear D-ring to the helmet includes some slack.

Figure 4-4-1 Umbilical Attachment

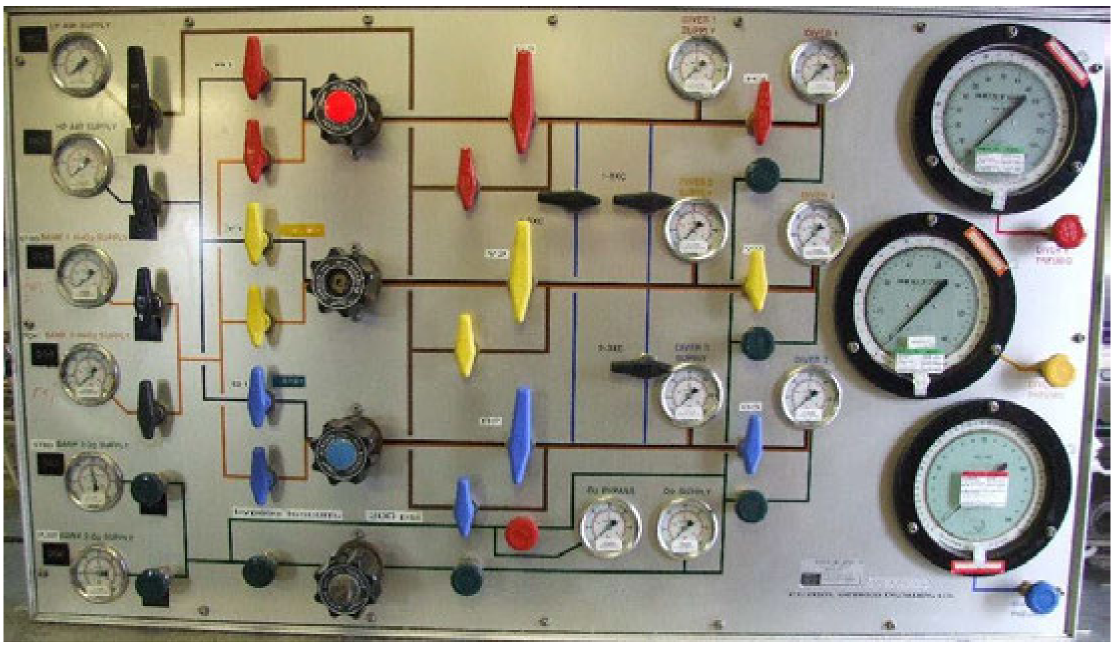


Figure 4-4-2 Diving Control Panel ("Diving Console")

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SECTION 5

PLANNED MAINTENANCE

4501 SSBA Helmet Maintenance

1. Each SSBAe helmet in use by the Canadian Forces shall have a log, which shall provide:

    a. A permanent record of modification and the current modification state of the helmet;

    b. A record of usage and routine maintenance; and

    c. A record of defects, (from which data to support UCR or to trace a persistent failing may be drawn).

2. SSBA Helmet maintenance manual may be found at **Annex A, Chapter 4, *Orders and References Pertaining to Diving*.**

4502 – 4599 Not Allocate

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ANNEX A, CHAPTER 4

ORDERS AND REFERENCES PERTAINING TO DIVING

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ANNEX A,

CHAPTER 4
ORDERS AND REFERENCES
PERTAINING TO DIVING

CFAO 34-35 Temporary Medical Restrictions Flying

CFAO 43-2 Canadian Forces Diving Organization and Responsibilities

CFCD 102(H) Operational Readiness

MARCORD Vol 1

46-500, Annex A – Fleet Diving Units Terms of Reference

MARCORD Vol 1

46-501, Annex B – Ship's Diving Teams

MARCORD Vol 1

46-503, Annex E – Diving Operations Safety Precautions

MARCORD Vol 1

46-505, Annex G – Recompression Chambers

MIL-STD-1330D STD	**Practice for Precision Cleaning and Testing of Shipboard Oxygen, Helium, Helium-Oxygen, Nitrogen and Hydrogen Systems**
B-GG-380-000/FP-001	**Underwater Diving in the Canadian Armed Forces** **Vol. 1: History, Physics and Physiology**
B-GG-380-000/FP-002	**Canadian Forces Diving Manual** **Vol. 2: Compressed Air Breathing Apparatus**
B-GG-380-000/FP-003	**Canadian Forces Diving Manual** **Vol. 3: Surface-Supplied Diving Manual**
B-GG-380-000/FP-004	Canadian Forces Diving Manual Vol. 4: Self-Contained Mixed-Gas Diving, Book 1 of 3
B-GG-380-000/FP-004	Canadian Forces Diving Manual Vol. 4: Self-Contained Mixed-Gas Diving, Book 2 of 3
B-GG-380-000/FP-004	Canadian Forces Diving Manual Vol. 4: Self-Contained Mixed-Gas Diving, Book 3 of 3
B-GG-380-000/FP-005	Canadian Forces Diving Manual Vol. 5: Hyperbaric Chamber – Operation and Treatment Procedures.

B-GG-380-000/FP-003	
B-GG-380-000/FP-006	Canadian Forces Diving Manual Vol. 6: Diving Supervisor’s Handbook
B-GG-380-000/FP-007	Manuel de Plongée dans les Forces Canadiennes Vol 7: Aide-Mémoire du Superviseur de Plongée
B-GG-380-000/FP-008	Manuel de Plongée dans les Forces Canadiennes Vol 8 : Appareil Respiratoire á Air Comprimé
C-03-005-033/AA-000	Naval Engineering manual. Vol 1 Compressed Air Systems Section 4
C-03-006-001/AA-001	Oxygen Systems/Compressed Air Systems: Part A, Section 4
C-03-010-106/NY-001	Electric Motor Bauer Compressors
C-03-010-336/MS-001	USN Ship Salvage Manual
C-03-040-013/MS-001	Technical Manual of Underwater Cutting and Welding
C-22-010-010/CS-022	Improved Cleaning Procedures for Gaseous O2 Components
C-27-776-000/NY-001	Naval Preventative Maintenance Schedule (Engineering) Compressor Unit, Reciprocating, HP Air Plan de Maintenance Présentative de Bord (Génie) Group Compresseur, Alternatif, à Air HP
C-27-834-000/NY-002	HP Hoses
C-27-834-000/NY-003	Robbins Tower YDT 11
C-27-834-000/NY-Z01	HP Air System YDT 11
C-28-020-001/TB-001	Standards for Testing Lifting Appliances
C-87-000-000/AX-000	Diving Equipment Environmental Clothing
C-87-010-009/TB-001	Air Filters Fitted To Bauer Compressors
C-87-010-010/MS-003	Operating and Maintenance Manual Diver’ HP Compressor NSN 4310-21-869-3745 (Gasoline-Engine-Driven) NSN 4310-21-869-3746 (Electric-Motor-Driven)
C-87-010-011/MS-001	Handbook: Care, Inspection, and Testing of Aluminium Diving Air Cylinders
C-87-010-013/NY-001	Naval Preventive Maintenance Schedule (Engineering) Recompression Chambers Calendrier d’Entretien Préventif à Bord de Navires (Génie Technique) Caisson de Recompression

C-87-010-013/MZ-001	Overhaul Instructions for CF Recompression Treatment Chambers
C-87-010-011/MS-001	Care, Inspection and cleaning of Diving Aluminum Cylinders
C-87-011-000/TB-001	Lubricating Oils Divers Breathing Air Compressors.
C-87-112-000/NY-001	100-3200 Hours Maintenance Order: Electric Bauer Compressor
C-87-112-000/NY-201	0-25 Hours Maintenance Order: Electric Bauer Compressor
C-87-112-000/NZ-001	100-3200 Hours Maintenance Order: Electric Bauer Compressor
C-87-112-000/TB-001	Instruction for NRU for Carrying Out Planned Maintenance Routines on Diving Compressors
C-87-113-000/NY-001	100-3200 Hours Maintenance Order: Gas Driven Bauer Compressor
C-87-113-000/NY-201	0-25 Hours Maintenance Order: Gas Driven Bauer Compressor
C-87-113-000/NZ-001	Instruction for NRU for Carrying Out Planned Maintenance Routines on Diving Compressors
C-87-113-000/TB-001	Instruction for NRU for Carrying Out Planned Maintenance Routines on Diving Compressors
C-87-113-000/TB-001	Instruction for NRU for Carrying Out Planned Maintenance Routines on Diving Compressors
C-87-117-000/MS-001	Operating and Maintenance Instructions YDT-11 Recompression Chamber, Fleet Diving Unit (Pacific)
	Directives Relatives au Fonctionnement et a l'Entretien Du Caisson de Décompression de l'ESP-11 Unité de Plongée de la Flotte (Pacifique)
C-87-161-000/MS-001	Instruction manual for Model 3340 Helium Voice Unscrambler
C-87-161-000/NY-Z01	Diver Control Communications System
C-87-167-000/MS-001	Operation and Maintenance Instructions Hydraulic Diver Tools
	Instructions d'Utilisation et de Maintenance Outils Hydraulique de Plongeurs
C-87-167-000/NY-001	Shipboard Preventive Maintenance Schedule for Divers Tools Hydraulic System

B-GG-380-000/FP-003

C-87-167-000/NY-Z01	Shipboard Preventive Maintenance Schedule for Divers Tools Hydraulic System
C-87-186-A00/MS-001	Air Compressor Assembly-High Pressure: Bauer Model KA20-20ED
C-87-197-000/MS-001	Ramset – Instruction and Training Manual for Underwater Tool – Model 200 HD Heavy Duty, .38 Caliber
C-87-197-000/NY-Z01	Ramset 200 HD
C-87-198-000/MS-001	Operation and Maintenance of DUI ECONO Hot Water Heater Hot Water Heater
C-87-198-000/NY-001	Shipboard Preventive Maintenance Schedule for DUI Econo II Hot Water Heater for use with Hot Water Diving Suit
C-87-209-000/MS-001	Instruction Manual for Model 3214 Diver Phone
C-87-210-000/NY-002	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Hydraulic Come-Along)
C-87-210-000/NY-003	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Hydraulic Hammer SK 58)
C-87-210-000/NY-004	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Energy Pac Load Cell)
C-87-210-000/NY-005	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Energy Pac Test Pump)
C-87-210-000/NY-006	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Hydraulic Chipping Hammer) Plan de Maintenance Préventive de Bord Équipement Divers pour Plongeurs (Marteau Hydraulique à Piquer)
C-87-210-000/NY-007	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Chain Saw) Plan de Maintenance Préventive de Bord Équipement Divers pour Plongeurs (Tronçonneuse)
C-87-210-000/NY-008	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Inflatable Lifting Bags) Plan de Maintenance Préventive de Bord Équipement Divers pour Plongeurs (Systèmes de Levage par Ballons Pneumatiques)

C-87-210-000/NY-009	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Stanley Cut-Off Wheel)
C-87-210-000/NY-010	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Hydraulic Pull Cylinder)
C-87-210-000/NY-011	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Energy Pac Jacks)
C-87-210-000/NY-012	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Hydraulic Grinder)
	Plan de Maintenance Préventive de Bord Équipement Divers pour Plongeurs (Rectifieuse Hydraulique)
C-87-210-000/NY-013	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Impact Wrench)
	Plan de Maintenance Préventive de Bord Équipement Divers pour Plongeurs (Clés à Chocs)
C-87-210-000/NY-014	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Rebar Cutter)
C-87-210-000/NY-015	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Wire Rope Cutter)
C-87-210-000/NY-016	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Hand Pump (Ener Pack P-80))
C-87-210-000/NY-017	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Hydraulic-Powered Submersible Pump)
	Plan de Maintenance Préventive de Bord Équipement Divers pour Plongeurs (Pompe Hydraulique Submersible)
C-87-210-000/NY-018	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Portable Hydraulic Pump)
\C-87-210-000/NY-019	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Accessory By-Pass Panel)
\C-87-210-000/NY-021	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Thermal Arc Cutting Equipment)
	Plan de Maintenance Préventive de Bord Équipement Divers pour Plongeurs (Matériel de Découpage Thermique a l’Arc)

C-87-210-000/ NY-Z21	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Thermal Arc Cutting Equipment
C-87-210-000/ NY-022	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (Cox Submerged Bolt Driving and Punching Gun)
C-87-210-000/ NY-Z23	Shipboard Preventive Maintenance Schedule for Divers Miscellaneous Equipment Group (ARCAIR Underwater Cutting and Welding Torch)
C-87-220-000/MS-001	Maintenance Instructions Modified Superlite 17-B Helmet NSN 4220-21-880-5664
	Instructions d'Entretien Casque Superlite 17-B Modifie NNO 4220-21-880-5664
C-87-220-000/MS-Z01	Operating and Maintenance Instructions for Canadian Modified Superlite 17-B Diving Helmet
C-87-220-000/NY-001	Naval Preventive Maintenance Schedule (Engineering) Helmet, Deep Sea Divers', Helium-Oxygen)
C-87-223-000/MS-000	Operating and Maintenance Instructions for the DUOCOM Transportable Recompression Chamber
C-87-223-000/MZ-001	Overhaul Instructions for the CF DUOCOM Recompression Chambers
C-87-226-000/MS-001	Operating and Maintenance Instructions YDT-12 Recompression Chamber
	Directives Relatives de Fonctionnement et d'Entretien Caisson de Recompression de l'YDT-12
C-87-229-000/MS-002	Operating and Maintenance Instructions Mobile (SUBSAR) Recompression Chamber (Atlantic)
	Manuel d'Utilisation et d'Entretien Caisson Hyperbare Mobile (SUBSAR) (Atlantique)
C-87-230-000/MS-002	Operating and Maintenance Instructions Mobile (SUBSAR) Recompression Chamber (Pacific)
	Manuel d'Utilisation et d'Entretien Caisson Hyperbare Mobile (SUBSAR) (Pacifique)
C-87-232-000/MS-000	Operating and Spare Parts Manual: Compressor, 200.0 CFM 200.0 PSI Trailer Mounted

C-87-233-000/NY-Z01	KA-15-H Compressor
C-87-236-000/NY-001	Hydraulic Port-A-Pack Diesel
C-87-236-000/NY-002	Hydraulic Hose Reel
C-87-249-000/NY-001	“1200 lb” Hydraulic Rescue tool
C-87-250-000/NY-001	Naval Preventive Maintenance Schedule: Umbilical, Diver’s, BEU/0043
C-87-252-000/MS-000	Operating and Maintenance Instructions Fleet Diving Unit (Atlantic) Main Recompression Chamber Consignes d’Utilisation et d’Entretien Unité de Plongée de la Flotte (Atlantique)
C-87-253-000/MS-001	Technical Manual: Haskel Pump AGD 30-C
C-87-253-000/NY-001	O2 Transfer Booster Pump Haskel
C-87-256-000/MS-001	Preventative and Corrective Maintenance SEATEC Buoyancy Compensator NSN 4220-21-892-4996 and NSN 4220-01-892-4997 Maintenance Préventive et Corrective Compensateur SEATEC de Flottabilité NNO 4220-21-892-4996 et NNO 4220-01-892-4997
C-87-258-000/MS-001	Robbins Air Purification Systems Instruction Manual: RAF Purification System; Model RAF 8197-35, 8197-30-W, 8797-35AW
C-87-258-000/NY-001	Air Purification System, MSA/RAF D13740
C-87-271-000/NY-Z01	KA-16-18DD Compressor
C-87-273-000/MF-001	Maintenance Instructions AGA MK II Diving Mask NSN 4220-21-903-1913 Manuel d’Entretien Masque de Plongée – AGA Mk II NNO 4220-21-903-1913
C-87-273-000/NY-001	Naval Preventive Maintenance Schedule (Engineering) Divers Mask Plan de Maintenance Préventive de Bord (Génie) Masque de Plongée

C-87-273-000/NY-Z01	Naval Preventive Maintenance Schedule (Engineering) Divers Mask Plan de Maintenance Préventive de Bord (Génie) Masque de Plongée
C-87-276-000/MS-000	Operating and Maintenance Instructions CFSSAT Recompression Chamber
C-87-279-000/MS-001	Technical Manual: Haskel Pump 51563-61
C-87-280-000/MS-001	SUBSMASH Air Storage
C-87-285-000/MF-001	Maintenance Instructions Diver's SE-2/ARCTIC Regulator NSN 4220-21-393-0750 Directives Relatives a l'Entretien Détendeur SE-2/ARCTIQUE NNO 4220-21-393-0750
C-87-285-000/NY-001	Naval Preventative Maintenance Schedule (Engineering) Regulator, Air Pressure, Demand (Diver's ARCTIC SE2/SE3 Regulator) Plan de Maintenance Préventive d Bord (Génie) Détendeur de Demande de Pression d'Air (Détendeur ARCTIC SE2.SE3 pour Plongeurs)
C-87-285-000/NY-Z01	Naval Preventative Maintenance Schedule (Engineering) Regulator, Air Pressure, Demand (Diver's ARCTIC SE2/SE3 Regulator) Plan de Maintenance Préventive d Bord (Génie) Détendeur de Demande de Pression d'Air (Détendeur ARCTIC SE2.SE3 pour Plongeurs)
C-87-287-000/MS-001	Operating and Maintenance Instructions Fleet Diving Unit (Pacific) Main Recompression Chamber) Consignes d'Utilisation et d'Entretien Casson Hyperbare Principal de l'UPF(P)
C-87-290-000/MS-001	Corrective Maintenance Instructions and Parts List for the Canadian Clearance Diving Apparatus (CCDA) Instructions d'Entretien Correctif et Listes des Pièces pour l'Appareil Canadien du Plongeur-Démineur (ACPD)

C-87-290-000/MS-002	Maintenance Instructions and Parts List for the Canadian Underwater Mine Apparatus (CUMA) Instructions d'Entretien Correctif et Listes des Pièces pour Canadien de Déminage Sous-Marin (ACDSM)
C-87-294-000/MS-001	Operating and Maintenance Instructions Three Dive Gas Supply Panel
C-87-294-000/NY-001	Naval Preventive Maintenance Schedule (Engineering) Panel, Surface Control, Divers' Gas (Air, HeO2, O2) Plan de Maintenance Préventive de Bord (Génie) Panneau de Gaz des Plongeurs a Commande en Surface (Air, Héliox, Oxygène)
C-87-298-000/NY-001	Naval Preventive Maintenance Schedule (Engineering) Aluminium Diving Air Cylinders Plan de Maintenance Préventive de Bord (Génie) Bouteilles d'Air Comprime de Plongée en Aluminium
C-87-303-000/MS-001	Operating and Maintenance Instructions for FDU(P) Main Diving Gas Supply and Distribution
C-87-304-000/MS-001	Operating and Maintenance Instructions for FDU(A) Main Diving Gas Supply and Distribution
C-87-316-000/MS-001	Compressor Instruction Manual, Jordair K150-3EH Air Compressor System
C-87-316-000/NY-001	Naval Preventive Maintenance Schedule (Engineering) Compressor Unit, Reciprocating, Bauer K 150-EH, Diver' HP Air Plan de Maintenance Préventive de Bord (Génie) Groupe Compresseur, Alternatif, Bauer K150-EH, pour Plongée à Air HP
C-87-316-000/NY-Z01	Naval Preventive Maintenance Schedule (Engineering) Compressor Unit, Reciprocating, Bauer K 150-EH, Diver' HP Air Plan de Maintenance Préventive de Bord (Génie) Groupe Compresseur, Alternatif, Bauer K150-EH, pour Plongée à Air HP
C-87-325-000/MF-001	Manufacturer's Data Containerized Diving system

B-GG-380-000/FP-003	
C-87-325-A00/MS-001	Operating and Maintenance Instructions Containerized Diving System: Recompression Chamber Instructions de Fonctionnement et d’Entretien Equipment Intègre de Plongée en conteneur : Caisson Hyperbare
C-87-325-B00/MS-001	Operating and maintenance Instructions Containerized Diving system: Workshop Instructions de Fonctionnement et d’Entretien Equipment Intègre de Plongée en conteneur: Conteneur d’Atelier
C-94-010-003/MG-000	Compressed Gas Cylinders
D-87-003-000/SG-001	Canadian Forces Standard Purity of Compressed Breathing Air and Gases for Divers
D-87-003-001/SF-000	Specification for Soda Lime
D-87-003-004/SF-001	Cleaning Procedures for Hyperbaric and Diver’s Breathing Gas Piping and Distribution Systems
L-87-220-000/LS-000	Equipment Support List for Canadian Modified Superlite 17-B Diving Helmet

CHAPTER 5
STANDARD OPERATING PROCEDURES

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CHAPTER 5
STANDARD OPERATING PROCEDURES

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CHAPTER 5
STANDARD OPERATING PROCEDURES

SECTION 1

DIVE PLANNING

5101 Use of SSBA

1. Surface-supplied breathing apparatus is used mainly for hard work where the work site is an obstructed or confined area. Deeper depths and other special conditions may also require the use of surface-supplied rigs. The gas supply in most instances is not a limiting factor, which is an advantage of this type of equipment. In addition, communication is improved, and there is more complete control of the diver and diver's environment throughout the dive.

2. This section discusses dive planning in general terms. It is included as a guide for the Diving Officer/Diver Supervisor and it not intended as a limitation. Each Article covers only general situations and is not comprehensive. Common sense and experience will indicate the best procedures to adopt, within the framework of the safety rules and regulations.

5102 Dive Planning

1. Safe diving operations start with careful planning. Think the job through beforehand and plan carefully for the personnel, equipment, and transportation requirements. Try to foresee emergencies or delays, and plan for alternatives. When commencing an underwater task, establish the lines of communication necessary for emergency assistance. Next, define the task as completely as possible. If there is a choice of techniques that may be used, pick the most appropriate procedure. Study the personnel requirements and match skills to tasks. Estimate the time requirements.

2. When planning a surface supplied dive into any unknown area, the decompression plan and associated procedures will be based on an imperfect knowledge of the actual conditions. As soon as possible after arrival, conduct a full onsite recce so the diving task can be well defined, and the information required in Figure 5-1-1, Planning Grid, is obtained.

3. Before man dives are conducted, the depth and current must be determined. This can be accomplished by sending the stage shot clump to the bottom with a minimum of two recording depth gauges. In addition the supervisor can utilize available charts to refine the dive plan. If the first divers determine that conditions are not as expected then the supervisor can adjust the dive plan accordingly

4. Upon completing the dive, proper reporting is essential. Whereas proper planning makes a hazardous task safer, proper reporting makes a new technique known and usable and a deficiency in equipment or training correctable. When appropriate, a ***Diving Incident and Accident form, Unsatisfactory Condition Report*** or similar standardized reporting method may be supplemented by a narrative report.

5103 Planning Grid

1. The information that is required in Figure 5-1-1, Planning Grid, is to be filled in as appropriate, depending on the location of the dive. The Supervisor must have all the relevant information at hand before starting the first dive. Figure 5-1-1, Planning Grid, may be reproduced locally.

5104 Diving Task

1. Task definition is necessary to determine the resources required. Geographical factors will affect manning, equipment and transportation requirements. For instance, the recovery of an aircraft requires support different from that for a ship's bottom survey. Figure 5-1-1, Planning Grid, shows a typical task definition format. It, or a similar format, may be locally reproduced.

5105 Safe Diving Practice

1. The successful completion of a diving operation is dependent on careful attention to details. Each is a small thing in itself, and each may be ignored successfully at some time or another in a diver's career. Investigation of diving accidents has shown that the diver who is continuously successful never ignores safe diving rules and safety regulation, while the distressed diver has fallen victim to either habitual or casual disregard of these rules and regulations. Many types of diving task are suitable for development and application of standard operating procedures. Whenever possible, these should be developed, promulgated and adhered to.

2. Surface-supplied diving is a complex evolution involving numerous personnel practising many skills. To remain "worked up", it is essential that both individuals and the entire team be exercised regularly in all normal and emergency procedures.

3. Operational SSBA diving should not be attempted by a team which is not "worked up".

5106 - 5199 Not Allocated

<table>
<tr><th colspan="4">EMERGENCY PLANNING AND TASK DEFINITION GRID</th></tr>
<tr><td>Hyperbaric Chamber / Alternate

Location</td><td>Diving Unit

Location</td><td>Air-Sea Rescue

Location</td><td>Diving Medical Officer / Hospital

Location</td></tr>
<tr><td>Contact Person</td><td>Contact Person</td><td>Contact Person</td><td>Contact Person</td></tr>
<tr><td>Response Time</td><td>Response Time</td><td>Response Time</td><td>Response Time</td></tr>
<tr><th colspan="4">TASK DEFINITION</th></tr>
<tr><td rowspan="6">Task Definition</td><td>Water Conditions

Temperature</td><td rowspan="2">Geographic Considerations

Location</td><td rowspan="6">Air Transport</td></tr>
<tr><td>Current</td></tr>
<tr><td>Depth</td><td rowspan="2">Weather FX</td></tr>
<tr><td>Visibility</td></tr>
<tr><td>Obstructions</td><td rowspan="2">Logistic Chain</td></tr>
<tr><td>Ice Cover</td></tr>
<tr><td rowspan="2">Specialized Equipment</td><td>Time Estimate</td><td rowspan="2">Personnel Req’d</td><td rowspan="2">Other Considerations</td></tr>
<tr><td>Time available</td></tr>
</table>

Figure 5-1-1 Planning Grid

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SECTION 2

DIVE PROCEDURES

5201 Attendant's Duties (Tender's)

1. The diver's attendant is the link between the diver and his supervisor. Usually, the tender is the first person to notice that something is wrong. The tender must remain alert, and be in contact with the diver at all times, and ready to render assistance at a moment's notice.

2. The attendants help the diver suit up and don equipment. They are responsible to ensure correct attachment of the umbilical. They assist him to the stage or ladder, always keeping a hand on the umbilical, close to the vest, to prevent a fall. The attendant and a back-up attendant must always be on station to help in handling the umbilical. As the diver enters the water, the attendant handles the umbilical, which should be led over a bulwark or deck edge roller whenever possible and should be kept away from sharp edges.

3. During descent, the attendant must keep all slack out of the umbilical and maintain a balanced, stable stance with both hands on the umbilical. A second attendant should provide back-up until the diver is on the bottom to prevent the attendant being jerked overboard by a sudden pull.

4. Once the diver is on the bottom, the attendant should release tension on the umbilical. This permits the diver to work unhindered, but allows the attendant to maintain contact easily. The attendant should, from time to time, take in slack until the diver's movement can be felt. Too much slack in the umbilical will make signalling difficult, hinder the attendant from catching a fall, and increase the possibility of fouling the umbilical. (See **Article 5208** on working in wrecks.)

5. The attendant constantly monitors the divers' progress, and keeps track of his position. He may do this by a number of methods:

   a. By observing the trail of bubbles. If the diver is searching the bottom, the bubbles should move in a regular pattern; if working in place, they should not move significantly. However, in open seas or strong currents it may be impossible to observe the bubbles;

   b. By feeling the pull of the umbilical; or

   c. By feeling the vibration of the pneumatic or hydraulic hoses as the diver operates the tools.

6. Where ever the diver is underwater, either working on or off the bottom, both attendants must maintain a firm grip on the diver's umbilical.

7. During ascent, both attendants must keep all slack out of the umbilical. If a descending line is being employed, the attendant must haul the diver up to his first stop. Depending upon the situation, the diver may then swing over to the stage. When a stage is being used it will normally carry the divers from the bottom, through any decompression profile, to the surface. Accurate depth control must be maintained.

5202 Diving Communications

1. The attendant should monitor both the umbilical (by feel) and the descending line (by sight), for any line-pull signals from the diver.

2. The List of ***Manual Signals*** is shown in **Figure 5-2-1**.

3. All signals are to be preceded by one pull to attract attention, except the Emergency Signal.

4. When using voice communications, traffic must be reduced to a minimum and messages kept as brief as possible. Running commentaries by the diver are generally impracticable. When several stations are on a common circuit, the identity of the speaker must always be announced at the beginning of every message (for example, “Topside, Red Diver…”).

5. Directions and orders to the diver are to be repeated completely by the diver. If the diver has been told to make a report on a particular object, for example, it is unnecessary for the attendant to repeat the report as it is made. At suitable intervals the attendant should indicate that the report is being received satisfactorily by stating “Roger” or “Understood”.

6. Radio circuit terminology should be kept to a minimum. However, the following common terms will be useful:

“OVER”	**USED AT END OF REPORT**
“ROGER / UNDERSTOOD”	**USED TO INDICATE RECEPTION OF MESSAGE**
“SAY AGAIN”	**USED TO REQUEST REPETITION OF LAST MESSAGE**
“STANDBY”	**USED TO REQUEST TEMPORARY BREAK IN A REPORT**

7. Supplementary signals in addition to those listed in **Figure 5-2-1** may be arranged by the Diving Supervisor to take care of special circumstances as they occur. See **Annex A Chapter 5, *SSBA Diving – Standard Operation Procedures***, for standard voice procedures used in surface-supplied diving.

DIVER TO ATTENDANT	
2 PULLS	Lower me; or Give me slack
3 PULLS	Take up my slack.
4 PULLS	Haul me up.
Series of Pulls not necessarily preceded by 1 PULL	**EMERGENCY HAUL ME UP ***
* Note: This signal is not to be answered but to be obeyed IMMEDIATELY IT IS ONLY TO BE USED IN GREAT EMERGENCY	

ATTENDANT TO DIVER	
2 PULLS	ON DESCENT - Stop going down.
2 PULLS	ON ASCENT - You have come up too far; Go down until stopped.
3 PULLS	Stand by to come up.
4 PULLS	Come Up
4 – 4 PULLS	Come Up Hurry Up

DIVER TO ATTENDANT AND ATTENDANT TO DIVER	
1 PULL	I am all right / Call attention / Made bottom / Left Bottom/ Interrogative
2 – 1 PULL	Send down a rope’s end. (or as previously arranged)
4 PULLS followed by 3 BELLS	Come up to your safety float; or May I come up my safety float

DISTRESS SIGNALS	
2 -2 -2 PULLS	Fouled; Require assistance
3 -3 -3 PULLS	Fouled ; but can clear myself

DIRECTION OR SEARCHING SIGNALS **NOTE:** The diver shall face the umbilical and then go in the direction signalled.	
1 PULL	Search where you are
2 BELLS	Go to the end of your distance line or jackstay.
3 BELLS	Go to you RIGHT
4 BELLS	Go to you LEFT
5 BELLS	Come in; or; turn back if on jackstay

Figure 5-2-1 Manual Signals (Sheet 1 of 2)

WORKING SIGNALS	
1 PULL	Hold on; or Stop
2 BELLS	Lower.
3 BELLS	Pull up.
5 BELLS	Have found, started, or finished my work.

HAND AND SPECIAL SIGNALS	
THUMBS UP	I am OK
HAND WAVED ACROSS FACE	I am in Trouble
ONE DIVERS SIGNAL RECALL EXPLODED UNDERWATER	All divers surface immediately

DECOMPRESSION SIGNALS – ATTENDANT TO DIVER	
5 BELL	Return to Stage
2 PULLS	Ventilate
1 PULL	Stop ventilation.
3 PULLS	Standby to come up.
2 BELLS	Travelling

DECOMPRESSION SIGNALS – DIVER TO ATTENDANT	
1 PULL	Stop
2 PULLS	Lower
3 PULLS	Pull up

NOTE: ***"PULL" – long, steady and distinct***

"BELL" – short and sharp, as in the timing and striking of a ship's bell

Figure 5-2-1 Manual Signals (Sheet 2 of 2)

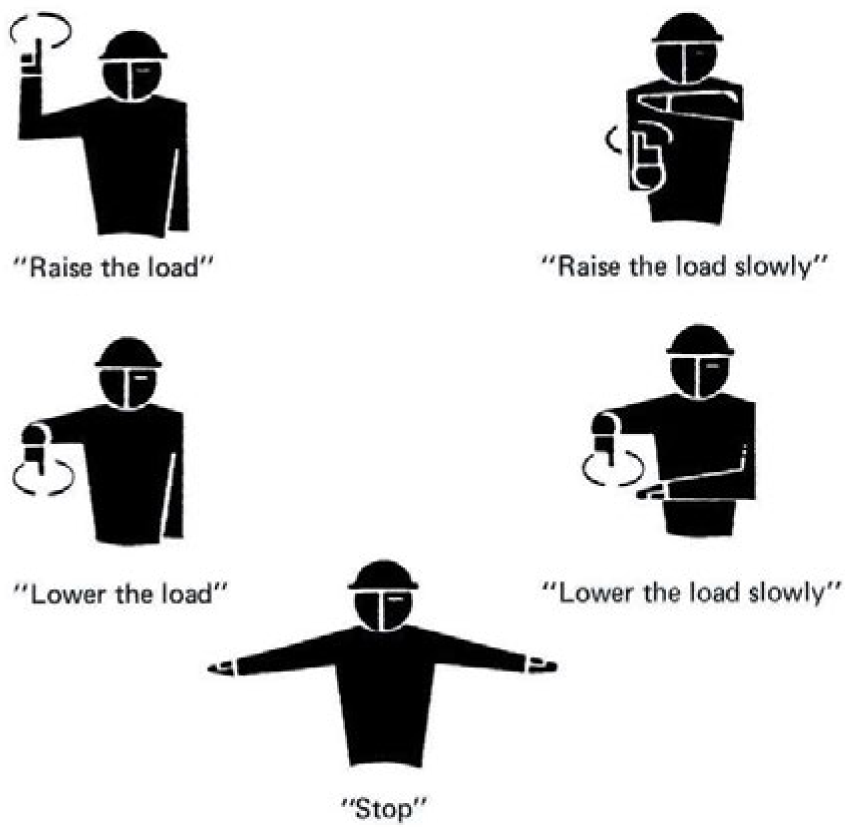


Figure 5-2-2 Winch Hand Signals

5203 Descent by Line

1. If the diver jumps into the water, the attendant must provide positive control of the umbilical and ensure to provide sufficient slack in the umbilical.

2. The diver remains at the surface until a leak check is conducted and the Supervisor is satisfied that the helmet, suit valves and communications are in working order and properly adjusted. The attendant or another diver can assist by looking for any telltale leaks. When the Supervisor is satisfied, begin the dive. At this point, the attendants haul the diver over to the descending line.

3. The diver's legs lock around the descending line and holds onto it. The air supply is adjusted before starting the descent. See **Figure 5-2-3**. ***Diving by Descending Line****:*

   a. The attendants move to one side to allow for a proper standoff angle.

4. ***In a descent by means of a descending line in a tideway***, the diver's back should be kept against the current, forcing the diver's chest against the descending line, not ***away*** from it.

5. The diver controls the rate of descent, informing the surface of the reason for any delays, (e.g.: "Ears…)".

5204 Descent by Stage

1. A single diver stands in the middle of the stage and holds on to the stage handrails for support. Two divers normally face each other from the front and back of the stage. During lifting and over-the-side deployment, the divers must grip the handrails with both hands. All portions of the diver's body and equipment must be within the structure to prevent possible injury.

2. The diver is lowered until the helmet/mask is awash. At this point, the descent is halted until the diver is checked for leaks. The diver checks and adjusts helmet/mask, suit valves, and communications, and reports when ready to dive. The diver is then lowered at a steady rate, allowing sufficient time to equalize. Communications between diver and topside are maintained throughout descent. The diver periodically reports: "OK RED / OK YELLOW". If there is a difficulty, the diver reports "STOP RED OR STOP YELLOW" and explains the problem. The diver reports when the bottom or worksite can be seen and "STOP" when on the bottom. The diver will normally step off the stage so that his umbilical passes ***under*** the top bar. This will assist in returning to the stage. However, it should be understood that the particular job scenario may preclude having the umbilical pass through the stage. See **Figure 5-2-4**, ***Diving by Stage*****.**

3. If the current is more than 1.5 knots, the diver should descend and ascend by stage rather than descending line so that travel will be as vertical as possible.

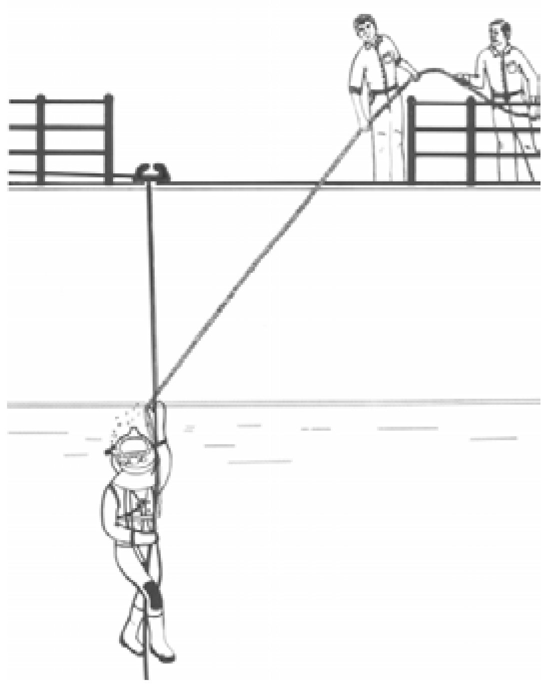


Figure 5-2-3 Diving by Descending Line

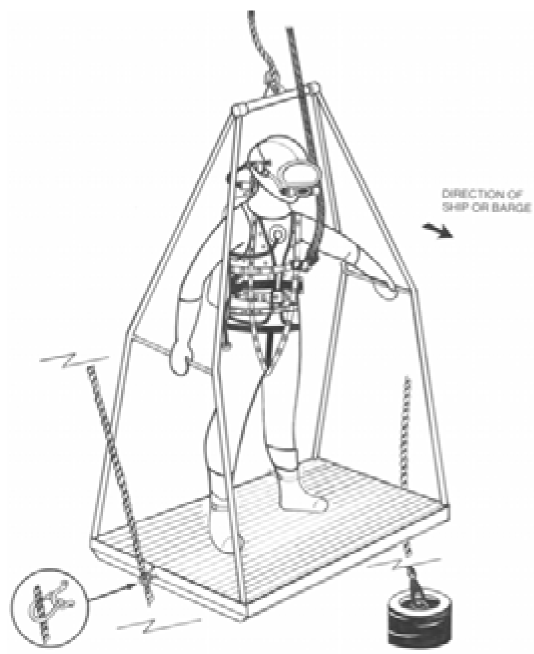


Figure 5-2-4 Diving by Stage

5205 Descent Rate

1. *Decent rate is 18 mpm or slower*. This allows the diver to equalize ear and sinus pressures, and check the descent whenever necessary. Factors limiting the rapidity of a divers descent are the possibility of a squeeze, dizziness, pain in the sinus passages, inability to equalize pressure across the ear-drums, the effect of currents, and the need to approach and unknown bottom cautiously.

2. Pain in the ears during descent *must not* be ignored. The diver must stop and clear their ears. Ascending one to two metres usually provides pressure relief, and the descent may then be continued. If the dive is to be made in deep water, and the diver has trouble for a third time, the diver should be brought to the surface and replaced by another.

3. The correct preparation of the nose-clearing device of the SSBA helmet, by adding individualized pads, will greatly assist the diver in equalizing. If having trouble equalizing, with the Supervisor’s permission a small free flow may be introduced to assist in clearing.

5206 Gas Supply Pressure

1. During descent and throughout the dive, the panel operator must ensure that the diver is being provided with gas at the required pressure over the steadily increasing water pressure. Set intermediate pressures in accordance with **Figure 5-2-5**, ***Depth for SSBA Helmet / LWSSDE Mask vs. Gas Supply Pressure.***

SSBA HELMET	**DEPTH**	***LWSSDE MASK***
Supply Pressure		**Supply Pressure**
bar	**msw**	**bar**
11.7	*Surface*	8.6
12.0	*3*	9.0
12.3	*6*	9.0
12.6	*9*	9.3
13.0	*12*	9.6
13.3	*15*	10.0
13.6	*18*	10.3
14.0	*21*	10.6
14.3	*24*	11.0
14.6	*27*	11.3
15.0	*30*	11.6
15.3	*33*	12.0
15.6	*36*	12.3
15.9	*39*	12.6
16.0	*42*	13.0
16.3	*45*	13.3
16.6	*48*	13.6
17.0	*51*	14.0
17.3	*54*	14.3
17.6	*57*	
18.0	*60*	
18.3	*63*	
16.6	*66*	
19.0	*69*	
19.3	*72*	
19.3	*75*	
19.6	*78*	
20.0	*81*	
20.3	*84*	
20.6	*87*	
21.0	*90*	

- **Rounded up pressures are shown for ease of operations.**
- **Where two divers are on a common supply, pressure is to be set for the deeper diver**
- **<u>LWSSDE Mask</u> Breathing air or gas should be supplied to demand regulator at 8.5 bar over ambient.**

- **<u>SSDE Helmet</u>**
  a. **11.7 bar is authorized for umbilical over-bottom pressure.**
  b. **11 bar is authorized for stage bailout regulator.**
  c. **10 bar is to be set for diver mounted bailout first stage regulator.**
  d. **Reduced umbilical over-bottom pressure of 10.7 bar is authorized when diving at depths of 15 msw or less.**

Figure 5-2-5 Depth for SSBA Helmet / LWSSDE Mask vs. Gas Supply Pressure

5207 On Bottom

1. The diver is to report to the surface when the bottom is in sight and when on the bottom. The diver adjusts buoyancy as necessary, orientates themselves to the bottom, checks and reports bottom conditions then plans the next move. *A minute spent at this time can often save many minutes later.*

2. The Supervisor will instruct the Console Operator to report the maximum depth the diver achieves while on the bottom. The maximum (Actual) depth is considered the depth shown on the Pneumofathometer gauge, plus 2 metres.

3. The diver should thoroughly ventilate the helmet and then adjust the demand regulator when arriving on the bottom and at subsequent intervals throughout the dive and as directed from the surface.

4. The diver should continually check that the umbilical is not fouled with other lines or obstructions.

5. Before leaving the descending line or stage, the diver should orient with respect to the descending line and the work. This may be done by direction of the current. However, the current does not always flow in the same direction on the bottom as on the surface and in tidal areas, it will change direction significantly, sometimes in a very short period of time. Consequently, the topside personnel should warn the diver if they head off in the wrong direction. The most satisfactory method of determining the direction of travel is by communication with the surface.

6. Upon leaving the descending line or stage, the diver should proceed slowly and cautiously and carry one turn of umbilical on their arm to avoid being thrown off balance by sudden communication pulls from the surface. The diver should examine the immediate surroundings reporting any wreckage or obstruction that could interfere with the dive.

7. Movement is relatively easy in slack water, but as the tidal stream or current increases, it becomes increasingly difficult to advance. This difficulty may be reduced by advancing in a stooping or crawling position, exposing less of the body area to the sweep of the current. The latter position is the easiest for underwater navigation.

8. In general, the diver should pass over obstructions. In passing around an obstruction, the diver must keep in mind the side passed, to avoid fouling on return.

9. On a rocky bottom the diver must guard against catching their suit or arms and legs in crevices or on sharp projections. If the umbilical becomes fouled, the diver must follow it back, coiling it over an arm. The attendant must maintain control of the umbilical to assist in preventing fouling.

10. On a gravel bottom, especially when walking on a slope, the diver must be on guard against slipping and falling.

11. On a mud or silt bottom, movement must be kept to a minimum to avoid stirring up silt and reducing visibility. The dry suit will need more inflation to reduce the diver's negative buoyancy or the diver's boots will tend to sink into the mud. Care must be taken that the suit does not over-inflate and cause a blow up. If sinking into the mud, the diver must relax and gradually work out by adjusting buoyancy, wriggling the body and presenting maximum surface area to gain leverage to break the suction of the mud. Over-inflation and the possibility of blow-up must be carefully guarded against when breaking loose. It may be better to call for aid from the stand-by diver than to risk blow-up. One thought should be kept in mind; mud, silt or quicksand are really just "thicker water" – not solid enough to support the body, but still with greater density than water. The primary hazard with mud bottoms comes from the concealment of obstacles and dangerous debris.

5208 Around Corners, Tunnelling, or Inside Wrecks

1. Entrapment, a cut gas hose, or collapse of the structure is an ever present hazard when a diver is working in an enclosed space or wreck, or when tunnelling. Extra precautions are therefore necessary and the attendants and safety divers must be ready for emergency procedures. See Figure 1-2-1 on readiness of the standby diver.

2. **Wrecks** - A safety diver must be stationed at the entry point when a diver is working in a wreck. In the event of voice communication failure with the surface, the safety diver must relay manual signals. The diver should enter any confined space feet first and avoid forcing through and opening which is just barely large enough for entry, without informing the surface beforehand.

3. **Working around corners** - When a diver is required to drag his umbilical around corners, a safety diver should be stationed at each corner to tend lines and pass along any line-pull signals. Such signals would be passed along on the first diver's umbilical; the safety diver's umbilical signals pertain only to the safety diver's own situation.

4. **Tunnelling** - A safety diver must be stationed at the tunnel entrance when tunnelling.

5209 Under Ships

1. When working under the bottom of a ship, the Supervisor should avoid having the diver work on the opposite side of the keel from his attendant. Such movement would interfere with proper line tending. In ship repair and salvage, consideration should be given to the need for special rigging and staging.

5210 Lines and Rigging

1. When working with or near lines or moorings, stay away from lines under strain.

2. Avoid passing under lines or moorings if at all possible; avoid brushing against lines or moorings which have been in the water long enough to become frayed and/or encrusted with barnacles.

3. If a line or mooring is to be shifted, the diver must be brought to the surface and moved to a position well clear of any hazard.

4. If a diver must work with several lines, (messengers, float lines, lifting lines, *etc.*) each should be distinct in character (size or material) or marking (colour codes, tags wrappings).

CAUTION

Never cut a line unless it is positively identified

5. When making preparations to lift heavy weights from the bottom, the lines selected must be of sufficient strength, and the surface platform must be positioned directly over the object to be raised. Prior to the lift, the diver must be completely clear of the area. When heavy strops or crane hooks are used, they should be very well marked with underwater lights. Chem-lights, hand lights or surface powered lamps may be used.

5211 Tools

1. For most underwater work, the diver will need special tools. Some of these are standard hand tools (preferably made of corrosion-resistant materials), and many others are specially designed for underwater work. Always use the proper tool for the job. Special adaptations may be required to make surface tools usable in the water.

2. Dropped tools are easily lost in limited visibility, or in silt. Since the diver can carry only a limited weight on descent or ascent, arrangements should be made on the surface to ensure that the proper tool arrives at the task site at the time the diver needs it. Tools that the diver carries should be fitted with a brightly coloured buoyant lanyard that can be slipped over the arm.

3. A heavy canvas tool bag fitted with drain holes is useful for sending tools to the diver. A special tool line with a shackle secures the tool bag to the divers descending line and leads from the surface to a point at hand to the diver, at a sufficient angle that the tool bag will sink to the task site. This tool line is also used by the surface to retrieve the tool bag. To lower larger tools, attach them to the shackle on the tool line, and control them in the same way as the tool bag. Care should be taken to ensure the shackle pin cannot accidently come free. When lowering items in dark or turbid water, lights must be attached to the item, or working line, to prevent injury.

4. Never use a tool that is not in good repair.

5. Power tools should be sent down ahead of the diver and should be returned to the surface before the diver makes his ascent.

6. The diving stage itself may be used as a worksite. This allows better organization of tools and helps prevent their loss. The stage can also help give the diver leverage or stability when applying force (as to a wrench) or when working with a power tool which will tend to transmit a force back to the diver. In underwater cutting, lack of leverage or inability to apply sufficient force is often a problem. Thought must be given to solving this problem before the diver goes to work. The diver can obtain leverage through the use of a hogging line tied to the work. This can also help keep him close to his task in a current.

7. In addition to knowing how to use a variety of tools, the diver may required training or briefing in the use of various materials, such as cement, foam plastic, and patching compounds.

5212 Preparing for Ascent

1. After the diver has completed the task or has received instructions from the surface to come up, the necessary preparations for ascent should be made immediately. The Supervisor, having previously determined the maximum depth of the diver, will make any changes required to the decompression plan and will instruct the Chartman accordingly.

2. If a special line has been used for sending down tools, the diver should request that the line be sent down to raise the tool bag or other tools to the surface prior to starting ascent. If no special line has been used the diver should return to the descending line or stage via the distance line or following the umbilical.

3. The diving stage, if possible, should be positioned on the bottom. The markers on the stage line will assist the winch operator in positioning the stage at the appropriate decompression stops; however, they are not the primary means of determining the stops. ***Readings from the Pneumofathometer are the primary depth measurements*.**

5213 Ascent

1. When everything on the surface is ready, the diver is advised to stand-by to leave bottom. The diver, after making certain that everything is clear and that there is nothing to interfere with the ascent, stands on the stage or places one leg around the descending line, as when descending, and prepares to ascend. While the diver may assist the attendant(s) primarily the diver shall be lifted off the bottom by the attendant. In general, as the surface is approached, the diver will prefer to be heavy, rather than light, to avoid blow-up. The decompression tables contained in Chapter 3 are based on the requirement that the diver be brought to the surface at a specified rate which can be controlled more accurately by the attendant than by the diver.

5214 Decompression Stops

1. During the time spent on the first and subsequent stops, the diver should check to see that the lines are clear of the descending line and the stage. Fouled lines shall be reported immediately to the attendants and they will help the diver un-foul the lines as much as possible. Similarly, when the attendants detect fouled lines, the diver shall be advised of the fact. When the lines are clear, the diver shall notify the surface. During the O2 stop, the diver must avoid all unnecessary activity or work.

2. When the diver is ascending on a stage, the diver should pay close attention to messages from the surface and in all cases endeavour to answer clearly and distinctly. When the diver is told that the stage is to be raised, the diver should confirm that they have a firm hold on the stage before reporting as ready to travel Prior to leaving the last stop, the diver must stand firmly on the stage before signalling, ready to travel to the surface, since wave action will increase rapidly as the surface is reached.

3. During the decompression period, the diver must be alert for any signs or symptoms of DCI. If any are noticed, the diver is to report it to the surface immediately.

4. Upon arrival at the surface, the diver must maintain a firm hold on the stage rails.

5. If the diver leaves the water via ladder, the attendants must provide assistance by keeping a positive control of the umbilical. The gear is heavy, and a fall back into the water could result in serious injury. ***Under no conditions should any equipment be removed before the diver is firmly on deck***.

5215 Current or Tideway

1. The Supervisor must be personally acquainted with the times and characteristics of the tides and currents, bearing in mind that the surface stream is not normally the same as the stream at the bottom. Diving in a tide is potentially dangerous and the diving supervisor must decide when conditions are likely to endanger the diver and whether the risk is justified. It is essential that the diving boat be securely moored and that communications are working.

2. The behaviour of the descending line will give a good indication of when a diver may usefully be sent down. If the tidal stream sweeps a 45 Kg clump off the bottom, it will generally be impossible for the diver to do anything on the bottom.

3. A method of diving in strong tidal streams is to anchor the boat upstream of the task and send the diver down the descending line, which angles downstream. The diver cannot return to the surface by the descending line under these circumstances unless pulled up. If necessary the diver can let go the descending line altogether. This method must not be used if the diver has to undergo decompression stops.

4. If there is any doubt of the divers' ability to control his ascent because of the strength of the current, the diver should be instructed to keep heavy and allow them to be pulled up slowly. Meanwhile the diver should, if possible, have their back to the stream and maintain a good grip on the descending line with both legs and both hands. In strong tidal streams, it will be difficult for a diver to cling to the descending line, let alone ascend it, if facing the stream.

5. The diving supervisor must ensure that the diver is called up in time to complete any necessary decompression stops and to surface before the current becomes too strong to remain on the descending line.

6. It is particularly difficult to clear a diver who becomes fouled in a strong tidal stream; therefore, the timing of the diver in relation to tidal streams is important.

5216 Bottom Searches

1. The primary method for searching on the bottom using SSBA is the circular search using a distance line. This and other standard search methods are described in **Volume 2, Chapter 5** of the ***CF Diving Manual***.

2. Once the object of a search is located, it should be marked. The diver can secure the distance line to the object as an interim measure.

5217 Cold Weather Operations

1. Cold causes the greatest reduction in diver efficiency under normal circumstances. Reduced manual dexterity, motor control and even reduced ability to make critical decisions and react to emergencies are all possible in varying degrees. See **Figure 5-3-5.**

2. Anyone working outdoors in severe cold must be aware of the possibilities of hypothermia and guard against it. Strict adherence to the lessons and procedures taught in winter environmental training and consideration for supporting personnel, as well as, divers will prevent such danger from developing. See **Figure 5-2-7**.

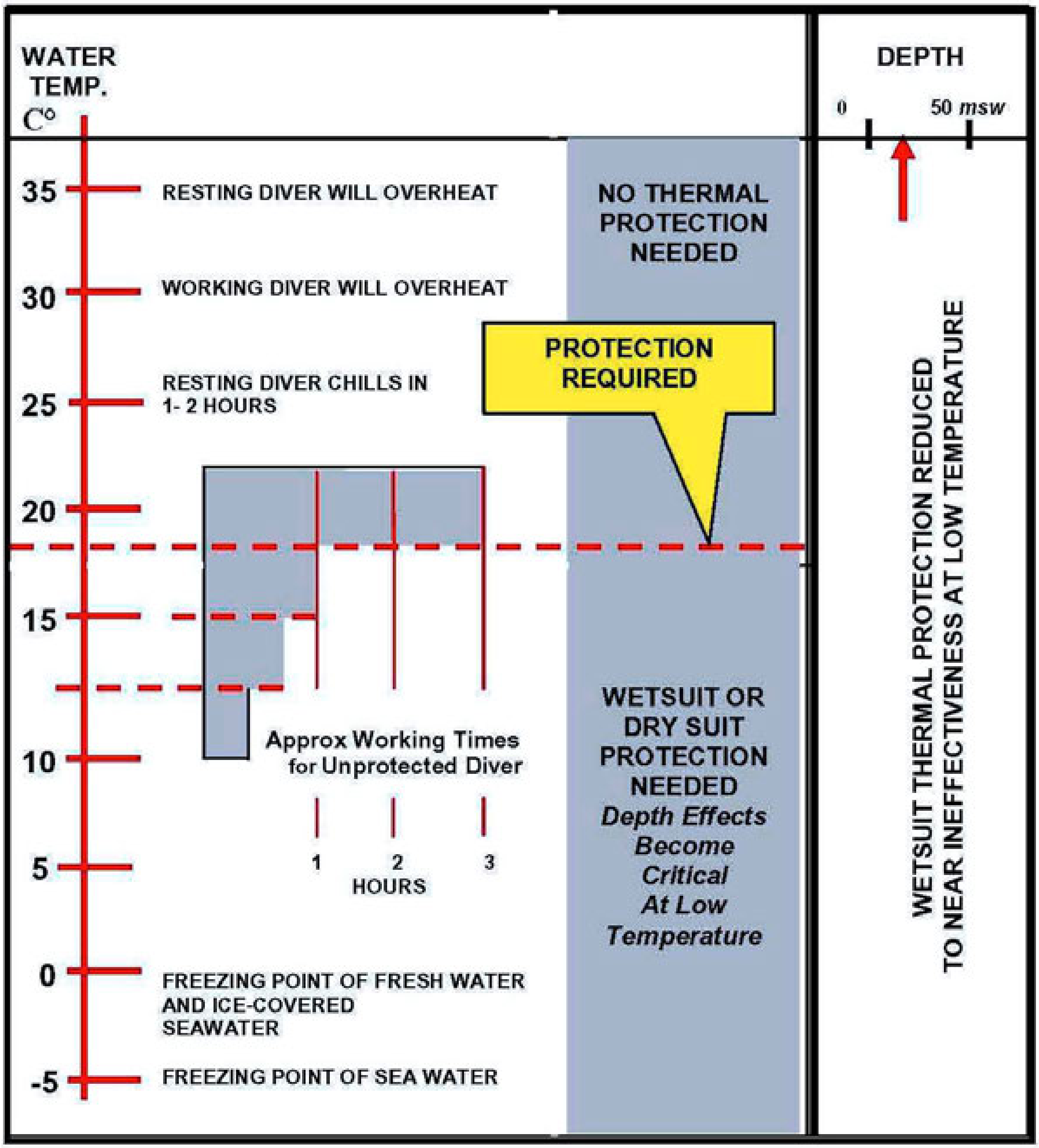
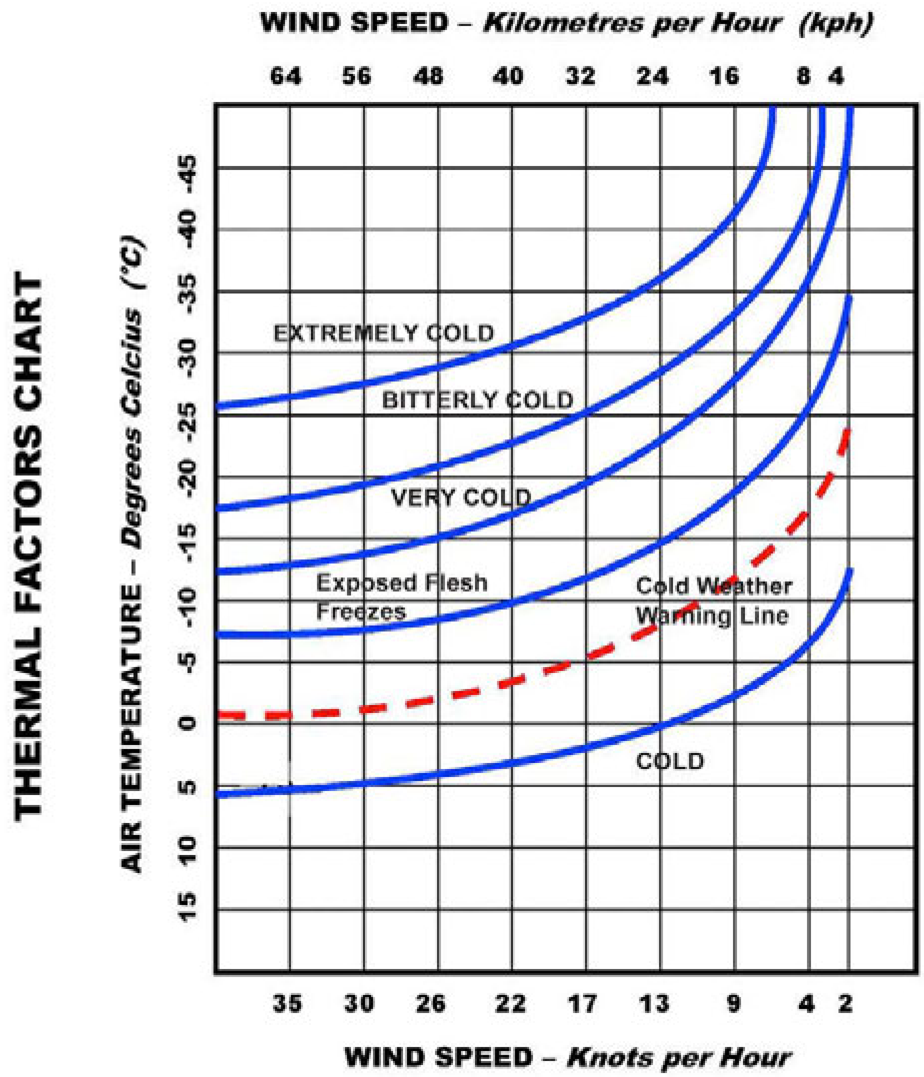


Figure 5-2-6 Thermal Factors Affection Diving Personnel; Underwater



For example: At -10°C with a wind speed of 17 knots per hour, the point of intersection lies to the right of the Cold Weather warning line. Therefore, precautions for cold weather operations should be taken.

Figure 5-2-7 Thermal Factors Affection Diving Personnel Above Water

3. The body restricts the flow of blood to the surface of the skin in order to maintain body core temperature. If the skin temperature drops below 10°C, all sense of touch is lost. If the temperature continues to drop below freezing, all circulation stops and frostbite occurs. Frostbite can be prevented by protecting skin from exposure, by avoiding alcohol, and by avoiding smoking, which constricts blood vessels and increases the probability of frostbite. All personnel on the surface must be briefed to watch others for signs of frostbite, as this often is the best method of avoiding serious injury. Frostbite symptoms are initially tingling and redness, followed by paleness and numbness of the affected area. Slow re-warming is recommended unless medical personnel are available, when rapid warming may be used. Hot, high energy drinks should be administered. Recovery has been known when affected parts were black and the necessity of amputation seemed clear. Therefore, slow, careful and determined first aid is needed. Severe pain will be experienced upon re-warming of parts.

4. Divers and support personnel frequently work on the ice for long periods in direct sunlight. Snow-blindness is caused by extreme exposure to the ultra-violet rays of the sun that penetrates mist and fog and can be reflected from the snow. Goggles or sunglasses shall be worn to assist in the prevention of snow-blindness.

5218 Ice Diving in SSBA

1. Ice diving procedures are dealt with in Volume 2 of the ***CF Diving Manual***. However, additional instructions relating specifically to ice diving in SSBA, are given in this Article.

2. Generally, SSBA is not used in ice diving because of the complex surface support required. Self-contained equipment has the advantages of lightweight, mobility, rapid deployment and freedom of movement of the diver. However, because of the limited endurance and depth capability of CABA and the lack of a diver's heating system with the LWSSD system, it may be necessary to use SSBA in such operations as aircraft crash investigation or other urgent salvage, recovery or repair tasks.

3. A SSBA ice diving operation will invariably be ordered for lengthy or complex tasks. However, it cannot be overemphasized that, because of the environment, additional time will be required to set up, conduct and terminate the dive. The following activities are additional to the normal preparations for a dive in temperate areas:

a. Clearing a suitably large work area and dive site of snow, *etc*;

b. Preparing entry holes;

c. Erecting accommodation, dive site, changing station and ancillary equipment shelters;

d. Providing a supply route; and

e. Maintaining the dive site, holes and supply routes.

NOTE

In northern regions, long nights or continuous darkness may hamper surface work.

4. If it is anticipated that decompression will be required, the diver's thermal protection must be adequate and conservative decompression procedures used if necessary.

5. If a hyperbaric chamber is required on site it will likely be a small portable type, and will require thorough protection against the elements and provision for temperature control arrangements such as space heater and fire resistant blankets.

6. The helmet should be kept in a warm place before diving. It is important that the diver tests the helmet and regulator in a warm place, and not wear it while on the surface or in an exposed, cold location, for longer than necessary. The diver's time on the surface should be kept to a minimum. Once in the water, chances of a malfunction are minimal. However, if a regulator is allowed to free-flow at depth for as little as five seconds, freeze-up may occur. The diver should therefore, avoid purging the demand regulator when diving in cold water (below 3°C). Finally, the air supply must meet the dryness requirement of CFTO D-87-003-000/SG-001, ***Purity of Compressed Air and Gases for Divers***. The best preventive measure against harsh environmental conditions which induce freeze-up is provision of surface shelter over the dive site. A heated tent or hut will greatly reduce the chances of diving equipment malfunction owing to cold.

5219 Hot Water Heater – Use

1. If hot water heating system is used and is essential to the safety of the diver, a secondary supply must be available.

5220 – 5299 Not Allocated

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SECTION 3

GUIDE TO EQUIPMENT CHECKS

5301 Introduction

1. This section provides a standard sequence for operating the diving support system and SSBA during surface supplied diving operations.

2. ***DO NOT TAKE SHORT CUTS IN THESE POCEDURES***

5302 Support Systems

1. The support systems and equipment required (i.e. other than equipment worn by the diver) are:

a. Air compressors;

b. Air and gas storage banks and distribution piping;

c. Hyperbaric chamber;

d. Diving Control Panel;

e. Appropriate Manuals;

f. Hot water heaters;

g. Stage, deck winch, handling gear, and guide lines;

h. Umbilicals; and

i. Communication.

5303 Air and Gas Supply

1. Ensure air compressor and gas supplies are in date for purity test and system certification. If a possibility of doubt about purity or mixture content exists, these must be checked.

2. Ensure that sufficient air and gases are available.

3. Bring primary and secondary banks on line to Diving Control Panel and hyperbaric chamber. Record all pressures.

4. Start up and check air compressors and top up air banks if necessary.

5304 Hyperbaric Chamber Start-up

1. Bring chamber on line, ready for immediate pressurization.

2. Conduct pre-dive checks on chamber air supply, BIBS, communication, lighting, and ensure required equipment and clothing are available.

3. Have a copy of ***Hyperbaric Chamber Operation*** available (Volume 5 of the ***CF Diving Manual***).

5305 Diving Control Panel Start-up

1. Adjust regulators to bring primary air or gas on line to outlet valves.

5306 Stage and Handling Gear Checks

1. Shackle the stage to the lift wire (do not use a hook). Mouse all shackle pins with flexible stainless steel wire.

2. Check the operation of the winch by lifting the stage from the deck and lowering it back in place, while carrying weights equivalent to the intended load.

3. Ensure that the lifting equipment is in date for static and running load tests. A tally plate should be affixed with this information displayed.

4. Ensure that any tools and equipment which are to be carried on the stage to the job site are aboard and thoroughly secured.

5. Deploy descending line(s) for the diver(s) and stage.

6. Check water depth.

7. Stage is lifted outboard and the guide eyes secured to the weighted shot lines. The stage is lowered to the bottom and returned to the surface checking travel rates. Depth gauges shall be attached to the stage to confirm depth.

5307 Divers' Umbilicals

1. Ensure umbilicals are in date for air samples and weight test.

2. Ensure umbilicals will pay out freely.

3. Check hoses and cables for damage, chafing and kinking.

4. Check end connectors.

5. Secure the inboard end of each umbilical to a deck cleat or other firm fastening.

6. Connect hoses and cables to Control Panel outlets and to the water heater outlet. Ensure that there is no strain on the connections.

5308 Water Heater Start-up

1. Information for the operation and maintenance of the Hot Water Heater may be found in CFTO C-87-198-000/MS-001, Operation and Maintenance of DUI ECONO Hot Water Heater.

WARNING

Failure to purge for 30 seconds may be dangerous.

WARNINGS

1. **Starting Burner after Ignition Failure** Do not attempt to restart burner when
   - (a) Excess oil has accumulated,
   - (b) When combustion chamber is full of oil vapours or
   - (c) When the combustion chamber is very hot.
2. Press reset button on primary control should start burner. Do not attempt this more than twice.
3. Do not fill the oil tank while burner is operating.

5309 Suits and Accessory Equipment

1. The diver is responsible for checking the equipment listed in this article prior to commencing the dive. This examination is one of the standard pre-dive checks. Although some of the equipment may have been previously checked by other personnel prior to the day's operations, each diver must confirm that the equipment is in sound condition.

2. The diver dons the following essential equipment:

   a. Suit (including underwear or liner as applicable) (Chapter 4, Section 3);

   b. Vest (including weights and emergency cylinder);

   c. Diving knife; and

   d. Weighted boots or fins.

3. The diver may wear the following optional equipment:

   a. Helmet-mounted camera and lights, or

   b. Helmet mounted lights

4. Secure the umbilical to the diver's vest or harness in such a way that it may not be released accidentally.

5. Connect the end fittings of the umbilical to the corresponding fittings to the helmet and suit:

   a. gas hose;

   b. communications;

   c. suit inflation whip or hot water hose; and

   d. heating whip shroud.

6. Pneumofathometer hose free end is secured at the diver's chest level

7. The standby's state of readiness shall be as stated in **Article 1205.**

5310 Communication Checks

NOTE

The communication set should be operated on a flat surface where it will not fall or slide, or be exposed to excessive salt spray. When possible, locate the unit away from other electronic equipment, electrical motors, generators, or other sources of electromagnetic interference.

Communication Checks, Helle Communication Set	
1. Connect the divers helmet communication whips to their umbilicals	
2. Plug in the connectors to the surface unit.	RED --------------- to "DIVER 1" or "DIVER 2" as appropriate BLACK ------------- to "EXTERNAL SPEAKER".
3. If operating on external power, switch to 115 Volt or 230 Bolt setting as appropriate for power input.	
4. Turn the TENDER VOLUME switch <u>clockwise</u> to turn the set on.	
5. Divers give a short count into their helmets on deck. Reception is monitored at the set.	
6. Adjust for the desired volume at the speaker. Be sure the SPEAKER switch is in the ON position. Verify that the TENDER VOLUME switch adjusts the audio output of the speaker.	
7. Depress and hold the AUTO/LISTEN/TALK switch to the TALK Position, and speak into the speaker.	
8. Adjust the DIVER VOLUME control knob to obtain the required audio output to the diver microphones.	
9. Place the UNSCRAMBLER selector switch in the MODE 1 position. Place the DEPTH IN FEET selector knob in the AIR CHECK position. Have another person speak into the diver's helmet. The system should continue to operate normally with only a slight decrease in voice clarity.	
10. Slowly rotate the DEPTH IN FEET selector knob <u>clockwise</u> while another person speaks into the diver's helmet. As the control is rotated, the monitored voice should become progressively lower in frequency until it becomes almost completely unintelligible beyond 1000 feet (300 metres).	
11. Adjust the DEPTH IN FEET selector knob to the depth of the divers, and then adjust it slightly for the most natural sounding voice and best intelligibility. Once the DEPTH IN FEET selector knob has been set, it requires no further adjustment unless the depth or the oxygen-helium mixture is changed.	

Figure 5-3-1 Communication Checks, Helle Communication Set

NOTE

Using the helium unscrambler circuit, the diver should speak distinctly at a slow to moderate speaking rate without unnaturally forcing their voice to drop in pitch. Also, he should speak loudly enough to override ventilation noises. Practice speaking sessions with the diver able to hear his own corrected speech are helpful to improve speaking technique.

5311 SSBA Helmet Pre-Dive Checks

1. The First dive of the day check list stated below shall be performed by the first diver and a Pre-dive check off sheet signed by that diver. This is to be retained with the rough dive sheets.

2. For all the following dives for that day, the diver shall carryout the, ‘Prior to each Dive” checks and inform the Dive Supervisor that they are conducted

SSBA Helmet Pre-Dive Checks	
During preparations at the beginning of the day's diving	***By the diver prior to each dive***
1. Visually inspect all rubber and moulded plastic components for cracking and fatigue.	1. Ensure that the nose-clearing device slides in and out easily.
2. Inspect all metal components for loose mounting bolts, severe dents, or cracks, etc	2. Apply a thin film of anti-fogging agent to the faceplate. Wipe off any excess. A mild, unscented liquid soap may be used.
3. Check that the lock nut and adjustment nut are secure and properly adjusted on the neck clamp and seal	3. Fit earphones into side pockets of headliner
4. Check the one-way valve as follows: • Open the steady flow valve. • Shut the emergency valve. • Create a vacuum on the inlet adapter and place the tongue against the inlet. If a leak is detected, the one-way valve must be dismantled and, if necessary, replaced with a functioning one.	4. Ensure that headliner is individually adjusted and correctly attached
5. Connect the first stage to the side block assembly.	5. Ensure that the oral-nasal mask is a close fit and is correctly attached. Ensure proper alignment of oral nasal non-return valves to allow flow of gas from helmet space to oral-nasal.
6. Check the emergency cylinder, ensuring that it contains the same gas mixture as that used for the dive.	6. Ensure that only moderate force is required to lock the neck clamp into place. The locking tension should be tight but not "forced" to the point of bending the lever
7. Connect the gas supply hose to the main gas supply inlet fitting.	7. Ensure that the interior of the neck dam has no small tears or damage likely to cause leakage.
8. Connect communication whip to communication cable.	8. Check the emergency cylinder pressure. The minimum pressure required is 193 bar (gauge).
9. Confirm there is flow of gas by depressing the demand regulator purge button.	9. Bring air online to the helmet.
10. Test communications with surface station.	10. Confirm there is flow of gas by depressing the demand regulator purge button.
	11. Test communications with surface station.

Figure 5-3-2 SSBA Helmet Pre-Dive Checks

5312 Donning SSBA

1. Prior to donning helmets, ensure that each diver is dressed correctly with regard to suitand other equipment.

2. Attendants place helmet on their diver and clamp in place. **Article 4212**.

3. Connect first stage to emergency cylinder.

4. Each attendant verifies that the emergency valve on the side block assembly is closed by turning the knob.

5. Open the emergency cylinder valve fully.

6. Confirm that the suit inflation valve is functioning (if used).

7. Secure each diver's umbilical to their weighted vest using carabiner clip.

8. Set the gas supply pressure IAW Figure 5-3-4. (In this case the surface.)

5313 SSBA Helmet Breathing System Check

1. Confirm that demand the regulator purge valve is functioning.

2. Open steady flow valve and ensure that there is adequate flow. Close steady flow valve.

3. Adjust regulator adjustment knob.

NOTE

Turn out until a free flow is created and then turn in until the free flow is stopped. See **Article 4206** on regulator adjustment.

4. Inform diver that the main gas supply valve will be shut off.

5. Test emergency gas supply system.

6. Shut emergency valve

7. Open main gas supply valve.

8. Test flow of water for hot water suit (if used).

9. Instruct diver to immerse in the water and check for leaks.

10. Diver signals, "***Ready to dive***".

5314 Standard Procedure for SSBA Diving

1. This procedure starts at the point where the divers are dressed and ready for their helmets. See **Annex A, Chapter 5**.

5315 SSBA Helmet Doffing

1. Remove helmet.

2. Shut off breathing gas to supply hose.

3. Bleed down gas supply hose at helmet.

4. Back off regulator adjustment knob.

5. Shut emergency cylinder valve.

6. Open emergency valve on side block to bleed down emergency hose.

7. Disconnect helmet from umbilical.

8. Remove helmet inner liner, and squeeze out water (do not twist or wring the foam), then hang to dry.

9. Wipe the inside of hat and clean the oral-nasal mask. Remove any sand or dirt from inside faceplate.

10. Perform post-dive routine.

5316 Shutdown

1. **Stage and Handling Gear:**

    a. Secure stage.

    b. Recover and secure guidelines.

    c. Secure winch.

2. **Water Heater (See Article 4406.)**

    a. Shut down of the Hot Water Heater may be found in CFTO C-87-198-000/MS-001, Operation and Maintenance of DUI ECONO Hot Water Heater.

3. **Umbilicals:**

    a. Cap ends of all supply hoses, to preserve cleanliness.

    b. Check fittings and hoses for damage.

    c. Stow umbilicals.

4. **Diving Control Panel:**

    a. Close inlet valves.

    b. Bleed down, back off regulators.

c. Close outlet valves.

d. Cap all outlet connections to maintain cleanliness.

5. **Communications:**

a. Shut down surface set.

b. Charge battery (if necessary).

c. Stow set.

d. Wash umbilical electrical connectors in fresh water and allow to dry.

6. **Pneumofathometer:**

a. Disconnect and secure.

7. **Diver's Suits / weight vest:**

a. Divers shower in suits or wash them in fresh water.

b. Check valves, zipper, seals, fabric, for damage and cleanliness.

c. Repair if necessary and stow.

d. Wash and check vest, then store.

8. **Chamber:**

a. Shut down one hour after completion of decompression, upon receiving authorization to do so from the Diving Supervisor.

9. **Air and Gas Supply:**

a. Close bank outlet valves.

b. Note bank pressures and gas consumption.

c. Replace empty oxygen and mixture cylinder.

d. Shut down air compressors after topping up banks.

5317 Documentation

1. Complete the timekeeping and diver records, decompression records and diver charts.

2. Supervisor checks dive log and ensures that all documentation is retained in log.

3. Dive Supervisor's Work Sheets must be retained by the unit conducting the dive for a period of five (5) years.

5318 – 5499 Not Allocated

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SECTION 4

SAFETY DURING UNDERWATER WORK

5401 Introduction

1. Divers use a variety of underwater work tools, including cutting and welding equipment, and pneumatically or hydraulically-powered tools. Operating procedures for these types of equipment are provided in other manuals. Safety procedures which are mandatory when cutting, welding or using power tools underwater are stated in this section. Other aspects of underwater work safety are also discussed in this section.

5402 Safety When Cutting and Welding

1. The main sources of danger when cutting and welding underwater come from explosive gases, pieces that fall from the work, and electric power.

2. In underwater cutting and welding operations using electricity, it is mandatory to take precautions to protect the diver from electric shock from the cutting, welding, or any other electrical circuit. This is especially true in sea-water, which is an excellent conductor of electricity. In operations involving oxygen cutting, constant alertness must be maintained to prevent the flame from coming in contact with the diver, the divers dress, lines, or hoses.

3. All personnel concerned with underwater welding and cutting operations are to make themselves thoroughly conversant with these regulations. Compliance with them is essential to diver safety.

5403 General Cutting and Welding Precautions

1. The general precautions to be followed in underwater welding and cutting are as follows:

   a. Personnel designated to operate underwater welding and cutting equipment shall be qualified divers who have been properly instructed and qualified to operate such equipment. They are to be assisted by experienced attendants;

   b. Only approved equipment, such as torches and holders, regulators, and hoses that have been examined and tested and found to be safe shall be used. Inspect all equipment for worn or damaged parts and insulating material before starting operations;

   c. In underwater operations, an attendant shall be assigned to the care and control of the cutting and welding gas supply. The attendant shall be positioned so as to have unhindered, quick access to the valves in case of an emergency;

   d. Before starting any cutting or welding operation, ensure that there are no highly combustible or explosive materials, whether gases, liquids, or solids, within a radius of at least 50 feet of the working area;

   e. Oxygen under pressure reacts violently with oil or grease. Oxygen cylinders, valves, regulators, hoses and other apparatus and fittings shall not be handled with oily hands, gloves, or greasy materials, or transported or stored where they can become fouled with oil or grease;

f. A jet of oxygen shall never be allowed to strike an oily surface, greasy clothes, or enter a fuel tank that has contained a flammable substance.

WARNING

Oxygen must never be used as a substitute for compressed air.

5404 Surface Safety Precautions for Arc Cutting and Welding

1. Only approved electric welding machines and accessories that have been tested and found to conform to the service specifications shall be used. The equipment shall be operated at all times according to the procedures and precautions specified by the supplier and according to the safety precautions in this section. Precautions to be observed at the surface in operation of arc cutting and welding equipment are listed below. **Articles 5508 to 5510** deal with underwater precautions:

a. The welding-machine operator shall ensure that the welding machine frame is grounded before starting operations.

b. The welding-machine operator shall ensure that neither terminal of the welding machine is short-circuited, or can become short-circuited, to the machine frame before starting operations;

c. The welding-machine operator shall ensure that all electrical connections are securely made before starting operations;

d. The welding-machine operator shall, whenever practicable, stand on dry wooden mats or similar insulating material and not on grounded metal structures;

e. Personnel shall wear dry rubber or rubberized-canvas gloves in good condition when handling energized holders, torches, cables, or machines. The diver should wear good quality rubber “kitchen” gloves underneath appropriate neoprene mitts or gloves;

f. Welding-machine commutators shall be kept clean to prevent excessive flashing;

g. Power supply cables and welding or cutting cables shall be kept separated and not allowed to become entangled;

h. Welding cables shall be kept dry when practicable and free of grease and oil to prevent premature breakdown of the cable insulation;

i. Welding cables shall be maintained in good electrical and mechanical condition to avoid unnecessary hazards;

j. Long cables on deck shall be substantially supported overhead when practicable. When this is not practicable, the cables shall be protected from damage and arranged to prevent interference with personnel or with safe passage; and

k. Welding equipment used in the open shall be protected from harsh or wet weather conditions. When not in use, the equipment shall be stored.

5405 Safety Switch

1. The use of a positive-operated disconnecting safety switch in the cutting or welding circuit is mandatory to protect the diver. Full control is obtained by switching the current on only when the diver is actually cutting or welding or when the electrode is positioned for starting or stopping the operation. To make these switches effective for safeguarding the diver, only approved safety switches that have been found safe by all practicable tests and examinations shall be used. The procedures outlined in **Article 5408** must be followed.

2. When a single-pole disconnecting switch is used, special care must be taken to ensure that the switch is not being shorted out. This can be done by making certain that the cable between the welding machine and the switch is fully insulated along its entire length, and is not wet, bruised, or worn, and that cables do not lie on a steel deck, constituting a potential source of danger.

3. Regardless of type, the disconnecting safety switch shall be located so that the diving attendant on the communication system can operate or oversee its operation at all times that the diver is below the surface. The attendant shall not operate the switch, nor open or close the circuit, unless specifically directed by the diver to do so. When so directed, the attendant shall confirm each change with the diver.

5406 Underwater Power Cables

1. Safety precautions related to the use of power cables and cable connectors for underwater operations are as follows:

a. All parts of submerged cables shall be fully insulated;

b. Inspect cables and cable connections for damaged insulation before starting operations. Defects in the cable must be repaired or the cable replaced before starting operations;

c. Use only approved welding cables thatare completely insulated, flexible, and conform to the service specifications. They must be capable of handling the maximum current requirements of the work in progress;

d. When connecting lengths of cable, use substantial connectors that have a capacity equal to or greater than the cable;

e. All connections shall be made tight and thoroughly insulated by tape or other means. Give all of the underwater connections a tight final wrapping of rubber tape to prevent loss of current at connections;

f. Make sure that all cable within 3 metres of electrode holder is continuous, *i.e*. free of splices;

g. Connect and arrange the ground cables to the work so that the diver's body is never between the electrode and ground side of the welding circuit; and

h. Power cables that are used for underwater work shall not be used for topside work, where damage through wear and tear would render them a serious hazard when used underwater.

5407 Diving Dress When Cutting and Welding

1. To protect the diver during underwater cutting and welding operations, it is extremely important that the diving dress and equipment shield against electric shock and eye injury. The following rules must be observed to ensure the safety of the diver:

a. The diver shall not have any part of the body in contact with the grounded work when the safety switch is closed. There is the possibility of touching an electrode, thereby completing the electrical cutting/welding circuit;

b. The diver must be clothed in diving dress that fully insulates from all electrical circuits, including torches, electrode holders, the grounded work, electric igniters, and the water itself;

c. Either a foam neoprene drysuit or an incompressible drysuit is suitable for underwater cutting or welding. If the suit is in good condition and has no holes or tears in it. The SSBA helmet is preferable to the LWSSDE mask, as it keeps the diver's head dry and does not conduct an electrical current. Any metal components of the helmet that may touch the diver's face must be insulated with rubber tape or in some other suitable way. This protection for the diver is required regardless of whether AC or DC current is used;

d. A wetsuit may be used for arc cutting or welding operations, providing the following conditions are met :

(1) At no time is AC current to be used, as a wetsuit cannot be fully insulated,

(2) The wetsuit must be in good condition, with its cellular structure intact, and the suit itself free of tears, holes, or other defects that might impair its electrical insulating properties;

e. The use of rubber or rubberized-canvas gloves is mandatory. Good quality kitchen rubber gloves are effective and permit the dexterity required. However, they must be worn inside neoprene wet or hot water suit gloves; and

f. Divers shall wear a supplementary welding-lens faceplate whenever performing electric arc cutting or welding. This faceplate should be fitted with No. 6 or No. 8 welding glass. See Article 4310 and Figure 4-3-5.

2. The diving dress, wet or dry, shall be inspected for holes or tears that could permit direct contact with the electrode or ground, or with any other current-carrying parts of the cutting or welding circuit. Suits containing such defects shall not be used.

5408 Underwater Procedures When Cutting and Welding

1. Extreme care should be taken by the diver to observe all safety precautions when engaged in underwater cutting or welding operations. The diver must be constantly alert for unforeseen circumstances resulting from a combination of underwater hazards, such as adverse currents, unstable footing, poor visibility, confined working spaces, and the dangers of handling explosive gases and electrical circuits. The diver should observe the following precautions:

a. The current shall be off at all times except when the diver is actually cutting or welding, or when the electrode is in the cutting or welding position;

b. The current shall be off at all times while the diver inserts the electrode into the holder, locates the starting point, holds the electrode against the work, and while the diver is positioning. When fully positioned and ready to cut the diver signals: "SWITCH ON". The safety switch is then closed;

c. When the electrode is consumed, or the operation is finished, the diver tell the surface, “CURRENT OFF”. The attendant shall not confirm the request until the circuit is broken; that is, until after the safety switch is opened. At the same time the diver shall hold the cutting or welding position until signalled: “CURRENT OFF” and has received the report back that the current is off. The diver may then remove the electrode stub or carry on with the next task.

d. The positive operating safety switch must be placed in the cutting or welding circuit in such a position that it cannot be closed accidentally by gravity. It must also be close enough to the attendant to ensure constant control of the switch and that the welding circuit can be opened or closed as requested by the diver.

2. The electrode holder or oxygen arc torch should be handled as though it were a loaded pistol. The bare end of the electrode, which is an exposed terminal of the cutting or welding circuit, shall not be pointed toward the diver’s body or helmet. Special care should be taken not to touch the helmet with the electrode or any part of the electrode holder or torch. Ensure that all current-carrying parts of the electrode holder are fully insulated.

3. Since it is possible that there may be some electric contact between the diver and the electrode holder or torch, care must be taken to avoid touching the work with any metallic part of the diving suit, helmet or accessory gear.

5409 Underwater Explosive Gases

1. In underwater cutting or welding operations, all possible precautions must be taken to guard against explosions of entrapped gases. When cutting into a compartment, it is mandatory to vent the compartment before starting cutting. Also, ensure that adjoining compartments do not contain trapped explosive gases.

2. Explosive gases may result from a variety of chemical reactions, some of which are not obvious to the inexperienced diver. Explosive gases may be produced as follows:

a. The actual process of oxy-arc cutting will produce hydrogen gas. Analyses have shown that 70 to 92 percent of residual gas is hydrogen.

Hydrogen is highly explosive. **—**

The UK Institute of Diving Contractors has reported that several experiments have been conducted into unexplained blowback while cutting. It was determined that a cutting rod underwater could ionize sufficient hydrogen to fill the hollow centre of the rod. When an arc was struck the hydrogen exploded with sufficient force to blow the faceplate out of a

SSBA helmet. To eliminate this hazard during the conduct of oxy-arc cutting by CF divers, ‘oxygen is to be switched ON and left running prior to striking an arc to ensure all hydrogen is flushed clear’:

b. Diesel, gasoline and aviation fuel mixed with various gases, particularly oxygen from cutting operations, will produce highly explosive mixtures;

c. Paints, solvents, oil, *etc.* mixed with oxygen will explode;

d. Vegetable or animal matter, through decay, will produce toxic and explosive gases, without any additional oxygen being added; and

e. Deteriorating explosives and ammunition can produce toxic and explosive gases;

3. Generally, warmer water will accelerate the production of explosive gases resulting from decay or deterioration.

4. Venting of compartments may be done with drills, mechanical cutting gear or explosive charges, providing damage will not impede operations. When cutting into compartments that are lagged, oxygen will accumulate in the lagging and produce explosions. Cutting in small patches will permit the diver to remove lagging by hand, preventing further oxygen retention as the cut progresses around the larger perimeter of the piece being removed.

5410 Underwater Cutting – Other Hazards

1. The diver should make a careful examination of the work before starting to cut. There is always the danger that the target piece cut away may fall or roll over, pinning or fouling the diver. The diver should determine where and how the cut piece will fall and whether there are any pipes, wires, or projections on it to foul lines or cause the piece to swing around in an unexpected way.

2. When cutting away all but the simplest pieces, or when there is any possibility that a piece may fall in a dangerous way, precautions must be taken to control the situation. A crane and strop may be used to take the weight in a safe direction. The piece may be cut away until the crane can tear it free of the remaining connecting sections; the diver must be well clear during this process. Whenever possible, the diver should return to the surface before tearing free.

3. When tearing free, it is essential that the strop passed through the window cut in the target piece be capable of taking the load. Parting such a strop under load could risk serious injury to personnel or severe damage to equipment.

4. When cutting operations are conducted under less than ideal conditions (visibility, current, sea state or depth) it is most important that the diver’s head be protected by a hard hat. The helmet is, therefore, the best outfit from the point of view of physical protection, shock protection and communication clarity.

5411 – 5499 Not Allocated

ANNEX A
CHAPTER 5

SSBA DIVING
STANDARD OPERATING PROCEDURES (SOP)

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ANNEX A
CHAPTER 5
SSBA DIVING
STANDARD OPERATING PROCEDURES (SOP)

No.	Action / Statement	Action By	Air	HeO2
1	**PRE-DIVE CHECKS**	**Supervisor**	X	X
2	**HELMETING DIVERS**			
	a. Confirming **AIR** is online to all helmets	**Supervisor**	X	X
	b. **"HELMET STANDBY DIVER"**	**Supervisor**	X	X
	c. **"HELMET ON AND LOCKED, PINS IN, EMERGENCY CYLINDER OPEN, ______ BAR ____ / ____ MIX, EMERGENCY VALVE IS SHUT, SUIT INFLATION (or hot water) HOOKED UP, LIFELINE SECURED WITH CARABINER AND LOCKED. READY FOR SYSTEMS CHECK."**	**Tender**	X	X
	d. **"STANDBY DIVER – STAND BY FOR SYSTEMS CHECK."**	**Supervisor**	X	X
	e. **"STANDBY DIVER - STANDING BY FOR SYSTEMS CHECK"**	**Standby Diver**	X	X
	f. **"STANDBY DIVER – CONDUCT SYSTEMS CHECK."**	**Supervisor**		X
	g. The diver checks purge, checks steady flow, adjusts regulator. **"STANDBY DIVER – SYSTEMS CHECK CORRECT."**	**Standby Diver**	X	X
	h. **"STANDBY DIVER – STAND BY TO SHIFT TO EMERGENCY MODE."**	**Supervisor**	X	X
	i. **"STANDBY DIVER – STANDING BY TO SHIFT TO EMERGENCY MODE."**	**Standby Diver**	X	X
	j. **"CONSOLE – AIR OFF TO STANDBY DIVER."** Console operator will shut AIR off to the standby diver and report**.**	**Supervisor**	X	X
	k. **"STANDBY DIVER – BLEED DOWN."** The diver will open the steady flow valve and bleed down the umbilical, Without direction the diver will then open the emergency valve	**Supervisor**	X	X
	l. **"STANDBY DIVER ON EMERGENCY."**	**Standby Diver**	X	X
	m. **"STANDBY DIVER SHORT COUNT"**	**Supervisor**	X	X

No.	Action / Statement	Action By	Air	HeO2
2 Cont'd	**HELMETING DIVERS Cont'd**			
	n. The standby diver will give a short count. Supervisor must listen for voice change if HeO2 diving.	**Standby Diver**	**N/A**	**X**
	o. While the diver is breathing from the emergency supply, the tenders will apply a light coat of leak detector to the valves and report status to the Supervisor.	**Supervisor**	**X**	**X**
	p. "STANDBY DIVER – OFF EMERGENCY" The diver must completely close the side valve and the Supervisor checks that it is closed before proceeding. Standby diver will, without direction, report when off emergency supply		**X**	**X**
	q. **"**CONSOLE – MIXED GAS TO STANBY DIVER**"** The console operator will put MIXED GAS to the diver and report.		**N/A**	**X**
	If diving AIR, the order will be : "**CONSOLE – AIR TO STANDBY DIVER**" The console operator will put AIR to the diver and report.		**X**	**N/A**
	r. **"STANDBY DIVER – VENTILATE, VENTILATE"** Approximately 5 – 7 seconds "**STOP – STOP VENTILATING**"		**X**	**X**
	s. Standby diver closes steady flow valve	**Standby Diver**	**X**	**X**
	t. **"STANDBY DIVER – SHORT COUNT"** When using HeO2 the Supervisor must confirm voice change before permitting a mode change on the communications unit. **NOTE:** At this time the Supervisor repeats Steps "a.-t." with **RED** and **YELLOW** divers.	**Supervisor**	**X**	**X**
	u. On completion of checks, Standby Diver removes helmet, Gas is isolated at panel, Supervisor confirms hot water flow and temperature.		**X**	**X**

No	Action / Statement	Action By	Air	HeO2
3	**DIVING**			
	a. Confirm all stations are ready to dive before ordering the divers to the stage. Once on the stage the divers are to square themselves off and stand by to be lowered to the water.	**Supervisor**	**X**	**X**
	b. #2 tenders release stage and fend off.	**Tender**	**X**	**X**
	c. "**LOWER THE DIVERS**" Using hand signals, the Supervisor directs the winch operator to lower the divers until their helmets are awash. "**BOTH DIVERS – CHECK EACH OTHER FOR LEAKS**"	**Supervisor**	**X**	**X**
	d. Red Diver reports: "**YELLOW DIVER WELL FOR LEAKS**"	**Red Diver**	**X**	**X**
	e. Yellow Diver reports: "**RED DIVER WELL FOR LEAKS**"	**Yellow Diver**	**X**	**X**
	f. **"BOTH DIVERS – STAND BY TO DIVE"** **"ON THE SIDE – STAND BY TO DIVE"**	**Supervisor**	**X**	**X**
	g. "**DIVING**" The Supervisor will ensure the correct rate of descent is maintained, depths are repeated, umbilicals are clear, and stage is descending correctly, Divers are to sound off continuously on descent: **"OK RED." "OK YELLOW."**		**X**	**X**
	h. Divers will report when bottom is in sight and when on bottom, During descent, should either have a problem, diver(s) order: **"STOP"**	**Diver**	**X**	**X**
	The Supervisor will direct the winch operator to bring the stage up 1-2 metres or more as required and determine the problem	**Supervisor**	**X**	**X**
	i. On bottom, the divers will give a bottom sitrep and status of the stage.	**Diver**	**X**	**X**
	j. Once the sitreps have been received **"BOTH DIVERS – TAKE A VENT."** **(approx 5 seconds)** **Supervisor will inform the side:** **"ON THE BOTTOM"**	**Supervisor**		

No	Action / Statement	Action By	Air	HeO2
4	**ASCENT**			
	a. Divers report when at the stage, and when ready to travel.	**Divers**	**X**	**X**
	b. **"BOTH DIVERS – TAKE A VENT"** (approx. 5 seconds)	**Supervisor**	**X**	**X**
	c. **"STAND BY TO TRAVEL"**		**X**	**X**
	d. **"TRAVELLING"** Supervisor will direct winch operator to travel at prescribed rates.		**X**	**X**
	e. **"CONSOLE – SHIFT ALL DIVERS TO AIR"**		**N/A**	**X**
	f. Upon arrival at FIRST STOP: **"CONSOLE – SHIFT ALL DIVERS TO AIR."** Console will shift all divers to AIR and report to Supervisor.		**N/A**	**X**
	g. **"RED DIVER – VENTILATE, VENTILATE"** **"YELLOW DIVER – VENTILATE, VENTILATE"** (approximately 20 seconds, or until ""Gas Shift To Divers" is heard.)		**N/A**	**X**
	h. **"RED DIVER – SHORT COUNT."** Supervisor will confirm voice change then continue with **"YELLOW DIVER – SHORT COUNT."** Confirm voice change.		**N/A**	**X**
	i. Start AIR STOP at next whole minute.		**N/A**	**X**
	j. Give 30 – second warning prior to travelling		**X**	**X**

No.	Action/Statement	By	Air	HeO2
5	**O2 STOP**			
	a. Upon arrival at the O_2 STOP: **"CONSOLE – SHIFT RED AND YELLOW DIVERS TO O_2."** Console will shift Red and Yellow divers to O_2 and report to the Supervisor.	SUPERVISOR	X	X
	b. **"RED DIVER – VENTILATE, VENTILATE."** (approx. 20 seconds) " Repeat step with Yellow Diver"	SUPERVISOR	X	X
	c. **"OK RED?" "OK YELLOW?"**	SUPERVISOR	X	X
	d. During the O_2 STOP both divers are to face each other on the stage and restrict movements to a minimum; however, the divers should be encouraged to move around occasionally.	DIVERS	X	X
	e. At the AIR breaks: **"CONSOLE – SHIFT BOTH DIVERS TO AIR."** The console will shift both divers to AIR and report to the Supervisor. After 5 minutes: **"CONSOLE – SHIFT BOTH DIVERS TO O_2."** The console will shift both divers to O_2 and report to the Supervisor.	SUPERVISOR	X	X

No.	Action/Statement	By	Air	HeO2
6	**UPON COMPLETION OF FINAL STOP**			
	a. One minute prior to travelling to the surface, state: ***"ON THE SIDE – STAND BY TO TRAVEL IN ONE MINUTE."***	SUPERVISOR	X	X
	b. ***"STAND BY – TRAVELLING."*** The Supervisor will direct the winch operator to travel the stage at the prescribed rate to the surface.	SUPERVISOR	X	X
	c. Upon reaching the surface: ***"ON THE SURFACE. SHIFT RED AND YELLOW DIVERS TO AIR."***	SUPERVISOR	X	X
	d. Once the stage is stopped at deck level the #2 tenders will secure the stage lines. When safe, the Supervisor will order: ***"RED DIVER – OFF THE STAGE."*** When safe, order: ***"YELLOW DIVER – OFF THE STAGE."***	SUPERVISOR	X	X

No.	Action/Statement	By	Air	HeO2
7	**SurD O2**			
	a. Once the divers have their helmets off and are observed to be OK, the Diving Supervisor and Chartman shall proceed to the RCC prior to the first diver. "The Dive Supervisor will announce that the Diving Officer has the side.... the Diving Officer announces he has the side and calls out the time in the Sur D."	**SUPERVISOR**	**X**	**X**
	b. Tenders must accompany the divers to the RCC.	**TENDERS**	**X**	**X**
	c. The Diving Officer shall follow the last diver down the ladder.	**SUPERVISOR**	**X**	**X**
	d. When the report **"BOTH DIVERS ON O2 , READY TO DIVE"** is passed by the RCC tender, the Supervisor will order: **"RCC Operator Dive the RCC to 12 msw, Not to exceed the rate of 18 mpm".**	**SUPERVISOR**	**X**	**X**
	e. The RCC operator will repeat the order then dive the RCC , stating diving through the comms.	**OPERATORS**	**X**	**X**
	f. The dive supervisor will then carry on with the remander of the planned Decompression profile IAW Chapter 3 Annexes to Vol 3,	**SUPERVISOR**	**X**	**X**

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NOTE

References are to Article number, (*e.g.* **5142**), Page number, (*e.g.* ii), Figure number (*e.g.* **Figure 4-2-1**), or Annex, Chapter, (*e.g.* **Annex A Chap 3**) unless otherwise noted.

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