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# 香港休閒潛水安全手冊

## Recreational Diving Safety Manual for Hong Kong




**HKUA**  
香港潛水總會

潛水安全及事故調查委員會  
Diving Safety and Accident Enquiry Committee

香港潛水總會  
Hong Kong Underwater Association





潛水安全及事故調查委員會  
香港潛水總會  
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此手冊為休閒潛水會/中心、教練、潛水人士而制定，確保潛水活動既安全又有樂趣。

# 香港休閒潛水安全手冊

香港潛水總會  
潛水安全及事故調查委員會

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謹此衷心鳴謝提供寶貴意見的下列政府部門及下列潛水訓練及發證機構。

- |            |          |
|------------|----------|
| -民政事務局     | -BSAC-HK |
| -康樂及文化事務署  | -CMAS    |
| -海事處       | -CUA     |
| -漁農自然護理署   | -NAUI    |
| -香港警務處水警總區 | -PADI    |
|            | -SDI     |
|            | -SSIHK   |

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# 香港休閒潛水安全手冊

## 前言

*水肺潛水是一項非常安全和令人享受的運動，但你必須接受適當的訓練和身體狀況良好、並時刻遵循安全潛水的規則。*

和所有動態運動一樣，潛水活動也會發生事故，尤其是在不理解或者忽視安全規則的情況下發生。作為香港認可的潛水體育總會，長久以來許多成員認為香港潛水總會（潛總）有必要成立一個潛水安全及事故調查委員會（潛安會）。2007年11月4日，一宗導致一位年青女醫生在據報首次出海潛水時意外身亡的嚴重事故，此一次悲劇再次引起會員對成立委員會的關注。

2007年12月，一群香港潛水總會成員包括經驗豐富、專業的合資格水肺潛水員決定成立一個專門的獨立部門，探討潛水安全的問題。

香港潛水總會董事局於2007年11月13日的董事會上通過了成立潛安會的方案。來自行政長官的直接反饋表明政府對成立潛安會的支持。

2008年1月26日的香港潛水總會周年大會上，成立潛水安全及事故調查委員會的決議獲支持及批准。潛安會是潛總的一個獨立部門，直接向潛總的主席負責，並通過潛水安全幹事在月會上向香港潛水總會董事局報告所有安全和事故調查事宜。潛安會由具有豐富潛水經驗和專業技能的各種人才組成，委員包括潛水及救援教官、潛水高壓醫學醫生、律師、執法官員、工程師、仲裁員及企業管理專業人士等，還有來自政府部門包括康樂及文化事務署、海事處、漁農自然護理署及香港警務處水警總區的特派代表，謹此致謝。

就有關本安全手冊內容，潛安會已經參考了多個海外潛水安全手冊及國際潛水認證組織的標準，並考慮到本地的實際潛水環境，作為提供本地潛水人士、教練及潛水會參考使用。謹在此鳴謝以下國際潛水認證組織：英國潛水協會－香港分區 (BSAC-HK Region)，世界潛水聯合會 (CMAS)，中國潛水運動協會 (CUA)，國際潛水教練協會 (NAUI)，專業潛水教練協會 (PADI)，國際水肺潛水 (SDI) 及 Scuba School International Hong Kong (SSIHK)。



## 1.1 目的

潛安會制定本手冊時，考慮到本地的潛水環境，並結納多個外國及以本地休閒潛水員為對象目標之認證組織的安全標準/指南，作為教練及潛水中心的主要安全參考。

可以理解要履行法定要求是有相當難度的，因為往往會牽涉大量複雜和專業的條例，不單難以明白並且很難跟上最新發展的要求。過往，法定要求的臨時實施只為解決突然出現的問題，並主要集中針對個別的客觀存在危險，結果導致難以全面涵蓋。這些具體的要求不鼓勵、甚至壓抑了人們試圖尋求新方法去解決問題。

休閒式潛水，一般來說應較安全，因潛水員可以選擇日子及較佳環境，令潛水風險和威脅更易受到控制。但是，休閒潛水不一定備有技術潛水需要的安全支援系統，這會使休閒潛水員、尤其是在偏遠地區潛水時，面對更大的風險。法定要求製造了一種依賴法規的傾向，而且牽涉潛水員、潛水會和潛水操作人員的健康和安全問題不多。因此法定要求似乎不適用於休閒式潛水。

潛安會的觀點是，休閒潛水行業應採用一種類似於技術潛水安全標準的自律方法。參與休閒式潛水活動的各方，包括潛水員/教練/潛水會應持保守態度，並利用常識，去採用潛水安全的一般原則來計劃及進行任何潛水活動。然而，與其他的娛樂活動相比，休閒潛水具有其特定的風險和危機。休閒潛水會出現致命事故，本手冊試圖通過講解休閒潛水的安全原則來緩解這一問題。

## 1.2 範圍

本安全手冊內容的設計覆蓋了使用壓縮氣體及獨立的呼吸設備(SCUBA)的休閒式潛水。適用於任何休閒潛水員、潛水教練、潛水會，同時也適用於潛水船操作員。參與的各方必須為休閒潛水在提供健康安全環境方面承擔一定的責任和義務。本安全手冊並不直接指定何種具體做法方能符合規定，只界定了當值操作員的責任包括必須實現的目標、或者必須解決的問題，讓當值操作員找出最佳和最有效的方法來達到休閒潛水的安全標準。由於安全知識和概念會隨著潛水技術的發展而改變，因此下述手冊並不能為休閒潛水的安全提供一種完整而充分的綜合性指南。但是它會盡可能地保持內容更新，隨著需求的發展而提高休閒潛水的安全性。

## 注釋

<b>平靜水域 -</b>	類似於游泳池深度條件的一種水中環境，可容許站立於淺水處，清澈，平靜和可隨時使用的。
<b>直接監督 -</b>	教練所處的位置必須能夠為水中的潛水員提供立即救助和指導，能目視及評估學員的安全和表現。
<b>潛水船和輔助船隻 -</b>	潛水船可以是一艘大的船舶、硬底充氣橡皮艇、遊艇、宿船或舢板。一般來說，輔助船隻支援潛水員在水底時用的船隻。
<b>潛水會 -</b>	潛水會是指一組人、一個潛水中心或為潛水員組織潛水或水肺潛水訓練的潛水經營者。
<b>潛水領隊 -</b>	為團體提供指導和協調幫助，確保一切都朝著團隊的既定目標進行。
<b>潛水長 -</b>	潛水長要具有組織和帶領持證潛水員潛水的資格，前題是潛水活動和潛水地點要與潛水長接受訓練時相約的。潛水長要想組織更高級的專門潛水活動，例如進入沉船、洞穴潛、冰潛或在新地點潛水等，需要有額外的培訓、知識或經驗。
<b>潛水醫學，亦稱海底醫學 -</b>	對人體進入海底環境時身體狀況發生變化的診斷、治療和預防。包括氣體壓力對人體的影響，診斷及治療因水底事故引致的症狀，潛水員的健康如何影響潛水員的潛水安全。
<b>潛水教練 -</b>	潛水教練就是由某一潛水發證組織(例如 BSAC, CMAS, CUA, HKUA, NAUI, PADI, SDI, SSI) 的認證專業人員，在潛水中擔任領導職位，並能安全指揮和監督開放水域級別以至潛水長級別的潛水員。
<b>潛水專業人員 -</b>	是指有領導地位的一類潛水員，包括潛水教練、潛水長和助教。
<b>資深潛水員或進階潛水員 -</b>	經常於不同潛水環境或水域有不少於五十次潛水經驗的潛水員。
<b>間接監督 -</b>	水中應該有一名教練或潛水長負責特定的訓練活動。船上的教練或潛水長應負責監督計畫的實施、準備工作、裝備檢查、下潛、出水、事後簡報、現場管理潛水活動、還應準備好迅速應對水中的任何事故。
<b>開放水域 -</b>	任何處於自然水流、海浪、潮汐和風力條件下的水中環境。
<b>必須 -</b>	是一項強制性的聲明
<b>應該 -</b>	是一項建議或意見的聲明
<b>小組 -</b>	小組潛水是指不多於 10 名潛水員的潛水團隊，或者是參與潛水訓練活動的潛水員。這組潛水員可能是租用非潛水專用船隻進行潛水活動，或者是指某潛水船上一個大潛水團隊中的一小組。
<b>助教 -</b>	曾接受正規訓練，除了監督持證潛水員進行潛水活動，還應協助教練訓練潛水學員。這一等級的潛水員是指擁有可作示範的潛水技巧和行為模範，具有可信賴的救援能力、專業水準的潛水理論知識、潛水管理和監督能力，並且是一名稱職的助教。



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## 責任

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### 3.1 概述

*潛水安全應該是所有潛水員、教練、潛水長和本地潛水會要實現的首要目標。這是每名潛水員的個人職責，也是任何導使他人潛水的人的一種“照顧責任”。*

### 3.2 潛水會的責任

- 向潛水業內的所有團體發佈潛水船隻安全操作手冊。
- 確保潛水裝備以安全謹慎的方式檢查及保養良好。
- 經常對潛水裝備進行外觀檢查和保養。
- 確保供應潛水員呼吸的壓縮空氣/氣體的所有壓縮機符合相關規定標準。
- 確保安全和應急設備能運作正常，並且在潛水地點或潛水船上便於取用。
- 根據發證潛水機構標準及程序指引監督所有訓練活動。
- 及時把潛水意外/事件的性質和起因以水肺潛水意外報告表（SDIRF）的形式彙報給潛安會。

### 3.3 潛水教練/潛水長/潛水專業人員的責任

- 確保每名潛水員均擁有有效的潛水證書及合資格進行相關的潛水活動。
- 在潛水訓練期間，要遵循發證潛水機構的標準及程序指引。
- 根據相關的安全潛水活動制定潛水計劃。
- 給潛水員詳細介紹潛水地點、潛水程序、預計的潛水時間、應急措施和罕見的危險或可能影響到潛水員安全的環境條件。
- 若認為當時條件不安全，應中止潛水活動。
- 採取所有預防措施並使用任何方法為潛水員提供一個安全的潛水環境，並應對潛水安全持保守態度。
- 教練與學對員比例應根據本手冊指引。

### 3.4 潛水員的責任

- 使自己的裝備處於良好狀態。
- 潛水前檢查自己的潛水裝備。
- 牢記並遵守潛水長/教練所作簡報的內容。
- 潛水期間遵守安全規則。
- 任何疾病/不適或如果要長期用藥等情況都要報告給潛水長/教練。
- 定期進行體檢，以核實是否適合潛水。
- 保持個人身體健康。
- 知道自己的個人極限並根據訓練水準和經驗嚴格遵守這一極限。
- 如果感覺不舒服和/或潛水後出現不適的跡象或症狀就不要潛水。
- 潛水前後都要確保身體有充足水分。

## 潛水員的權限和潛水常規

在香港，除非持有香港特區政府認可之潛水組織發出的證書，否則任何人不得從事水肺潛水活動。

### 4.1 潛水員的權限

潛水認證組織一般將初學者到資深潛水員的休閒式潛水訓練分成四等級。

等級 1：通常稱為開放水域潛水員或水肺潛水員，在教練監督下進行過 4-5 次的潛水活動；

等級 2：進一步鞏固潛水員在各種環境下潛水的經驗，如深潛、夜潛等，並提高潛水員的導航技能。這一等級通常被稱為進階開放水域潛水員，約有 10 次潛水經驗。儘管使用了術語“進階”，但因沒有足夠的下潛經驗，故不會被視為資深潛水員。

等級 3：這一等級的訓練通常旨在讓潛水員理解潛水緊急事件的常見原因；預防潛水事故的方法；以及如何幫助處於困境中的另一名潛水員。然而，這僅僅是休閒水肺潛水訓練。儘管達到 3 級水準的一名持證潛水員通常被稱為一名救援潛水員，但是並不能滿足專業潛水救援和水中安全團隊的要求。這一級別的潛水員通常要有最少 20 次潛水經驗。

等級 4：潛水員有最少 50 次在不同環境的下潛經驗。本手冊中，這一級別的潛水員通常被稱為**資深潛水員或進階潛水員**。

本手冊中，1 到 3 級水準的潛水員的訓練都被稱作是初級水準或入門級水準。具有初級水準的潛水員必須在自己的極限內、一個容易安全潛水的條件下及按照以下情況來潛水：

1. 深度：等級 1 < 18 米; 等級 2 或以上 < 30 米;
2. 水底水流情況：從沒有水流到輕微水流範圍內，絕不要在沒有接受過飄流潛水訓練的情況下在強海流中潛水；
3. 水底溫度：> 20 °C，穿濕式潛水衣
4. 能見度：至少 3 - 5 米
5. 水面條件良好

#### 4.1.1 完成初級訓練課程後與專業潛水員下潛

- 鑒於香港水底的低能見度，一名 1 級的潛水員應該在一名教練或潛水長陪同下，在本地各種潛水環境進行首 10 次的下潛，以確保他們的安全。
- 有 10 次以上潛水經驗的 2 級或 1 級潛水員在上述條件下潛水，應由 3 級的潛水員陪同，1 教練帶不多於 3 名學員。
- 2 級或 1 級的潛水員，在能見度低於 3 米的情況下潛水，至少應由 4 級的潛水員、潛水長或教練陪同，1 教練帶不多於 3 名學員。
- 上述情況總結如下：-

潛水員經驗	潛水團隊必須/應該有的陪同人員	潛水團隊裡潛水員的最大數目(包括領隊)
潛水經驗不超過 10 次的 1 級潛水員	教練或潛水長	4 - 6
潛水經驗超過 10 次的 1 級潛水員和 2 級潛水員	(1) 正常條件下由 3 級潛水員陪同 (2) 能見度低於 3 米時，由 4 級潛水員、教練或潛水長陪同	4

#### 4.1.2 各種情況下的潛水技巧

- 參加特定的潛水活動如夜潛、乾衣潛水、飄流潛水、沉船潛或高氧空氣潛水活動之前，潛水員必須參加由合格教練執行的專業訓練課程。
- 在參加專業培訓課程後，由合格教練陪同，在這種條件下於兩天內至少潛水 4 次，或者由認證機構推薦的較高潛水次數，1 級到 3 級的潛水員應在不多於 1：3 之比例下由 4 級潛水員陪同下潛

#### 4.1.3 潛水技術重溫

- 為確保能靈活運用自己的潛水技巧，在 6 到 12 個月沒有參加任何潛水活動情況下，潛水員必須由合格潛水長或教練陪同，在游泳池裡進行一次技術重溫。如果是 1 級或 2 級的潛水員，在 6-12 個月沒進行潛水活動後的首次開放水域潛水，應由一名 4 級潛水員陪同。

## 4.2 潛水安全的標準

### 4.2.1 海外接受訓練後如何適應本地潛水環境

- 潛水員之責任 - 相對很多外地之潛水環境，特別是東南亞地區，香港之下潛環境通常能見度比較低及水面交通十分繁忙。為此我們建議，若潛水員於海外接受訓練後應與本地有經驗的潛水長或潛水教練進行四次或以上之下潛，以適應香港之潛水環境。
- 潛水會的責任 - 在沒有本地潛水長或更高級別的潛水員陪同下，潛水會不應讓在海外接受訓練或沒有曾在香港潛水的潛水員進行潛水活動。潛水會必須安排潛水長/教練領導此等海外潛水員在香港進行首 4 次潛水活動，幫助他們熟悉本地潛水環境。進行過 4 次導潛或適應性潛水後，在接下來的 6 次潛水活動中，潛水會應該給這類潛水員搭配一名資深潛水員或和潛水長。潛水會應核對潛水員之證書及下潛記錄，以便證明資歷及經驗。

### 4.2.2 香港的低能見度潛水條件

- 香港的水底能見度差別相當大，並且很容易受風向和潮汐的影響，能見度有可能下降到只有二至三米，因此香港之下潛環境有時甚具挑戰性。
- 低能見度給潛水員帶來的主要問題是降低了與潛伴溝通的能力，除非潛水員與同伴進行特別之程序去處理此情況，否則他們的安全將受到威脅。
- 潛水員責任 -
  1. 任何時候潛水員都應在相互視線的 1-2 米範圍內。如果潛水員在水底失散或迷失方向，潛水員應在上升至水面等候前，在附近進行不多於一分鐘之搜索。潛水員亦可以應用水底聲響來引起他人注意，此種溝通模式要在潛水前預先安排（水底發聲器，敲擊石頭或以刀敲擊氣樽等方法）。
  2. 在低能見度的水中，下潛和上升都要特別小心。潛水員應以腳先下潛避免頭部撞到海床。浮出水面時也要謹慎，手應舉於頭上以免撞上水面物體，如碼頭防波堤或停泊的船隻。潛水員上升之前，必須釋放身上附著的橙色充氣象拔，以警示水面船隻“下面有潛水員”，“有潛水員上升”。
- 潛水專業人員的責任 -
  1. 當環境條件降低時，如強海流、低能見度、泥濘的海床等，教練對潛水員的比率也應降低。

- 潛水會的責任 -
  1. 對那些沒有經驗的潛水員，在低能見度條件下潛水，容易出現失去信心和恐慌的問題。在此情況下，一名缺乏經驗的潛水員應由潛水長或教練陪同潛水，人數比例不應多於 1 潛水長/教練：4 潛水員。

#### 4.2.3 本地潛水地點的知識

- 潛水員的責任：(完成十次伴潛及兩次導潛)
- 潛水員應在下潛前對潛水地點有一定的瞭解。如果潛水員在那潛水地點沒有下潛經驗，他應在第一次在該地點下潛時，與資深潛水員一起下潛，並應事先從本地可靠來源提供的潛水地點簡報中取得資料。
- 潛水會的責任：-
  1. 進行潛水活動前，潛水會必須給潛水員提供潛水地點的詳細簡報。
  2. 如果潛水條件，包括水流、能見度、溫度等，比潛水員曾經歷的情況差，那麼就要延遲潛水活動，或者換一個條件較好的潛水地點。
  3. 船上應備有潛水地點地圖。

#### 4.2.4 裝備保養、裝備檢查和測試

確保自己的潛水裝備得到恰當的保養是潛水員的責任。潛水會也要對所有出租的裝備負責。在使用潛水會的出租裝備進行潛水前，潛水員應對裝備作最後檢查。下面是從附錄一中摘錄的建議保養要求供參考。

##### 調節器

- 水肺調節器在首次使用之前和此後每 12 個月或在有需要時，都必須進行檢查和測試。目測有磨損的跡象及對橡膠部件品質的測定。
- 調節器必須包括一個主要二級頭和備用氣源(如備用二級頭或備用氣源)。
- 確保調節器的咬嘴必須處於良好狀態及牢固。
- 為把交叉感染的風險降至最低，出租或租借的調節器（和面鏡、呼吸管）被個別人士用過之後，必須根據適當程序進行徹底清洗及消毒。

##### 水肺氣瓶

- 必須根據香港相關標準或法定要求對水肺氣瓶進行靜水測試。
- 必須對水肺氣瓶進行內部目視檢查，時間間隔不能超過 12 個月。



- 必須對水肺氣瓶閥門進行機能測試，時間間隔不能超過 12 個月，潛水前要檢查 O 形環是否有破裂。

#### 測量儀錶

- 儀錶在首次使用前和此後每 12 個月必須進行最小一次檢查和測試。

#### BCD

- 個人的浮力系統、浮力補償裝置、乾式潛水衣、或其他的體積浮力補償裝置 必須配備排氣閥(OPRV)。
- 必須對這些裝置進行功能檢查和測試，時間間隔不能超過 12 個月。

#### 計時裝置，深度和氣壓錶

- 所有潛水隊員必須有一個水底計時器、深度顯示器和氣壓錶。
- 減壓資料的測定：潛水減壓表、潛水電腦
- 潛水地點必須備有一套潛水減壓表。

#### 急救物品

- 必須備有急救箱和合適的緊急氧氣裝置。定期檢查以確保裝備充足、清潔、氧氣瓶是充滿的並準備好應用。

#### 潛水旗

- 進行任何潛水活動時，須於當眼處掛上香港特別行政區認可的潛水旗。
- 必須對所有潛水裝備進行定期檢查以確保潛水安全。

### 4.2.5 潛水計劃

潛水計劃的制定要以能力最低的潛水員為依據。進行任何潛水活動前，潛水員應對建議的活動制定一個潛水計劃，計劃應包含以下內容：

- 潛水員的資歷、經驗和潛水次數。
- 緊急計劃包括每位潛水員之緊急聯絡人的姓名，電話號碼及與潛水員的關係。
- 最近的再壓艙
- 最近的醫院
- 可用的運送方法
- 大約的建議下潛次數

- 建議下潛的地點
- 深度估計和預定的水底時間。
- 使用於潛水活動的裝備和船隻
- 任何預料的危險狀況.
- 潛水活動 - 包括溝通方法、失散時的重聚步驟和應急措施
- 緊急求救電話號碼，例如水警、海事處，召喚政府緊急飛行服務直升機的程序等

#### 4.2.6 潛水前安全檢查

潛水員的責任：

- 潛水員應與潛伴互相進行儀器檢查。
- 每名潛水員必須能判斷潛水條件是否適合自己。如果潛水員認為潛水條件不適合自己或超越了自己的訓練極限，那麼就有責任中止潛水活動。然而，如果潛水員欠缺經驗，很顯然他/她正想計劃一次超越自己及潛伴能力的潛水活動，那麼潛水長/潛水領隊就應該明確地提醒這名潛水員並採取恰當的行動。
- 每名潛水員須保證自己及潛伴的裝備能正常運作並適合自己參加的潛水活動類型。
- 每名潛水員須確保自己及潛伴於潛水當日，無論心理及生理狀況均適合潛水
- 每名潛水員須清楚是次潛水活動符合自己及潛伴的個人極限，包括訓練資歷和經驗。

#### 4.2.7 潛水簡報

- 潛水地點的潛水簡報至少應包括以下內容：潛水地點名稱、一般說明、地圖、預期的深度、在區域內的最大深度、水底特徵、潮汐和海流情況，應變計劃、具體風險（如水面交通繁忙、低能見度、本地危險的海底生物等）
- 潛水會的責任  
潛水會有責任提供一名潛水長資歷或以上人士進行一個詳盡的潛水地點簡報。
- 潛水員的責任  
認真聽取潛水簡報和指示並尊重那些監督潛水活動人員的建議。對不理解的問題提出詢問。

#### 4.2.8 潛伴制度

- 潛伴制度是一項程序，當兩個人即夥伴，共同行動形成一個整體，相互監察和幫助。這一制度的主要好處就是提高安全性：預防對方發生事故或於危機中對另一人提供救

援。這制度對發生空氣不足、非潛水醫療緊急事故和被繩索或魚網纏繞等情況都可望有效地予以緩解。這一制度用於潛水安全檢查時，能幫助避免潛水裝備的遺漏、誤用和故障等。

- 潛水團隊裡應避免出現“單數”。

- 潛水會必須確保潛伴制度

潛水會有責任確保潛伴制度能嚴格執行。這可以通過在船上預先登記潛伴資料。

- 潛水員的責任

與潛伴潛水，每名潛水員就被假定要對另一名潛水員負責。期望“潛伴”之間要相互照顧、保持之距離足以在出現緊急情況時能提供幫助、要安全行動並遵守潛水前團隊內一致通過的計劃。當潛伴制度出現問題時，通常因為其中一名潛水員沒有履行自己作為潛伴的職責。

進行潛水前，潛水員有責任根據潛水長提供的一般性潛水計劃內容，與潛伴達成以下協議，包括：下潛點、出水點、潛水目標、深度限制、建立並複習溝通程序和應急措施。

- 進行潛水活動前，潛伴必須互相檢查裝備的性能和安全性。

#### 4.2.9 潛水限制以及程序

多數情況下，減壓病(DCI)都發生在當潛水員超越了個人潛水電腦或潛水減壓表的限制範圍。制定所有潛水計劃時都應謹慎，尤其是深潛、重複潛水、多日重複潛水。建議水面停留時間要超過 2 小時。

- 潛水會的責任

1. 確保潛水地點的條件適合參與的潛水員
2. 確保潛水員清楚應急措施
3. 確保潛水員瞭解召回程序

- 潛水員的責任

1. 確保配重恰當並能在發生緊急情況時迅速丟掉；
2. 在水底時不應過度費力;
3. 呼吸壓縮空氣時絕不能憋氣或不持續呼吸;
4. 不能超越“免減壓”極限，必須保守使用免停留時間；
5. 在已知的不利條件下不應進行潛水活動，這種不利條件可能會影響自己的安全和健康，如紅潮、油污、當地漁民使用爆炸品、拖網捕魚等；
6. 因應潛水員的經驗，評估天氣和海的狀況以確定是否適合；

7. 按潛水員之資歷及潛水經驗進行活動，未經合適的訓練不應進行如飄流潛水、洞穴潛或穿越沉船等潛水活動；
8. 應盡量以每分鐘 10 米左右的速度上升，或遵循潛水電腦的建議；
9. 在約 5 米深處時做 3 到 5 分鐘的安全停留；
10. 完結潛水時應尚保留充足的空氣，淺水區域不少於 50bar，20-30 米或更深的深潛不少於 70 bar；
11. 上升之前發出一個充氣象拔，以警示其他水上活動者水下有潛水員，例如滑水者、動力快艇等。
12. 在水面上游泳和休息或遇險時應保持正浮力。

#### 4.2.10 潛水後事項

- 潛水員應在適當的潛水日誌上記錄自己的潛水資訊，包括日期、時間、深度、現場條件等。
- 當發生任何潛水事故，潛水員和潛水會有責任在 5 天內向香港潛水總會彙報和遞交水肺潛水事故報告表(SDIRF)。香港潛水總會將收集並保存有關資料，目的是透過分析這些資料，向潛水員／潛水中心發出可作改善的安全指引，並且希望提升香港的潛水安全標準。而香港潛水總會亦會將相關資料保密存放。任何轉交其他機構作研究用途的資料，如潛水員警報網 (Divers Alert Network)，個人資料將絕對保密。
- 潛水員若感到身體不適，例如頭痛、關節感到痛楚或頭暈、昏厥、嘔吐等，應立即通知有關的潛水會。

### 4.3 小組潛水的做法

#### 4.3.1 定義

- 小組潛水是指潛水員數目最多為 10 名的潛水團體。這組潛水員可能是租借一艘非專用潛水船進行潛水活動的，或者是潛水船上較大潛水團隊中的一小組。第 4 節中推薦的所有潛水常規也適用於小組潛水活動。
- 任何潛水員參與潛水訓練活動都被視作是小組潛水。可採用以下建議。

#### 4.3.2 由一名資深潛水員領導

- 小組中必須選定一名組長以保證安全。這名被選定的潛水員必須是本手冊中所定義的，或者是勝任的潛水員。領隊必須熟悉所選的潛水地點，具良好的本地環境導航技巧。

### 4.3.3 潛水地點的選擇

- 如果小組是租用非專用潛水船進行潛水活動的，那麼他們就須要考慮附近是否有輔助船隻和容易取用的氧氣裝備。在你的潛水計劃中，對租用潛水船的操作要有仔細的介紹，並瞭解潛水團隊要求，如營救系統、聲音信號、手號和對潛水員保持觀察等。
- 如果沒有這種便於取用的裝備，建議潛水小組從潛水會那裡租用，或應提早聯絡潛水會尋求必要的支援，選擇一個附近有其他潛水會共同的潛水地點，或岸潛時有方便的緊急出口。
- 如果小組是租用潛水會的裝備/船隻，那麼就應通知潛水會該次活動的性質。

### 4.3.4 上升前發出充氣象拔

- 為保證與其他水中活動者的溝通，潛水小組必須在潛船上掛起一面潛水旗，並在上升前發出充氣象拔，這一點至關重要。

### 4.3.5 水面支援

- 至少要有一名小組成員留在船上，給潛水員和舵手或船長提供水面支援。
- 必須與船長或船隻操作員傳達潛水計劃，確保他/她知道如何提供水面支援。
- 應把綁有浮標的繩索附於梯子上，作為隨時可用的充氣信號。

## 4.4 常見的危險海洋生物

接觸海洋生物時的一般指引：-

**眼看手勿動。**不要觸摸、搬動或騎上海洋生物。觸摸或試圖觸摸海洋生物會傷害到海底動物，使你處於危險之中，而且觸摸某些物種還是違法的。魚和眾多海底無脊椎動物身上的黏滑覆蓋層是保護它們免受感染的，但很容易被手、手套或腳磨擦掉。為免出現此情況，就需要調節好中性浮力。

**不要餵食或吸引海底生物。**給海底生物餵食或試圖用食物、誘餌、聲音或光吸引它們，會破壞正常飼育循環，令牠們因進食非自然或受污染的食物而生病或死亡，會導致動物依賴於人類。

**絕不要追捕或騷擾海洋生物。**追逐正試圖逃跑的生物是很危險的。絕不要把動物完全圍攏起來，擋住它的逃跑路線或分開動物母子。

香港周圍水域中棲居著大量可能有危險性的水底生物，它們包括芋螺；藍圈八爪魚；不同種類的棘鱗魚如石頭魚、獅子魚、蠍子魚、魴魚；海膽類、鯊魚、鰻魚和其他大型帶齒魚類；有毒水母；海蛇。被這類生物傷害到的症狀和急救方法概括見附錄四：

#### 4.4.1 芋螺

芋螺是一種海蝸牛，其貝殼形狀像圓錐形的冰淇淋筒。它們會利用有毒的刺把毒素注入獵物身上。某些芋螺的毒素對人體會造成傷害。

**棲息地：**可見於下潮間帶和淺水的潮下帶區域的石下。

**徵兆和症狀：**被芋螺螫傷的症狀包括傷處會疼痛、麻木和刺痛感。嚴重情況包括視覺肌麻痹和導致死亡的呼吸衰竭。

**急救措施：**按壓-穩定法是建議的急救法，並且應儘快執行，也可能需要持續人工呼吸。

#### 4.4.2 藍圈八爪魚

藍圈八爪魚是一種細小害羞、非侵略性的生物。當它變激動時會在身體展示出螢光藍色的閃光環。它的唾液有一種很強烈的毒素能使人體癱瘓和導致死亡的呼吸衰竭。

**棲息地：**淺水珊瑚區和岩石池，岩石下，珊瑚礁的縫隙，在潮汐區，貝殼裡面，廢棄的瓶、罐和其他海床上的殘渣中。他們也可在沙地或泥潭延伸有豐富海藻的海底中找到。

**徵兆和症狀：**被咬傷通常感覺不到疼。5-30 分鐘後可能會出現麻木、吞咽困難、噁心、視覺障礙等症狀。嚴重者會出現癱瘓、呼吸衰竭、可能還會發生窒息導致死亡。

**急救措施：**按壓-穩定法是建議的急救法，並且應儘快執行，也可能需要持續人工呼吸。

#### 4.4.3 蠍子魚、獅子魚、石頭魚

很多魚類和軟體動物類都有有毒的倒鉤以保護自己免受捕食者襲擊。這類脊椎動物中的有些毒素對人類會造成傷害。石頭魚是其中最具毒性的一種，且它的刺螫有時會是致命性的。被其它魚類傷到會感覺到疼並且傷口容易被感染。

**棲息地：**蠍子魚善於偽裝，能見於珊瑚中、洞穴、岩石裂縫或泥漿中。獅子魚棲居於近海珊瑚和岩石礁中。石頭魚主要棲息於珊瑚礁、暗色植物的周圍、岩石附近、或潛伏在泥沙中。

**症狀：**劇痛、嚴重腫脹、被刺部位變色。嚴重的反應有噁心、嘔吐、腹部絞痛、發抖、心率失常、呼吸困難、昏倒。

**急救措施：**有效的急救治療方法是把受影響部位浸入熱水中（約 45-50°C）。第一名施救者自己應首先試一下水溫以確保不會燙傷受傷者。應保持在高溫的水中 30-60 分鐘，能減輕疼痛並援解毒性。可以用鑷子去除傷口的小刺。用肥皂水擦洗傷口。用清水沖洗受影響部位。不要把傷口遮蓋起來。一般應儘快尋求醫療處理以防感染。

#### 4.4.4 鯊魚

一旦海面溫度升到 23°C 以上，鯊魚就開始在本地水域出現。曾發生過鯊魚襲擊游泳者和潛水員的事件，大部分個案發生於清水灣附近。但在香港周圍曾有多宗目擊鯊魚的報告。在本港潛水前最好先查看鯊魚出沒報告。有些潛水員則在所謂鯊魚出沒季節使用鯊魚驅趕器(shark pods)以作保護。

由於鯊魚造成的創傷往往致命，應該盡可能避免。一些預防遇上鯊魚的建議或許有用。



- 能見度受阻時，不要在經常有鯊魚出沒的水域游泳。
- 身上有流血的傷口時避免潛水。若潛水時受傷則應馬上上岸。
- 應有其他潛水員陪同潛水

**症狀：**被鯊魚咬傷會導致大量出血和組織損傷或肢體切斷。被鯊魚襲擊導致的死亡通常是由於大量出血和休克。

**急救措施：**最優先的是儘快給傷口直接加壓進行止血，如果可能要對傷口進行評估。因為很可能會發生休克，因此應保持受害者的體溫並以仰臥姿勢放置(背朝下平放)，如果受害者沒有失去意識並能呼吸，就要以復原臥式放置，並應提供氧氣。

如果使用加壓法和繃帶仍不能止血，可以使用止血帶作為最後的方法。

#### 4.4.5 海膽類

海膽類是細小、多刺的海生物。它們的外殼是圓形並長滿刺，闊度通常為 3-10 釐米。

**棲居地：**它們居住於淺水區、多石的海底，或者是隱藏於沙地區。

**症狀：**被刺傷會導致劇烈疼痛和紅腫。

**急救措施：**把受影響部位浸入熱水中 30-90 分鐘，水溫要在傷者能忍受的範圍內。根據需要重複浸泡以減輕痛楚。然後用鑷子取出傷口的大刺，塗上剃鬚膏，用剃刀輕刮以清除刺針。隨後用肥皂抹擦傷處並用大量清水沖洗。切勿用膠布把傷口覆蓋。如果有感染跡象，如流膿、發紅、發熱，使用局部的抗生素藥膏及看醫生，醫生或會處方抗生素。

#### 4.4.6 水母

水母的形狀大小各異，但是最具毒性的是箱狀的，這種水母四個角上都有很多觸鬚。有些每只角上只有一條觸鬚，而另一些則有多條觸鬚。每條觸鬚上有無數的刺細胞，某些種類的身體上也有刺細胞。有些種類的箱狀水母即使只有指甲那麼大，也可能對生命構成威脅。

**棲居地：**淺水區和深水區都能找到水母。

**徵兆和症狀：**如果被水母有毒的觸鬚刺傷，輕微的會紅腫、瘙癢。嚴重者劇烈疼痛、呼吸困難、肌肉痙攣、失去意識，甚至還會出現死亡情況。

**急救措施：**懷疑被箱狀水母螫到立即往螫傷處抹醋。若有必要開始施行 CPR。不要摩擦傷口。抹上醋後可以用鑷子或甚至用手指清除觸鬚。然後可以用冷敷以減輕疼痛。嚴重螫傷應立即尋求醫療救助。

被其他種類的大海蜇螫傷儘管可能會很疼，但是一般不嚴重。用海水（不是淡水）就能沖洗掉觸鬚，可以冷敷以減輕疼痛。如有必要尋找醫療救助。

#### 4.4.7 海蛇

海蛇在世界各地尤其熱帶水域都能見到。全部都有毒牙並會釋放毒液，但多數對人類不會造成危險。然而，有些種類含劇毒並有大的毒牙，能給人帶來致命性的咬傷。幸好很多咬傷沒能有效地給人體注入毒素，但必須視作嚴重的咬傷處理。

**棲居地：**在淺水區、島嶼周圍及離陸地不遠的地區都能找到。

**徵兆和症狀：**有刺穿的痕跡或刮傷、頭疼、噁心、嘔吐、腹痛、呼吸困難、癱瘓、失去意識、死亡。

**急救措施：**必須讓傷者保持靜止不動，並在咬傷處開始的周圍範圍使用加壓止血繃帶。以類似處理扭傷的方式包紮，緊包肢體，但不要阻礙血液循環，手指和腳趾指應呈粉紅色。儘快尋求緊急醫療救助。必須保持繃帶原封不動直到醫務人員給受害者施行治療。

#### 4.4.8 毛足蟲（亦即海毛蟲）

**棲居地：**棲居於沙地或天然岩石中。夜間活動，白天一般看不見。

**徵兆和症狀：**如果人的皮膚被這種鋒利的硬毛刺破，毒液會使人感到瘙癢、紅腫並起水泡。

**急救措施：**應用鑷子去掉那些看得見的硬毛。去除看不見的硬毛，把黏膠帶粘到受傷部位，硬毛就會附著在膠帶上。這種方法應重複3次以上。硬毛去掉後，用比例3滴水1滴家用阿摩尼亞混合抹到傷處以緩解疼痛。如果沒有阿摩尼亞，把受傷部位浸入酒精中消毒。

#### 4.4.9 魷魚

魷魚的棘狀突起的刺極其鋒利並具有致命的毒液。

**棲居地：**魷魚扁平的身軀使它們很容易在自己的生存環境中隱匿起來，通過攪動沙子把自己藏身其中。

**徵兆和症狀：**接觸魷魚的毒刺會導致局部外傷(被刺的地方)，毒液會引起疼痛和腫脹，稍後可能會受到細菌感染。其中對人體可造成的直接傷害包括：中毒、刺傷、切斷動脈及可能死亡。致命性刺傷則十分罕見。

**急救措施：**治療刺傷的方法有：使用接近滾燙的水，以改變毒液的複雜蛋白從而舒緩痛楚；及使用抗生素。在受傷部位及其周圍即時注射局部麻醉劑很有幫助，由於使用了減輕疼痛的麻醉劑如肌注哌替啶（intramuscular pethidine）。局部注射麻醉劑能即時帶來幾個小時痛楚的消除。任何暖至熱的液體包括尿液，都可以幫助緩解痛苦。醋和木瓜酶（papain）則無效。

“感興趣的潛水員可以從適當的來源取得更加多有關危險海洋生物的詳細資訊”

## 5. 潛水員的身體健康和體能

### 5.1 休閒式潛水員的身體健康要求

#### 5.1.1 簡介

休閒式潛水是一種令人享受的運動，與商業性潛水比較，這類型潛水所需面對和承受的各種風險相對較輕。但是，要成為安全和有樂趣的休閒潛水員，必先要保持身體健康，並且接受過正規潛水訓練，而且為所參與的潛水活動類型配帶合適的潛水裝備。

為了保障商業潛水員職業安全及健康，各地一般會根據有關政府或機構所闡述的標準，對他們作定期的考核和認證。不過對於非專業的休閒式潛水員，除了英國本土及澳洲的昆士蘭有制定相關或同類的法則之外，其他各國並沒有給休閒潛水員訂立守則或法例規定的具體標準。雖然如此，作為提供訓練的休閒式潛水訓練中心，不能夠以這些沒有規管作為一個抗辯理據，而推卸所有安全責任。因此，休閒潛水經營者和潛水員都有必要對休閒潛水中可能存在的風險、相關的體能及體格要求有一個恰當和透徹的瞭解。

對休閒潛水員作適當的醫療評估，必須從兩個主要的基本原則考慮。第一，潛水員身體應沒有潛在的健康問題或疾病，否則可能會增加潛水員的風險包括減壓病；肺部過度膨脹綜合症與緊隨的動脈氣體栓塞，還有其他狀況例如失去意識、判斷力減退、迷失方向以及行動障礙等，以上情況都可能會導致淹溺。第二，潛水員沒有致使潛伴處於上述危險情況的潛在健康問題或疾病。

#### 5.1.2 成為休閒潛水員最低體格要求

##### 醫療需求

##### 準則

- 作為休閒式潛水行業內的人士(即包括休閒式潛水訓練中心、休閒式潛水教練)，對所有準備參與休閒式潛水的人事，必先要求這名參與人士取得一份完整、合格的醫學證明，證明這名人士醫學上適宜參與休閒式潛水活動。
- 所有這些適宜參與潛水活動健康證明，需由一名本港註冊的註冊西醫所簽發；這名註冊西醫，必先要對潛水醫學有一定的認識，並且明白潛水時可能產生的生理及心理變化，並且充分考慮以上提及的各項風險，才可以作出判斷。若果這名負責簽發證明的醫生對這些相關風險問題有不明白或者不肯定的時候，應該尋求相應的專科醫生意見。因此，建議這名準備參與潛水活動人事可以選擇本身的家庭醫生、潛水醫學醫生、職業醫學醫生等。
- 對已經成功晉身為合格的休閒式潛水員，若果在他們的潛水運動生涯中，任何時候出現過新的疾病或健康問題，建議再一次請教本身的家庭醫生、潛水醫學醫生、職業醫學醫生，並且得到負責處理該疾病或醫學問題的主診醫生同意下，才可繼續參與潛水運動。
- 必須絕對遵從潛水會/組織或保險機構對體檢的任何其他規定，包括檢查內容和次數。

## 潛水體檢內容

- 審查潛水員的病歷及身體檢查至少應包括以下要點。一些會給潛水員帶來不利影響的情況可能並未包括在內，但卻包含了最常見的健康問題，這也是目前休閒潛水領域就潛水安全標準的共識。未來的潛水員和他/她的醫生，必須權衡潛水所帶來的樂趣相對因個人病理狀況而增加了死亡或受傷的風險。正如所有娛樂活動一樣，潛水也欠缺數據使能夠計算出受傷的準確機率。經驗和生理學原理只允許計算性的估量出其風險和危害程度。
- World Recreational Scuba Training Council 與 Undersea & Hyperbaric Medical Society 聯手制定了一套四頁紙的休閒潛水員醫生檢查指引(Guidelines for Recreational Scuba Diver's Physical Examination)，這套指引由世界級潛水醫學專科醫生共同製作而成，絕對是負責簽發適合休閒式潛水證明的醫生指引。以下對休閒潛水的風險等級相同於指引中所述。

(可於互聯網下載，RSTCMedStatementGeneric：<http://www.wrsc.com/downloads.php>)

**重大風險** - 就是指相較於一般大眾，某人被認為罹患減壓病 (Decompression Sickness)，肺部或耳壓力傷 (barotrauma) 或意識喪失而導致溺斃的風險大幅增加。有此類健康問題的學生一般視為不具備潛水條件或不鼓勵從事潛水。

**相對風險** - 就是發生危險的可能性有所增加，在某些情況下這是合理的。要決定潛水是否是此類健康問題的禁忌時，醫生必須針對個別病患評估並且作出判斷。若果這名主診醫生有懷疑或者不肯定的話，應該給潛水員推薦一名潛水醫學醫生。(潛水員警報網 (Diver Alert Network) 和 Duke 大學保健體系 (Duke University Health System) 正常辦公時間諮詢電話 +1 919 684 2948，及UK Sport Diving Health Committee，將是最合適的潛水醫學醫生來源。)

**暫時性風險** - 有些無法潛水的健康問題，在本質上可能只是暫時性的，這些問題經過治療處理之後，或者有機會可以讓該潛水學員去潛水。

### 可能妨礙潛水的一些具嚴重風險的健康問題：

- (1) 童年時發燒而導致的抽搐
- (2) 短暫缺血性發作 (TIA) 或大腦血管性意外 (CVA) 病歷
- (3) 嚴重減壓病 (中樞系統、大腦或內耳部位發生的減壓病) 並且有殘餘的缺陷
- (4) 心肌肥大疾病與心臟瓣膜狹窄可導致在運動中突然的失去意識。
- (5) 自發性氣胸 (肺部破裂、爆肺)。
- (6) 肺部存在先天或後天的疾病，導致肺部空氣存留
- (7) 胃出口阻塞到足以產生反覆性嘔吐。
- (8) 慢性或反覆性小腸阻塞。
- (9) 嚴重的胃食道逆流、弛緩不能、食道旁的疝氣。
- (10) 因接受胰島素治療或是口服糖尿病藥物，引發血糖過低的糖尿病患者，若因血糖過低而造成意識狀態急速的變化，將可能導致溺水。
- (11) 不當的潛水動機 - 僅僅為了取悅別人
- (12) 患有幽閉恐懼症或曠野恐懼症
- (13) 活躍性精神病

- (14) 曾有未接受治療的恐慌失調
- (15) 藥物濫用或是酗酒
- (16) 只有單耳聽覺
- (17) 耳膜開放性穿孔
- (18) 耳膜存在有耳膜造口術導管
- (19) 鐙骨修補術的病史
- (20) 耳骨骨鏈手術的病史
- (21) 曾動過內耳手術
- (22) 由壓力傷而導致的顏面神經受損
- (23) 除了老人性耳聾以外的內耳疾病
- (24) 未矯正的上呼吸道阻塞
- (25) 喉頭切除術或喉部分切除術後的狀態
- (26) 曾動過氣管切除術
- (27) 未修補的喉頭漏管
- (28) 內耳減壓病的病史
- (29) 大腦氣體栓塞或大腦減壓病史，並有殘留缺損

**可能妨礙潛水的一些具相對風險的健康問題：**

- (1) 偏頭痛的症狀嚴重到了損害運動神經或認知功能的程度。
- (2) 曾頭部受傷而留下了後遺症。
- (3) 椎間盤脫出症
- (4) 顱內腫瘤或動脈瘤
- (5) 神經末梢病變
- (6) 多發性硬化
- (7) 三叉神經神經痛
- (8) 脊椎神經或大腦受傷病歷
- (9) 曾作過冠狀動脈繞道手術（CABG）或經皮下氣球血管修復術（PCTA）或冠狀動脈血管疾病（CAD）
- (10) 發生過心肌梗塞
- (11) 心臟衰竭
- (12) 高血壓
- (13) 有心律不整的病史並且需要藥物控制
- (14) 心臟瓣膜逆流
- (15) 曾有過氣喘或是反應性的氣管疾病(RAD)
- (16) 運動誘發的支氣管痙攣(EIB)病歷
- (17) 慢性阻塞成肺部疾病
- (18) 曾有肺泡、肺氣囊損傷
- (19) 由外傷或手術引發的繼發性的氣胸、肺部破裂、爆肺；發生過肺部充氣過度損傷
- (20) 肺水腫
- (21) 間質性肺部疾病：可能提高氣胸的危險。
- (22) 發炎性腸道疾病
- (23) 肢體折斷手術後
- (24) 可能影響肺功能及運動能力的脊柱病變
- (25) 無菌性骨壞死
- (26) 鎌狀紅細胞疾病、紅血球增多症、白血病、血友病



- (27) 荷爾蒙分泌過量或不足
- (28) 過度肥胖
- (29) 腎臟功能不足
- (30) 成長遲緩
- (31) 濫用藥物或酗酒
- (32) 曾患過精神疾病
- (33) 服用治療精神科疾病的藥物
- (34) 復發性外耳炎
- (35) 重大的外耳管阻塞
- (36) 重大的耳廓凍傷
- (37) 耳咽管功能不良
- (38) 復發的中耳炎或鼻竇炎
- (39) 有骨膜穿孔的病史、有骨膜修補術的病史，曾動過乳突切除手術
- (40) 重大的傳導或感應神經性的聽力受損
- (41) 與壓力傷無關的顏面神經麻痺
- (42) 佩戴口腔修復設備
- (43) 顏面中骨折的病史
- (44) 尚未癒合的口腔部手術傷口
- (45) 頭部或頸部曾接受放射線治療
- (46) 牙齒關節功能不良
- (47) 內耳卵圓窗破裂病史
- (48) 卵圓孔未閉

**可能妨礙潛水的一些具暫時性風險的健康問題：**

- (1) 進行性的肺部感染性疾病
- (2) 活躍型哮喘、氣喘
- (3) 胃潰瘍及胃酸反流
- (4) 未修復的疝氣
- (5) 持續性的腰背痛

可以定期複習休閒潛水中的健康問題/疾病風險明細表，潛水員的體檢醫生應想盡一切辦法保持參考文獻和書目列表的更新，就像本手冊附錄中的那樣。

### 5.1.3 潛水體格檢查的次數

**潛水體格檢查應於以下時間完成：**

- **在潛水學員開始學潛水** 除非相當於初次（潛水）體格檢查已在就近的 5 年內完成過一次(如果該名潛水學員年介 40 歲以上的則 3 年，50 歲以上則 2 年)，潛水員必須出示有關的報告，並獲潛水會對有關報告進行審查和表示滿意。
- **定期潛水體格檢查** 可以根據潛水會/組織或保險機構的有關規定，40 歲以下在 5 年的期間做一次體格檢查，40 至 60 歲之間，每 3 年一次，60 歲或以上，則每 2 年一次或根據潛水會/組織指定。



- **重新作潛水體格檢查** 在首次（潛水前）體格檢查後如經歷重大受傷或疾病，或曾住院接受治療，都必須重新作潛水體格檢查。如其受傷或疾病與潛水有關，則必須得到潛水醫學專科醫生的許可證明方可再潛水。

#### 5.1.4 潛水體格檢查的檢驗內容建議

##### 首次（潛水前）體格檢查項目：

- 詳細病歷資料最少包括以上提及的不同“風險/危險因素”
- 全面身體檢查，重點對心血管，肺，神經和耳鼻喉科檢查的組成部分
- 肺功能測試，血液及尿液化驗，
- 根據個別學員的身體狀況，由醫生認為必要追加的任何檢驗\*

##### 定期潛水體格檢查需要的檢查項目：

- 詳細病歷資料及徹底的體格檢查 - 如同上述的首次（潛水前）體格檢查
- 醫生認為必要的任何檢驗\*

##### 醫生認為必要的任何檢驗備註\*

- \* 檢查潛水學員的醫生可以添加額外的評估項目，其中會涵蓋潛水員冠狀動脈疾病的風險因素評估、潛水員過去的病歷記錄，年齡，血脂，血壓，糖尿病篩查以及吸煙狀況;
- \* 基於評估風險因素或會加入靜息心電圖和運動負荷試驗;
- \* 正常情況下，例行胸部 X 光檢查於初始潛水體格檢查並不屬於必須項目，除非學員的病歷顯示有此需要，或臨床檢查過程中發現有相關的需要（如懷疑胸部病理性疾病）。

#### 5.1.5 醫生書面報告

學員經過任何有關潛水的體格檢查，必須出示醫生的書面報告，負責檢查醫生的報告，應包含學員的身體狀況是否適合潛水，是否有任何約束建議或限制。潛水會應保存一份醫生的書面報告至少五年。

## 5.2 潛水員的體能健康

休閒潛水在某個時候可能是一個吃力的活動，休閒式潛水員應具備並保持一定程度的體能，以便能夠應付緊急情況、突發的水流或海中費勁的活動。

建議的休閒式潛水體能水準應該能夠於 12 分鐘內完成步行 1.6 公里。

## 6. 本地潛水訓練要求

### 6.1 本地泳池訓練要求

- 參加課程的前提條件必須包含以下內容：
  1. 最低年齡：要根據簽證機構的建議（未成年人：需要一份由父母或法定監護人簽名的同意書）。
  2. 健康聲明書以證明適合進行水肺潛水和徒手潛水活動。
  3. 根據 S.5.2. 的規定最低的體能要求
  4. 建議為潛水活動投保個人保險。
  5. 必須能夠游 200 米
- 培訓必須在泳池中進行，香港的海灘沒有類似於泳池條件下的水清晰度，通常不能符合簽證機構平靜水域定義的要求。
- 第一節訓練必須在較淺的泳池中進行，深度要使學員能夠在池中站起來。
- 由於沒有淺水區供潛水員能夠站立起來，故此不建議在公共泳池的跳水池進行第一節的訓練。如果別無選擇的話，必須做好預防/安全措施，包括使用一個接有繩子的浮標，讓學員可以抓住繩子下潛。這種情況下，師生比例不應超過 1：2，有助教的情況下師生比例最大值是 1：4。
- 鑒於香港普遍的潛水地點水面交通繁忙，初階潛水員進行水中訓練時，應包括於泳池練習使用充氣象拔，以確保潛水員學員知道於升水之前如何發出充氣象拔。

### 6.2 本地開放水域訓練要求

初階潛水員訓練，主要著重安全使用水肺潛水裝備及其他水下潛水儀器。以下僅是對初階潛水員最基本的技術要求。我們鼓勵於開放水域練習時，應盡量把標準提升。

- 確保潛水員有足夠水中技術，提議潛水員應該有以下徒手潛水技能。二級潛水員可以使用面鏡，呼吸管和蛙鞋進行下列活動：
- 1. 不需用手輔助下，於 10 分鐘內游泳 400 公尺
  2. 於水中閉氣潛泳前進 7 公尺；及
  3. 閉氣深潛 3 公尺。

三級潛水員最好能夠：

1. 不需用手輔助下，於 20 分鐘內游泳 800 公尺
  2. 於水中閉氣潛泳前進 15 公尺
  3. 閉氣深潛 5 公尺；及
  4. 於水深 3 公尺中，閉氣穿戴徒手潛水器具（包括面鏡，呼吸管及蛙鞋）。
- 初階潛水員必須在教練指導下，使用全套的水肺裝備，在不同的本地潛水環境至少完成 10 次開放水域潛水活動。每次潛水都應該超越 20 分鐘及深度不少於 5 公尺。每一日最多只可潛水三次。若上升到水面後於 10 分鐘內再次下潛，這兩次下潛只可作一次潛水。
  - 初階潛水員的技能評估，應根據休閒式水肺潛水訓練局(RSTC)所定的最低要求。
  - 教練應確保潛水學員穿著適當的潛水衣，以避免低溫症。
  - 當水底能見度超過 2 公尺，教練學員的最大比例不能超過 1:6，有助教的情況下是 1:8。如果低能見度少於 2 米，教練學員的最大比例必須是 1:2，有助教時也只能是 1:4。
  - 提議第一次開放水域訓練時，水底能見度應該不少於 2 公尺。於當時情況，無論有否助教協助，教練學員建議最高的比例為 1：2。
  - 學員不容許在沒有教練或助教的直接監管之下，於水底單獨停留。當教練陪同一學員練習技術及升水，不應獨留其他學員在水底。
  - 當教練與學員於水底練習技術時，在水面上的其他學員應該有助教監管或受船上的潛水長間接監管，並需要在水面設置浮泡提供給有關學員。教練應指示及確定在水面的學員調整浮力調整裝置（BCD）以建立正浮力，才可由助教跟進。
  - 當學員要進入水中時，教練或助教應於水中監督和協助以確保他們的安全。教練及助教不應忽略任何一個學員。在船上，潛水長應協助學員進入水中。
  - 在第一至第四次開放水域潛水時，教練應使用浮泡以協助學員下潛。訓練時應選擇沒有珊瑚／泥／淤泥的合適沙質海床。
  - 當潛水員未上升到水面前，必須通知所有船隻駛離潛水員活動範圍以保安全。為了避免因空氣、光線或海面情況影響能見度，而令潛水船與潛水員失去聯繫，應該發出充氣拔，好讓潛水船確定潛水員位置。
  - 當 3 號或以上颱風訊號及黑色暴雨警告訊號懸掛時，不可進行任何潛水訓練。當有雷暴警告，大雨或強風警告，教練須考慮當時的情況。在任何情況下，最重要是潛水員的安全，教練應採取較保守的決定以保障潛水員的安全。

### 6.3 進階休閒救援潛水員要求

除了於 4.1 休閒式潛水證書簽證機構所提供的一般進階休閒式救援潛水員課程，同時建議潛水領導員、駐船潛水長或潛水／活動組織者需要符合一個進階休閒式救援潛水員的標準。持證進階休閒救援潛水員就是曾接受進階技能的培訓，包括使用水肺裝備和其他水底潛水儀器以進行搜索、救援、和尋回等潛水活動。進階休閒救援潛水員至少應演示 (1)超出平均水準的水中技能、耐力、和徒手潛水技術，以便在沒有水肺裝備情況下，對發生在船或海岸附近淺水區的任何事故作出迅速反應；(2)熟悉使用繩索作水底搜索，無論是以搜索潛水夫或指導員身份進行。(3)能運用超出一般水準的水肺潛水技術找回並處理失去意識的潛水員，及能在各種水面條件下拖曳潛水員；(4)參加正規的持續教育；(5)具有在各種環境條件下，包括 10- 30 米的深度、夜潛和有海流潛的潛水經驗；(6)有效的急救證書；且(7)每 3 年就要更新他/她的救援潛水技能。

### 6.4 本地開放水域實習的特定支援

- 足夠的水面支援
  - 水面上必須有一個附有潛水旗和下潛繩的浮標。
  - 掛上潛水旗的機動式支援船。
  - 值勤潛水長或教練必須在船上間接監督學員，並為水中的學員和教練提供水面支援。
- 船上應有足夠安全裝備以作支援
  - 自動體外除顫器
  - 急救箱
  - 適用於潛水事故的氧氣裝置
  - 聲號裝置系統
  - 可浮的脊椎固定板
  - 視覺信號
  - 航海無線電
  - 手提電話
  - 探照燈(夜潛)
  - 緊急照明閃光/煙幕信號
  - 用於箱狀水母螫傷的醋

## 7. 潛水會

### 7.1 船上當值人員的資格和責任

船上當值人員的資格：

- 必須是一名持證潛水長或以上資歷
- 必須持有有效/更新的急救證書
- 必須有一名曾接受恰當訓練的急救氧氣裝備操作員
- 必須是曾接受緊急/意外事故處理訓練的團隊成員
- 必須具有最新的水中救援技能，具備等同於本手冊中建議的進階休閒救援潛水員資格

當值人員的責任：

- 必須提供一個清楚的下潛簡報，包括潛水目標和跟進序列，潛水地點資料、潛水員核點方法和應急措施。
- 必須檢查潛水員的潛水日誌和證書，並審查潛水員的經驗和資歷。
- 必須配對潛伴/分組，給本地潛水經驗較少/資格較低的潛水員和那些經驗豐富的潛水員配成一組。
- 必須保證一個潛水團隊領隊的資格和經驗，依照 4.1 內容，應具有充足本地潛水經驗。
- 應協助潛水員入水和出水。
- 必須觀察潛水環境的變化，包括天氣、風向、雨、溫度、潮汐、水流和能見度，並根據潛水員的資歷和經驗確定情況的可接受性。
- 潛水員制定自己的潛水計畫時，應給他們提供建議
- 必須核對潛水員的入水和出水人數。
- 必須知會潛水員有關的緊急步驟處理，包括召回潛水員的方法。
- 必須與操船的艇長保持密切聯繫
- 必須禁止單獨潛水
- 確保潛水員在入水前檢查自己的配重是否合適，以保持中性浮力及避免“過重”。

## 7.2 船上當值人員及資深潛水員對初階潛水員的照顧

- 對海外受訓的初階潛水員及久疏潛水活動的潛水員需要加倍注意；請參閱本手冊的 4.2.1；建議沒有本地潛水經驗之潛水員，先進行由潛水長或教練陪同的導潛。
- 最近 6 個月沒有進行潛水活動的潛水員，必須推薦他們參加導潛/課程重溫。
- 導潛/課程重溫應由潛水長或更高級別的潛水員執行。
- 應把初階潛水員和資深潛水員組合，或由潛水長/教練帶領。
- 必須闡明本地潛水環境例如：能見度、水流、溫度、海床構成、水面狀況、海浪、危險海洋生物或任何其他潛在的危險。

## 7.3 潛水員的點算步驟

潛水員名冊包括：-

- 潛船上一份列有船上所有潛水員/乘客名字的名單。
- 所有潛水小組/潛伴組別的名單。
- 重要的附加資料如潛水員的資歷、經驗、還有租借的裝備。

必要步驟如下：-

- 第一次潛水前，檢查並確定名冊上所有的潛水員/乘客已登船。
- 必須備有適當步驟點算及登記入水及上水人數，記錄重要資料包括入/上水時間、空氣使用量和最深下潛深度。
- 離開潛水點前必須進行點名。
- 每次完成下潛後，必須進行「目視」點名；確保每個潛水員均在現場，點名時別人不應替其他潛水員報到。

## 7.4 潛水船隻

潛水船的定義

- 能支持 10 名或以上的水肺潛水員進行潛水活動的船隻。
- 從事水肺潛水訓練的船隻。

潛水船必須具備：-

- 須配備足夠及穩固空間，供擺放潛水裝備；尤其擺放水肺潛水氣瓶的穩固範圍以防止其左右滾動。
- 船上須配備隨時可供應用的急救裝備及急救氧氣供應裝置，每次出發潛水前都要檢查確保功能良好。
- 須按法定要求配備充足的救生設備，例如滅火筒、救生衣及救生筏）。



- 有充足的船尾平台供入水前和出水前準備用。
- 建議備有由纜繩繫至船身的浮標，支援在水面等候之潛水員。
- 備有構造結實且穩定的船梯以供潛水員上水用。
- 在船尾平台看守著，防止潛水員在上水時意外進入船底範圍。
- 在螺旋槳周圍建造一個防護網，以防不慎開動發動機時螺旋槳會傷及潛水員

#### 輔助船隻

- 最理想的是一艘充氣橡皮艇(RIB)，有舷外安裝發動機和螺旋槳的周圍設有安全防護網。
- RIB 容易在海上來回，即使在波濤洶湧的海面也能操縱靈活。
- 任何時候進行任何潛水活動都需要。
- 根據香港特區政府的法律要求，輔助船隻的駕駛船夫必須持有有效牌照，船上要有人手協助潛水員登船。
- 操縱靈活的輔助船隻上掛有潛水旗是必要的。划艇是不能接受。
- 在有潛水員的區域時，船速必須減慢。船員和艇長必須經常留意正浮出水面的潛水員。
- 靠近水面上潛水員前，必須關掉發動機或保持空波。在螺旋槳仍然旋轉時，潛水員不應遊近潛船或輔助船隻。在起動發動機前，艇長和潛水長必須檢查以確保附近和/或船下沒有潛水員。
- 輔助船隻上的梯子和帶繩的浮標，供潛水員準備登船時使用。
- 強烈建議應和主船保持無線電通訊。
- 螺旋槳周圍的防護網是必要的且必須具備。

#### 出租裝備

- 出租的調節器和濕式潛水衣在使用後應加以清洗和消毒。
- 出租裝備應妥善保養，保存每年檢查記錄日誌。在裝備上附保養標籤顯示最後檢查日期和檢查員的簽署。
- 有問題的儀器應立即把保養標籤取走，以避免再使用。

## 7.5 事故和緊急措施

- 潛水安全手冊/指引必須放置於工作人員/船員輕易存取的地方。
- 工作人員需要制定和計劃有關失蹤潛水員的搜索程式。

- 任何情況下都不應延遲向警方報案 – 亦可向警方要求直升機緊急援助搜尋和運送受害者。
- 救援搜索隊應由合資格的潛水員組成（最好是高級救援潛水員、潛水長、教練，或受過搜索與尋回訓練的潛水員）。
- 船上必須具備一份緊急程式核對表。其附錄應有緊急聯絡人清單。
- 強烈建議潛水會和船隻管理人/救援隊每年應作緊急程式的演習。

## 7.6 急救設備

### 急救箱

- 每艘潛船上都應配備急救箱
- 下列建議項目，必須儲存充足
  - 緊急電話號碼/硬幣/電話卡
  - 手套，用於換氣的隔膜
  - 大型吸水敷料，消毒棉花，棉花紗布
  - 壓力護墊
  - 無菌紗布墊，黏貼式繃帶卷
  - 黏貼式繃帶/膠布，三角繃帶
  - 乾燥護墊
  - 繃帶剪刀
  - 壓舌板
  - 鑷子，針
  - 安全別針，筆型電筒
  - 口腔溫度計
  - 擠壓瓶裝水
  - 夾板
  - 急救毯
  - 冷包/熱包
  - 醋
  - 塑膠袋、小紙杯
  - 工業酒精 – 消毒用（不用於傷口）
  - 抗菌性肥皂、抗菌溶液或拭布、抗生素藥膏
  - 消炎抗敏軟膏
  - 阿司匹林和非阿司匹林止痛藥
  - 抗過敏藥片
  - 活性炭
  - 防暈浪藥
  - 鼻塞噴劑
  - 止血帶

### 氧氣裝備

- 在本地水域的話，氧氣瓶的大小或氧氣供應應量應能至少持續 45 分鐘，以便等待緊急支援的到來。
- 應同時備有連續供氧系統和需求閥供氧系統。

- 一次性的面具應保持清潔及用後應丟掉。

#### 除顫器

- 潛船上應有自動體外除顫器（AED）。
- 在崗人員/全體船員應曾接受操作 AED 的良好訓練。

## 7.7 空氣壓縮機的要求

- 所有空氣壓縮機的進氣口，必須遠離含有廢氣或其他污染物的地方。可以用靈活的進氣軟管，放在最佳的位置來吸取純淨空氣。
- 潛潛水會應使用日誌，保存所有壓縮機的運作，資料、更換過濾器、修理、全面檢查的記錄資料。潛水會亦應該根據壓縮氣體協會的標準和參考 OSHA 29 CFR 1910.134，定期在每隔不超過 100 個小時運作或 6 個月內，以較短者為準，分析和測試壓縮氣體，以免違反壓縮氣體協會(CGA Pamphlet G-7.1)技術規格要求，或參照 OSHA 29 CFR 1910.134 之內容。

#### CGA 等級E

##### 組成成分最大值

氧氣 20 - 22%/v  
 一氧化碳 10 PPM/v  
 二氧化碳 500 PPM/v  
 濃縮碳氫化合物 5 mg/m<sup>3</sup>  
 水蒸氣 NS  
 無不良氣味

- 這些測試的結果，須寫入由潛水會記錄和保存的正式日誌。

## 7.8 記錄保存

- 潛水經營者應保存活動記錄日誌，包括名冊、表格和所有其他檔。
- 潛水組織者應保存每項潛水裝備的維修記錄，即每裝備的改裝、修理、測試、校準、或維護服務都必須進行記錄，包括日期和進行工作的性質；這項設備的編號；操作人的姓名，裝備包括調節器、潛水壓力計、深度計、水肺氣瓶、氣瓶閥、壓縮機、氣體控制台、空氣貯存瓶、空氣過濾系統、分析儀器、浮量控制裝置和乾式潛水衣。

## 7.9 海外潛水旅遊的具體安全措施

潛水會/船主在組織香港水域以外的旅程時必須格外小心。

#### 通訊設備

- 高頻無線電

- 無線電報
- 無線電話信號
- 旗

#### 支援

- 足夠整個旅程所需的燃料、淡水、食物
- 準備充足的急救氧氣份量
- 需要操縱靈活的機動小船。充氣橡皮艇是一個很好的選擇，但是還需船隻操作員和甲板人員。

#### 行政程序

- 離開香港範圍前，船長必須獲得海事處發出的出境證
- 根據入境程序，若需要時收集每位乘客的身分證

#### 潛水後飛行

以下指引摘錄自 DAN “2002 Flying After Diving Workshop” 之潛水後飛行的建議。應用於緊接著潛水後飛行的並無減壓病症狀(DCS)的潛水員，飛行高度在 2,000 至 8,000 英尺(610 至 2,438 米)。

- 潛水員在完成一個不需減壓停留的下潛後，應至少 12 小時後才可飛行或升空。
- 如果潛水員曾重複多次潛水或多日潛水，應至少在潛水後 18 小時才可飛行。
- 如果潛水員進行了需要減壓停留的潛水活動，飛行前的水面休息時間似乎應遠超於 18 個小時才顯得謹慎。
- 如果潛水員使用之潛水電腦的飛行指示，比上面 DAN 指引的更長，就應遵從電腦的不能飛行時間。如果電腦上顯示的時間比上述 DAN 指引的短，那麼就要使用 DAN 準則。
- 在制定潛水活動計畫前要考慮潛水員的航班時間表。
- 如果需要直升機救援，建議飛行員低空飛行。

### 7.10 潛水安全手冊和安全審核計畫

- 中英文版的潛水安全手冊/指引應放在工作人員/船員容易存取的地方。
- 潛水會應參考附錄一中建議的清單內容，制定潛水安全審核計畫。
- 在審核計劃中，應包括每年進行尋找失蹤潛水員和處理昏迷潛水員的演習。
- 潛水員安全審核應每年由獨立的教練導師進行。其審核和跟進行動的建議記錄，應由潛水會正式備存。

## 8. 海本地及海外不同潛水類型的潛水安全措施

### 8.1 岸潛

準備：

- 潛水會一般不會設立在香港潛水點附近提供岸潛活動，因此潛水員未必能輕易取得潛水裝備/設施。
- 潛水員必須注意有關潛水裝備的運送、更衣設施及照顧個人物品。
- 潛水員在下水前應評估就有關潛水點的情況包括，注意該區的特性及潛在危險，例如海浪、水深、潮汐的改變、海岸線的形狀及海底結構、水流及其他正在進行中的水上活動。
- 潛水員應有安全設備，例如潛水旗、浮標、附有捲軸的鈎繫於堅韌的繩索等。
- 在入水前，潛水員至少應確認 2 個可能的出水點。

入水步驟：

- 入水前應裝備齊全並進行一次徹底的潛水前安全檢查。
- 留意水底障礙物，例如岩石、漁網、防鯊網等。
- 進入海水中時要注意海浪/波浪、水流。
- 由於香港的海岸線比較平坦，潛水員需預備有可能游一段距離方可到達潛水點。

出水步驟：

- 保存/預留充足的空氣以游向岸邊/出水點。
- 準備好游回出水點的導航計畫。
- 留意海底的任何障礙物，如，岩石、泥底等。
- 預備出水時可能遇到海面風浪

### 8.2 夜潛

準備：

- 若進行夜潛，建議使用船潛。潛水員應確保有足夠海面支援，例如合適的潛水輔助船隻。
- 船上應備有性能良好的防水燈。建議備有主要、後備照明燈及標誌燈連同新電池。
- 應在入水點和出水點設照明燈或閃燈。使用潛水船潛水時，建議在船下、下錨點或附近掛上頻閃閃光燈。

- 潛水用具應有夜光功能。
- 高度建議使用附有重量的下潛繩索。

程序：

- 低能見度潛水時要降低教練與學員比例。船上當值人員應留意任何潛水員發出的求救信號。因此，保持潛水船上安靜是必要的。
- 下潛/上升時使用輔助繩。
- 永遠從淺水區開始。
- 當與潛伴失散，應立即升上水面。不建議水底搜索。

### 8.3 漂流潛水

準備：

- 香港大部份的潛水點均位於東部或東北部海岸地區。
- 部份潛水點面向東中國海。
- 地區容易受的強季風影響。
- 能見度不如海外漂流潛水的條件好。

裝備：

- 每一組漂流潛水的潛水員須備有最少一個水面浮標。
- 每一名潛水員須備有氣笛/哨子/潛水警報器，供水面及水底求救時使用。
- 須備有其他水面警報工具，例如反光物件、有色標誌甚至舊光碟用以反射陽光。在接近傍晚或晚上潛水時帶備手電筒。
- 輔助船隻上要有具警覺性和受過指示的人員，並具備一個望遠鏡。

### 8.4 沉船

準備：

- 香港有人工珊瑚礁項目計劃。
- 船隻殘骸、舊輪胎、海洋結構冗餘或人工結構常常吸引及孕育大量魚類，為海洋生物提供庇護。
- 大部份沉船位於低能見度、深水、水流或航道地區，該類地區包括海下灣、印洲塘、外牛尾海及濶西等，因此應留意任何存在的風險。
- 這些地點大部分不適合休閒潛水。只有少數位於海下灣海岸公園及尖洲的沉船可作休閒式潛水活動。



裝備：

- 全套水肺潛水裝備。
- 刀 (有結實鋒利鋸齒刀鋒)；手套；照明燈；線軸及 100 英尺長的堅韌繩索，線繩上有鉤；舊 CD 光碟以反射陽光。

風險和考慮：

- 能見度會比珊瑚區低。
- 小心給破爛及漂流的漁網、繫於石上或沉船上的繩索纏繞。
- 殘骸上的粉砂層、淤泥能迅速產生非常危險的低能見度
- 很多沉船的面積不足以給進入，故此不建議進入沉船。
- 小心尖銳物件，例如生鏽金屬、木尖等。

## 8.5 高氧空氣、混合氣體和技術潛水

- 香港大部份的潛水點均不深於 20 米。
- 在本地的潛水環境不利於使用混合氣體或技術潛水。
- 混合氣體潛水或技術潛水一般只用作訓練。
- 氣體的可獲性是一個考慮因素。

## 8.6 魚槍

- 擁有魚槍要獲得警方發出的牌照和不使用時要特別鎖在安全地方。
- 使用魚槍需要由認可導師專門訓練。
- 不要在陸地或指向任何人時，把魚槍上橡根。經常帶上保險栓。
- 在海岸公園或公共海灘區域禁止捕魚。

## 8.7 在海外潛水時的有用資料

- 參加持有由香港旅遊業議會發出牌照的旅行社。
- 向具經驗處理潛水事故的保險公司購買個人及旅遊保險，保險應覆蓋水肺潛水。
- 出發前舉行有關潛水地區的簡報。
- 有必要與本地潛水組織者保持良好溝通。

- 確定到特定地區需帶備的特別裝備。
- 確保潛水地點有適當的氧氣設備和氧氣供應。
- 瞭解潛水地區的特性，例如：天氣、深度、能見度、潮汐變化等
- 潛在危險例如海洋生物、水流等。
- 領隊和當地潛水領隊的資格。
- 最近的緊急醫療服務。
- 前往計劃中的潛水地點前，可向曾於當地潛水的資深香港潛水員，取得盡可能多的資訊。
- 熟讀有關將要前往潛水的地點的出版物，例如書本、潛水雜誌等。
- 確保自己的個人潛水裝備性能良好，否則到時可能難找替換。
- 根據需要攜帶後備裝備。
- 確保潛水船上的全體船員是訓練有素及可靠的；並配有艇長和水手的輔助船隻。
- 在團隊進行潛水時，團隊的一名成員要留在潛水船上，以確保長保持“值勤”和警覺性。

## 9.0 參考

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3. [www.wikipedia.org](http://www.wikipedia.org)
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7. International Life Saving Federation “ILS CERTIFICATION GUIDELINES APPENDIX 14 AND 15”

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## 附錄 I 潛水審核核對表

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潛水審核檢查清單  
摘錄自 American Academy of Underwater Sciences 的  
“STANDARDS FOR SCIENTIFIC DIVING”  
作為參考

建議潛水會參考以下潛水審核檢查清單樣本，制定自己的審核檢查清單。建議任何情況下每年都要進行緊急程式演習。

### A. 緊急資料

1. 是否知道最近的醫療設施（醫院或診所）在哪裏？
2. 是否已和最近的醫療設施確立通訊方法？
3. 知道最近處可使用的減壓艙在哪裏嗎？
4. 是否已和減壓艙確立通訊方法？
5. 是否已確認緊急疏散方法？
6. 是否已和有關於緊急運送系統確立通訊方法？
7. 是否已列出緊急電話號碼、尋求醫療建議的號碼和減壓艙地點？

### B. 具體計劃資料

1. 潛水計劃中有否詳細描述建議的潛水方案？
2. 建議的潛水計劃目標是否清晰？
3. 是否已找出有哪些潛在危險？
5. 識別出其他環境條件並有否在潛水計劃中討論？
  - a. 潮汐高度
  - b. 水流
  - c. 最大下潛深度
  - d. 水中能見度
  - e. 天氣
  - f. 船舶交通

6. 潛水計劃中的潛水員、船隻操作員、支援人員是否已被認可？

## II. 潛水前簡報和活動

負責本次潛水活動的潛水長應在潛水活動進行前，集合所有工作人員並檢查下列內容。

1. 是否已檢討緊急疏散程式？
2. 是否已對潛水事故處理和應急設備(例如，急救和氧氣設備) 進行檢查?
3. 是否已檢討該次潛水的所有安全規程 (例如，潛水超過 60 英尺需在 15 英尺作安全停留，下潛/上升浮標繩、低空氣量措施/使用備用氣源)?
4. 是否已檢討方案內容和其目標？
5. 是否已檢討潛在危險？
6. 對該次潛水的所有專用設備是否已作檢查 (例如，聲波發射器、聲波探測器、流量計、潛水器 (ROVs)、潛水拖運器、高氧空氣含氧度測定儀等)?
7. 潛水員在每次潛水前是否已檢查自己的所有裝備？
8. 每次潛水員入水前，潛水長是否已檢查並記錄其氣瓶量和隨後的開始潛水時間？
9. 是否已收集每名潛水員的個人緊急聯絡資料 (例如，病歷史、通知的家人) ？
10. 如果有必要的話，是否已通知船舶交通控制中心嗎?

## III. 潛水期間的運作

潛水進行期間，注意輔助船隻的位置、儀器的操作、在水面的潛水員是很重要的。

1. 負責監察潛水員的輔助船，有沒有同時在執行另一項工作而妨礙其照顧的職責？
2. 輔助船隻是否已在潛水區域清場？
3. 船上是否已展示恰當的潛水旗來照料潛水員？
  - a. 陸上或沿海水域是否已展示紅/白色的旗幟顯示有“潛水員在下面”？
  - b. 在國際船舶活動水域範圍展示規定的紅/白旗和藍/白旗？
4. 潛水旗的大小是否適合該次潛水活動？
5. 是否有一名裝備齊整的待命潛水員能隨時提供協助？
6. 是否已部署好船隻和潛水員間的溝通系統 (負責召回潛水員的小組)？
7. 急救和氧氣設備是否能隨時提供潛水員取用？

#### IV. 潛水後程序

檢查潛水後的程序很重要，需確保潛水員已採取必要的預防措施避免受傷、保護自己免受環境條件影響和維護好自己的裝備等。

1. 潛水長和/或照顧人員有否留意每名潛水員出水時是否出現“氣泡問題”的跡象和症狀？
2. 潛水員是否已做好保護避免低溫症或高熱症？
3. 是否已準備淡水（或其他適合的流體）以避免身體脫水？
4. 每次潛水後，是否已記錄了每名潛水員的水深、水底時間、和氣瓶餘量資料？
5. 準備一份針對該次潛水活動的潛水報告，該報告內容應是否已包括適當的資料（例如，水深和水底時間、瓶壓、完成的目標、遇到的危險、出現故障和遺失儀器等）？
6. 當潛水員不進行潛水或完成潛水活動後，是否已徹底清潔並妥善存儲自己的潛水裝備？

#### V. 潛水人員

對訓練、背景、和參與該次潛水活動的每名潛水員能力的評估是頭等重要的事。

1. 所有潛水員是否都已接受潛水體檢（一年以內）？
2. 所有潛水員於當時都持有有效的心肺復甦法證書（一年以內）？
3. 所有潛水員是否都曾接受急救培訓（3年以內）？
4. 所有潛水員是否都曾接受輸氧培訓（只需要初級培訓，建議2年更新一次）？
5. 所有潛水員是否獲認證符合各自責任範圍的資格(即，潛水員階級或潛水長)？
6. 所有潛水員是否使自己保持對潛水的熟練（過去的3個月內曾進行潛水）？
7. 對於預期中的活動環境，潛水員是否曾有類似的經驗？
8. 如果上面問題中有4或5個的答案是否定的，那麼潛水長要採取什麼預防措施和準備工作使潛水員對新的潛水環境做好準備呢？
9. 如果潛水現場有一台空氣壓縮機，潛水員要使用時是否能熟練地操作？

#### VI. 潛水裝備

潛水裝備的保養必須根據潛水安全原則的要求或製造商的說明書，以較保守的為準。

##### A. 水肺潛水裝備

1. 所有水肺氣瓶在5年水壓試驗日期內是否都進行過檢測？



2. 所有水肺氣瓶在過去 12 個月內是否都經過內部目視檢查？
  3. 所有調節器在過去 18 個月內是否都經過精密檢查、校正、或徹底檢修？
  4. 潛水員的所有測量儀錶（例如，壓力計、深度計、指北針、水底計時器、和腕表），在過去 18 個月內是否都經過精密檢查和校準或替換？
  5. 所有閥門和喉管是否都經過精密檢查和替換，或者根據需要作徹底檢修？
  6. 所有帶子和帶扣是否都處於良好使用狀態？
  7. 使用濕式潛水衣潛水時，所有浮力補償裝置是否都處於良好狀態，並根據製造商的商品規格進行保養？
  8. 所有浮力補償裝置是否都能使用 2 種方法充氣(除卻口吹的另一個方法)?
  9. 潛水員的通訊設備在使用前是否都經過檢查？
  10. 協助潛水員登上輔助船隻的潛水梯是否已準備就緒(有些船隻離水面很近或設有梯級的都不需要潛水梯)？
  11. 所有全罩式面罩都經過清潔維護了嗎?
  12. 所有全罩式面罩是否都沒有腐蝕跡象並處於良好的操作狀態？
  13. 所有護頭具和搭扣是否都處於良好狀態？
  14. 所有給特殊潛水裝備的製造商維修及保養指南是否隨時備妥可用(例如通訊設備、全罩式面罩)?
  15. 潛水裝備整體上是否都沒有受到腐蝕並處於良好工作狀態?
  16. 潛水地點是否備有足夠的備用部件和修理材料？
- B. 急救設備
1. 帶有需求式二級頭調節器急的救氧氣設備，是否能同時提供 2 名潛水員使用？
  2. 急救氧氣設備中是否包括一個尺寸"E" (626 升)或更大的氧氣瓶？
  3. 氧氣瓶上的調節器是否按照製造商的指引進行保養？
  4. 氧氣設備中是否包含一個用以打開和關閉氣瓶開關的圓筒扳手(或輪子扳手)?
  5. 氧氣設備上的喉管、關門和調節器是否處於良好狀態和保持清潔，尤其是不能有油脂？
  6. 氧氣瓶在 5 年水壓試驗日期內是否都進行過檢測？
  7. 閥門上的閥座（valve seats）和密封墊圈（washer seal）是否處於良好狀態？

8. 存放氧氣瓶地區的溫度會否超過 125 華氏度？
9. 有否為潛水員準備好一套設備齊全的醫療（急救）用品？
10. 是否有可供使用的備用氧氣[密封墊圈]？
11. 船上是否備有一塊供緊急時使用的背板？

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## 附錄 II 緊急聯絡電話

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### 潛水有關的香港緊急聯絡電話

緊急聯絡電話	: 112
緊急聯絡電話(警方、消防處)	: 999
消防處減壓艙	: 2723 2233
DAN 駐香港辦事處	: 3611 7326
香港水警	: 2367 0666
海上救援中心	: 2233 7999
海事處	: 2542 3711
船隻航行監察中心(24 小時)	: 2233 7801
政府飛行服務隊	: 2305 8301
飛行服務隊	: 2769 4451
消防處救護服務處	: 2735 3355
香港天文台	: 2926 8200

附錄 III 運動潛水意外報告表



香港潛水總會  
HKUA

潛水安全及事故調查委員會  
DS&AEC

***Sport Diving Incident  
Report (Form I)***

- PURPOSE:** This report aims to collect data and to assist research into diving incidents with an aim to prevent their occurrences. **The names and contacts of individuals involved would be kept confidential.**
- DEFINITION:** A Sport Diving Incident is any error or unplanned event that could, or indeed did, reduce the safety margin for a diver on a particular dive. This report would not be used for incidents of cave and technical diving.
- QUALITY:** Please DO NOT report hearsay incidents.
- INSTRUCTIONS:**
- (i) Please tick one or more options under each heading, write simply in your own words a description of what happened.
  - (ii) This proforma may also be used by an incident investigator to interview a witness of an accident.
  - (iii) Please DO NOT identify any person involved unless he/she so agrees

Please return the completed form to:  
Diving Safety and Accident Enquires Committee (DS&AEC)  
Hong Kong Underwater Association (HKUA)  
Room 1026  
Olympic House  
1 Stadium Path  
So Kon Po  
Causeway Bay  
HONG KONG

**(A) Information about the dive**

**Date** \_\_\_\_\_ (  am  pm  evening or night )

**Location of incident**  Sea  Freshwater  Swimming Pool  On Land  others \_\_\_\_\_

**Dive site / Country** \_\_\_\_\_

**Organisation of Dive**  Private/individual  Diving club  others: \_\_\_\_\_

**Purpose of dive:**  leisure  training  commercial / professional  others: \_\_\_\_\_

**Equipment used:**  self-owned  rental  borrowed from others

**Diving computer used:**  Yes  No

**Buddy diving:**  Yes  No

**Dive details**

Types of dive:  shore dive  boat dive  snorkeling  night dive  wreck dive  others: \_\_\_\_\_

Maximum depth \_\_\_\_\_ Safety stop conducted:  Yes  No

Depth at which incident started \_\_\_\_\_ Gas use:  air  nitrox  others: \_\_\_\_\_

Dive duration \_\_\_\_\_ Decompression conducted:  Yes  No

Weather \_\_\_\_\_

Surface interval since previous dive (if applicable) \_\_\_\_\_

Underwater conditions \_\_\_\_\_

**Previous related dives**

No. of dives within the same day before incident \_\_\_\_\_

Maximum Depth and the duration of the dive before incident \_\_\_\_\_

Decompression conducted  Yes  No

**(B) Details of the diver involved in the incident**

The diver involved was:

Yours;  diving buddy;  someone whom you witnessed

Name(optional) \_\_\_\_\_

Contacts & details (optional) \_\_\_\_\_

Age: \_\_\_\_\_

Gender:  Male  Female

**Did the diver have any health problems prior to the incident:**

Yes (specify: \_\_\_\_\_)  No  Not known

**Regular medications taken by the diver?**

Yes (specify: \_\_\_\_\_)  No  Not known

**Medications/drugs taken prior to diving**

Yes (specify: \_\_\_\_\_)  No  Not known

**Alcohol on the day of diving**

Yes  No  Not known

**Diver's qualification: (please tick the highest level, >1 if necessary)**

In training  Open water  Advanced diver  Divemaster  Instructor

Technical  Commercial  Not known

Others \_\_\_\_\_

**Experience of diver:**

Years of diving \_\_\_\_\_

Total no. of dives \_\_\_\_\_

Total dives in the last 12 months \_\_\_\_\_

**History of diving incidents in the past:**

Yes (specify: \_\_\_\_\_)  No  Not known

**(C) Type of Incident(s) (tick as many as relevant):**

Physical injury  injuries sustained from marine creatures  drowning or near-drowning

Hypothermia  Ear barotrauma  sinus barotrauma  pneumothorax

Decompression sickness (DCS) of any degree

Serious equipment failure (e.g. BCD, regulator, gas supply)

(Please

specify: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Illness(s) developed during the dive (Please specify: \_\_\_\_\_)

Others: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**(D) Any contributing factors identified for the incident**

Yes (please specify: \_\_\_\_\_)

\_\_\_\_\_

\_\_\_\_\_

No

Unknown

**(E) Outcome of the incident**

- no damage sustained/no treatment necessary     received simple first-aid treatment by non-medical personnel
- received treatment by doctor(s)     received oxygen     received depression treatment
- received resuscitation                       required hospitalization
- received surgery                       death (fatal incident)

**Description of the incident (for additional information not covered above)**

(Use extra paper if necessary).

Report submitted by:

Name \_\_\_\_\_

Phone \_\_\_\_\_

Email \_\_\_\_\_

address \_\_\_\_\_

Date \_\_\_\_\_





DIVING SAFETY AND ACCIDENT  
ENQUIRY COMMITTEE  
HKUA  
5/2009

Manual for recreational diving clubs/centres, instructors and divers to ensure safe and enjoyable diving.

# Recreational Diving Safety Manual for Hong Kong

*Diving Safety and Accident Enquiry Committee  
Hong Kong Underwater Association*

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- Leisure and Cultural Services Department,
- Marine Department,
- Agriculture, Fisheries and Conservation Department &
- Marine Police Section of the Hong Kong Police Force
- BSAC-HK, CMAS, CUA, NAUI, PADI, SDI, SSIHK

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# Recreational Diving Safety Manual for Hong Kong

## INTRODUCTION

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*Scuba Diving is a very safe and enjoyable sport but you must receive proper training, be medically and physically fit and always follow the rules of safe scuba diving*

Diving accidents, as in any active sport, may still happen; especially if the safety rules are either not understood or ignored. As the recognized national sports association for the sport of underwater diving in Hong Kong, many members have for a long time considered it was essential that the Hong Kong Underwater Association (HKUA) should set-up a Diving Safety & Accident Enquiry Committee (DSAEC). This issue was again brought to fellow members' attention by the tragic fatal accident that resulted in the death of a young female doctor, on the 4th November 2007 whilst on her reportedly first open water dive. A dedicated group of experienced, professional and qualified scuba divers who were members of the HKUA, decided in December 2007 to establish a special independent organisation within the HKUA to look into diving safety issues.

The Board of Directors of the HKUA at their board meeting on 13th November 2007 endorsed the proposal to set-up a DSAEC. Government support with direct feedback from the Chief Executive supported the proposed DSAEC.

A Resolution to establish A Diving Safety and Accident Enquiry Committee was supported and approved at the HKUA Annual General Meeting on 26th January 2008. The DSAEC is an independent body within the HKUA and directly responsible to the Chairman of the HKUA. The DSAEC through the Diving Safety Officer reports to the HKUA Board of Directors on any safety issues and accident enquiry at their monthly meeting. The committee comprises members with considerable diving experience and expertise. They include diving and rescue instructors, a diving & hyperbaric medical practitioner, lawyer, law enforcement officers, an engineer, an arbitrator, corporate management professionals and ad hoc government representatives from Leisure and Cultural Services Department, Marine Department, Agriculture, Fisheries and Conservation Department and Marine Police Section of the Hong Kong Police Force.

With reference to various safety standards/manuals from overseas and certifying organisation, the DSAEC compiled this manual taking into account the local diving environment for local divers, instructors and diving clubs for their reference. We wish to thank the following certifying organisation for their invaluable comments on the preparation of this manual: BSAC-HK Region, CMAS, CUA, NAUI, PADI, SDI and SSIHK.

## 1.1 Purpose

The DSAEC compiled this manual taking into consideration the local diving environment & has incorporated various overseas safety standards/manuals and certifying organisation targets for local recreational divers, instructors and diving clubs as a core safety reference.

It is appreciated that there are difficulties in the implementation of statutory requirements which frequently results in a mass of detailed and technical rules, often difficult to understand, and difficult to keep up to date with. In the past, requirements were implemented ad hoc to resolve problems as they arose, and concentrated mainly on particular physical hazards, resulting in uneven coverage. Specific requirements did not encourage or even enable people involved to be innovative and to look for solutions. Scientific divers are employed to dive for the purpose of underwater research but are exposed to a less hazardous working environment as involved in industrial diving activities. Nowadays, scientific divers normally adopt and follow safety standards [1] to ensure their safety. This is a self regulatory method under the principle of health and safety. Self-regulation describes the move away from specification standards, and allows duty officials to choose the means by which they will comply with general duties and process-based and performance-based standards.

Recreational diving and divers should normally be safer as they allow a diver to dive on selected days and under better environment conditions making diving risks and hazards more controllable. However, some of the safety support systems required for scientific diving are not necessarily available with recreational diving and this can expose the recreational diver to increased risk, especially when diving in remote locations. Statutory requirements created a climate of dependence on regulations, with little involvement to health and safety by divers, diving clubs and diving operators. Statutory requirements may not be appropriate for recreational diving.

The DSAEC is of the view that a self-regulation approach similar to scientific diving safety standards should be adopted in recreational diving. Parties involved in recreational diving including divers/instructors/diving clubs should be conservative and always apply their common sense to adopt the general principle of diving safety to plan and conduct any diving activities. However, in comparison with other recreational activities, recreational diving involves specific risks and hazards. Fatal accidents can arise in recreational diving, which this manual attempts to alleviate by explaining the principle of safe recreational diving practices.

## 1.2 Scope

This Safety Manual is designed to cover recreational diving using compressed gases and self-containing underwater breathing apparatus (SCUBA). It applies to all recreational divers, diving instructor, diving clubs as well as dive boat operators. Each of these involved parties must hold some level of duty and responsibility in providing a healthy and safe environment for recreational diving. Instead of telling the duty officials exactly how they are to achieve compliance, this safety manual defines the duty official's duty in terms of goals they must achieve, or problems they must solve, and leaves it to the initiative of the duty official to work out the best and most efficient method for achieving the safety standard in recreational diving. As the knowledge and concept of safety will change with the advance in diving technology, the following manual therefore is not intended to provide recreational diving safety with a complete or fully comprehensive manual. It will be as far as possible regularly updated to improve recreational diving safety as the need arises.

## INTERPRETATION

<b>Confined water –</b>	Any body of water that is of similar conditions to a swimming pool with respect of depth which is with water shallow enough to stand up in, clarity, calmness and current.
<b>Direct supervision –</b>	Instructor shall be in a position to provide immediate assistance and guidance in water to visually observe and evaluate students’ safety and performance.
<b>Dive boat and support boat –</b>	Dive boat can be a large craft, rigid-hulled inflatable boat, a day boat, liveaboard or sampan. In general, a support boat is used as a cover boat for divers whilst underwater.
<b>Dive club –</b>	Dive club refers to a group of people, a dive center or dive operator that organizes dives or scuba diving training for divers.
<b>Dive group leader –</b>	To provide a direction and co-ordinated support for the Group and to ensure that all are working towards the defined Objectives of the Group.
<b>Dive master –</b>	A Divemaster is qualified to organize and conduct dives for certified divers if the diving activities and locale approximate those in which the Divemaster is trained. Additional training, knowledge or experience is necessary for the Divemaster who wishes to organize highly specialized activities, such as wreck penetration, cavern or ice dives or enter a new locale.
<b>Diving medicine, also called undersea medicine –</b>	is the diagnosis, treatment and prevention of conditions caused by humans entering the undersea environment. It includes the effects on the body of pressure on gases, the diagnosis and treatment of conditions caused by marine hazards and how relationships of a diver's fitness to dive affect a diver's safety.
<b>Diving instructor –</b>	A diving instructor is a certified professional from a diving organization (e.g. BSAC, CMAS, CUA, HKUA, NAUI, PADI, SDI, SSI) that assumes a leadership position in diving and can safely instruct and supervise open water to divemaster level divers.
<b>Dive Professional –</b>	A dive professional is a leadership rank of diver including diving instructor, dive master and teaching assistant.
<b>Experienced diver or Advanced diver –</b>	Requires a diver to have at least 50 dives on a basis of regular diving experience in various diving environments.
<b>Indirect Supervision –</b>	There should be an instructor or dive master in the water responsible for certain training activities. The on board instructor or dive master should oversee the planning, preparation, equipment inspections, entries, exits, debriefings and control the activities on site and should be prepared to quickly respond to any incident in the water.
<b>Open water –</b>	Any body of water which is subject to natural current, wave, tidal and wind.
<b>Shall –</b>	a statement is mandatory
<b>Should –</b>	a statement is recommendation or suggestion
<b>Small group –</b>	Small group diving refers to a group of divers of a maximum size of 10 divers, or divers who are involved in diving training activities. This group may be renting a non-purpose built dive boat for diving activities, or are a small group within a bigger group in a dive boat.
<b>Teaching assistant –</b>	A teaching assistant who has undergone formal training, for diving activities in addition to supervising for certified divers should assist instructors with training student divers. This rating denotes an individual who has exemplary diving skills and role model behaviour, solid rescue skills, professional level knowledge of dive theory, dive management and supervision abilities and competence as a certified assistant.



## RESPONSIBILITIES

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### 3.1 General

*Diving Safety should be the top goal of achievement by all divers, instructors, dive masters, diving clubs locally. This is the individual responsibility of every diver in the diving fraternity, and is a “Duty of Care” for anyone who facilitates diving activities for others.*

### 3.2 Responsibilities of a Diving Club

- Promulgate the Safety Manual to all parties within the diving fraternity.
- Ensure that their diving equipment is well maintained in a safe and prudent manner.
- Frequently conduct inspections and maintenance of their diving equipment.
- Ensure that all their compressors for the supply of compressed air/gasses for divers breathing meets the relevant standard requirement.
- Ensure safety and emergency equipment is in working order and readily available at the dive site or on the diving boat.
- Supervise all training activities in accordance with the standards & procedures of the certifying diving agencies.
- Report back the nature and cause of diving accidents/incidents to the DSAEC on the Scuba Diving Incident Report Form(SDIRF) in a timely manner.

### 3.3 Responsibilities of Diving Instructor/Dive Master/Dive Professional

- Ensure that every diver possess current certification and is qualified and appropriately equipped for the type of diving operation.
- Follow the training standards & procedures of the certifying diving agencies during training dives.
- Plan dives according to relevant safe diving practices.
- Brief the divers on details of dive site, dive procedure, estimated dive time, emergency procedure and unusual hazards or environmental conditions likely to affect the safety of the divers.
- Suspend diving if in his/her opinion conditions are not safe.
- Take all precautions and implement any measures to provide a safe diving environment for divers which should be on conservative side to diving safety.
- Should be conservative on the instructor to students ratio

### 3.4 Responsibilities of a Diver

- Maintain equipment in good condition.
- Check the equipment used by himself/herself before diving.
- Remember and follow the briefing given by the dive master/instructor.
- Follow the safety rules during diving.
- Report any sickness/discomfort or if under any medications of himself/herself to the dive master/instructor.
- Have periodic medical check with a doctor knowledgeable in diving medicine to verify suitability for diving.
- Maintain physical fitness for diving.
- Know personal limitations and abide by them according to training level and experience.
- Do not dive if feeling unwell and/or if having signs or symptoms after a previous dive.
- Ensure you are well hydrated before and after diving.

## COMPETENCE OF DIVERS AND DIVING PRACTICES

*No person shall engage in scuba diving in Hong Kong unless he/she holds a current certification issued pursuant to certifying organization adopted by Hong Kong SAR*

### 4.1 Competence of a Diver

Training certification organizations normally group recreational scuba diving training into 4 levels from beginner to advanced diver.

Level 1 is commonly named as open water diver or scuba diver with appropriate experience in 4- 5 dives under supervision of an instructor;

Level 2 further consolidates divers' experience in various environments such as deep water, night dive, etc. and enhancing the divers' navigation skill. It is normally known as advanced open water diver with about 10 dives experience. Although a term "Advanced" is used, the diver is not considered to be an experienced diver with limited diving hours;

Level 3 training is normally designed to ensure a diver understands common causes of dive emergencies; ways to prevent dive accidents; and how to assist another diver in trouble. However, it is only recreational scuba diving training. Although a certified diver of level 3 is commonly known as rescue diver, it is not intended to meet requirements for professional dive rescue and water safety teams. They are normally with at least 20 dives experience.

Level 4 normally requires a diver to have at least 50 dives with experiences in various diving environments. Considered to be **an experienced diver or advanced diver** in this manual.

Divers of level 1 to 3 training are all considered to be entry or beginner level in this manual. The beginner level diver shall dive within their limit in an easy and safe diving conditions as per the following:-

1. Depth: Level 1 < 18m; Level 2 or above < 30m;
2. Underwater current: none to mild, never in strong current without drift dive training;
3. Underwater Temperature: > 20 °C with wet suit
4. Visibility : at least 3m – 5m
5. Good surface conditions

#### 4.1.1 Dive with a professional after Entry Level training course

- In view of the low underwater visibility environment in Hong Kong, a level 1 diver shall dive with an instructor or dive master for their 1st 10 dives in various local diving environments to ensure their safety.
- Level 2 or 1 divers with more than 10 dives experience should be accompanied by level 3 diver in the above said diving conditions in a ratio of 1 to 3.

- Level 2 or 1 divers, in visibility of less than 3m, they should be at least accompanied by a level 4 diver, dive master or instructor in their dives in ratio not higher than 1 to 3.
- The above is summarized in below:-

Diver's Experiences	Dive team shall/should be accompanied by	Maximum number of divers in the dive team(including the leader)
Level 1 Diver less than 10 dives experience	Instructor or Divemaster	4 – 6
Level 1 Diver more than 10 dives experience and Level 2 Diver	(1) Level 3 diver in normal condition (2) Level 4 diver, Instructor or Divemaster in visibility of less than 3m	4

#### 4.1.2 Diving skills in various conditions

- Divers shall attend special training courses held by qualified instructors before diving in certain environments including night, cold water, drift-current, wreck or using nitrox dives.
- After attending specialty training courses and diving in such conditions with qualified instructors for at least 4 dives on two days or number of dives recommended by a certification organization whichever is higher, level 1 to 3 divers shall dive in such special conditions with a level 4 diver in a ratio not exceeding 1 to 3.

#### 4.1.3 Diving skills tune up

- To ensure the diver is comfortable with his/her diving skills, the diver shall undertake a skill tune up session in a pool with a qualified dive master or instructor after 6 months to 12 months of not taking part in any underwater diving activity. If the diver is a Level 1 or 2 diver they should be accompanied by a Level 4 diver on their first open water dive after a break of 6-12 months.

## 4.2 Standard Safe Diving Practices

### 4.2.1 Adapting to the local environment by divers who received training overseas

- Diver's responsibility - Compared to lots of overseas dive sites, especially South East Asia, the Hong Kong environment is often low in visibility and with a lot of boat traffic in the common dive sites. As such, a diver who received training overseas shall have at least 4 introductory or familiarization dives with a divemaster or instructor to adapt to the local Hong Kong environment of low underwater visibility and heavy boat traffic.
- Dive club's responsibility - dive clubs shall not offer dives without a local divemaster or above to divers who received training overseas and do not have any logged dives in Hong Kong. Dive clubs shall arrange divemaster/instructor to lead these overseas-trained divers

within their 1<sup>st</sup> 4 dives in Hong Kong to assist such divers to familiarize themselves with local environment at conditions. After they have received 4 introductory dives or familiarization dives, dive clubs should pair up these overseas-trained divers with experienced divers or/and divemaster within their next 6 dives in Hong Kong. Dive clubs shall verify divers' certificate level and experiences by checking their Certificates and logbooks during their registration or aboard.

#### 4.2.2 Low visibility conditions in Hong Kong

- Underwater visibility in Hong Kong does vary considerably and is subject to prevailing seasonal wind and tide conditions. Hong Kong diving is sometimes challenging as tides and wind conditions can reduce visibility to 2-3 m.
- The major problems that low visibility diving causes to the diver is that it reduces the ability to communicate with their buddy and, unless steps are taken to compensate for this, both the diver and buddy are put at increased risk.
- Diver's responsibility –
  1. At all times the divers should be in view of each other within a 1-2m distance. Should the divers become separated or lost underwater a brief search in the near vicinity for 1 min should be made before heading up and waiting on the surface. Divers may also wish to use underwater noises to attract each other's attention, communications should be pre-dive arranged (underwater horn, dive alert, banging rocks/knife on tank etc).
  2. Descents and ascents need special care in low visibility water. Divers should descend feet first to avoid banging into the sea bed with their head. Surfacing is usually performed cautiously, with a hand above the head, to avoid bumping into surface objects such as jetties or moored boats. Desirable that an inflatable orange coloured dive-float attached to the diver shall be released prior to ascent to warn surface boats of "diver below", "diver ascending".
- Dive professional's responsibility –
  1. The diver to dive instructor ratio should be reduced when environmental conditions are reduced such as in a strong current, poor visibility, muddy sea bed etc.
- Dive club's responsibility –
  1. Loss of confidence and panic are also a major problem in low visibility, especially for the inexperienced diver. In this sort of situation, an inexperienced diver should be accompanied by a divemaster or instructor, with ratio not more than 1 divemaster or instructor to 4 divers.

#### 4.2.3 Knowledge of local dive sites

- Diver's responsibility:- (10 accompanied and 2 introductory dives completed)
  1. A diver should be familiar with a dive site before diving the site. If a diver has no previous experience on a particular dive site, he should be accompanied with an experienced diver for his 1<sup>st</sup> attempt of diving the site and should obtain diving

information about the site in pre-dive site briefing from a knowledgeable, local source.

- Diver club's responsibility:-
  1. A dive club shall provide a detail dive site briefing to their diving members on site before diving.
  2. If diving conditions including current, visibility, temperature, etc. are worse than those in which divers have experience, postpone the dive or select an alternate site with better conditions.
  3. Dive site map should be provided on board.

#### 4.2.4 Equipment/Maintenance/Equipment Examination and Testing

It is the diver's responsibility to ensure proper maintenance of their own equipment. The dive club is also responsible for all rental equipment supplied by them. Diver is responsible for final check of the rental equipment from the dive club before using them for diving. The following suggested maintenance requirements were extracted from [1] for reference.

##### Regulators

- Inspection and testing. Scuba regulators shall be inspected and tested prior to first use and every twelve months thereafter and if there is any sign of wear and deterioration of rubber based items.
- Regulators shall consist of a primary second stage and an alternate air source (such as an octopus second stage or redundant air supply).
- Ensure mouth pieces of regulators shall be in good condition and firmly secured.
- To minimize the risk of cross infection, regulators (and masks and snorkels) used for loan or hire must be thoroughly cleaned and sterilized according to appropriate guidelines after each use by a particular individual.

##### Scuba Cylinders

- Scuba cylinders shall be hydrostatically tested in accordance with relevant standards or statutory requirements of Hong Kong.
- Scuba cylinders shall have an internal inspection at intervals not exceeding twelve months.
- Scuba cylinder valves shall be functionally tested at intervals not exceeding twelve months, 'o' rings to be checked for wear/splitting before a dive.

##### Gauges

- Gauges shall be inspected and tested before first use and every twelve months thereafter.

##### BCD

- Personal flotation systems, buoyancy compensators, dry suits, or other variable volume buoyancy compensation devices shall be equipped with an exhaust valve(OPRV).

- These devices shall be functionally inspected and tested at intervals not to exceed twelve months.

#### Timing Devices, Depth and Pressure Gauges

- All members of a diving group shall have an underwater timing device, a depth indicator, and a submersible cylinder contents pressure gauge.
- Determination of Decompression Status: Dive Tables, Dive Computers
- A set of diving tables shall be available at the dive location.

#### First aid supplies

- A first aid kit and suitable emergency oxygen unit shall be available. Regular evaluation to ensure they are well-stocked and clean, and oxygen cylinder full and ready for emergency use.

#### Diver's Flag

- A diver's flag recognized by the Hong Kong SAR shall be displayed prominently whenever diving is conducted under circumstances where required and where there is water traffic.

All dive equipment shall be regularly checked to ensure safety in diving.

### 4.2.5 Dive Plans

Dives should be planned around the competency of the least experienced diver. Before conducting any diving, the dive club for a proposed activity should formulate a dive plan which should include the following:

- Divers qualifications, and the type of certificate or certification held by each diver, experience of diver and number of dives logged.
- Emergency plan with the information including Name, telephone number, and relationship of person to be contacted for each diver in the event of an emergency.
- Nearest operational recompression chamber
- Nearest accessible hospital
- Available means of transport
- Approximate number of proposed dives.
- Location(s) of proposed dives.
- Estimated depth(s) and bottom time(s) anticipated.
- Proposed activities, equipment, and boats to be employed.
- Any hazardous conditions anticipated.
- Dives – including communications, procedures for reuniting in case of separation and emergency procedures



- List of emergency calling list i.e. Marine Police, Marine Dept., procedure for calling a government flying services helicopter for acute rescue etc

#### 4.2.6 Pre-dive Safety Check

Diver's Responsibility:

- Each diver shall conduct a functional check of his/her diving equipment in the presence of the diving buddy.
- Each diver shall judge if the dive condition is suitable for him/herself. It is the diver's responsibility to abort the dive if he/she considers the dive condition is not favorable to him/her or exceed his/her training limit. However, if the diver is very inexperienced and it is obvious that he/she is planning to dive beyond his/her capabilities, the dive master / dive leader should clearly advise the diver of this and take appropriate action.
- Each diver shall ensure that his/her equipment is in proper working order and that the equipment is suitable for the type of diving operation.
- Each diver shall ensure that on the day of diving, he/she shall be medically, physically and mentally fit to dive
- Each diver shall ensure their personal limitation for such a dive is correct i.e. training qualifications and experience

#### 4.2.7 Dive briefing

- A dive site briefing should at least include:- Name of site, General description, Site map, Expected depth, Maximum depth in area, Bottom characteristics, Tides and Current, Contingency plan, Particular risks (e.g. Traffic congestion, Limited visibility, local dangerous marine life, etc)
- Dive club's responsibility

It is the responsibility of a dive centre to provide an experience divemaster or above personnel with diving experience of the site giving a detail dive site briefing.

- Diver's responsibilities

Listen carefully to dive briefings and directions and respect the advice of those supervising diving activities. Query anything not fully understood.

#### 4.2.8 Buddy system

- The buddy system is a procedure in which two people, the buddies, operate together as a single unit so that they are able to monitor and help each other. The main benefit of the system is to improve safety: each may be able to prevent the other becoming a casualty or rescue the other in a crisis. The system is likely to be effective in mitigating out-of-air emergencies, non-diving medical emergencies and entrapment in ropes or nets. When used with the buddy check it can help avoid the omission, misuse and failure of diving equipment
- 'odd numbers' diving group should be avoided.

- Dive club shall ensure buddy system
 

Dive center has a responsibility to ensure buddy system is strictly followed. This can be done by marking the buddy pair on a board.
- Diver's responsibility
 

With buddy diving, each of the divers is presumed to have a responsibility to the other. The "buddies" are expected to care for each other, to stay close enough together to be able to help in an emergency, to behave safely and to follow the plan agreed by the group before the dive. When the system fails, it is generally because one of the divers does not fulfill his or her responsibilities as a buddy.

It is the responsibility of divers to agree within the Divemaster's general dive plan on the following with their buddy before their dive: Entry point, Exit points, Dive objectives, Depth limits, Establish and review communications procedure, and emergency procedures.
- Buddy divers shall check the safety and full function ability of their buddy divers equipment prior to a dive

#### 4.2.9 Dive limit and Procedure

Most cases of decompression illness (DCI) occur in divers who had dived within the limits of their dive computers or tables. All dives should be planned conservatively, especially deeper dives, repetitive dives and multi-day diving. Surface intervals longer than 2 hours are recommended.

- Dive club's responsibility
  1. Ensure that conditions of a dive site are suitable for divers' experiences
  2. Ensure divers know the emergency procedure
  3. Ensure divers know the recalling procedure
- Diver's responsibility
  1. Ensure weights are correct and can be quickly released in any emergency;
  2. Should not overexert themselves underwater;
  3. Shall never hold their breath or skip-breathing when breathing compressed air;
  4. Shall not exceed "no decompression" limit and shall use conservative no-stop times;
  5. Shall not dive during any known unfavorable conditions which are likely to affect their safety and health, such as red-tide condition, oil pollution, local fishermen using explosives, drag net fishing, etc.;
  6. Should evaluate the weather and sea conditions in order to ensure that divers' experiences is appropriate for the conditions;
  7. Shall dive within diver's qualified depth and dive experience, such as not to attempt:- drift diving, cave diving, penetration of a wreck without appropriate prior training;

8. Should try to ascend at around 10 metres per minute, or follow the suggestion of the dive computer;
9. Should do a safety stop at about 5 metres for 3 to 5 minutes;
10. Should reserve sufficient air at the end of a dive, not less than 50bar for shallow water dive or not less than 70 bar for deep dive at 20-30m or more;
11. Should release an inflatable signal before ascent to alert other water sport users that divers are below e.g. water skiers, powerboats, etc..
12. Should keep positive buoyancy on the surface when swimming and resting or when in distress;

#### 4.2.10 Post Dive Action

- Diver should keep their dive information including date, time, depth, site conditions, etc. in an appropriate diving log book.
- Diver and dive club are responsibility to provide and submit scuba diving incident report form(SDIRF) within 5 days to Diving Safety and Accident Enquiry Committee(DSAEC) in case of any diving accident or incident. Relevant information kept in DSAEC is solely for the purpose of enhancing safety standards of Hong Kong via issuing guidelines to Divers/Diving Centres and will be held in confidence by members of the DSAEC and any information passed on to other institutions, such as Divers Alert Network, for research purposes will be de-identified.
- Diver should report any physical discomfort such as headache, joint pain or discomfort, dizziness, fainting, vomiting to diver club immediately

### 4.3 Small Group Diving Practices

#### 4.3.1 Definition

- Small group diving refers to a group of divers of a maximum size of 10 divers. This group may be renting a non-purpose built dive boat for diving activities, or they are a small group within a bigger group in a dive boat.
- All the recommended practices in Section 4 are also applicable to small group diving activities.
- Any divers who are involved in diving training activities are consider to be in small group diving. The below advice is applicable.

#### 4.3.2 Leading by an experienced diver

- There shall be a designated group leader in the small group to ensure safety. The designated diver shall be an experienced diver defined in S.4.4 or Competence of Diver. The group leader shall be familiar in the selected dive sites, have good local environment and navigational skills.

### 4.3.3 Selection of dive sites

- If the small group is renting a non-purpose built dive boat for diving activities, they need to consider whether there is a support boat nearby and suitable oxygen kits are easily available. Also, that a hired dive boat operation is thoroughly briefed on your dive-plan and understands dive group requirements e.g. pick-up system, noise signals, hand signals keeping a look-out for divers, etc.
- If such equipment is not readily available, it is advisable that the small group rent the equipment from a diving club or liaise with a diving club to provide necessary support in advance and choose a common dive site with other dive clubs nearby, or shore dive where emergency exit is readily accessible.
- If a small group rents equipment/boat with diving clubs, they should inform diving clubs about their nature of activities.

### 4.3.4 Releasing of inflatable signal before ascent

- To ensure communication with other water sports users, it is crucial that the small group shall hang up a diving flag from the dive boat and release an inflatable signal before ascent.

### 4.3.5 Surface support

- At least one of the group members shall remain on board to provide surface support to divers and the coxswain or master.
- Dive plan shall be communicated with the skipper or boat handler and make sure he/she understands how to provide surface support.
- A ladder and rope with float attached should be made available for inflatable signal.

## 4.4 Common Dangerous Marine Creatures

General guidelines for encountering marine creatures [2]:-

**Hands off.** Never touch, handle or ride marine wildlife. Touching wildlife, or attempting to do so, can injure the animal, put you at risk and may also be illegal for certain species. The slimy coating on fish and many marine invertebrates protects the animal from infection and is easily rubbed off with a hand, glove or foot. To achieve this, you'll need a good neutral buoyancy control.

**Do not feed or attract marine wildlife.** Feeding or attempting to attract wildlife with food, decoys, sound or light disrupts normal feeding cycles, may cause sickness or death from unnatural or contaminated food items, and habituates animals to people.

**Never chase or harass wildlife.** Following a wild animal that is trying to escape is dangerous. Never completely surround the animal, block its escape route, or come between mother and young.

A variety of potentially dangerous marine creatures inhabit waters surrounding Hong Kong and these include cone shells; blue-ringed octopi; a variety of spiny fish such as stone fish, lion fish, scorpion fish and stingrays; sea urchins; sharks, eels and other large toothed fish; some venomous jellyfish; and sea snakes. The signs and symptoms and first aid for injuries from these

creatures is summarized below[4]:

#### 4.4.1 Cone shells

Cone shells are sea snails with a shell shaped like an ice-cream cone. They can fire a small harpoon to inject a toxin into its prey. The toxins of some of the tropical cone shells can be dangerous to humans.

**Habitat:** It may be found under rocks in the lower intertidal and shallow subtidal zones.

**Signs and Symptoms:** Symptoms of a cone snail sting may include pain at the site, numbness and tingling. Severe cases involve changes in vision muscle paralysis and respiratory failure that can lead to death.

**1st-Aid procedure:** Pressure-immobilization is a recommended first aid and should be applied as soon as possible. Prolonged CPR may also be required.

#### 4.4.2 Blue-Ring Octopus

The blue-ringed octopus is a small, shy, non-aggressive creature. When it becomes agitated it displays iridescent blue flashing rings over its body. There is a powerful toxin in its saliva which can paralyze humans and cause respiratory failure.

**Habitat:** The octopus are found in shallow coral and rock pools, under rocks, in cracks and crevices on the reef, in tidal pools, inside shells, and in discarded bottles, cans and other detritus on the sea floor. They may also be present in sandy or muddy stretches of the sea bottom where seaweed is plentiful.

**Signs and symptoms:** The bite is usually painless. Numbness, difficulty swallowing, nausea and visual disturbances may result after 5-30 minutes. In severe cases, this is followed by paralysis, respiratory failure, and potentially death through asphyxia.

**1<sup>st</sup>-Aid procedure:** Prompt pressure-immobilization is a recommended first aid. Prolonged CPR may also be required.

#### 4.4.3 Scorpion fish, Lionfish and Stonefish

A variety of fish, and molluscs have poisonous barbs to protect themselves from predators. Some of these spines can inject poison that can be harmful to humans. The stonefish is the most venomous of these fish and its sting can occasionally prove fatal. The other injuries can be very painful and can easily become infected.

**Habitat:** Scorpionfish with camouflage can be found at corals, caves, crevices or on mud. The lionfish is an inhabitant of near and offshore coral and rocky reefs. The main habitat for stonefish is on coral reefs, around dull coloured plants, near and about rocks, or can be found dormant in the mud or sand.

**Symptoms:** Severe pain, substantial swelling and discolouration of the stung area. Severe reactions include nausea, vomiting, abdominal cramps, tremors, abnormal heart rhythms, breathing difficulty and collapse

**1<sup>st</sup> aid procedure:** An effective first aid treatment is to immerse the affected area in hot water (approximately 45-50°C). The first aider should first test the water themselves to ensure it will not scald the victim. The heat should be maintained for 30-60 minutes. It provides both pain relief and breaks down the venom. Tweezers can be used to remove any spines on the wound.

Scrub the wound with soap and water. Then flush the affected area with fresh water. Do not apply tape to close the wound. Medical care should be sought to prevent infection - which is common.

#### 4.4.4 Sharks

Once the sea surface temperature rises to above 23°C large sharks start to patrol the local waters. There have been attacks on swimmers and spearfishing divers. Most of these attacks have occurred around Clearwater Bay. But shark sightings have been reported all around Hong Kong. It is a good idea to check on shark sightings before diving in Hong Kong. Several groups of divers here use Shark Pods for protection during the so called shark season.

Because shark injuries are often lethal, avoidance is highly desirable. Some of the suggestions for preventing unfavourable shark encounters may be useful.

- Do not swim in waters known to be frequented by sharks if visibility is obscured for any reason.
- Avoid diving with bleeding wounds, exit the water promptly if you are wounded while diving
- Dive with a group of divers

**Symptoms:** Shark bites can cause dramatic blood loss and tissue damage and sometimes amputation. Death from a shark attack usually results from massive blood loss and shock.

**1<sup>st</sup> aid procedure:** The first priority is to stop the bleeding by applying direct pressure on to the wound as soon as possible and elevating the wound if possible. Because shock is likely, the victim's body temperature should be maintained, and the victim kept in the supine position (lying flat on the back), unless they are unconscious in which case they are placed in the recovery position, if breathing. Oxygen should be provided.

A tourniquet can be applied as a last resort if the bleeding cannot be controlled using a pressure pad and bandage (i.e. direct pressure) and elevation.

#### 4.4.5 Sea Urchins

Sea urchins are small, spiny sea creatures. Their shell is round and spiny, typically from 3 to 10 cm across.

**Habitat:** They live in shallow, rocky bottoms, or hide in sandy crevices

**Symptoms:** Redness, swelling and excruciating pain will be caused if hurt by the spines

**1<sup>st</sup> aid procedure:** Immerse the affected area for 30-90 minutes in water as hot as the injured person can tolerate. Repeat as necessary to control pain. Then, use tweezers to remove any large spines in the wound. Remove the spines by applying shaving cream to the affected area and gently scrap with a razor. Afterwards, scrub the wound with soap and water followed by extensive flushing with fresh water. It is important that the wound should not be closed with tape or glue skin. If signs of infection, such as pus, redness, or heat occur, apply topical antibiotic ointment and ask the doctor who may prescribe antibiotics.

#### 4.4.6 Jellyfish

Jellyfish come in a variety of shapes and sizes but the most venomous ones are boxed-shaped with tentacles at each of the four corners. Some have single tentacles at each corner while other

have multiple tentacles. There are millions of stinging cells on the tentacles and also on the body of certain species. Some species of box jellyfish, even as small as the size of a fingernail, can be a threat to life.

**Habitat:** Jellyfish can be found in both shallow and deep water.

**Signs and Symptoms:** If one is stung by the venomous tentacles, redness, swelling and itching will be resulted in minor case. In serious case, excruciating pain, breathing difficulties,, muscle cramps, unconsciousness and even death can occur.

**1<sup>st</sup> aid procedure:** Immediately pour vinegar over a sting thought to have been caused by a box-type jellyfish. CPR should be begun if necessary. Do not rub the wound. Tentacles can be removed with tweezers or even fingers once vinegar has been applied. Ice packs can then be applied to provide pain relief. Medical aid should be sought, urgently for a severe sting.

The stings from other jellyfish are usually not serious, although they can be painful. Tentacles can be washed of with sea (not fresh) water, and ice packs can be used to reduce the pain. Medical aid should be sought if necessary.

#### 4.4.7 Sea Snake

Sea snakes can be found throughout the world, mainly in tropical waters. All have fangs that can inject poison but most are not harmful to humans. However, some species have strong venom and large fangs and can inflict potentially fatal bites. Fortunately many bites fail to inject venom effectively but must always be managed as a potentially serious bite.

**Habitat: Sea Snake can be found in** shallow waters, around islands and should be not far from land.

**Sign and Symptoms:** Puncture marks or scratches, headache, nausea, vomiting, abdominal pain, breathing difficulty, paralysis, unconsciousness, death.

**1<sup>st</sup> aid procedure:** the victim must be kept still and quiet and a pressure-immobilisation bandage should be applied to as much as affected limb as possible, starting over the bite site. The bandage should be as tight as for a sprain and the fingers or toes beyond the bandage should remain pink. Urgent medical aid should be sought. The bandages must be left intact until medical personnel can administer treatment.

#### 4.4.8 Bristle Worm

**Habitat:** Live in sand or within live rocks. They are nocturnal and not usually seen during the day.

**Signs and symptoms:** If one's skin is punctured by these sharp bristles, the venom will cause itching, redness, swelling and blisters.

**1st aid procedure:** Visible bristles should be removed by forceps. To remove invisible bristles, the injured area is covered with adhesive tape, which, when removed, will cause the bristles to adhere to it. This method should be repeated three more times. After the bristles are removed, household ammonia diluted 3 parts water to 1 part ammonia is applied to relieve pain. If ammonia is not available, the injured area can be soaked in isopropyl alcohol.

#### 4.4.9 Stingray

The stinger of stingray is a razor-sharp, spine and possessed specialized venom.



**Habitat:** The flattened bodies of stingrays allow them to effectively conceal themselves in their environment. Stingrays do this by agitating the sand and hiding beneath

**Signs and Symptoms:** Contact with the stinger causes local trauma (from the cut itself), pain and swelling from the venom, and possible later infection from bacteria. Immediate injuries to humans include, but are not limited to: poisoning, punctures, severed arteries and possibly death. Fatal stings are very rare.

**1st aid procedure:** Treatment for stings includes application of near-scalding water, which helps ease pain by denaturing the complex venom protein, and antibiotics. Immediate injection of local anaesthetic in and around the wound is very helpful, as is the use of opiates such as intramuscular pethidine. Local anesthetic brings almost instant relief for several hours. Any warm to hot fluid, including urine, may provide some relief. Vinegar and papain are ineffective.

“ Interested divers may seek more comprehensive details about dangerous marine creatures from appropriate sources”

## 5. MEDICAL and FITNESS OF a DIVER

### 5.1 Medical Fitness to Dive in recreational diving

#### 5.1.1 Introduction

Recreational scuba diving is an enjoyable sport and the risks and hazards in this class of diving should be less intense in comparison with commercial diving. However, to be safe and enjoyable recreational divers should be healthy, dive-fit, well-trained, disciplined as well as well-equipped for their type of diving activities.

In order to protect their safety at work, commercial divers generally are examined and certified regularly according to standards set forth by relevant government or agencies. While currently, except in U.K. and Queensland of Australia, scientific divers are regulated by their respective “code of practice”, there are no regulations or legislative requirement specifying standards for recreational divers. However, it should not be an excuse of recreational diver training organizations being immune from their responsibility. Therefore a proper and clear understanding of possible risks, hazards and medical limitations in recreational diving is necessary both applicable to recreational diving operators and divers.

For the medical assessment of fitness to dive in recreational divers, two major underlying principles must be considered. The first is that the diver should be free from any underlying medical problem or illness that may put him/her at increased risk for Decompression Illness, Pulmonary overinflation syndrome with subsequent arterial gas embolization and other conditions such as loss of consciousness, impaired judgment, risk of disorientation as well as impaired mobility, which could lead to drowning. The second principle is that a diver should be free from any underlying medical problem or illness which may render his/her buddy at risk of the above problem.

#### 5.1.2 Minimum Medical Standards for recreational diver

##### Medical Requirements

##### General

- Any recreational diving operator shall determine that divers must pass at least one pre-dive (pre-training/Entry level scuba divers) diving medical examination and have been declared by the examining physician to be fit to engage in diving activities as may be limited or restricted in the diving medical report.
- All medical examinations required by this standard shall be performed by, or under the direction of, a licensed physician of the applicant-diver’s choice, preferably one trained in diving/undersea medicine. Medical physician without training in diving medicine may not be aware of the unique potential dangers of diving and he/she bears responsibility because generally there will be no review of the doctor’s decisions. If for some reason this pre-dive medical has to be done by physician untrained in this field, then any abnormalities detected, on either history or examination, should result in the candidate being made unfit to dive, until specialist medical advice, or an examination by a medical physician with training and experience in diving medicine has been obtained.
- If the recreational diver continues to dive but at some material time being suffers from new medical illness or problem that develops after the above pre-dive medical examination,

he/she must consult and be declared again by the treating physician or physician trained in diving/undersea medicine.

- Any additional clubs/organization or insurance related requirement in recreational diving medical examination must be in compliance with such as the frequency and detail of examination.

### **Diving Medical Examination content**

- A review on the diver's medical history and physical examination should include as a minimum the points listed below. The following list of conditions that might adversely affect the diver is not all-inclusive, but contains the most commonly encountered medical problems. These also represent the current consensus diving safety standard in recreational diving. The potential diver and his or her physician must weigh the pleasures to be had by diving against an increased risk of death or injury due to the individual's medical condition. As with any recreational activity, there are no data for diving enabling the calculation of an accurate mathematical probability of injury. Experience and physiological principles only permit a qualitative assessment of its degree of risk & hazards.
- World Recreational Scuba Training council in co-operation with Undersea & Hyperbaric Medical Society developed a four pages **Guidelines for Recreational Scuba Diver's Physical Examination** (available from internet, under the name of RSTCMedStatementGeneric; <http://www.wrsc.com/downloads.php>) with a brief description & explanation. It has been endorsed by world-class diving/undersea medicine experts therefore it serves as guidelines for all divers' examining Physician. The following classification of risks in recreational diving is the same as the guidelines.

**Severe Risk** - implies that an individual is believed to be at substantially elevated risk of decompression sickness, pulmonary or otic barotrauma or altered consciousness with subsequent drowning, compared with the general population. It should generally be regard as disqualifying or discourage a student with such medical problems from diving.

**Relative Risk** - refers to a moderate increase in risk, which in some instances may be acceptable. To make a decision as to whether diving is contraindicated for this category of medical problems, physicians must base on an assessment of the individual patient. If the divers' examining physician is in doubt or has any uncertainty, he/she should refer the diver to a physician trained in diving/undersea medicine. (Diver Alert Network, associated with Duke University Health System is available for consultation by phone +1 919 684 2948 during normal business hours and UK Sport Diving Medical Committee would be the most appropriate sources of diving/undersea medicine physicians)

**Temporary Risk** – the medical problem or illness is temporary in nature and responsive to short-term treatment allowing the student to dive safely after the medical problem is resolved.

### **Some Severe Risk medical problems which may preclude diving are:**

- (1) History of seizures other than childhood febrile seizures
- (2) History of Transient Ischemic Attack (TIA) or Cerebrovascular Accident (CVA)
- (3) History of Serious (Central Nervous System, Cerebral or Inner Ear)

- Decompression                      Sickness with residual deficits
- (4) Hypertrophic cardiomyopathy and valvular stenosis
  - (5) History of spontaneous pneumothorax
  - (6) Altered anatomical relationships secondary to surgery or malformations that lead to gas trapping
  - (7) Gastric outlet obstruction of a degree sufficient to produce recurrent vomiting
  - (8) Chronic or recurrent small bowel obstruction
  - (9) Severe gastroesophageal reflux, Achalasia, Paraesophageal Hernia
  - (10) The potentially rapid change in level of consciousness associated with hypoglycemia in diabetics on insulin therapy or certain oral hypoglycemic medications can result in drowning.
  - (11) Inappropriate motivation to dive – solely to please other
  - (12) Claustrophobia and agoraphobia
  - (13) Active psychosis
  - (14) History of untreated panic disorder
  - (15) Drug or alcohol abuse
  - (16) Monomeric Tympanic Membrane
  - (17) Open Tympanic Membrane perforation
  - (18) Tube myringotomy
  - (19) History of stapedectomy
  - (20) History of ossicular chain surgery
  - (21) History of inner ear surgery
  - (22) Facial nerve paralysis secondary to barotrauma
  - (23) Inner ear disease other than presbycusis
  - (24) Uncorrected upper airway obstruction
  - (25) Laryngectomy or status post partial laryngectomy
  - (26) Tracheostomy
  - (27) Uncorrected laryngocele
  - (28) History of vestibular decompression sickness
  - (29) History of cerebral gas embolism or cerebral decompression sickness with residual deficits

**Some Relative Risk medical problems which may preclude diving are:**

- (1) Complicated Migraine Headaches whose symptoms or severity impair motor or cognitive function, neurologic manifestations
- (2) History of Head Injury with sequelae other than seizure
- (3) Herniated Nucleus Pulposus
- (4) Intracranial Tumor or Aneurysm
- (5) Peripheral Neuropathy
- (6) Multiple Sclerosis
- (7) Trigeminal Neuralgia
- (8) History of spinal cord or brain injury
- (9) History of Coronary Artery Bypass Grafting (CABG) & Percutaneous Balloon Angioplasty (PCTA) or Coronary Artery Disease (CAD)
- (10) History of Myocardial Infarction
- (11) Congestive Heart Failure
- (12) Hypertension
- (13) History of dysrhythmias requiring medication for suppression
- (14) Valvular Regurgitation
- (15) History of Asthma or Reactive Airway Disease (RAD)
- (16) History of Exercise Induced Bronchospasm (EIB)

- (17) Chronic obstructive pulmonary disease
- (18) History of solid, cystic or cavitating lesion
- (19) Pneumothorax secondary to: Thoracic Surgery, Trauma or Pleural Penetration, Previous Overinflation Injury
- (20) History of Immersion Pulmonary Edema Restrictive Disease
- (21) Interstitial lung disease
- (22) Inflammatory Bowel Disease
- (23) Amputation
- (24) Scoliosis must also assess impact on respiratory function and exercise performance
- (25) Aseptic Necrosis possible risk of progression due to effects of decompression
- (26) Sickle Cell Disease, Polycythemia Vera, Leukemia, Hemophilia/Impaired Coagulation
- (27) Hormonal Excess or Deficiency
- (28) Obesity
- (29) Renal Insufficiency
- (30) Developmental delay
- (31) History of drug or alcohol abuse
- (32) History of previous psychotic episodes
- (33) Use of psychotropic medications
- (34) Recurrent otitis externa
- (35) Significant obstruction of external auditory canal
- (36) History of significant cold injury to pinna
- (37) Eustachian tube dysfunction
- (38) Recurrent otitis media or sinusitis
- (39) History of Tympanic Membrane perforation, History of tympanoplasty, History of mastoidectomy
- (40) Significant conductive or sensorineural hearing impairment
- (41) Facial nerve paralysis not associated with barotrauma
- (42) Full prosthodontic devices
- (43) History of mid-face fracture
- (44) Unhealed oral surgery sites
- (45) History of head and/or neck therapeutic radiation
- (46) History of temporomandibular joint dysfunction
- (47) History of round window rupture
- (48) Patent foramen ovale

**Some Temporary Risk medical problems which may preclude diving are:**

- (1) on going upper respiratory tract infection
- (2) active asthma
- (3) peptic ulcer and gastric reflux
- (4) unrepaired hernia
- (5) on going back pain

The detail list of medical problems/illness risks in recreational diving may reviewed periodically that divers' examining physician should try all means to keep himself/herself updated from the lists of bibliography and reference as in the Appendix of this manual.

### 5.1.3 Frequency of Diving Medical Examination

**A Diving Medical Examination shall be completed:**

- **Before a diver begins diving**, unless an equivalent Initial (Pre-dive) Medical Examination has been given within the preceding 5 years (3 years if over the age of 40, 2 years if over the age of 50), the diver must produce the report to the diving operator, and those results have been reviewed and found satisfactory by the diving operator.
- **Regular Diving Medical Examination** may follow divers' clubs/organization or insurance related requirement at 5 year intervals up to age 40, every 3 years after the age of 40, and every 2 years after the age of 60 or more frequency as diving clubs/organization specified.
- **Clearance of return to Dive-Medical Examination** must be obtained from a physician following any major injury or new illness developed after the Initial (Pre-dive) Medical Examination, or any condition requiring hospital care. If the injury or illness is diving related, then the clearance to return to diving must come from a physician trained in undersea/diving medicine.

### 5.1.4 Recommended Laboratory & Content of the Diving Medical Examination

**Initial (Pre-dive) Medical Examination items:**

- Detail Medical History covering at least the above mentioned different types of "Risk"
- Complete Physical Examination, emphasis on cardiovascular, pulmonary, neurological and otological components
- Spirometry (Lung Function Testing), Complete blood picture, Urinalysis
- Any further tests deemed necessary by the physician.

**Regular Diving Medical examination items:**

- Medical History & Complete Physical Examination – as the above initial (pre-dive) Medical examination
- Any further tests deemed necessary by the physician

*Remarks for further tests deemed necessary by the physician:*

*\* The divers' examining physician may add extra assessment items covering divers' coronary artery disease as based on their risk factor as divers' past medical record, age, lipid profile, blood pressure, diabetic screening as well as smoking status;*

*\* Resting Electrocardiography and Exercise stress testing may be indicated based on risk factor assessment;*

*\* Routine Chest X-ray (AP view with full inspiration) at Initial Diving Medical Examination is not required except when indicated by the diving candidate's clinical history or finding suggesting any recognizable clinical need (such as the detection of chest pathology).*

### 5.1.5 Physician's written Report

After any medical examination relating to the diving candidate's fitness to dive, the diver must produce the written report to the dive club as prepared by the examining physician that shall contain the examining physician's opinion of the individual's fitness to dive, including any recommended restrictions or limitations. The diving club shall keep a copy of the physician's written report at least five years.

## 5.2 Physical Fitness of Divers

Recreational diving may sometimes be a strenuous activity. The recreational diver should possess and maintain a level of physical fitness capable to respond to an emergency, unexpected current or heavy seas demand.

Recommended level of physical fitness for recreational diver, able to walk 1.6 km within 12 mins.



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## 6. LOCAL DIVING TRAINING REQUIREMENTS

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### 6.1 Local Pool Training Requirements

- The prerequisites for course attendance shall be as follows:
  1. Minimum age: as per recommendation of certification organisation (for minors: a consent form shall be required, signed by parent or legal guardian).
  2. Medical confirmation to determinate the candidate's fitness for scuba diving and skin diving.
  3. Minimum physical fitness as per stated in S.5.2.
  4. Personal insurance covering the risks of scuba diving should be recommended.
  5. shall be able to swim 200m .
- Training shall be conducted in a swimming pool because no water clarity from beaches in Hong Kong is of similar condition as a swimming pool and would normally meet confine water definition by certification organization.
- 1<sup>st</sup> session of training must be in shallow water swimming pool where students can stand up.
- The 1<sup>st</sup> session of training in PUBLIC diving pool, where there is no shallow water so student can stand up, is not suggested. If there is no alternative, precaution/safety measures including a buoy with rope allowing student holding to descend must be provided. In such situation, instructor to student ratio should not be higher than 1:2, maximum of 1:4 with teaching assistance.
- In view of a lot of boat traffic in the common dive sites in Hong Kong, entry level diver training should include practicing and using inflatable signal in pool session to ensure all divers know how to release inflatable signal before ascent.

### 6.2 Local Open Water Practice Requirements

- Entry level diver training is for safety using scuba equipment and other underwater dive equipment. The following are the minimum competencies recommended for an entry level diver. It is encouraged that the highest possible standards are used in open water practice, and merely provides the following as recommended minimum competencies.
- To ensure the waterskill of diver, the diver should have the following skin diving competencies. The Level 2 diver can use mask, snorkel and fins to at least :
  1. Swim continuously 400 metres without the use of arms within 10mins,
  2. Undertake a 7 metres breath holding horizontal swim under water and
  3. Undertake a breath holding dive to a depth of approx. 3 metres.

Preferable, the Level 3 diver is able to

1. Swim continuously 800 metres without the use of arms within 20 mins,
  2. Undertake a 15 metres breath holding horizontal swim under water,
  3. Undertake a breath holding dive to a depth of approx. 5 metres and
  4. Undertake in water, with a depth of about 3 metres put on the skin diving equipment (consisting of mask, snorkel and fins).
- Entry level divers shall practice at least 10 dives with instructor in open water by using full set of scuba gear in various local diving environments. Each dive shall be of at least 20 minutes of a maximum depth not less than approx. 5m. Maximum three practice dives shall take place on one day. Repeated descents within 10 minutes surface time count as a single dive.
  - Entry level divers shall be assessed with competence on diving knowledge in accordance with the minimum requirements recommended by Recreational Scuba Training Council RSTC.
  - Instructor shall ensure student divers wear appropriate wet suit to prevent hypothermia.
  - In situation of underwater visibility > 2m, instructor to students ratio shall be of maximum of no higher than 1:6, with teaching assistant 1:8. In case of low visibility < 2m, the maximum instructor to student's ratio shall be 1:2, with teaching assistant 1:4 only.
  - 1<sup>st</sup> open water training session should not be conducted in visibility < 2m. In such condition, the maximum instructor to student's ratio of shall be 1:2, no further increase with teaching assistant.
  - No students shall be allowed to stay underwater without direct supervision by instructor or teaching assistant. When instructor accompanies a student to practice skill and ascent to surface, student shall not be left unattended underwater.
  - In case the instructor is attending a skill practice underwater with students, other students at the surface shall be directly supervised by a teaching assistant or at least have indirect supervision by on board duty divemaster in the condition that a floating buoy shall be provided for students at the surface. The instructor shall directly instruct and ensure that the students establish positive buoyancy of their BCD and float on the surface before leaving them for teaching assistant.
  - When students enter into the water, an instructor or a teaching assistant shall be in the water to manage and to supervise the students' safety. The instructor and teaching assistant shall not leave any student unattended. On board duty divemaster shall assist student to enter the water.
  - Instructor shall use floatation buoy to assist students decent during 1 to 4 open water dives. An appropriate seabed of sand, no coral/mud/silt, should be selected for training.
  - It is essential to notify any boat to steer clear for the safety of the diver before ascent. An inflatable signal (safety sausage) shall be used to indicate the diver's position to the dive boat to reduce the risk of losing contact when air, light or sea conditions reduce the visibility of the divers from the boat.
  - No training shall be conducted under typhoon number signal 3 and black rain warning signal. When there is a thunderstorm warning, heavy raining and strong wind warning, instructor should consider the actual site condition. In any case, diver safety should be on 1<sup>st</sup> priority. Instructor's decision should be on conservative side to ensure students' safety.

## 6.3 Advanced Recreational Rescue Diver Requirements

In addition to recreational rescue diver normally offered by certification organisation mentioned in Section 4.1, an Advanced Recreational Rescue Diver[6][7] standard is recommended for divers who are dive leader, on board duty dive master or dive tour/activities organiser. A certified Advanced Recreational Rescue Diver is a person trained with advanced skills to use scuba equipment and other underwater dive equipment for search, rescue, and recovery. He should at least demonstrate (1) with above average water skills, stamina and skin diving skills to quickly respond to any incident within shallow water in the vicinity of a boat or shore without scuba equipment; (2) familiar with line-guided search dive acting once as diver or as guide; (3) with above average scuba diving skills to recover and to respond unconscious divers and to tow divers at various surface conditions; (4) participation in formal continuing education; (5) with current diving experiences in various environments including 10- 30m depth, night dive and water with current; (6) valid 1st aid certification; and (7) refreshing his rescue diving skills for every 3 years.

## 6.5 Specific Local Open Water Practice Support

- Sufficient surface support
  - Buoy with dive flag and decent line shall be provided on the surface.
  - Maneuverable support boat with dive flag displayed shall be available.
  - On board divemaster or instructor shall indirectly supervise the students on board and provided surface support to the divers and instructors in water.
- Sufficient Safety Equipment Support shall be on Boat
  - Automatic External Defibrillators
  - First Aid Box
  - Oxygen Kit suitable for diving accidents
  - Sound Signaling System
  - Floatation Spine Board
  - Visual Signal
  - Marine Radio
  - Mobile phone
  - Search light (night diving)
  - Emergency flares/smoke signal
  - Vinegar for box-type jellyfish stings

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## 7. DIVING CLUB

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### 7.1 On Board Duty Staff Qualifications and Responsibilities

Duty staff qualification:

- Shall be a Certified Divemaster or above
- Shall hold a valid/refreshed First-Aid qualification
- Shall have a properly trained operator of the First-Aid Oxygen Equipment
- Shall be trained Emergency/Accident Management Team
- Shall be of up-to-date in water Rescue Skills with qualifications similar to Advanced Recreational Rescue Diver recommended in this manual

Duty Staff Responsibilities:

- Shall provide a clear dive briefing that covers dive objectives and follow-up sequences, dive site information, diver accounting method and emergency procedures
- Shall check diver's log book and certifications and screen divers' experience and qualifications
- Shall assign diver buddies/ grouping, divers with less local diving experience/lower qualifications is recommended to group/buddy up with experienced divers.
- Shall ensure that qualification and experience of group leader of a dive team, in accordance with S.4.1, should have sufficient experiences of local diving conditions
- Should assist divers or student divers entering and exiting water
- Shall observe change of dive conditions including weather, wind, rain, temperature, tides, current and visibility and determine the acceptability of the conditions in terms of divers' qualifications and experiences
- Should give advices to divers planning their dives
- Shall account for divers entering and exiting the water
- Shall inform and manage the emergency procedure including communication methods to recall divers
- Shall closely liaise with coxswain on the boat operation at all times
- Shall ensure that Solo-dive is prohibited
- Should ensure divers have a proper weight check before entering the water to avoid over "weighting" and have neutral buoyancy

## 7.2 On Board Duty Staff and Experienced Diver for Entry Level Divers

- Should Pay extra attention to divers who received training overseas or divers who have not dived recently. S.4.2.1 should be referred to introductory dive is recommended for Divers without local diving experience with Divemaster/instructor
- Shall ensure that divers who have not dived recently within 6 months, are recommended to attend a refresher program
- Should ensure that divemaster or above qualified diver conduct Introductory Dives/Refresh Program
- Shall group up Entry Level divers with experienced local diver or to be lead by Divemaster/Instructor
- Shall explain the diving conditions of the local dive site such as: Visibility, Current, Temperature, sea bed composition, surface conditions, surge, dangerous marine life or any other possible hazards

## 7.3 Diver Accounting Procedures

Dive roster to include:-

- A roster listing out names of all divers/passengers onboard is essential on a dive boat
- List of dive groups/buddy teams
- Additional information to be included such as divers' qualification, experience and equipment rental is important

Procedures shall be followed:-

- Check and confirm all divers/passengers listed on the roster are on board before the first dive
- Proper procedure is essential to check off divers on entry into and exit from the sea. Recording essential information such as in/out water time, use of air and maximum depth dived
- Roll call must be performed before departure from dive site
- Perform a **Visual** roll call after every dive, make sure each diver is present during the roll call. Answering for an other divers is not acceptable during the roll call

## 7.4 Dive Boat

Definition of dive boat

- A boat supporting 10 or more Scuba divers for a diving activity
- Scuba dive training being undertaken onboard

The dive boat shall have:-

- Sufficient and stable space to layout equipment, especially a secure area for Scuba tanks to prevent them rolling around
- First-Aid Kit and First-Aid Oxygen System are required onboard and should be readily available and checked to be functional well prior to each dive outing.
- Adequate and sufficient life-saving apparatus, eg. Fire extinguisher, life jacket, life raft as required by law
- Adequate area at rear platform for preparation before entry into and exit from the water
- A floating buoy with ropes attached to the boat recommended for supporting divers who are waiting on the surface
- Solidly constructed and readily available ladder(s) for divers to exit water
- Guard at the rear platform to prevent divers slipping underneath the platform when exiting from the water
- A guard cage to be constructed around the propeller to protect divers from the propeller should the engine be inadvertently started

Supporting boat

- An rubber inflatable boat(RIB) with outboard engine and safety cage around the propeller is ideal.
- An RIB is easy to exit and enter into the sea, to get out of the sea and to be also highly maneuverable in rough seas.
- Required at all times during any diving activity.
- Boat man who operates supporting boat must hold valid licenses according to statutory requirements of HKSAR and have a deck hand on board to assist divers getting on board.
- Maneuverable support boat with dive flag displayed is essential. A rowing boat is not acceptable.
- Boat shall be operated at slow speed in the area when divers are below. Crew member and coxswain shall keep divers surfacing under constant observation.
- Engine shall be stopped or in neutral before approach is made to divers on the surface. Divers shall not swim close to the dive boat or support boat whilst propellers are revolving. The coxswain and diver master shall check before starting engine that no divers are near and/or beneath the dive boat or support boat.
- Ladder on supporting boat and a rope and buoy are useful for divers to hold on to when preparing to get on board
- Radio communication with mother boat should be strongly recommended

- Protection guard cage around the propeller is essential and shall be provided

#### Rental Equipment

- Rental regulators and wet suit should be cleaned and disinfected using appropriate solutions and procedures after use.
- Rental equipment should be properly maintained with an annual log book-records kept. A waterproof maintenance label should be attached to the equipment showing the last checking date and signed by the checker.
- The maintenance label should be immediately detached from equipment which is reported defective to avoid further use in diving activities.

## 7.5 Accidents and Emergency Procedures

- Dive Safety Manual/Guidelines shall be easily accessible by Duty Staff/Crew members
- Duty Staff shall manage and plan for any Missing Diver Search Procedures
- Report to police shall not be delayed at all – helicopter emergency assistance can be requested through the Police for search and evacuation of a casualty.
- A rescue search team shall be formed and trained comprising qualified divers(Best by Advanced Rescue Divers, Divemasters, Instructors, or divers who are well trained in search & recovery)
- Emergency Procedure check list shall be on board at all times. Emergency contact list is in the Appendix.
- Emergency Procedure Annual Drill is highly recommended for Dive clubs and Boat managers/rescue teams.

## 7.6 First Aid Equipment

#### First Aid Kit

- First Aid Kit shall be on every dive boat
- Shall be well-stocked, following items are recommended
  - Emergency phone numbers/coins/phone card
  - Gloves, Ventilation barriers
  - Large absorbent dressings, sterile cotton, Cotton tipped swabs
  - Pressure pads
  - Sterile gauze pads, clinging rolled bandages,
  - Adhesive bandages/tape, Triangular bandages
  - Dry pads
  - Bandage scissors
  - Tongue depressors
  - Tweezers, Needle
  - Safety pins, Penlight
  - Oral thermometer
  - Squeeze bottle of water

- Splints
- Emergency blanket
- Cold packs/Hot packs
- Vinegar
- Plastic bags, Small paper cups
- Denatured alcohol – for disinfectant (not to be used on wounds)
- Antibacterial soap, Antiseptic solution or wipes, Antibiotic ointment
- Hydrocortisone ointment
- Aspirin and non-aspirin pain relievers
- Antihistamine tablets
- Activated charcoal
- Anti-nausea drugs
- Nasal decongestant spray
- Tourniquet

#### Oxygen Kit

- Size of Oxygen Kit cylinder should last for at least 45 mins for local water areas or appropriate size to wait for emergency support
- Should have both continuous flow and demand-valve systems suitable for different status of patients
- Should be kept clean and disposable masks discarded replaced after use

#### Defibrillator

- Automatically External Defibrillator should be on dive boat
- Duty Staff/Crew should be well trained on operation of AED

## 7.7 Air Compressor Requirements

- Areas containing exhaust fumes or other contaminants shall be kept away from all air compressor intakes. Flexible air intake hose can be used to obtain the best location for pure air intake.
- The Dive club should maintain a log book to keep all compressors' operation, data, replacement of filters, repairing, overhaul. In regular intervals of no more than 100 hours operation or six months, whichever is less, the dive club should analyze and test the compressor gas against standards from the specifications from Compressed Gas Association (CGA Pamphlet G-7.1) and referenced in OSHA 29 CFR 1910.134

#### **CGA Grade E**

#### **Component Maximum**

- Oxygen 20 - 22%/v
- Carbon Monoxide 10 PPM/v
- Carbon Dioxide 500 PPM/v
- Condensed Hydrocarbons 5 mg/m<sup>3</sup>
- Water Vapor NS
- Objectionable Odors None

- The results of these tests should be entered in a formal log and be maintained by the Dive Clubs.



## 7.8 Record-Keeping

- Dive Operator should keep activity logs, including roster, forms and all other documents
- Dive Operator should keep records of each item of equipment maintenance, i.e. every equipment modification, repair, test, calibration, or maintenance service shall be logged, including the date and nature of work performed, serial number of the item, and the name of the person performing the work for the equipment including Regulators, Submersible pressure gauges, Depth gauges, Scuba cylinders, Cylinder valves, Compressors, Gas control panels, Air storage cylinders, Air filtration systems, Analytical instruments, Buoyancy control device and Dry suits.

## 7.9 Specific Safety Practices for Diving Trips Outside of Hong Kong

Extra caution is necessary for Dive Clubs/Boat owners when planning and organizing a trip outside Hong Kong waters.

### Communication Equipment

- VHF radio
- Radiotelegraph
- Radiotelephone signal
- Flags

### Support

- Fuel, fresh water, food sufficient for the whole journey
- Prepare the size of First Aid Oxygen adequately
- Maneuverable cover boat is required. Rubber inflatable boat rib is a good option but cover boat operator and deck hand needed.

### Administration Procedure

- Prior to departure from Hong Kong Area, Captain must obtain port clearance from Marine Department
- Collect I.D. of every passengers for immigration procedure when required

### Flying After Diving

The following guideline has been adapted from the DAN “2002 Flying After Diving Workshop”, recommendations for flying after diving. It is applied to air dives followed by flights at cabin altitudes of 2,000 to 8,000 feet (610 to 2,438 metres) for divers without symptoms of decompression sickness (DCS).

- Divers shall have a minimum surface interval of 12 hours before flying or ascending to altitude after a single dive not requiring decompression stops.

- If Divers did Repetitive dives or multiple day diving, minimum preflight surface interval is 18 hours
- If divers did dives requiring decompression stops, there is little evidence on which to base a recommendation, and a preflight surface interval substantially longer than 18 hours appears prudent.
- Divers shall follow the no flight time of his/her Dive Computer if used, if this advice is longer than the above DAN Guidelines. If the time indicated by the computer is shorter than the above, the DAN guidelines should be used.
- Consider air flight schedule of divers before planning dive activities
- If helicopter rescue is necessary, pilot should be advised to fly at low altitude

## 7.10 Dive Safety Manual and Safety Audit Plan

- Dive Safety Manual/Guideline in Chinese and English should be readily accessible to Duty Staff/Crew members
- Dive Club should make reference to suggested checklist from [1] extracted in Appendix I to formulate a diving safety audit plan.
- Annual emergency drill and practice for searching missing for divers and handling unconscious divers should be included in the audit plan.
- Divers Safety audit should be conducted annually by independent instructors/trainer. Records of recommendation from the audit and sequence follow up actions should be formally kept and maintained by the dive club.

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## 8. DIVING SAFETY PRACTICES FOR VARIOUS DIVE LOCATIONS LOCALLY AND OVERSEAS

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### 8.1 Shore Dive

#### Preparation:

- Dive club facilities are not normally available around dive sites for shore dives in Hong Kong. Thus, equipment/facilities may not be readily available to divers
- Divers should concern about logistics problem such as equipment delivery, changing facilities, looking after personal belongings
- Divers should evaluate conditions before entry into the sea and should know the characteristics & Hazards of dive sites, e.g. Surf/waves, Depth, Tidal change, Shape & Seabed composition of Shoreline, currents, any other water sport activities taking place
- Divers should have safety accessories e.g. Dive Flag, Marker Buoy, good strong line with a hook preferably on a reel etc.
- Divers should identify at least two possible exit points prior to entry.

#### Entry Procedures:

- Shall be fully equipped and shall have a complete Pre-dive Safety Check before entry
- Be aware of obstacles under water e.g. rocks, fishing nets, shark nets, etc.
- Be aware of surf/waves, current while entering the sea
- Be prepare to swim for a distance to reach dive sites as shoreline slopes in Hong Kong are normally gentle

#### Exit Procedures:

- Conserve/reserve sufficient air for swim toward the shore/exit point
- Prepare navigation plan to swim back to exit point
- Be aware of any underwater obstacles e.g. rocks, muddy bottom. etc
- Be prepared for surf/waves while exiting the sea

### 8.2 Night Dive

#### Preparation:

- Boat Dive for a night dive is highly recommended; Divers should ensure there is sea surface support available on board. e.g. a dive cover boat
- Good strong water proof lights shall be on board. It is recommended to have Primary, backup and marker light with new batteries

- A light or a flash shall be placed at the Entry point and Exit point. When dive with a boat, strobes are suggested being hung just below the boat and on or near the anchor point.
- Diving instruments should be luminous
- Surface float with weight reference line is highly recommended

Procedures:

- Reduce instructor to student ratio for low-visibility dives. On board duty staff should listen for any diver distress signals. Therefore silence on board dive boat is essential.
- Use reference line on descent/ascent
- Always start from shallow water
- Ascend to surface when /if buddy becomes separated. Under water search is not recommended

### 8.3 Drift Dive

Preparation:

- Most of the dive sites in HK are located in Eastern/North Eastern Coastal areas
- Some dive sites are facing East China Sea
- Areas can be affected by strong monsoon winds
- Visibility is not as good as drift dives overseas

Equipment:

- Have at least one and preferably more Surface Marker buoy('s) for every dive team to dive in such sites
- Have Air horn/Whistle /Dive Alert for below and on the surface for each diver
- Have other surface alert tools, such as light reflecting object, dye marker, even old CD discs which are useful for reflecting the sun's rays and torches if diving near the end of day or at night.
- Have an alert and briefed attendant on a support boat preferably with a pair of binoculars.

### 8.4 Wreck Dive

Preparation:

- Artificial reef projects are found in Hong Kong
- Ship Wrecks, Used Tyres, redundant marine structure or custom made structure were used to attract and support large populations of fish, provide sheltered area for marine animals

- Most of them are located in areas with low visibility, deep water, current, or in fairway areas so beware of any hazards. Areas include Hoi Ha Wan, Yan Chau Tong, Outer Port Shelter, Kau Sai etc.
- Most of these locations are not suitable for recreational diving. Only a few ship wrecks are possible for recreational diving activities located around area of Hoi Ha Wan Marine Park and Tsim Chau

#### Equipment:

- Full set of scuba equipment
- Knife (strong and sharp with a serrated edge ), gloves, light, reel with over 100 foot of strong line , line with hook, old CD disc for catching sun rays reflection

#### Hazard and Consideration:

- Visibility is low in comparison to areas of coral
- Broken and drifting fish nets and /line attached to rocks and any wrecks may be found so beware of entanglement
- Layer of silt over wrecks, disturbing silt and mud can very quickly cause dangerously reduced visibility
- Size of wrecks are not enough for penetrating. Penetration of the wrecks is not recommended
- Sharp objects e.g. rusted metal, splintering wood can be encountered

## 8.5 Nitrox, mixed gas and technical Dive

- Most of dive sites in Hong Kong are shallow in depth above 20M
- Mixed gas or technical dives are not beneficial to the local dive environment
- Mixed gas or technical dives are normally for training purposes only
- Availability of gases is a consideration

## 8.6 Spear Fishing

- Ownership of a spear-gun requires a Police License and a special lockable security box, when not in use
- Use of a spear-gun requires special training by an authorized instructor
- Never load a spear-gun above water or when pointing at anyone. Always apply safety catch when loading
- Spear-fishing is not allowed in Marine Conservation areas or off public beaches

## 8.7 Useful Information When Diving Overseas

- Join agencies licensed by the Travel Industry Council of Hong Kong
- Be covered with personal & travel insurance policy to include scuba diving with a company that is experienced in managing diving accidents
- Have a full question and answer briefing with expedition organizers on all aspects of the expedition
- Good communication with local dive operator essential
- Determine what essential equipment is needed for specific areas
- Ensure that suitable oxygen equipment and oxygen supply will be available at the dive site
- Understand characterizes of dive area e.g. weather, depth, visibility, tide changes etc.
- Possible hazard e.g. marine life, current etc.
- Qualification of tour leader and overseas local dive leader
- Nearest emergency medical services
- Obtain as much information as possible from experienced Hong Kong divers who know the location of the planned dive location
- Read-up and study publications e.g. books, dive magazines on areas/locations to be dived
- Ensure your own personal diving equipment is in to working condition, replacements may be difficult to obtain
- Take spare items of equipment as necessary
- Ensure dive boat has a trained, reliable crew; surface cover boat with coxswain and deckhand
- Leave a responsible member of your team on the dive boat whilst group are diving to ensure coxswain remains “on-station” and alert

## 9.0 Reference

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1. The American Academy of Underwater Sciences, “STANDARDS FOR SCIENTIFIC DIVING”, 2001
2. Watchable Wildlife Marine Viewing Working Group, “MARINE WILDLIFE VIEWING GUIDELINES”, 2004 January
3. [www.wikipedia.org](http://www.wikipedia.org)
4. Divers Alert Network Asia-Pacific “FIRST AID FOR HAZARDOUS MARINE LIFE INJURIES”, 2003.
5. Edmonds C. “DANGEROUS MARINE CREATURES” Flagstaff AZ, Best Publishing, 1995.
6. CMAS “ DIVER TRAINING MANUAL”
7. International Life Saving Federation “ILS CERTIFICATION GUIDELINES APPENDIX 14 AND 15”

## APPENDIX I DIVE AUDIT CHECK LIST

SAMPLE Dive Audit Check List  
 Extracted from  
 “STANDARDS FOR SCIENTIFIC DIVING”  
 by the American Academy of Underwater Sciences  
 for reference

Dive clubs are advised to refer to the below sample dive audit check list to formulate their own audit check list. Annual emergency procedure drill is highly recommended in any circumstances.

### A. EMERGENCY INFORMATION

1. Was the nearest medical facility (i.e., hospital or clinic) identified?
2. Was a method of communication with the nearest medical facility established?
3. Was the nearest operational recompression chamber identified?
4. Was a method of communication with the recompression chamber established?
5. Was a method of emergency evacuation identified?
6. Was a method of communication with the means of emergency transportation established?
7. Are the emergency telephone numbers, numbers for medical advice and locations of recompression chambers listed?

### B. PROJECT SPECIFIC INFORMATION

1. Did the dive plan describe the proposed dive project?
2. Were the objectives of the proposed dive project clearly identified?
3. Were the potential hazards identified?
4. Were other environmental conditions identified and discussed in the dive plan?
  - a. tidal heights
  - b. water currents
  - c. max. dive depth
  - d. in-water visibility
  - e. weather
  - f. boat/vessel traffic
5. Were the divers, boat operators, and support personnel identified in the plan?

### II. PREDIVE BRIEFING AND ACTIVITIES

The divemaster for the dive should gather all project personnel together just before diving operations are to start and review the following topics.

1. Was there a review of emergency evacuation procedures?
2. Was there a review of diving accident management and emergency equipment (e.g., first aid and oxygen kits)?
3. Were any safety protocols for the dive reviewed (e.g., a safety stop at 15 ft. for dives deeper than 60 ft., buoy line descent/ascent, low air supply procedures/alternate air source use)?
4. Was there a review of the project description and objectives?
5. Was there a review of the potential hazards:



6. Was there a review of any specialized equipment for the dive (e.g., pinger, pinger locator, current meters, ROVs, dive sleds, oxygen meters for Nitrox )?
7. Did the divers check all of their dive equipment prior to each dive?
8. Were the tank pressures checked and recorded before each diver entered the water and subsequent dive start times by the divemaster?
9. Was the personal emergency information available for each diver (e.g., medical history, family notification)?
10. Was vessel traffic control notified, if necessary?

### III. OPERATIONS DURING THE DIVE

During the dive it is important to observe the position of the support vessel(s), operation of the equipment, and the topside diving personnel.

1. Was the tender monitoring the divers and not performing another function that could interfere with tending responsibilities?
2. Was the support vessel clear of the diving area?
3. Were the appropriate dive flags displayed on the vessel tending the divers?
  - a. red/white "diver down" flag on inland/coastal waters?
  - b. r/w flag and blue/white code alpha flag in waters with international vessel traffic?
4. Were the size of the dive flags appropriate for the diving operation?
5. Was a standby diver equipped and ready to provide immediate assistance?
6. Was a tender-to-diver communication system deployed (i.e., diver recall unit)?
7. Were the emergency first aid and oxygen kits readily available to the diving personnel?

### IV. POST-DIVE PROCEDURES

Monitoring post-dive diving operations is important to ensure that divers are taking the necessary precautions to avoid injury, protect themselves from environmental conditions, and maintain their equipment.

1. Did the divemaster and/or tender monitor each diver exiting the water for signs and symptoms of "bubble trouble".
2. Were the divers protecting themselves from hypothermia or hyperthermia?
3. Was freshwater (or other appropriate fluids) available to prevent dehydration?
4. Were the water depths, bottom time, and tank pressures of each diver recorded after each dive?
5. Was a dive report prepared that included appropriate information specific to the diving operation (e.g., water depths and bottom times for the dives, tank pressures, achievement of objectives, hazards encountered, malfunctions and lost equipment)?
6. Did the divers properly clean and store their equipment when they were not diving or after they had completed the diving operations?

### V. DIVING PERSONNEL

An evaluation of the training, background, and capabilities of each diver involved in the diving operation is of primary importance.

1. Were all divers current with diving physical examinations (within one year)?
2. Were all divers current with CPR certification (within one year)?
3. Were all divers current with first aid training (within 3 years)?
4. Were all divers trained in oxygen administration (initial training only required, 2 yr. refresher

recommended)?

5. Were all divers certified for their respective levels of responsibility (i.e., as Working Divers or Divemasters)?
6. Had all divers maintained their proficiency (i.e., dived within the last three months)?
7. Were all divers experienced with the working conditions that were expected during the project?
8. If the answer to nos. 4 or 5, above, is negative, what provisions and preparations has the divemaster undertaken to prepare the diver for the new situation?
9. Were all divers using the air compressor, trained in its operation, if one was at the dive site?

## VI. DIVE EQUIPMENT

Diving equipment must be maintained according to the requirements in the Diving Safety Policy, the manufacturers specifications, whichever are the most conservative.

### A. SCUBA EQUIPMENT

1. Were all SCUBA cylinders tested within the 5-year hydrostatic test date?
2. Had all SCUBA cylinders been visually inspected within the past 12 months?
3. Were all regulators critically examined, calibrated, or overhauled within the past 18 months?
4. Had all of the diver's gauges (e.g., pressure, depth, compass, bottom timers, and watches) been critically examined and calibrated or replaced within the past 18 months?
5. Had all valves and hoses been critically examined and replaced or overhauled as needed?
6. Were all belts and buckles in good condition?
7. For wet suit diving, were all buoyancy compensators in good condition and maintained in accordance with manufacturers specifications?
8. Were all buoyancy compensators capable of being inflated by two methods (one other than oral)?
9. Had the diver communication equipment been checked prior to use?
10. Was a dive ladder available for the divers to enter the tending vessel? (Some boats are low to the water or have swim step and do not require a dive ladder.)
11. Was hygienic maintenance performed on all full-face masks?
12. Were all full-face masks free of corrosion and in good operating condition?
13. Were the head harness and buckles in good condition?
14. Were the manufacturers' repair and maintenance manuals available for the specialized dive equipment (e.g., the communication equipment, and full-face masks)?
15. Was the dive equipment, in general, free of corrosion and in good working condition?
16. Were adequate spare parts and repair materials available at the dive site?

### B. FIRST AID EQUIPMENT

1. Was the emergency oxygen kit capable of servicing two divers with demand second stage regulators at the same time?
2. Did the emergency oxygen kit have an oxygen cylinder that was size "E" (626 liters) or larger?
3. Had the regulator on the oxygen cylinder been maintained according to the manufacturers' specifications?
4. Did the oxygen kit contain a cylinder wrench (or wheel) for opening and closing the tank valve?
5. Were the hoses, valves, and regulators in the oxygen kit in good condition and clean, particularly of oil and grease?

6. Were the oxygen cylinders within 5-year hydrostatic test date?
7. Were the valve seats and [washer seal(s)] (on the valve) in good condition?
8. Was the oxygen cylinder stored in an area where the temperature may exceed 125 degrees Fahrenheit?
9. Was there a fully equipped medical (first aid) kit for divers?
10. Were spare oxygen [washer seals] available?
11. Was there a backboard for emergency use on board the survey vessel?

## APPENDIX II EMERGENCY CONTACTS

### Hong Kong Diving Related

#### Emergency Contacts

Emergency Number	112
Emergency Number(Police 、 Fire Services):	999
Decompression Chamber of Fire Services Department:	2723 2233
D.A.N. Hong Kong Representative:	3611 7326
Hong Kong Marine Police :	2367 0666
Marine Rescue Centre:	2233 7999
Marine Department:	2542 3711
Vessel Monitoring Centre(24 hours):	2233 7801
Government Flying Services Department :	2305 8301 2769 4451
Fire Services Department	2735 3355
Ambulance Services:	
Hong Kong Observatory:	2926 8200

APPENDIX III SPORT DIVING INCIDENT REPORT FORM



香港潛水總會  
HKUA

潛水安全及事故調查委員會  
DS&AEC

*Sport Diving Incident Report (Form I)*

- PURPOSE:** This report aims to collect data and to assist research into diving incidents with an aim to prevent their occurrences. **The names and contacts of individuals involved would be kept confidential.**
- DEFINITION:** A Sport Diving Incident is any error or unplanned event that could, or indeed did, reduce the safety margin for a diver on a particular dive. This report would not be used for incidents of cave and technical diving.
- QUALITY:** Please DO NOT report hearsay incidents.
- INSTRUCTIONS:**
- (i) Please tick one or more options under each heading, write simply in your own words a description of what happened.
  - (ii) This proforma may also be used by an incident investigator to interview a witness of an accident.
  - (iii) Please DO NOT identify any person involved unless he/she so agrees

Please return the completed form to:  
 Diving Safety and Accident Enquires Committee (DS&AEC)  
 Hong Kong Underwater Association (HKUA)  
 Room 1026  
 Olympic House  
 1 Stadium Path  
 So Kon Po  
 Causeway Bay  
 HONG KONG

**(A) Information about the dive**

**Date** \_\_\_\_\_ (  am  pm  evening or night )

**Location of incident**  Sea  Freshwater  Swimming Pool  On Land  others \_\_\_\_\_

**Dive site / Country** \_\_\_\_\_

**Organisation of Dive**  Private/individual  Diving club  others: \_\_\_\_\_

**Purpose of dive:**  leisure  training  commercial / professional  others: \_\_\_\_\_

**Equipment used:**  self-owned  rental  borrowed from others

**Diving computer used:**  Yes  No

**Buddy diving:**  Yes  No

**Dive details**

Types of dive:  shore dive  boat dive  snorkeling  night dive  wreck dive  others: \_\_\_\_\_

Maximum depth \_\_\_\_\_ Safety stop conducted:  Yes  No

Depth at which incident started \_\_\_\_\_ Gas use:  air  nitrox  others: \_\_\_\_\_

Dive duration \_\_\_\_\_ Decompression conducted:  Yes  No

Weather \_\_\_\_\_

Surface interval since previous dive (if applicable) \_\_\_\_\_

Underwater conditions \_\_\_\_\_

**Previous related dives**

No. of dives within the same day before incident \_\_\_\_\_

Maximum Depth and the duration of the dive before incident \_\_\_\_\_

Decompression conducted  Yes  No

**(B) Details of the diver involved in the incident**

The diver involved was:

Yours;  diving buddy;  someone whom you witnessed

Name(optional) \_\_\_\_\_

Contacts & details (optional) \_\_\_\_\_

Age: \_\_\_\_\_

Gender:  Male  Female

**Did the diver have any health problems prior to the incident:**

Yes (specify: \_\_\_\_\_)  No  Not known

**Regular medications taken by the diver?**

Yes (specify: \_\_\_\_\_)  No  Not known

**Medications/drugs taken prior to diving**

Yes (specify: \_\_\_\_\_)  No  Not known

**Alcohol on the day of diving**

Yes  No  Not known

**Diver's qualification: (please tick the highest level, >1 if necessary)**

In training  Open water  Advanced diver  Divemaster  Instructor

Technical  Commercial  Not known

Others \_\_\_\_\_

**Experience of diver:**

Years of diving \_\_\_\_\_

Total no. of dives \_\_\_\_\_

Total dives in the last 12 months \_\_\_\_\_

**History of diving incidents in the past:**

Yes (specify: \_\_\_\_\_)  No  Not known

**(C) Type of Incident(s) (tick as many as relevant):**

Physical injury  injuries sustained from marine creatures  drowning or near-drowning

Hypothermia  Ear barotrauma  sinus barotrauma  pneumothorax

Decompression sickness (DCS) of any degree

Serious equipment failure (e.g. BCD, regulator, gas supply)

(Please

specify: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_)

Illness(s) developed during the dive (Please specify: \_\_\_\_\_)

Others: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**(F) Any contributing factors identified for the incident**

Yes (please specify: \_\_\_\_\_)

\_\_\_\_\_

\_\_\_\_\_)

No

Unknown

**(G) Outcome of the incident**

- no damage sustained/no treatment necessary     received simple first-aid treatment by non-medical personnel
- received treatment by doctor(s)     received oxygen     received depression treatment
- received resuscitation                       required hospitalization
- received surgery                       death (fatal incident)

**Description of the incident (for additional information not covered above)**

(Use extra paper if necessary).

Report submitted by:

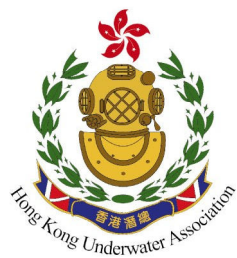
Name \_\_\_\_\_

Phone \_\_\_\_\_

Email \_\_\_\_\_

address \_\_\_\_\_

Date \_\_\_\_\_



**HKUA**

香港潛水總會