

Good Practice Guide – Swiftwater Breathing Apparatus



*WORKING SAFELY USING
SWIFTWATER BREATHING
APPARATUS IN THE PUBLIC
SAFETY INDUSTRY
– A GUIDE FOR IMPLEMENTING
ORGANISATIONS*

October 2023

This guidance is for persons carrying out public safety related activities (operations or training) using Swiftwater Breathing Apparatus (SWBA).

Working safely using swiftwater breathing apparatus in public safety industries

KEY POINTS

- Every person working in public safety industries has health and safety duties.
- Everyone should clearly understand their roles and responsibilities when carrying out diving work.
- The swiftwater environment can change at any time. Make sure everyone on the swiftwater team know about the risks, how they can help manage such risks and what they need to do keep themselves safe.
- Engage everyone in the swiftwater team when planning how to manage risks.

CONTENTS

1.0	Introduction	4
1.1	Scope	4
1.2	Definitions	4
1.3	Abbreviations	5
1.4	Acknowledgement & Creative Commons License	5
2.0	Safety Management System	6
2.1	Personnel	7
2.2	Fitness for work	7
2.3	Training	7
2.4	Equipment	8
2.5	Risk Management	9
2.6	First Aid	9
2.7	Incident Reporting	9
3.0	Risk Management	10
3.1	Intent	11
3.2	Team Positions	11
3.3	Briefing	11
3.4	Minimum Equipment	12
3.5	Prohibited Activities	13
3.6	Recommended Signals	13
4.0	Annexes	14

1.0

Introduction

IN THIS SECTION:

- 1.1* Scope
- 1.2* Definitions
- 1.3* Abbreviations
- 1.4* Acknowledgement & Creative Commons License

Introduction

1.1 Scope

This guidance is for persons carrying out public safety related activities (operations or training etc.) using Swiftwater Breathing Apparatus (SWBA).

1.2 Definitions

Adjuncts means devices used to assist swimming such as fins, mask, floatation aids.

Approved Filler means a person who meet local regulatory requirements to recharge a compressed gas cylinder (e.g. SWBA).

Approved Instructor means a person who meets the requirements laid out in this guideline as a SWBA Instructor.

Competent person is a person who meets local regulator requirements to perform visual and hydrostatic testing of gas cylinders.

Cylinder means an aluminum or composite wrapped gas cylinder not exceeding 450 ml (water volume) used as part of a type approved SWBA.

Breathing System means a SWBA product as specified in Annex A.

Guideline refers to this guideline (PSI Global Good Practice Guide – Swiftwater Breathing Apparatus).

Operator a person who is certified to use SWBA under this guideline or someone training to gain such certification under the direct supervision of an Approved Instructor.

Service Technician means a person who is authorised by the manufacturer to carry out maintenance on the respective SWBA.

Swiftwater Breathing Apparatus (SWBA) means the use of an emergency breathing system during swiftwater and floodwater activities to provide respiratory protection from aspiration of water, whilst remaining buoyant at the surface, without the intention to dive below the surface.

1.3 Abbreviations

- ADAS** Australian Diver Accreditation Scheme
- CMAS** Confédération Mondiale des Activités Subaquatiques
- DAN** Diver Alert Network
- DEFRA** Department for the Environment, Food and Rural Affairs (UK)
- EBS** Emergency Breathing System
- GPG** Good Practice Guide
- IPSQA** International Public Safety Qualifications Authority
- ISO** International Standards Organisation
- NAUI** National Association of Underwater Instructors
- NFPA** National Fire Protection Association
- PADI** Professional Association of Dive Instructors
- PFD** Personal Floatation Device
- PSI** Public Safety Institute
- SCBA** Self-Contained Breathing Apparatus (Closed Circuit)
- SCUBA** Self-Contained Underwater Breathing Apparatus
- SSI** SCUBA Schools International
- SWBA** Swiftwater Breathing Apparatus
- UHMS** Undersea & Hyperbaric Medical Society
- WRSTC** World Recreational Scuba Training Council

1.4 Acknowledgement & Creative Commons License

1.5.1 PSI Global acknowledge this Good Practice Guide has been adapted from the [WorkSafe New Zealand Good Practice Guideline for Diving](#).

1.5.2 As part of the creative commons license set by WorkSafe New Zealand on their guideline, the PSI Global Good Practice Guideline for SWBA is an open access document.

1.5.3 This Good Practice Guide is licensed under a Creative Commons Attribution-Non-commercial 3.0 NZ license.

2.0

Safety Management System

IN THIS SECTION:

- 2.1 Personnel
- 2.2 Fitness for work
- 2.3 Training
- 2.4 Equipment
- 2.5 Risk Management
- 2.6 First Aid
- 2.7 Incident Reporting

2.1 Personnel

2.1.1 Personnel who undertake or support SWBA activities should be given an orientation to this guideline.

2.2.2 Operators should not be referred to as divers unless they are intending to dive and operate outside this guideline.

2.2 Fitness for work

2.2.1 Operators must have the strength, physical fitness and mental health to undertake SWBA activities safely.

2.2.2 As a minimum they should be able to comfortably:

- Swim 50m in under 60 seconds using any stroke without adjuncts OR
- swim 200m non-stop using any stroke with adjuncts.

2.2.3 Operators should also have and maintain a medical clearance to a recreational dive medical or higher standard (CMAS, DAN, RSTC, UHMS).

2.2.4 Operators and Approved Instructor carrying out SWBA activities must not be impaired by fatigue, drugs or alcohol.

2.3 Training

2.3.1 Operators must hold and maintain a recognised dive certification that meets ISO 24801-1 (supervised diver) or higher (such as a military or commercial diver certification).

2.3.2 Operators must hold and maintain a recognised swiftwater rescue technician certification (e.g. IPSQA, PSI Global, Rescue 3, DEFRA, PUASAR002, NFPA etc.)

2.3.3 Operators should complete a recreational dive medical questionnaire and supply this to an approved instructor prior to commencing practical training. Practical training should not be undertaken if the operator fails any initial screening question, unless medical clearance is provided by a physician or medical practitioner.

2.3.4 SWBA certification and recertification training must consist of:

- Validation of 2.3.1 and 2.3.2 requirements
- Overview of SWBA
- Good Practice Guide for SWBA
- Regulatory requirements affecting diving and the use of compressed gas cylinders

2.3.5 Maintenance of SWBA certification (2.3.4) should be done using a real-time verifiable document (i.e. online QR code).

2.3.6 Operators are exempt from Clauses 2.3.1 to 2.3.5 where they hold and maintain micro-credential certification in accordance with IPSQA Standard 5002 (Swiftwater Breathing Apparatus Operator) as this certification exceeds such requirements.

2.3.7 Operators should undertake annual skills check to ensure proficiency in between recertification. A recommended skills check is available as from www.swba.tech

2.3.8 Approved Instructors must hold and maintain the following:

- Dive medical clearance, and

- Approved Filler certificate (as per local regulatory requirements), and
- And one of the following:
 - PSI Global Swiftwater Breathing Apparatus Instructor certification.
 - Recognized Rescue Diver certification (e.g. PADI, SSI, NAUI) and recognized Swiftwater Rescue Instructor certification (e.g. PSI Global, Rescue 3).
 - Recognised Dive Leader certification (ISO 24801-3) and recognized Swiftwater Rescue Technician certification (e.g. PSI Global, Rescue 3).

2.3.9 Instructors and operators should maintain a log of their SWBA activities.

2.4 Equipment

2.4.1 Cleaning

2.4.1.1 SWBA equipment should be cleaned and sanitized after use and between users to avoid infection.

2.4.1.2 SWBA equipment used in natural waterways should be inspected and cleaned in accordance with local regulatory requirements (if any) to avoid spread of biosecurity risks (e.g. didymo)

2.4.2 Storage

2.4.2.1 SWBA equipment should be stored in protective cases in a secure, clean, dry and cool environment.

2.4.2.2 Storage of SWBA equipment in hot environments and in direct sunlight should be avoided as it may cause air expansion leading to burst disc rupture.

2.4.3 Maintenance

2.4.3.1 SWBA cylinders must be visually inspected by a competent person, no less than every two years.

2.4.3.2 SWBA cylinders should undergo a hydrostatic test by a competent person, no less than every five years.

2.4.3.3 SWBA cylinders should have their visual inspection and hydrostatic test certificate dates marked on their exterior.

2.4.3.4 SWBA fittings (regulators, hose, gauge) should be serviced annually or as per the manufacturers instructions by a service technician.

2.4.3.5 Recharging of SWBA cylinders must be done by an approved filler using breathable (non-enriched) air that meets air quality for diving.

2.4.3.5.1 Air quality should be periodically tested to ensure it is not contaminated.

2.4.3.5.2 SWBA cylinders should be fully charged (100%) before being stowed ready for use.

2.4.3.6 Where SWBA cylinders are to be stored not fully charged, they should be stored with nominal pressure (approximately 30 bar) to avoid moisture and other contaminants entering.

2.4.3.7 In the event of a burst disc, it should be replaced and the SWBA should be checked by a service technician.

2.4.3.8 SWBA cylinder should be labelled as per Annex A.

2.4.3.9 SWBA cylinders should be refilled to refresh stored air every 6 months.

2.4.3.10 Records of maintenance, servicing and testing must be held in accordance with local regulations.

2.5 Risk Management

2.5.1 A risk management or safety plan must be developed by the entity responsible for SWBA activities and communicate this to those who are affected by it.

2.5.2 The risk management plan must include hazard identification, hazard control, normal operating procedures, emergency operating procedures and be approved by the entity.

2.5.2.1 Normal operating procedures must include:

- Buddy check
- Understanding of signals
- Unintended diving*

* Such as where the user has no intention to dive but is forced underwater at depth requiring the operator to use SWBA (i.e waterfall hydraulic)

2.5.2.2. Emergency operating procedures must include:

- SWBA hose or assembly entrapment
- Low air
- Out of air
- Free flowing/frozen regulator

2.5.3 The risk management plan must be reviewed no less than annually.

2.6 First Aid

2.6.1 Adequate first aid facilities and trained first aiders must be available when undertaking SWBA activities.

2.6.2 First aiders must be qualified to:

- Provide emergency care for water related emergencies including hypothermia, drowning, dislocation, fractures.
- Administer oxygen and operate an Automatic External Defibrillator
- Perform Cardiopulmonary resuscitation (CPR)

2.6.3 First aiders must re-qualify their training in accordance with local requirements, but no less than every three years.

2.6.4 SWBA activities should have access on-site to oxygen and an Automatic External Defibrillator.

2.7 Incident Reporting

2.7.1 Near misses, incidents causing harm or damage, injuries, illness and death must be recorded and reported in accordance with local regulatory requirements.

2.7.2 Approved Instructors must report SWBA training incidents involving illness, injury or death to PSI Global within 7 days

3.0

Risk Management

IN THIS SECTION:

- 3.1 Intent
- 3.2 Team Positions
- 3.3 Briefing
- 3.4 Minimum Equipment
- 3.5 Prohibited Activities
- 3.6 Recommended Signals

3.1 Intent

3.1.1. SWBA activities must not be performed with the intention to dive. Where there is intent, public safety or commercial diving protocols must be followed.

3.1.2 SWBA activities shall ensure that the operator is positively buoyant and no weight belt system is used.

3.2 Team Positions

3.2.1 In addition to normal swiftwater crewing and positions, SWBA activities must have the following dedicated positions on-site:

- Primary Operator who is fitted with, or operating the SWBA in the hot zone.
- Secondary Operator, who is fitted with SWBA and is available to immediately provide rapid intervention to the primary operator. Generally positioned in the warm or cold zone.
- Attendant, who maintains communication and positioning of the primary operator and attends the operator's tether if used. Generally positioned in the warm zone.
- Supervisor, who is directly responsible for coordinating SWBA operations and directs the operators and attendants under the local incident command structure.

3.2.2. A Safety Officer should be designated and where possible, this person should meet SWBA operator certification requirements.

3.2.3 The Primary Operator, Secondary Operator, Attendant and Supervisor must meet SWBA operator certification requirements.

3.3 Briefing

3.3.1 A briefing must be given prior to commencing SWBA activities by the supervisor. It must include:

- Hazard identification including special hazards where present, such as low head dams, delta-P, strainers etc.
- Outline of Risk Management Plan (training) or Dynamic Risk Assessment (operations)
- SWBA team positions
- Designation of zones (hot, warm, cold)
- Signals and communications
- Equipment checks
- Normal operating procedures
- Emergency procedures
- First aid arrangements
- Verification of operator training requirements

3.3.2 The briefing may also include additional information such as:

- ECHO swiftwater risk assessment
- Water conditions (depth, speed, class, temperature, contamination, turbidity)
- Weather conditions (current and forecast)
- Entry and exit locations for operators
- Operational boundaries/work zones
- Incident command structure and arrangements
- Jurisdictional authority and delegations
- Air refilling

3.4 Minimum Equipment

3.4.1 Operators shall be equipped and be fitted with a minimum of:

- Personal Floatation Device
- SWBA (as per Annex B)
- Whistle
- Helmet
- Knife/cutting device

3.4.2 Operators may be equipped and fitted with other equipment including, but not limited to:

- Low volume diving mask or
- Swimming goggles and nose plug
- Snorkel

3.5 Prohibited Activities

3.5.1 SWBA activities under this guideline shall not be used in the following circumstances or conditions:

- Class IV (Grade 4) or above flow
- Water flows exceeding 25 kmph (15 mph/13 knots)
- Outside the manufacturers operating temperature limits
- Where there is intent to dive under water
- With a weight belt or similar such system
- Where the operator is not positively buoyant in non-aerated water

3.6 Recommended Signals

Where monitoring indicates your control measures aren't working as effectively as they should be, take action to improve them. This includes:

3.6.1 The briefing shall include signals to communicate between the operator and attendant:



- Low on air
- Out of air
- Recall operator



3.6.2 The briefing may use the recommended SWBA signals as per the table below.

SIGNAL	Hand Signal	Whistle
Are you ok?	Flat hand on head	
I am ok	Flat hand on head in response	
Something is wrong	Flat hand tilting	
I am low on air	Fist on front of helmet	N/A
I am out of air	Level hand sliding back and forth across front of helmet	N/A
Help	Hand extended above waving	Continuous
Recall operator	Finger swirling (eddy out) then pointing in safe exit direction	
Stop/attention	Hand extended in front above water with palm raised	One short blast
Up	Hands patting upward top of shoulder on same side	Two short blasts
Down	Hands patting downward from top of shoulder on same side	Three short blasts
Rope free/release	Hand level moved swinging wide backwards/forwards above water	Four short blasts

Annexes

Annex A: Recommended SWBA cylinder labels

<p>SWBA® WWW.SWBA.TECH</p> <p><input type="checkbox"/> 200 BAR/3000 PSI <input type="checkbox"/> 300 BAR/4500 PSI</p>		<p>WARNING: THIS DEVICE MUST ONLY BE USED BY THOSE HOLDING SWBA® CERTIFICATION. FAILURE TO DO SO MAY CAUSE DEATH OR SERIOUS INJURY. SCAN THE QR CODE FOR MORE INFORMATION. DO NOT REMOVE THIS LABEL.</p>	
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Annex B: Type Approvals

Type Approved EBS for SWBA activities

- Tiger Performance EBS
- Aqua Lung Mil-Pro MEER
- HEED3 with 27' hose
- Poseidon EBS

Type-Approved Mounting System:

- PSI Global



Available from www.amazon.com Search for "SWBA"

Author

Dr. Steve Glassey

Email steve.glassey@publicsafety.institute

Contact

For further information on the PSI Global: Good Practice Guide – Swiftwater Breathing Apparatus or for information on operator and approved instructor training, please contact the author.

Disclaimer

This publication provides general guidance. It is not possible for PSI Global to address every situation that could occur in every workplace. This means that you will need to think about this guidance and how to apply it to your particular circumstances.

PSI Global regularly reviews and revises this guidance to ensure that it is up-to-date. If you are reading a printed copy of this guidance, please check www.swba.tech to confirm that your copy is the current version.

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