CMAS

CONFÉDÉRATION MONDIALE DES ACTIVITÉS SUBAQUATIQUES

WORLD UNDERWATER FEDERATION

CMAS Tec Scooter Diver Course
Level II

STANDARDS AND REQUIREMENTS

VERSION 2008/01

(CA 158 12/01/08)

CAUTION

The operation and handling of an underwater scooter, as well as the appropriate technical maintenance requires a certain minimum of technical understanding and knowledge, a certain minimum level of diving skills and competence and an appropriate equipment configuration. As any moving object may represent a potential danger to other persons in its vicinity, the driver must also have a distinctive feeling of responsibility for all his/her doing.

Therefore, CMAS does NOT endorse, promote or otherwise recommend the use of such devices, even at recreational diver course level, for

- *persons of less than 16 years of age*
- *divers not having at least a CMAS 2star diving certificate (or equivalent)*
- *divers without the proper training as received in a CMAS (or otherwise) sanctioned scooter diver course*
- *divers not meeting the minimum requirements for mandatory equipment and its configuration (ref. to standards and training program for CMAS scooter diver courses)*
- *diving beyond the limits as set by the diver's certification level or the operational limits set by the manufacturer of such a device (whichever applies first)*

Having appropriate private liability insurance with a minimum coverage of 2 Mio. Euros is absolutely mandatory.
By no means and under no circumstances, must scooters or any other towing devices be used as a substitute for the lack of physical fitness.

1 Glossary of used terms and abbreviations

1.1 Equipment

BC	Buoyancy Compensator (vest, jacket)
SPG	Submersible Pressure Gauge (depth-gauge)
SMB	Surface Marker Buoy
a dangly	a piece of equipment loosely hanging down, not closely attached to the body

1.2 Organisations

NACD	National Association for Cave Diving
NSS-CDS	National Speleological Society – Cave Diving Section
SNSS	Scuola Nazionale di Speleologia Subacquea
CDAA	Cave Diving Association of Australia
CDG	Cave Diving Group (Great Britain)
ANDI	American Nitrox Divers International
TDI	Technical Diving International
IANTD	International Association of Nitrox and Technical Divers

1.3 Certifications / Levels of Training

1.3.1. Foreign

OWD	Open Water Diver (entry diver level); equiv. to CMAS 1 star
AOWD	Advanced Open Water Diver; equiv. to CMAS 2 star
MSD	Master Scuba Diver ; equiv. to CMAS 3 star
DM	Divemaster; approx. equiv. to a CMAS 4 star

1.3.2. CMAS

Cave Diver 1	= Cavern Diver Diver certified to dive in zone 1 (daylight zone) of a cave with a permanent guideline; depth limit 20m, max. penetration 50m from surface
Cave Diver 2	= (Advanced) Cave Diver Diver certified to dive in zone 2 (zone of total darkness) of a cave; depth limit 30m, no sumps, no restrictions, max. penetration set by 2x10l tank
Cave Diver 3	= Full Cave Diver Diver certified to dive in zone 3 of a cave, which is anything beyond zone 2; depth limit 40m EAD.

1.4 Scooters designations (synonyms)

DPV	Diver Propulsion Vehicle (mainly used in US)
ADV	Advanced Diving Vehicle (used by SUEX)
UPV	Underwater Propulsion Vehicle
Propulseur	French term for underwater scooter

1.5 Other

Overhead environment	**Any diving place where the direct ascent to the water surface is not possible due to natural or artificial obstructions such as caverns, caves, wrecks, mines, submerged buildings, under ice.**
OOA-situation	Out-of-Air situation
OOG-situation	Out-of-Gas situation (more general term)

2 Preface

The main objectives of this course compared to Recreational Scooter Diver course are:

2.1 to refresh and reinforce knowledge and skills learned in level 1 course and improving them to a higher level of proficiency
2.2 learning how to correctly use class 2 scooters
2.3 to handle and correctly and safely use the scooter during
- 2.3.1. Extended bottom time
- 2.3.2. Multiple stage/deco tank dive
- 2.3.3. Gas switching
- 2.3.4. Position of the scooter during decompression
- 2.3.5. Towing buddies and scooters in case of engine failures
- 2.3.6. Towing the buddy in OOG situation to the entry point when the gas reserve is sufficient

3 Course Classification

The Tec Scooter Diver Course is an advanced specialty course
This course can only be classified as an addition to other certifications which develop the necessary basics.

4 Course Prerequisites and Constraints

4.1 Prerequisites for students (for course admission)

- 4.1.1. Must be at least 16 years old
- 4.1.2. CMAS two star diver or equivalent (e.g. AOWD)
- 4.1.3. CMAS Advanced Nitrox Diver or equivalent
- 4.1.4. CMAS Stage Handling Course OR must show proof of mastering stage handling techniques AT BEGINNING of course (assessment)
- 4.1.5. CMAS Recreational Scooter Diver or equivalent
- 4.1.6. Minimum of 100 logged dives after certification as a CMAS two star diver (or equivalent)
- 4.1.7. Valid medical attest (fitness for diving) in compliance with the regulations of the national CMAS federation
- 4.1.8. Equipment as requested under “Personal equipment”
- 4.1.9. Private Liability Insurance with a minimum coverage of 2 Mio. Euros

4.2 Requirements for training scooters in use

All scooters used must fulfil at least all technical characteristics as defined in the "CMAS CONSTRUCTION STANDARDS FOR UNDERWATER SCOOTERS” for class 2 rated scooters.

4.3 Training limits

- 4.3.1. Scooter use in open water only
- 4.3.2. Within diver’s certification limits
- 4.3.3. Within scooter’s operational limits (depth and range)

5 Entry assessment (only if deemed necessary)

An entry assessment can be utilized to verify that candidates fulfil all prerequisites with regard to theoretical knowledge, practical skills and physical performance. Candidate must successfully pass all assessment requirements before being accepted to course.

6 Aims and priorities of the training

6.1 To reinforce the understanding of the 3 different types of scooters, their relevant technical characteristics, their intended range of operation and their limitations, as defined in the “CMAS CONSTRUCTION STANDARDS FOR UNDERWATER SCOOTERS ".
6.2 To provide a clear understanding of the basic functions of the scooter: mechanical, electrical and nautical (e.g. buoyancy in fresh and sea water, trim, torque, steering)
6.3 To provide a clear understanding of the basic scooter’s maintenance
6.4 Proper equipment set-up for efficient scooter diving.
6.5 To provide a clear description of the scooter operation in open water (lake/sea) with advantages and limitations of the machine.
6.6 Scooter dive planning for prolonged dives: scooter’s burn time and gas planning.
6.7 Pre-dive and post-dive operations
6.8 Positioning in the water and recover of the scooter
6.9 Correct trim and buoyancy while managing several scooters – diver’s horizontal position -
6.10 Proper use of the scooter during the descent, bottom time and ascent
6.11 Correct fining technique with a deactivated scooter
6.12 Team diving :
- Speed adjusting
- Signals
- Compass navigation

6.13 Emergency scenarios :

6.13.1. Scooter malfunctioning and how to fix the problems

- runaway
- complete stop
- flooding
- propeller line entanglement

6.13.2. OOG situation

- direct ascent to the surface respecting ascent speed and deco obligations

6.13.3. How to tow a buddy with a deactivated scooter (proper signals and procedures)

6.14 SMB Deploying

6.15 Gas switching (use of stage tanks); extensively exercised

6.16 Positioning during decompression

6.17 Awareness of the environment

7 Instructor : Students Ratio

7.1 Theory/classroom
1:8

7.2 Practical
1 instructor or instructor candidate: 4 students under normal or better conditions; must be reduced to 1:if situation is considerably worse

7.3 Note

7.3.1. Assistants may only account on a basis of 1 assistant: 2 more students, but never more than for instructors.

7.3.2. Assistant candidates may only account on a basis of 1 assistant candidate: 1 more student.

8 Requirements for instructors/assistants

8.1 Responsible course director must be Tec Scooter Instructor or Tec Scooter Instructor CANDIDATE under supervision of a delegated supervising instructor from the national federation.

8.2 Assistants must be Tec Scooter Assistants or Tec Scooter Assistant CANDIDATES.

8.3 Equipment as requested under “Personal Equipment” for all staff

9 Personal Equipment

9.1 Mandatory Equipment:

9.1.1. All standard OW equipment for dives at CMAS 2* diver level (especially buoyancy compensator, power-inflator, dive computer and compass, submersible pressure gauge!)

9.1.2. Harness with the possibility of attaching stage tanks (max. 2 and with crotch-strap with front-strap D-ring)

9.1.3. Min. one (1) double 10 litre tank set, EITHER completely independent tanks OR manifold connection WITH an isolator valve

9.1.4. Two (2) independent regulator rigs

9.1.5. One (1) primary long hose with a min. length of 2.10m and a max. length of 3m (7-10 feet)

9.1.6. Two (2) additional stage tanks per student with a min. volume of 7liters (recommended are 80cft aluminium tanks)

9.1.7. Each student has to bring his own Class 2 rated scooter (tow-behind style only!)

9.1.8. One (1) deployable surface marker buoy (SMB)

9.2 Recommended (suggested) Equipment:

Nothing special

9.3 Equipment configuration and body position:

Scooter class 2 or higher - Tow behind style mandatory.

In any case the diver must wear a harness with front crotch-strap D-ring where the scooter is clipped by means of special safety spring-clip and tow leash with proper length.

9.3.1. ***Correct equipment configuration*** is a crucial factor for safe diving in general and becomes a must when diving with the scooter. As a rule, gear configuration should guarantee a very good streamlining and no elements should protrude or be left dangling.

9.3.2. ***The diver's position*** during the dive must be more as horizontal as possible (posture and buoyancy always derive from correct equipment configuration and adequate training).This ensures safety, longer running times, scooter speed and cruise comfort

Be especially careful when setting out your equipment especially as regards : hoses, regulators, stage tanks, SPGs, audible alarms, light cords, reels and so on; making sure they do not dangle and that hey cannot come into contact with the propeller or entangle themselves on the bottom or on your buddy, creating possibly serious hazard situations.

10 Course Facilities & Supporting Material

10.1 A class room suitable to match the needs of the course
10.2 Open water (lake/sea), minimum visibility 3m and max depth 30m
10.3 At least one class 2 rated scooter per any participant, instructors and assistants included
10.4 At least one fully operational class 2 spare scooter for backup, replacement and for emergency towing exercises
10.5 Suitable handouts or a manual given to every student; all this teaching material must be accredited/endorsed by the CMAS TC
10.6 The document "CMAS CONSTRUCTION STANDARDS FOR UNDERWATER SCOOTERS"

11 Final Knowledge (Theory) Evaluation

Theoretical knowledge will be evaluated with one single, written test, consisting of 20 MC questions on the main topics as listed under "aims and priorities of the training".
In order to pass, the student must have a scoring of at least 80% (correct answers).

12 Final Skills Evaluation

At the end of the class the candidate has to demonstrate to be confident with scooter diving in all these steps :

12.1 Clear understanding of the basic functions of the scooter : mechanical, electrical and nautical
12.2 Clear understanding of the basic scooter's maintenance
12.3 Proper equipment set-up for efficient scooter diving.
12.4 Scooter dive planning : scooter's burn time and gas planning
12.5 Pre-dive and post-dive operations
12.6 Positioning in the water and recover of the scooter
12.7 Correct trim and buoyancy while managing several scooters – diver's horizontal position -
12.8 Proper use of the scooter during the descent, bottom time and ascent
12.9 Correct fining technique with a deactivated scooter
12.10 Team diving :
- Speed adjusting
- Signals
- Compass navigation

12.11 Emergency scenarios :
- - Scooter malfunctioning
- - OOG situation
- - Towing the buddy with a deactivated scooter

12.12 SMB Deploying
12.13 Gas switching (stage tanks)
12.14 Positioning during decompression
12.15 Awareness of the environment

13 Minimum Course duration

13.1 Minimum of 2 days
13.2 Theory/Classroom : 4.0 hrs
13.3 Dives : Minimum 4 dives
Minimum duration per dive of 60min
Two of the dives must include (simulated) decompression stops
Not more than 2 dives per day

14 Certification

14.1 CMAS double-sided card
14.2 wall certificate in A4 format (left to the decision of the national federation)

15 Quality Control

Compliant with CMAS Standards and the relevant procedures of the national CMAS federation

Training Program

1 Minimum Course duration

1.1 Minimum of 2 days
1.2 Theory/Classroom : 4.0 hrs
1.3 Dives : Minimum 4 dives
Minimum duration per dive of 60min
Not more than 2 dives per day

2 Course content

2.1 Theory

2.1.1. Basic functions of the scooter : mechanical, electrical and nautical
2.1.2. Basic scooter's maintenance
2.1.3. Proper equipment set-up for efficient scooter diving.
2.1.4. Scooter dive planning: scooter's burn time and gas planning.

2.2 Practical

2.2.1. Pre-dive and post-dive operations
2.2.2. Positioning in the water and recover of the scooter
2.2.3. Buoyancy control and correct trim while managing the scooter – diver's horizontal position -
2.2.4. Proper use of the scooter during the descent, bottom time and ascent
2.2.5. Correct fining technique with a deactivated scooter
2.2.6. Team diving :
- Speed adjusting
- Signals
- Compass navigation

2.2.7. Emergency scenarios :
- Scooter malfunctioning → how to fix the problem
- OOG situation
- Towing the buddy with a deactivated scooter/ towing multiple scooters

2.2.8. Gas switching
2.2.9. SMB Deploying
2.2.10. Positioning during decompression
2.2.11. Awareness of the environment