

Underwater Stunts and Underwater Film Operations

(From the NS Screen Industry Health & Safety Guidelines)

This guideline applies to all diving operations conducted in relation to underwater stunts and underwater work during film operations. The following DEFINITIONS apply in this Guideline:

Buddy System: the system of assigning diving partners who are responsible for maintaining effective communication with each other and rendering assistance when necessary.

Competent: qualified because of knowledge, training and experience to carry out assigned duties and knowledgeable of Regulations relating to duties.

Diving Supervisor: the individual who, because of his/her diving qualification and experience, is responsible for a particular diving operation.

Dive Team: a minimum of three personnel involved in a diving operation.

Free Swimming: diving without a lifeline or surface tether.

Hyperbaric Chamber: a pressure vessel and associated equipment designed to subject humans to greater-than atmospheric pressure.

Lifeline: a rope or other material of sufficient strength to recover and lift a diver and his/her equipment from the water.

SCUBA: Self Contained Underwater Breathing Apparatus

Stand-by Diver: a diver who is trained to operate at the depths and in the circumstances in which the diver in the water is operating. The primary function of the Stand-by Diver is to render assistance in the event of emergency.

A. Diving Regulations and Safety Measures

The following is only an overview of the regulation and some of its requirements, for a complete description and explanation of what is required for diving operations in Nova Scotia refer to the NS Occupational Diving Regulations.

Divers Requirements

In Nova Scotia each diving supervisor, diver and diver's tender must meet the competency requirements set out in CSA Standard Z275.4-02, "Competency Standard for Diving Operations" for their position and the depths and circumstances of the dive. All members of a dive-team must hold a valid standard first aid certificate, must be trained in the use of oxygen therapy equipment that is provided at a dive site and they must all have photo identification available at the site. Divers must also be physically fit and meet various fitness requirements and pass specific medical examinations, see sections 12 – 15 of the NS Occupational Diving Regulations for details.

The employer/producer must designate, in writing, one competent person to be the diving supervisor for a dive site at any one time. A diving supervisor must supervise all dives conducted and ensure that

the Act and the Diving Regulations are complied with before a dive, during a dive, and after a dive. A diving supervisor must be at the dive site; however, he must not dive unless it is necessary to do so in a health or safety emergency. The diving supervisor may dive when another person, who is competent, is delegated in writing by the diving supervisor.

Before a dive is conducted a written plan must be prepared that meets the requirements of Section 20 of the NS Occupational Diving Regulations. The diving supervisor for the planned dive or dives must brief the rest of the dive team on the details of the dive plan along with the requirements outlined in Section 21 of the Occupational Diving Regulations.

Dive Crew Size

A minimum crew of three must be present at each diving operation and must include at least two divers and one team member who act as both a supervisor and a diver's tender. One of the divers must be a standby. The minimum crew requirement changes according to depth, equipment usage, degree of hazard and other conditions. In many situations there is a requirement for more than a crew of three to be present, see Section 9 of the Occupational Diving Regulations for a detailed description of dive team requirements.

SCUBA Prohibitions

SCUBA equipment cannot be used for dives more than 40m in depth. In addition, the use of SCUBA is completely prohibited at construction or industrial underwater work sites for some activities (ex. welding). Diving in the entertainment industry will in most cases require the use of SCUBA, however there are many situations where SCUBA is not allowed, for specific provisions on the prohibition and use of SCUBA see sections 86-87 of the NS Occupational Diving Regulations.

Equipment Examination, Testing, Maintenance & Repair

Diving equipment must be examined by a competent person each day it is used, and it must be tested, repaired and maintained in accordance with the manufacturer's specifications. Records of tests and repairs must be kept for 2 years.

Diver Logbook and Supervisor's Record

All divers must keep a logbook containing the information specified in the Nova Scotia Occupational Diving Regulations. Entries into the logbook must be signed by the diver, and counter-signed by the diving supervisor. Diving supervisors must keep a supervisor's record and file a signed copy of the record with the employer within 7 days of the end of the dive. The Employer (dive contractor) must keep the supervisor's record for at least 2 years.

Responsibility for Safe Diving

Diving and underwater work can be very dangerous and physically demanding. Because of all the hazards and regulatory requirements employers/producers are strongly encouraged to hire only professionally trained certified divers and diver's tenders. This guideline only highlights some of the duties and responsibilities regarding diving and by no means replaces the requirements set out in the NS Occupational Diving Regulations, and if there is a difference between this guideline and the Regulation, the Regulation will apply. Every person at a dive site must ensure they perform all duties and meet all

requirements of the Regulation. A diver must not dive if any of the regulatory duties or requirements are not met, regardless upon whom the Regulations placed the duty or requirement.

General Information

1. A designated competent Diving Supervisor shall be assigned to supervise each dive.

His/her duties shall include, but not be limited to, the following:

i. Planning the dive(s)

ii. Briefing the crew, including emergency procedures that are to be followed in the event of a malfunction of the equipment or system.

iii. Ensuring that all necessary equipment is provided and in good operating condition.

iv. Supervising the entire diving operation.

v. Reviewing divers' logbook; and

vi. Keep a diving supervisor's record which must include all the information outlined in the applicable section of the Regulations.

2. Each diving supervisor, diver and diver's tender must meet the competency requirements set out in CSA Standard Z275.4-02, "Competency Standard for Diving Operations" for their position and the depths and circumstances of the dive.

3. For each diving operation there must be a minimum dive team of three. Within the team there must be at least two divers and one team member who act as both a supervisor and a diver tender.

4. Each diver and diver's tender must hold a valid standard first aid certificate, be trained in the use of oxygen therapy equipment (if made available) and have photo identification available at the site. The Nova Scotia Occupational Diving Regulations do not make Oxygen Therapy mandatory; it is optional.

5. Except in the case of accident or unavoidable circumstances, a diver shall not be permitted to remain at any depth longer than the maximum time planned for that depth during that dive.

6. A diver shall not be permitted to dive unless a signed statement issued by a physician is presented, stating that the diver has received a comprehensive physical examination during the preceding 24 months and has been found to be free of any medical condition that would prohibit the type of diving for which the diver is to be employed.

7. When the diver shows any indication of pressure-related illness or requires therapeutic recompression for any reason, treatment shall be initiated, and the physician shall be alerted immediately.

8. Before commencing a diving operation, the Diving Supervisor shall ensure that all diving plant and equipment, including umbilical's, winches, cables, hyperbaric chambers, etc. used in connection with the diving operation are in operating condition.

9. The Employer or the Diving Contractor shall ensure that there is a second source of power for the diving system in the event of failure of the primary source.

10. When diving operations are in progress, warning devices shall be displayed as follows:
 - i. Buoys, flags, lights, lamps, or flares to define the limits to be kept clear of by any equipment other than that connected with the diving operation; and
 - ii. In navigable water, flags and lights in accordance with the requirements of the Regulatory Authority.

Warning Signals - Divers Down

BY DAY: International Code Alpha and/or any locally recognized signal (Divers' red and white flag).

BY NIGHT: Vertical lights in a red-over-white position indicating underwater operations (this is an international code).

11. An effective two-way means of communication between the underwater site and the person in control of equipment that may assist the diving operation must be provided.
12. A lifeline tended from the surface shall be used at all times in diving operations under ice, or where potentially hazardous situations such as water currents, low visibility and adverse weather conditions exist.
13. Dive plan must be posted on all boats in the area.

B. SCUBA Diving

1. A diver using SCUBA shall limit depth of dives to not exceed 40 meters (130 feet).
2. A diver using SCUBA shall use the buddy system. The buddy system shall consist of two free-swimming divers, each of whom shall:
 - i. Be responsible for the other's safety.
 - ii. Be familiar with the operation of all equipment worn or employed by the buddy and be prepared to correct in case of malfunction.
 - iii. Maintain constant visual contact with the other during the dive (monitor the actions and conditions of the buddy).
 - iv. Know the hand signals being used and acknowledge each signal as given; FAILURE TO ACKNOWLEDGE SHALL BE CONSIDERED AN EMERGENCY.
 - v. Not leave the other except in the case of an emergency requiring the assistance of one of them; and
 - vi. Abort the dive immediately if one becomes separated from the other(s) or one of them aborts the dive.
3. When it is unsafe to use the buddy system, a lifeline tended at the surface or tethered to an identifiable float located on the surface shall be used and visually monitored from a location that will allow for immediate assistance to be rendered to the submerged diver in the event of an emergency.
4. Each diver employing SCUBA should be equipped with two (2) functioning demand regulators and shall use an octopus rig when diving in excess of 60 feet.

5. Effective two-way communications with the surface (i.e., float, life-line, voice communication, etc.) shall be used when it does not interfere with the operations and at all times during solo diving.
6. No diver shall undertake to dive in a contaminated environment unless the diver's competence to engage in such work is acceptable to the Regulatory Authority.
7. It is the Producer's responsibility to ascertain that the working area is not contaminated.

C. Actors Involved in Underwater Work

When an actor is required to perform underwater work, it is essential that appropriate safety measures be implemented. A dedicated dive team should accompany the actor. Warm up vehicles and changing areas should be immediately available, as well as shower facilities.

It is recommended that medical assessments be made to ensure physical fitness for the rigors of underwater work. Work underwater involves physical and physiological stresses that can rapidly deplete reserves in an individual having a poor physical fitness level. It is necessary, therefore, that all divers have a good to excellent exercise tolerance.

The middle ear, the sinuses and the lungs are air-containing spaces in the body. The pressure in them must be equal to the surrounding pressure in order to prevent tissue damage. This means that the diver cannot be suffering from respiratory infections, cold, flu, etc.

Due to shooting demands and wardrobe restrictions, the risk of hypothermia should be monitored closely.