

# Cleaning of diving equipment

## HSE information sheet

### Diving Information Sheet No 12

#### Introduction

This diving information sheet is part of a series of information sheets providing guidance on diving at work. The information is also relevant to the recreational diving sector. It provides guidance to manufacturers, as well as users, on the risks from micro-organisms that can be present in diving equipment and how these risks can be minimised.

Diving equipment, due to its nature and the fact that it might be stored in a damp condition, creates an environment where micro-organisms including fungi, yeasts, bacteria and viruses can multiply rapidly. Fungi are one of the most likely contaminants and these can produce large quantities of spores. Inhalation of these spores can cause an allergic reaction in the lungs, producing potentially life-threatening conditions, particularly in those individuals who may be predisposed to allergy.

#### Cleaning regime

Users should always follow the manufacturer's current instructions regarding the cleaning regime of their equipment.

The most effective defence against micro-organisms is to avoid creating conditions in which they thrive: Equipment should be thoroughly cleaned, dried and then stored in a dry, clean environment – ideally, an enclosed room with circulating air.

The key areas that need cleaning are those parts of the equipment which allow a direct path into the diver's airway. These include mouthpieces and oral nasal masks and the mouthpieces, and internal surfaces of BCDs. In the case of rebreathers, the full breathing loop, including hoses and counterlungs, must be considered.

The minimum recommended cleaning regime after each day's diving is thorough rinsing with clean potable water and then drying. Microbial agents can be particularly opportunistic and tenacious. Therefore the inclusion of periodic disinfection as part of the

cleaning regime should also be considered, in order to further reduce the risk from these micro-organisms.

#### Rinsing

The use of clean potable water for rinsing is essential. The aim of rinsing is to flush away any minute deposits, which could act as nutrients for microbial growth. Rinsing also removes any growth that might already be forming. Where the quality of the available water is in doubt, sterile or bottled water should be used. Sterile water can be purchased, or a suitable alternative can be produced by boiling and then leaving water to cool directly before use. This cooled boiled water can be stored for later use in sealed containers that have been treated with sterilising tablets.

#### Drying

Humid and moist conditions encourage the growth of micro-organisms. It is therefore important that after rinsing the equipment is allowed to dry completely. Whilst the priority is to ensure complete drying, the quality of the air in which the equipment is dried should also be considered to minimise the potential for recontamination. Drying equipment inside an enclosed, clean and dry room with circulating air (eg, with a fan), provides the best conditions. Where this is not feasible, the decision on the drying site should consider exposure to airborne contaminants.

#### Storage

Once cleaned and dried, the equipment should be stored in a clean and dry environment. There should be adequate air circulation to minimise the potential for condensation.

#### Disinfectants

When disinfectant is used the equipment should first be thoroughly rinsed, to remove any soiling that might be present. To be fully effective and safe, several factors need to be taken into account when choosing and using disinfectants:

- The disinfectant must be effective and able to kill the full spectrum of micro-organisms that might be present in breathing apparatus. It is recommended that the disinfectant is effective against the most resistant micro-organism, which, in this context, is *Mycobacterium Tuberculosis* (TB).
- The equipment manufacturer's recommendations regarding suitable disinfectants should always be followed. The use of disinfectants that have not been endorsed by the manufacturer may pose a health hazard to the diver and/or damage components of the apparatus.
- The disinfectant and equipment manufacturer's guidelines need to be closely followed to ensure that the dilution of disinfectant and the contact time (time which the disinfectant is in contact with the surfaces of the equipment) is adequate. Excessive contact times or insufficient dilution might damage equipment, while the opposite might reduce the disinfectant's effectiveness.

### **Post-Disinfection Rinse**

The number of these rinses and how they are conducted must be in accordance with the equipment and disinfectant manufacturer's instructions to ensure that all surfaces are cleared of disinfectant residue. If not completed adequately, any residue might pose a health hazard to the diver and/or damage the equipment. Sterile water is ideal for the rinsing process, but the alternatives of clean potable water, bottled water or cooled boiled water (see rinsing process) may be used. Where the equipment is subsequently to be stored for a significant period, the use of sterile or cooled boiled water for the last rinse would minimise the possibility of introducing any waterborne contaminants.

### **Frequency of Periodic Disinfection**

When recommending periodic disinfection, manufacturers should consider the following, regarding its frequency:

- **Time.** Micro-organisms can reproduce very rapidly in the right conditions. The greater the timescale between disinfections, the greater the potential risk from any that might remain in/on the equipment after the standard rinse and drying regime.
- **Heat and Humidity.** Higher ambient temperatures, as well as humidity, promote the growth of micro-organisms. In warm and/or humid climates more frequent disinfection should be considered.
- **Shared Equipment.** Where equipment is shared between individuals, for example, during training and many commercial diving scenarios, there is potential for the spread of infectious agents from user to user. When equipment is shared, more frequent periodic disinfection would be

appropriate, including the rinsing and disinfection of mouthpieces and oral nasals between dives.

- **Storage.** Equipment that is not used for an extended period will not benefit from regular cleaning (rinsing and drying). This will increase the potential for growth of any micro-organisms that might be present. The disinfection, rinsing and drying of equipment before it is placed into storage should be considered.

### **Information Provided by Manufacturers**

Manufacturers have a responsibility to provide users with the necessary information to carry out effective cleaning of their product. As part of this, users should be made aware of its importance as a critical element of the equipment maintenance regime and how it should be performed in an effective and safe manner.

Users should always follow the manufacturer's instructions regarding the correct cleaning of their product.

### **Further information**

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