

APPENDIX 4A

# MK 16 MOD 1 use in Non-MCM Environments

## 4A-1 Introduction.

Appendix 4A is intended to supplement Chapter 18 in the use of MK 16 MOD 1 in Non-Mine Counter Measures (MCM) environments. The MK 16 MOD 1 is well-suited for EOD operations, and also has the capability to be safely employed outside EOD-specific use. NAVSPECWARCOM units are exempt from Appendix 4A restrictions for dry dock shelter and seal delivery vehicle operations.

## 4A-2 Scope.

Due to the hydrostatic effects that are inherent with a back mounted counter lung, use is restricted to an oxygen consumption rate of 1.2 l/m as shown in [Figure 3-6](#). As a MK 16 diver descends, breathing inhalation becomes increasingly difficult on N<sub>2</sub>O<sub>2</sub>, especially at depths over 5 ATAs. The attributes of the MK 16 limit use to inspections, searches, and/or light work requiring a diver to swim against a current of less than 0.85 knots. Typically, light work on a project is associated with light rigging, light lifting without the use of diver's buoyancy compensator, and marking objects on the ocean floor. Since the MK 16 provides limited physical protection, ORM should drive the use when working while objects will be lifted or potentially unstable projects are being approached. The type of bottom may have a significant effect upon a diver's ability to move, work efficiently and safely, and may increase the diver's oxygen consumption. Advance knowledge of bottom conditions is important in selecting the type of work to be accomplished.

## 4A-3 Use in Non-MCM Environments

- 4A-3.1 Communications.** Working and training dives commonly require communication from diver to diver and diver to supervisor. Communications, via line or other means, shall be utilized. The use of voice communications are highly recommended for all dives conducted in Non-EOD environments. Chapter 7, [7-7.5.1](#) provides examples of various systems. The MK 7 Buddy line system is an ancillary piece of equipment to the MK 16 and provides for tended round robin communication. Additional lengths of the MK 7 Buddy line can be purchased from the manufacturer to meet operational depths.
- 4A-3.2 Full Face Mask (FFM).** The FFM provides for the greatest protection of the diver in the event the diver becomes incapacitated due to problems associated with diving related disorders or dive rig malfunctions. Seal Delivery Vehicle

Teams use the FFM in high risk evolutions and have documented cases where the mask was the one item that saved the divers life due to an unconscious state. Use of the FFM is mandatory when diving the MK 16 MOD 1.

- 4A-3.3 Single Untended Diver.** Use of MK 16 MOD 1 in Non-MCM environments does not constitute a real threat; therefore single untended divers shall not be used in search, inspection, and light work operations. The diver(s) shall be surface tended or marked by a buoy.
- 4A-3.4 EBS Deployment.** The depth of a dive can increase the risk of a diver's ability to safely reach the EBS in the event of a rig malfunction. It is recommended to lower the EBS as close to the project site as possible to increase the ability to safely recover divers. This is best accomplished from a two point moor. If circumstances prevent the deployment of the EBS to the project site, the guidance provided in Chapter 18, [18-7.4.1](#) shall be utilized.
- 4A-3.5 Chamber Requirements.** Due to the difficulty in determining the various exertion levels of each diver as associated with workload and the breathing resistance at deeper depths, additional safety concerns arise. In addition to the requirements in Chapter 18, [18-2.3](#), the following chamber requirement shall be adhered to for the following MK 16 MOD 1 dive profile.
- An immediately available recompression chamber is required when planned decompression stops are conducted deeper than 20 fsw.
- 4A-3.6 Diving in Contaminated Water.** Although MK 16 is not designed specifically for diving in contaminated waters, as a rebreather set it does reduce the risk of exposure through exhaust valve reflux and with a FFM it is suitable for diving in Category 3 contaminated water. A thorough ORM analysis should be completed to assess an acceptable level of risk associated with diving in contaminated water and using an UBA. Refer to the technical manual, *Guidance for Diving in Contaminated Waters* (SS521-AJ-PRO-010) for further guidance.

## **MK 16 MOD 1 UBA General Characteristics for Non-MCM Environments**

### **Principle of Operation:**

Self-contained closed-circuit constant ppO<sub>2</sub> system

### **Minimum Equipment:**

1. An approved Life Preserver or Buoyancy Compensator (BC).
2. Dive knife
3. Swim fins
4. Full face mask (FFM)
5. Weight belt (as required)
6. Dive watch or Dive Timer/Depth Gauge (DT/DG) (as required)
7. Depth gauge or DT/DG (as required)

### **Principal Applications:**

1. Search and inspection
2. Light work and recovery

### **Advantages:**

1. Optimum efficiency of gas supply
2. Portability
3. Excellent mobility
4. Communications
5. Modularized assembly
6. Rapid deployment
7. Minimum bottom disturbances

### **Disadvantages:**

1. Extended decompression requirement for bottom times or deep dives.
2. Limited physical and thermal protection
3. Extensive pre-dive/post-dive procedures

### **Restrictions:**

1. Working limit 150 feet, N<sub>2</sub>O<sub>2</sub> (air) diluent; 300 fsw, HeO<sub>2</sub> diluent
2. An immediately available Chamber is required when planned decompression stops are conducted deeper than 20 fsw.

### **Operational Considerations:**

1. Dive team ([Table 18-2](#))
2. Safety boat(s) required
3. MK 16 MOD 1 decompression schedule must be used.
4. Deployment of EBS



**Figure 4A-1.** MK 16 MOD 1 UBA General Characteristics for Non-MCM environments.