

**Officer of the Watch**

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**MCA EOOW Orals**  
**Examination**  
**Revision: Safety**

**1: Explain the procedure for lowering a Lifeboat with Gravity Davits.**

The Lifeboat is held in against a cradle by ropes called gripes and the cradle is secured by pins. With the gripes and securing pins (sometimes known as harbour pins) are removed and released, the winch handbrake can be released to enable the cradle to slide down and over the Ship's side. A "Tricing-in Pennant (wire)" brings the Lifeboat close to the Ship's side to enable it to be boarded. The Bowsing Lines which fasten to each end of the Lifeboat are then used to hold it in to the Ship's side, the "Tricing-in Pennants" then being released. A Painter is then led from the forward end of the Lifeboat and attached somewhere forward of the lifeboat on the ship. Lifeboat plugs are then secured. Once the Crew are on board the Lifeboat the bowsing lines are released and the Lifeboat is lowered to the water. The Engine is started, Falls released and then the Painter.

**2: State the regulations regarding the Emergency Fire Pump.**

The Emergency Fire Pump is to be located remote from the Machinery Space and with Independent Means of Power, which could be a diesel engine or from the Emergency Switchboard.

**3: What checks should be carried out on a Breathing Apparatus Set before entering a smoke filled compartment?**

The following checks should be carried out:

- Ensure the bottle is full,
- Check operation of low pressure whistle, and
- Face seal check should be carried out.

**4: What is the gas analysis after the Scrubber Tower on an Inert Gas System.**

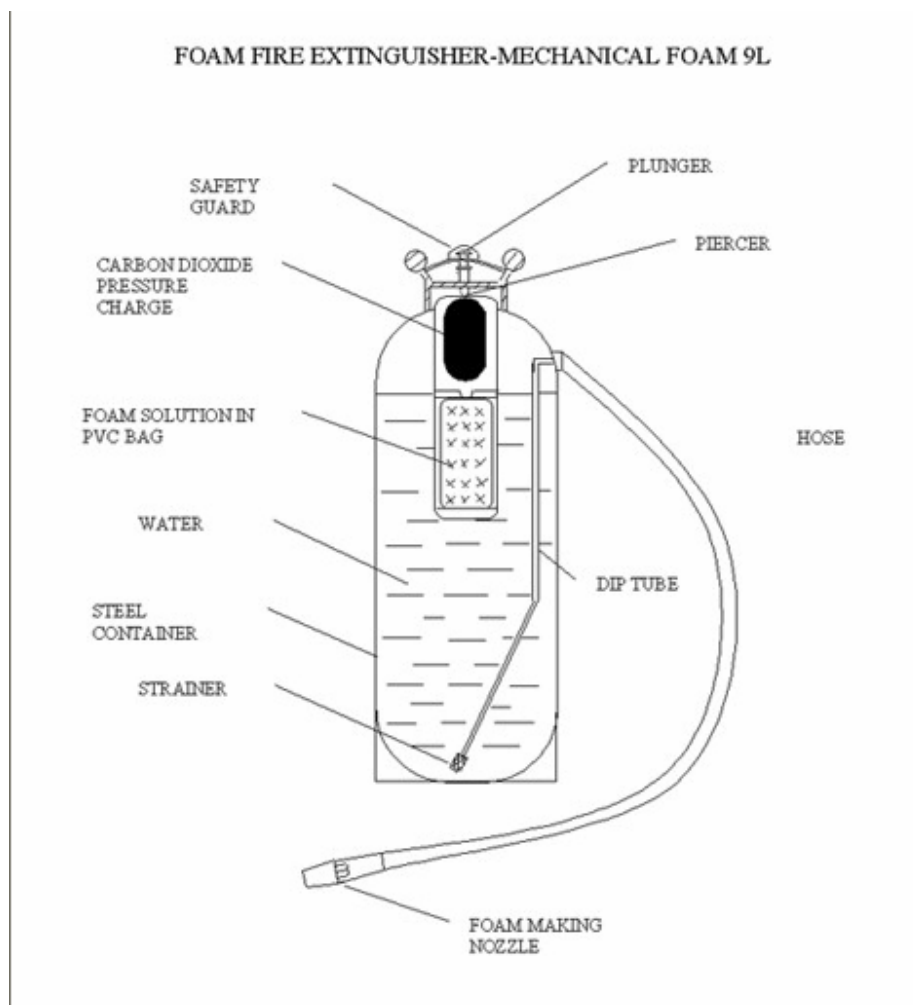
Oxygen: 0-1% (Alarm at 5%)  
Carbon-monoxide: 0  
Carbon Dioxide: 14-15%  
Nitrogen: 85%

**5: What Speed does the Centrifugal Brake on a Lifeboat Winch limit the Speed of Fall of the Lifeboat to?**

The Centrifugal Brake on a Lifeboat will not allow the Lifeboat to fall faster than 36m/min.

**6: Sketch and describe the Chemical Foam type of Extinguisher.**

The main container is filled with sodium bicarbonate solution and a long inner polythene container is filled with aluminium sulphate. The inner container is sealed by a cap, held in place by a plunger. When the plunger is unlocked by turning it, the cap is released. The extinguisher is then inverted for the two liquids to mix. Carbon dioxide is produced by the reaction, which pressurises the container and forces out the foam.



**7: With regards CO2 Extinguishers, what testing and maintenance is carried out?**

Being a pressure vessel, the CO2 Extinguisher is initially tested to 207 bar and after every ten years and after two such tests, every five years. Carbon Dioxide Extinguishers should also be weighed every six months to check for leakage.

**8: What is a good practice before using a Dry Powder Extinguisher?**

It is good practice to give a Dry Powder Extinguisher a shake before use, as the Extinguisher could have been lying for a while causing the powder to clog up.

**9: Where would you expect to find a Dry Powder Extinguisher?**

It is usually located near Electrical Equipment in the Machinery Space and elsewhere on the Ship.

**10: What should be used with Breathing Apparatus Sets when entering a Space or Compartment?**

A BA Control board should be used. This board will normally have a built in clock. On this board the time the wearer enters a space is noted, plus bottle number and pressure, the time the wearer is due out is calculated as the time the low-pressure whistle operates at. This gives the wearer time to exit.

**11: What pumps in the Engine Room would supply the Fire Main?**

As well as the Main Fire Pump, several pumps are arranged to supply the Fire Main, their number and capacity set by legislation (MCA for UK registered Ships). These pumps are normally: ballast pumps, general service pumps.

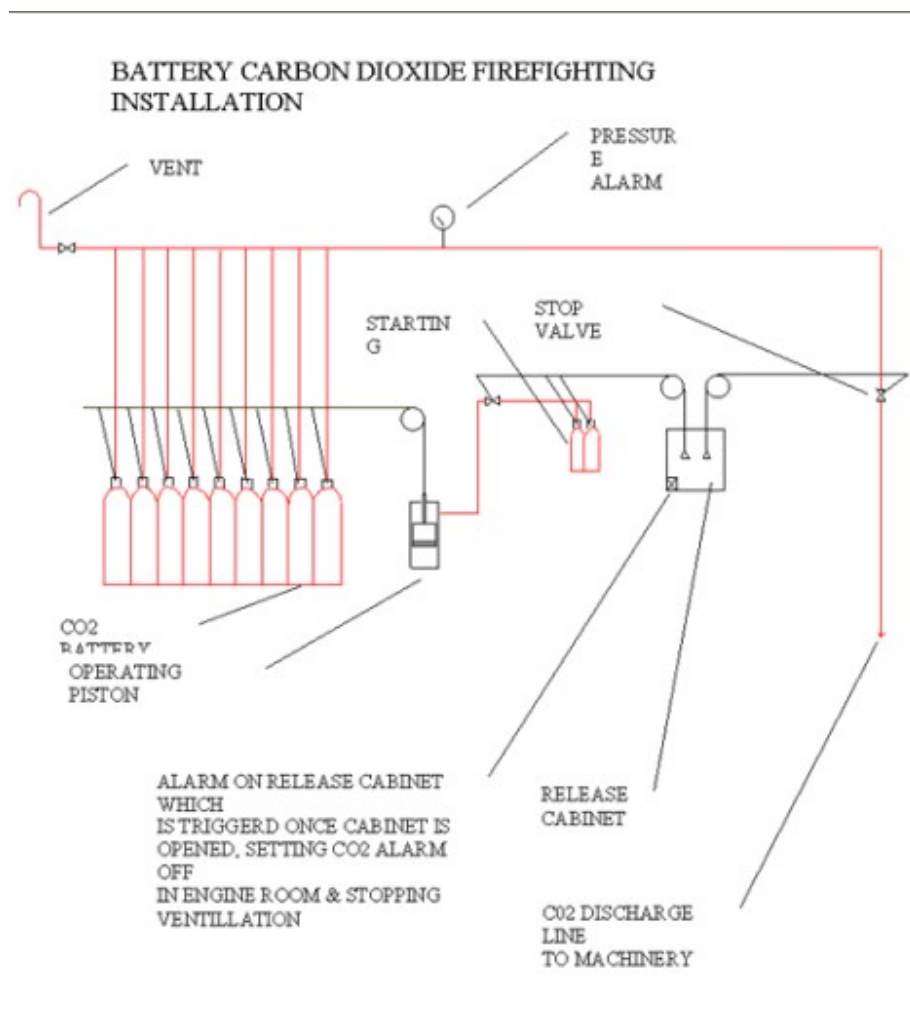
**12: What is the duration and range of a 136L Trolley Foam Extinguisher?**

The duration of a 136L Foam Trolley Extinguisher is 15 minutes approximately with a range of around 18m

**13: Sketch and describe the Battery CO2 System.**

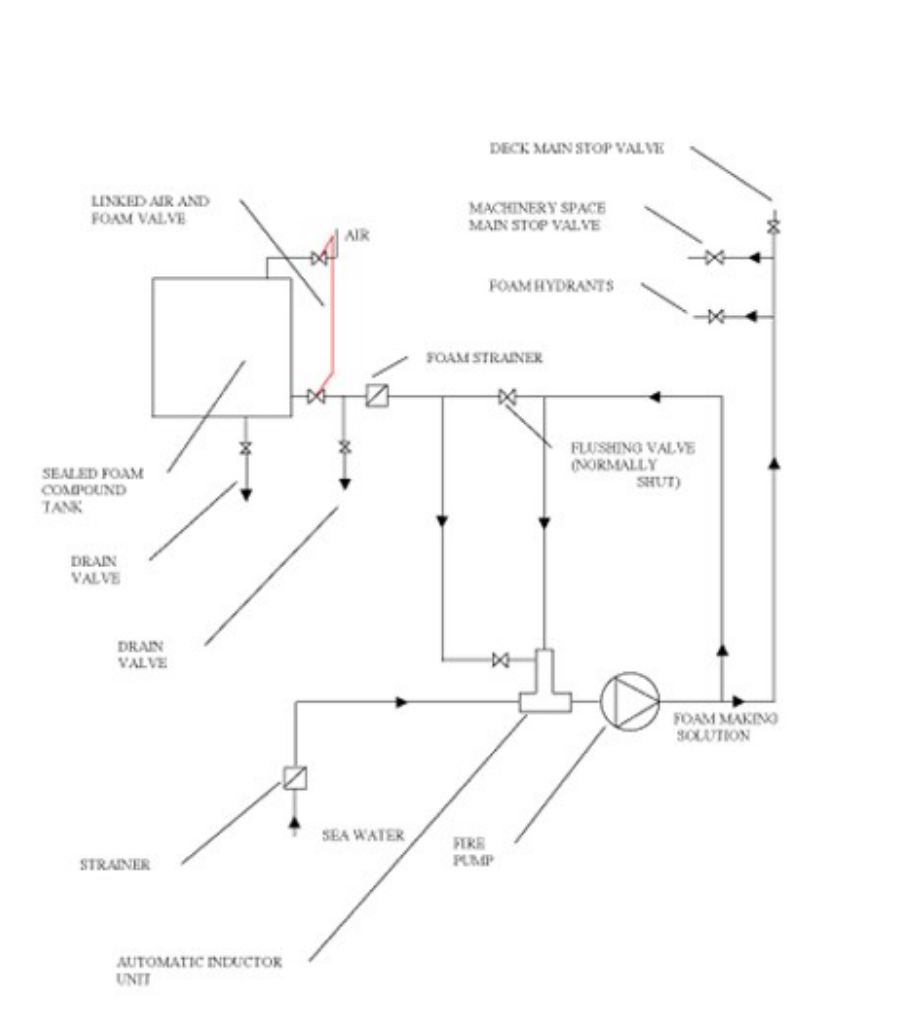
The above system shows a Battery CO2 System for a Machinery Space. On opening the release cabinet, this will sound the alarm in the Engine Room, warning personnel that release is imminent and that they should vacate the Engine Room. Opening of the cabinet will also stop ventilation. Before release of CO2, a head count must be done to see all personnel are accounted for and the Machinery Space must be sealed.

When the operating handle is pulled, this opens a set of CO2 starting bottles, which in turn supply CO2 to an operating piston via a safety valve. The piston in turn allows the battery of CO2 bottles to be released to the Engine Room. This is known as a "One Shot" method.



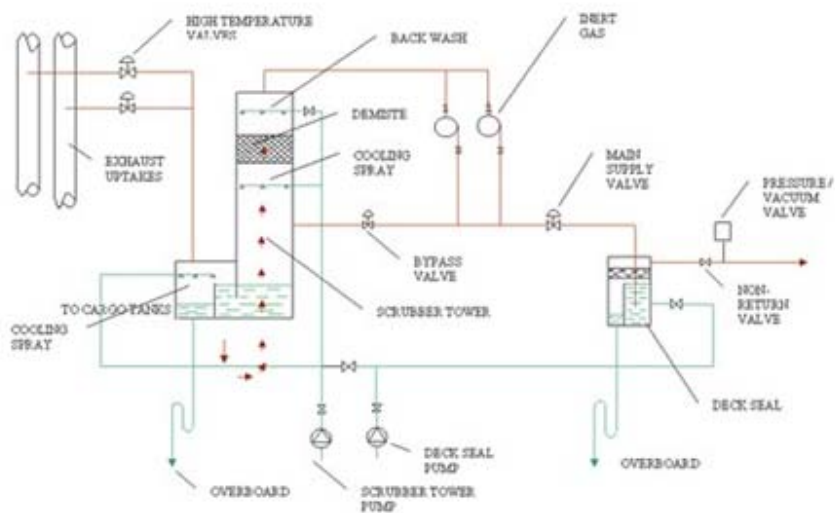
**14: Sketch and explain a Foam Fire-fighting Installation.**

Here an Automatic Foam Induction System is shown. The Automatic Inductor Unit ensures the correct mixing of Water and Foam compound which is then pumped to hydrants, deck or machinery space for use. The foam compound tank is sealed to protect the contents from deterioration and has linked compound supply and air vent valves. To operate the system, these two linked valves are opened and the Fire Pump started. Foam mixing is carefully metered by the automatic inductor unit. The Fire Pump and compound tank must be located outside the protected space.



**15: Explain and sketch a Funnel Inert Gas System.**

In a Boiler Funnel Inert Gas System, exhaust gas is taken from the Boiler Uptakes and passed through a scrubber tower where the gas is cleaned with sulphur and excess carbon being removed. The Gas which by then is considered inert and mainly contains Nitrogen and Carbon Dioxide with less than 5% Oxygen, is then supplied via blowers and deck seal which acts as a non-return valve, along deck pipes to cargo banks. The inert gas being used to blanket the oil cargo during discharging operations. Empty tanks are filled with gas and the inert gas is blown out when oil is loaded.





**16: Why are CO2 Extinguishers not permitted in the accommodation.**

Because if used in a confined space, it could be lethal.

**17: Describe a Self-Contained Breathing Apparatus Set.**

The Self-contained Breathing Apparatus Set usually consists of one or two cylinders of compressed air kept in a harness, which is carried on the back. Cylinders usually being charged to a pressure of around 200-240 bar. The high pressure air is fed through a reducing valve and then to a demand valve, which can be set in positive pressure mode, that will supply a constant demand of air, or in demand mode, which will only supply air as the wearer demands. A non-return valve permits breathing out to atmosphere. The set incorporates a warning whistle that sounds on low air pressure. A standard cylinder will allow for about 20-25 minutes operation, but this will also depend on a few factors, such as workload of wearer.

**18: How much foam is produced from a 9L Foam Extinguisher?**

72 litres of Foam.

**19: What is the Bilge Injection Valve?**

The Bilge Injection is a valve that enables the Engine Room Bilges to be pumped out directly overboard in the event of an emergency such as flooding. The valve is normally fitted to the end of a branch connection with the main sea-water suction line. This enables large main sea-water cooling pumps to be used as a bilge pump in an emergency.

**20: Why is an Alarm Sounded when CO2 is released into the Engine Room?**

An Alarm is sounded to inform personnel in the Engine Room that the release of CO2 is imminent. The type of Alarm will be visual and sound different from Engine Room Alarm and General Alarm. CO2 can not support Life.

**21: What are the dangers of excessive lubrication in Start Air Compressors?**

There is a danger that excessive cylinder lubrication in Start Air Compressors could lead to explosions in Air Start Lines/Manifolds. Excessive lubrication can lead to carry over with compressed air, being deposited in the Receiver then transferred to the Air Start Manifold, where a leaking Air Start Valve may allow hot gases from combustion into the Air Start Manifold, ignite the oil vapour, causing an explosion.

**22: Describe an Inert Gas Generator**

The Inert Gas Generator burns fuel in designed quantities to produce perfect combustion. This produces an exhaust gas, which is largely nitrogen and carbon dioxide with a very small oxygen content. The exhaust gases pass to a cooling and washing chamber to remove sulphur and excess carbon. The washed or scrubbed gas is now inert and passes to a distribution system for Fire Fighting. The complete unit is arranged to be independently operated in order to supply inert gas for as long as the fuel supply lasts. On tankers the inert gas can be supplied and used to blanket the oil cargo during discharging operations. Empty tanks are filled with gas and inert gas is blown out when oil is loaded.

**23: What Safety Equipment should there be at a Bunker Station?**

Safety Equipment that should be found at a Bunker Manifold are a Foam Fire Extinguisher, Oil Spill Gear such as Spill Absorbent and there should also be communications of some sort.

**24: What are the Four Principle Types of Portable Fire Extinguishers found on board ships?**

Water/Soda acid type extinguishers  
Foam extinguishers  
Dry powder type extinguishers  
Carbon dioxide extinguishers.

**25: What action would you take in the event of Fire breaking out in the Machinery Space?**

If a Fire breaks out, the alarm should be raised and the Bridge informed immediately. If the Ship is in Port, the Local Fire Authority should be called. If possible, an attempt should be made to extinguish or limit the fire by any means possible (a Fire in its first few minutes can usually be readily extinguished). Ventilation fans should be stopped (should stop automatically on activation of fire alarm). Openings to the space should be sealed to reduce the supply of air to the fire and to prevent it spreading. Any fuel lines feeding the fire or threatened by it should be isolated. If practicable, combustible materials adjacent to the Fire should be removed. After the Fire has been extinguished, precautions should be taken against spontaneous re-ignition. Personnel, unless wearing breathing apparatus, should not re-enter a space in which a fire has occurred before it has been fully ventilated.

**26: What does AFFF stand for and where would you use this type of Extinguisher?**

AFFF stands for: Aqueous Film Forming Foam.

This would be used on Class B Fires, fires burning liquids such as lubricating oils and fuels.

**27: What action would you take if you spotted oil in the Gauge Glass of a Boiler?**

- The action to be taken would be to scum the boiler and blow down the gauge glass. Then the source of contamination investigated and stopped.
- If the oil contamination is excessive, then alternative heating source must be found for engine fuel, if running on heavy or change over onto diesel.
- The boiler should then be shut down, allowed to cool and vent.
- The top door of the drum should then be removed and the oil overflowed from the drum.
- Ideally the boiler should be degreased before re-using.
- Source of contamination must be found and remedied.

**28: The Main Engine Cylinder Lubricating Oil Tank is empty, oil drums are on the Main Deck beside run down Pipes to the Tank and air is handy - What do you do?**

If need be, the engine should be stopped to allow filling of the tank. Under no circumstances should you use the air hose to pressurise the drums to speed up the process. Oil drums are not a pressure vessel and it could lead to a fatality.

**29: In the occurrence of an Oil Spill, what do you do?**

Stop the flow of oil. If possible contain the spill on Deck and start clean up procedure using appropriate oil spill equipment and raise the alarm. There will be a set Drill for Oil Spill Procedure. If the oil has spilt into the Sea, if in Port, the Port Authorities must be informed, if at Sea, the Coastguard must be informed. The time, place or position, type of oil and approximate quantity must be recorded in the Engine Room Log, Bridge Log and Oil Record Book. Circumstances of spill must also be recorded.

**30: How is the Bilge Injection Valve brought into Operation?**

To bring the Bilge Injection Valve into operation during an Emergency, the Valve is opened fully and the Sea Injection or Suction Valve is fully closed. After it is established the Bilge Injection Valve is capable of lowering the water level in the Engine Room, the Sea-water Injection Valve or Suction Valve may be opened slowly. This should be done

in stages so that the Tank Tops are not pumped dry, as this would cause the sea water pump to lose suction.

**31: Fires are classified according to the types of material, which are acting as the source, what are these Classifications?**

- Class A - Fires burning wood, glass fibre, upholstery and furnishings
- Class B - Fires burning liquids such as lubricating oil and fuels
- Class C - Fires burning gas fuels such as liquefied petroleum
- Class D - Fires burning combustible metals such as magnesium and aluminium
- Class E - Fires burning any of the above materials together with high voltage electricity.

**32: What is the purpose of the Deck Seal on an Inert Gas System?**

The purpose of the Deck Seal is to act as a non-return valve and prevent the back flow of gases, i.e. hazardous to non-hazardous.

**33: What is the procedure for entering an enclosed space?**

An enclosed space entry permit is required which can only be obtained with the permission of a responsible officer. This permit will list the conditions to be met before entry.

The space should be well ventilated before entry takes place; Before entry, oxygen levels must be checked using an O<sub>2</sub> Meter.

Another person should remain at the entrance while the person is in the space, to summon assistance if necessary and there should also be means of communications arranged between the person within the space and the attendant.

Lifelines and harnesses should be available at the entrance to the space.

If the occupant appears to be in danger, the attendant should first raise the alarm, but should not enter the space unless equipped with breathing apparatus.

**34: What is, and where would you find, the International Shore Connection?**

This is a standard size Flange which is fitted with a suitable coupling suitable for the Ships Fire Hoses. The Flange is slotted in order to fit any shore side Fire Main and enable water to be brought on board Ship lying alongside. Located port and Stbd of accommodation on main deck.



**35: What survival equipment would you expect to find in a Lifeboat?**

Survival equipment would include oars, a boathook, a compass, distress rockets, first aid equipment, rations and fresh water.

**36: What is Boundary Cooling and the reasons for it?**

It should be remembered that a Fire exists in three dimensions and therefore has six sides, therefore can be transmitted through bulkheads due to radiant heat, i.e. causing combustible materials in adjacent compartments to catch Fire. Therefore, this radiant heat is prevented by Boundary Cooling of all sides of the compartment on fire, using water spray hoses.

**37: What oxygen levels would you regard as safe to enter an enclosed space?**

20% or above.

**38: What is "Water Hammer" and its danger?**

When steam lines are shut down it is possible from various causes for them to fill with water. If steam is allowed to enter a line with water, the steam starts to move the water down the line. The steam in contact with the water eventually condenses and a vacuum is formed causing the water to be pulled back to the valve which has just been opened and striking it with a heavy blow, often fracturing the valve. If the valve fractures, it may end disastrously with risk of loss of life.

**39: Why should the boiler not be blown down on finding oil contamination?**

The boiler should not be blown down, as this will cover all heating surfaces with oil i.e. insulating the tubes, heating surfaces.

**40: What is regarded as an enclosed space?**

An enclosed space is a space that cannot be assumed to contain oxygen. These are spaces such as a duct keel, a double bottom tank, a cofferdam, boiler, etc.