



U.S. Department of Homeland Security

United States Coast Guard

Marine Safety, Security and Environmental Protection

ENVIRONMENTAL PROTECTION - IMPROVING EQUIPMENT PERFORMANCE

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Recently in various ports of the United States, the US Coast Guard and other state and federal agencies discovered instances of improperly operated oily water separation equipment. In some cases, piped and hose bypasses were identified and in others, evidence of ineffective operation was indicated. The flushing of an oil content monitor's sensors with clean water to trick the oily water separator's control system to allow unmeasured and uncontrolled discharges overboard has also occurred.

Currently, the US Coast Guard's Oily Water Separations Systems Task Force (OWSSTF) is examining a wide range of issues related to the machinery and equipment used to manage oily bilge water on commercial vessels. Several years ago the International Maritime Organization (IMO) issued Marine Environment Protection Committee Circular (MEPC) 289 that vessel owners and operators may find helpful in understanding and solving operational problems associated with oily water separation equipment.

The MEPC circular recognizes that often oily water separation equipment problems are caused by emulsions resulting from cleaning chemicals and by fouled bilges. Effective maintenance of all equipment, systems and components capable of leaking petroleum products into the bilges is essential to ensuring successful operation of oily water separation equipment. Oily water separators are not designed to compensate for inadequately maintained engineering systems and work best when processing minimum amounts of oil.

The text of MEPC Circular 289 follows. Its information may be particularly useful to vessel crew members and further dissemination is encouraged.

Information on Cleansing Agents for use in Machinery Spaces of Ships.

1. OPERATIONAL PROCEDURES

Research and reports from Administrations have revealed that failure of oil filtering equipment to perform effectively is mainly caused by improper use of cleansing agents and unfamiliarity with proper operation of the oil filtering equipment, especially when cleansing agents, heavy fuel oil and lubricating

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oil form part of the oil water bilge mixture to be filtered.

Shipowners and ship operators should ensure that an operation manual is on board, and that the crew members are given an opportunity to study this manual and practice with the equipment to become fully conversant with it.

It is essential for the proper use of the equipment that crew members have a good understanding of both its working principles and its operation.

Administrations may require crew members responsible for the oil filtering equipment to demonstrate their ability and knowledge of its operation.

The oil filtering equipment will perform best while processing bilge water with a low level of oil content. Reducing the oil content of bilge water not only improves the effectiveness of oil filtering equipment but also improves economy and reduces fire hazards.

There are a number of ways to reduce the amount of oil which finds its way into the bilge.

- leaking oil pipes, couplings, etc. should be repaired without delay;
- water from oil tanks should be drained into a waste oil tank;
- waste oil from cleaning or other activities should be drained into a waste oil tank;
- machinery which is likely to leak oil should be fitted with drip trays which can be drained to a waste oil tank; and
- cleaning of floor plates, engines, etc., with oil products should be minimized.

It is important that machinery spaces be kept clean. The use of cleansing agents is one of the primary means of achieving this, and it is realized that most cleansing agents eventually end up in the bilge.

However, many of the cleaning products cause oily-water mixtures to emulsify. Unfortunately, these emulsions have an adverse effect on the performance of oil filtering equipment.

Emulsions should be broken or separated before the mixture is pumped into the filtering equipment. It should also be realized that after separation the emulsion may reform when the mixture is stirred, for instance by a centrifugal type pump that may be used to pump the bilge water to the oil filtering equipment.

To avoid problems caused by emulsions, use the cleansing agents which are recommended by the manufacturer of the oil filtering equipment or which pass the emulsion separation test described in section 3.

Different cleansing agents are used for different cleaning purposes. It is important to read the label or product data sheet prior to selecting a cleansing agent appropriate for the job. Where label information is inadequate to determine the effects on the cleansing agent of the oil filtering equipment, the emulsion separation test in section 3 should be conducted before allowing the cleansing agent to drain into the bilge.

Care should be taken to avoid draining different types of cleansing agents into the bilge at the same time. Otherwise, emulsions may be formed which may even be permanent.

2. PROPERTIES OF CLEANING PRODUCTS

Some cleansing agents already on the market claim not to effect oil filtering equipment. They either do not produce an emulsion, or they have the ability to break the emulsion a short time after it is formed; these products are called Quick-Separating Detergents (QSDs).

There are many different types of cleansing agents. The two principal types are QSDs and emulsifying detergents.

QSDs work by penetrating between the surface and the adhering grease and oil, and after using, any emulsion formed by the cleaning action is quickly broken down. QSDs should generally be used for cleaning machinery spaces.

Other kinds of cleansing agents are emulsifying detergents. The grease and oil is broken up into fine droplets which form an emulsion that can be quite stable. As most hand washing lotions or gels belong to this type, special care should be taken when using these products.

When a QSD is mixed with only a small amount of emulsifying detergent, as for instance a hand cleaner, small water droplets will be formed and these are likely to be taken up by the oil. This may well result in a stable mixture looking like a mayonnaise, which will effectively block the oil filtering equipment.

Furthermore, caution should be taken when using hydrocarbon solvent-based QSDs since they may affect the performance of the 15ppm bilge alarm.

Most household types of cleansing agents are emulsifying detergents and should preferably not be used in machinery spaces: not even in the smallest quantities. However, if this is unavoidable, arrangements should be made to prevent the effluent from draining into the bilge; for example, hand wash

basins in machinery spaces should have a permanent drain connection to a dirty water tank.

Emulsifying detergents should not be allowed to drain into the bilge or machinery spaces.

3. EMULSION SEPARATION TEST

A simple method to check if the separation time of an emulsion is acceptable can be carried out as follows:

- fill two bottles of approximately 0.5 liters in size about 60% full of clean fresh water,
- add approximately 10% of oil, preferably fuel oil to both bottles,
- to one bottle only add 2%, or an amount specified by the cleansing agent manufacturer, of the cleansing agent to be tested,
- shake both bottles well by hand for approximately one minute,
- let both bottles stand,
- the bottle without cleansing agent should show clear water underneath the oil within a relatively short time,
- the other bottle will need more time for separation; the time needed for this bottle is the so-called separation time which should be less than one hour. At the end of the separation time, the mixture of this bottle should have water with light turbidity at least over half of the height of the bottle.

The purpose of the bottle with only water and oil is to see if the oil will separate from the water; if this should not be the case, the test is invalid because the effect of the cleansing agent cannot be determined.

4. SAFETY ASPECTS

When applying cleansing agents it should always be kept in mind that they might contain certain chemicals which are hazardous to human health and may cause acute or chronic intoxication. In addition, some cleansing agents are flammable liquids although in general the flash point is rather high. Therefore, it is important to follow the manufacturers' instructions for its storage, application and precautions to be taken.

Some Administrations have issued special safety regulations or guidelines with respect to the composition and use of cleansing agents. These requirements may deal with the storage of cleansing agents, marking of receptacles, provision of data sheets, operating instructions and special personal protection equipment and should be carefully observed.

For safety reasons cleansing agents used on board should:

- have a flash point above 61 degrees C; and
- not contain Benzene, Tetrachloromethane, Tetrachloroethane, Pentachloroethane or chemicals with a comparable toxicity.

When applying cleansing agents, contact with skin and respiration of vapors should be minimized. If possible, work should be done at well-ventilated places. Never leave receptacles open at the work place. Extensive cleaning may require the use of filter-type respiratory protection.

Before starting work, eyes should always be protected by chloroprene goggles. In addition, barrier creams against skin defatting effects should be used and gloves and protective clothing should be worn.

It is recommended not to use high pressure spray equipment to apply cleansing agents.

This information does not relieve any foreign, domestic or international environmental requirement and is provided for informational purposes only.

RELEASED BY - Oily Water Separation Systems Task Force, USCG Headquarters. Questions or comments related to this information or its delivery may be addressed to Mr. Ken Olsen at 202.267.1417 or kolsen@comdt.uscg.mil.

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