

SUB-COMMITTEE ON SHIP SYSTEMS AND
EQUIPMENT
11th session
Agenda item 7

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**REVIEW AND UPDATE OF THE CODE OF PRACTICE FOR ATMOSPHERIC OIL MIST
DETECTORS (MSC.1/CIRC.1086)**

**Proposal of a basic document for discussing the output to "Review and update of the
Code of practice for atmospheric oil mist detectors (MSC/Circ.1086)".**

Submitted by Denmark, Germany and CESA

SUMMARY

Executive summary: This document proposes a base document for the discussion of the output to "Review and update of the Code of practice for atmospheric oil mist detectors (MSC.1/Circ.1086)"

Strategic direction, if applicable: 5

Output: 5.11

Action to be taken: Paragraph 7

Related documents: MSC 107/17/13 and SSE 10/17/4

Background

1 Following the request from Denmark, Germany and CESA in document SSE 10/17/4, SSE 10 agreed to include the new output on "Review and update of the Code of practice for atmospheric oil mist detectors (MSC.1/Circ.1086)" to the provisional agenda for this session.

2 Document MSC 107/17/3 (Denmark et al.) describes that fires on board ships are often caused or exacerbated by oil leaks in engine rooms. The emitted oil evaporates into the air, in many cases undetectable to the seafarers. At a certain point, it becomes a fire risk when the level of oil content reaches a saturation level and the oil may be ignited due to the heated surfaces in the engine room.

Discussion

3 The co-sponsors highlighted in document MSC 107/17/13 that the *Code of practice for atmospheric oil mist detectors* (MSC.1/Circ.1086) was developed based on the available technologies at the time and that the Code did not fully reflect the current principles and technologies available today, which can provide detection of airborne oil mist or releases over the whole spectrum from a few particles of vapour to higher levels in the form of mist and airborne drops. The co-sponsors also articulated that an updated Code for the performance and operation of atmospheric based oil leakage detectors, would provide a consistent and reliable foundation as to what could be expected from these systems, as well as the installation, training and operation of such systems.

4 The co-sponsors of document MSC 107/17/13 also argued that MSC.1/Circ.1086 was outdated due to the technological development, as mist detection systems, today, can continuously monitor the machinery space atmosphere, thereby giving early warning of a dangerous onset of oil mist accumulation in the engine room, thereby warning the crew of the situation and possibly preventing a dangerous situation from occurring.

5 In document MSC 107/17/13, the co-sponsors estimate that the work needed for reviewing and updating the Code will need two sessions to complete.

Proposal

6 Taking into account the workload of the Sub-Committee, the co-sponsors propose to start the discussion based on the draft revision of MSC.1/Circ.1086, as set out in the annex.

Action requested by the Sub-Committee

7 The Sub-Committee is invited to consider the proposal in paragraph 6 and the annex, and to take action, as appropriate.

ANNEX¹

DRAFT REVISED CODE OF PRACTICE FOR ATMOSPHERIC OIL [VAPOURS AND DROPLETS/LEAKAGE] / [MIST AND FUEL RELEASE] DETECTORS (REVISION OF MSC/CIRC.1086)

1 Fire caused by the presence of oil spray/mist, vaporised fuel or gaseous fuel in an enclosed space would not be possible if no release occurs, however, this has shown to be practically impossible. Besides, the use of conventional fuels, also mixtures of such and low- or zero-carbon fuels will, in the near future, be in use. With these multiple fuel combinations, it is more difficult to foresee the risks at hand and make preventive design measures accordingly, making it more essential to have an additional fire preventive measure in form of detection systems in place.

In an ideal world, the simple solution for preventing oil mist fires is to ensure no leaks occur in the first instance, but the harsh reality is that oil mist fires do occur and the problem needs to be addressed. One practical answer is to install an oil mist detection system that will detect an oil mist before it can reach levels where it saturates the atmosphere to such an extent that there is a risk of fire

2 It is generally accepted that oil or fuel releases can form in ~~can be formed in one of two ways:~~ can form a hazardous atmosphere when present in the form as:

- ~~1 minute leaks in oil lines which, under pressure, produce a very fine atomised spray; or~~
- ~~.2 oil, when allowed to come into contact with a hot surface, will boil off producing a fine vapour.~~

.1 atomized spray/mist;

.2 direct gas release; or

.3 vaporized liquid fuel.

3 ~~In the first instance, the d~~ Danger occurs when the concentration of oil or fuel reaches the explosion limit. It should be noted that the ~~particle size formed is between 3 to 10 microns and is allowed to form a mist in the atmosphere. When oil vapour reaches the range of flammability, the condition can be classed as truly hazardous and, if no action is taken, a fire may result. The~~ ignition or auto ignition temperature for oil or fuel mist or fine atomized spray this type of oil mist can be extremely low depending on the type of oil or fuel being released atomized.

4 ~~Oil mists generated by being boiled off can produce particles between 3 to 10 microns. This mist is visible and is known as a blue smoke. Temperature and area of surface contact affect the rate of oil mist generation. At this stage, a temperature as low as 150°C could result in ignition.~~

4.5 Sources of oil mists releases are not only from the piping system but also include pump seals, leaking injectors; loose or incorrectly fitted pipe fittings, flexible connections between ship and engine, weld fractures and poor maintenance of machinery.

¹ The annex is provided in English only and modifications are shown in grey shading.

6 Possible ignition heat sources causing the ignition includes heat exchangers, exhaust pipes, turbocharger, electrical contacts, static electricity, faulty wiring and high- and low-pressure turbines. When using premixed fuels, such as biofuel, and other alternative fuels, such as methanol, it might be difficult to predict the nature of which it will be released also depending on where in the fuel system the release occurs. It should, furthermore, be noted that released low-flashpoint fuels could ignite even without the presence of a hot surface.

7 Types [examples] of detection systems [methods]:

- .1 single sampling units; and
- .2 multiple sampling systems.
 - .1 an oil spray detection;
 - .2 opacity measurements;
 - .3 sampling, single sampling point or multiple sampling points;
 - .4 gas level measurements;
 - .5 a combination of technologies mentioned above; or
 - .6 other proven technology.

8 Location of detectors and sampling lines

8.1 In each case, the number of detectors or sampling points to be used is dependent on the size and layout of the particular application. For a single point application, the unit may be mounted next to the application or connected via a sampling line. Multiple sampling systems are fitted in a suitable location away from the application. Sample lines are fed to a common manifold with a suitable control unit to allow alternative samples to be taken from continuously flowing sample streams, thus one unit can be utilised to monitor several points. The oil mist may be drawn into the unit by its own built in fan or by an independent blower.

8.2 To determine suitable positions for mounting detectors or for fitting sampling lines, a smoke test [a survey] would should be required to verify air movements in relation to application. In general, air will move towards ventilation extractors and turbochargers, so any detector or sampling line should be positioned as close as possible to the machinery. Likewise, detectors or sampling lines should not be sighted next to ventilation blowers as these will prevent mist formation from being drawn into the unit. On installation, if a smoke test is used it should be under normal operation condition. should be carried out with all engines, ventilation and machinery fully operational to ensure that detectors/sampling lines are correctly positioned.

8.3 If detector units are to be located close to the source of application, care should be taken to ensure that the detector unit is suitable for excessive vibration, high temperature, risk of avoid locating the unit in places where: vibration is excessive; extremes of temperature may be experienced; it would be difficult for maintenance personnel to gain access; high levels of humidity and water may occur; and there is a risk of electromagnetic interference, high levels of humidity and water which may occur. It has to be considered that maintenance can be carried out in a safe manner in the position, in which the detectors is mounted.;

8.4 Locating of any equipment detector in an explosive atmosphere should not be undertaken unless the equipment unit is certified intrinsically safe for the hazard area.

9 Setting alarm levels

9.1 ~~This may be determined by the requirements of the alarm setting level end user.~~ The end user ~~be~~ determined by the requirements of the alarm setting level end user. In general, there are likely to be two stages: first an early warning that something is wrong; and then a secondary alarm indicating a full alarm., but one stage may suffice. These The alarm given should be advisory and the monitor should be able to define the areas where or fuel release oil mist has been detected. In certain circumstances, alarms may be used to shut down individual sections of the plant if deemed necessary, but there should be an overriding control.

9.2 The alarm level set initially should take into account the atmospheric condition when there is no problem, for example there is always a small amount of hHydrocarbon fumes mist generated within an oil purifier room. The initial level set will change with each application, but should not reach an explosive level for the specific oil or fuel, used in the application. ~~exceed concentrations of greater than 2 ppm atmospheric oil content.~~ For oil, the concentration should not exceed 2 ppm, for fuel or fuel mixtures levels must calculated based on the operational properties. Alarms should be activated as the concentration reaches a ~~levels will be indicated as the level rises to certain preset percentages of this set value.~~

10 Test procedure

10.1 ~~As with most electronic equipment, units~~ The equipment should have built-in calibration possibilities to verify and correct measurements ~~be fixed by the components used in the design stage and have built-in calibration routines to correct slight deviations.~~

10.2 The manufacturer should calibrate the detector against a known oil fuel or fuel mixture release mist measurement². ~~No adjustment to the e~~ Calibration may be done by the user in accordance with the manufacturer's instructions ~~should be possible by the user. It is not satisfactory to set up a system against an electronic procedure or a piece of filter glass. If deemed necessary, a calibration certificate should be issued.~~

10.3 The equipment should, as a minimum, comply with standards acceptable to the Organization.

11 Maintenance

11.1 ~~There is very little maintenance which can be carried out on the units in relation to the electronic components. The main areas which will require attention are in line filters either in the sample line or within the unit itself. These will require either cleaning or replacement depending on the type, and recommendations of the detector manufacturer. Sensor faces will also require cleaning periodically with approved cleaner to clean any oil film build up. Some detectors may have built-in fault diagnostic circuitry which will give an indication that cleaning is required or that filters need attention due to fall off in flow. Maintenance should be done in accordance with the manufacturer's instructions.~~

11.2 Some detection equipment may have built-in fault diagnostic circuitry or software which will give an indication that cleaning is required or that the equipment needs other attention.

² ISO 16437:2012 or similar.