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# CODE OF PRACTICE FOR ATMOSPHERIC OIL MIST DETECTORS

1 The Maritime Safety Committee, at its seventy-seventh session (28 May to 6 June 2003), taking into account that most engine-room fires are the result of the formation of oil mist, that sectors within the shipping industry have been actively fitting oil mist detection equipment and following the recommendation of the forty-seventh session of the Sub-Committee on Fire Protection, approved a Code of practice for atmospheric oil mist detectors set out in the annex.

2 Member Governments are invited to bring the attached Code of practice to the attention of shipbuilders, shipowners, ship operators, shipmasters and other parties concerned with the manufacture and installation of oil mist detectors.

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## ANNEX

## CODE OF PRACTICE FOR ATMOSPHERIC OIL MIST DETECTORS

1 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 mist can be formed in one of two ways:

.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.

3 In the first instance, the danger occurs when 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 temperature for this type of oil mist can be extremely low depending on the type of oil being atomised.

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.

5 Sources of oil mist include pump seals, leaking injectors; loose or incorrectly fitted pipe fittings, weld fractures and poor maintenance of machinery.

6 Possible heat sources causing the ignition include heat exchangers, exhaust pipes, turbocharger, electrical contacts, static electricity, faulty wiring and high- and low-pressure turbines.

7 Types of detection systems:

.1 single sampling units; and

.2 multiple sampling systems.

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 would be required to verify air movements in relation to application. In general, air will move towards ventilation extractors and turbo chargers, 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, a smoke test 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 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.

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

9 Setting alarm levels

9.1 This may be determined by the requirements of the 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. These should be advisory and the monitor should be able to define the areas where 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 mist generated within an oil purifier room. The initial level set will change with each application, but should not exceed concentrations of greater than 2 ppm atmospheric oil content. Alarm 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 should 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 mist measurement. No adjustment to the calibration 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.

11 Maintenance

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.