

THE ENGINEERING EQUIPMENT AND MATERIALS USERS ASSOCIATION

RECOMMENDATIONS FOR THE PROTECTION OF DIESEL ENGINES FOR USE IN ZONE 2 HAZARDOUS AREAS

PUBLICATION No. 107 (1992)

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RECOMMENDATIONS FOR THE PROTECTION OF
DIESEL ENGINES FOR USE IN ZONE 2
HAZARDOUS AREAS

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11th May 1994

To: All Recipients and Holders of EEMUA Publication No.107 (1992)

RECOMMENDATIONS FOR THE PROTECTION OF DIESEL ENGINES FOR USE IN ZONE 2 HAZARDOUS AREAS

Recent developments have indicated that it is necessary to amend section 6.1 (General) on page 15 of the above document as detailed below:

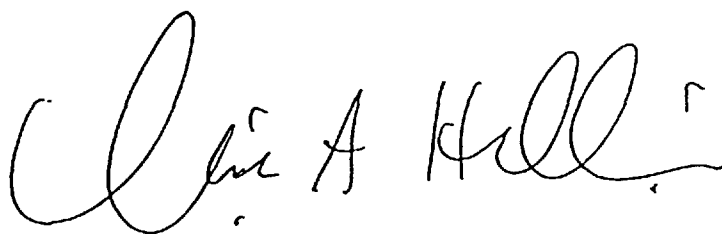
- 1 Substitute the following for the first paragraph:

Protection against ignition by hot surfaces shall be provided while the engine is running and following a shutdown. The maximum permissible surface temperature shall be the auto-ignition temperature of the explosive atmosphere

- 2 Delete the second paragraph and Figure 1

Consequently, in Paragraph B.2.3 (b) on page 39, "figure 3" should be amended to "figure 1"; and on page 40, the title of the figure should be amended to "Figure 1"

Please amend your copy of Publication 107 accordingly as soon as possible



Chris A Hutchins
Technical Secretary, on behalf of the EEMUA Machinery committee

May 94

A:amd.107

Document 5067-95

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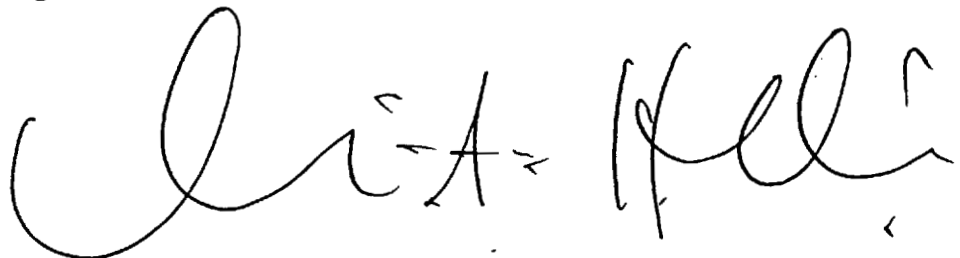
Date: 23 June 1995

To: All Recipients and Holders of EEMUA Publication No.107 (1992)**RECOMMENDATIONS FOR THE PROTECTION OF DIESEL ENGINES
FOR USE IN ZONE 2 HAZARDOUS AREAS**

Further to our letter of 11 May 94 (Doc. 3672-94), please note that our attention has been drawn to a small editorial error remaining in the above publication. Consequently, to ensure that there is no misunderstanding, an additional change should be made as below:

DELETE NOTE 3 TO CLAUSE 6.2

Please accept our apologies for the error, amend your copy of Publication 107 accordingly and do not hesitate to contact me with any related queries



Chris A Hutchins
Technical Secretary, on behalf of the EEMUA Machinery committee

June 95

A:amd.107

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FOREWORD

These recommendations were first issued in 1977 by OCMA as Publication No. MEC-1. On the formation of EEMUA in 1983 it was designated EEMUA Publication No. 107.

This 1992 issue draws upon experience in the use of the earlier documents in the petroleum, petrochemical and allied industries, and the recommendations are directed towards those industries.

The present document has also drawn upon work carried out to formulate a new British Standard "BS Specification For Diesel Engines For Use In Potentially Explosive Atmospheres (Other Than Mining Applications Or Explosive Processing And Manufacture)". EEMUA contributed to the BS work and will withdraw its own recommendations on publication of a British Standard.

The previous sub-division into mobile and permanent installations has been discontinued, and the scope has been limited to Zone 2 hazardous area.

The recommendations in this document are related to hardware only and are supplementary to existing safety precautions. Training in the use of diesel engines in hazardous areas is outside the scope of this document.

1. SCOPE

The recommendations in this document cover the construction, testing and operation of diesel engines for use in potentially flammable atmospheres. They address only the hazards that arise from the flammable environment and should be used to supplement existing specifications and safety precautions applicable to engines generally.

They are applicable to naturally aspirated and turbocharged engines and engines pressure charged by a blower mechanically driven from the engine crankshaft.

They cover four-stroke engines and two-stroke engines with fuel injected into the combustion chamber. Crankcase scavenged engines are not covered.

They may be applied to liquid cooled and air cooled engines but the surface temperature limits might render the latter impractical.

The recommendations cover permanent or temporary installations in Zone 2 areas.

They may be applied when the potentially explosive environment contains Group IIA and IIB gases (see EN 50 014 or BS 5501:Part 1). Protection of engines in Group IIC gases is not covered. Also, protection of engines for use in atmospheres likely to contain flammables with auto-ignition temperatures below 135°C are not covered.

Road tanker vehicles subject to the 'Petroleum Spirit (Conveyance by Road) Regulations' and the 'Inflammable Substances (Conveyance by Road) Regulations' are excluded from these recommendations, since the conditions under which they may load or unload at installations and depots are described in the Institute of Petroleum Marketing Safety Codes.

2. DEFINITIONS

For the purposes of these recommendations the following definitions apply:

2.1 Auto-Ignition Temperature

The temperature at which a mixture ignites when tested according to the method given in IEC 79-4 or ASTM E659-78.

2.2 Closed Joint

A joint which must be closed, ie. leak-tight for the correct operation of the engine.

2.3 Deflagration

Reaction in a combustion wave propagating at a speed less than detonation.

2.4 Deflagration Arrester

A device to prevent the transmission of a deflagration; consisting of an arrester element and an arrester housing.

2.5 Detonation

Reaction in a combustion wave propagating at supersonic velocity.

2.6 Detonation Arrester

A device to prevent the transmission of a detonation; consisting of an arrester element and an arrester housing with all parts including pipes designed to contain the detonation wave.

2.7 Duty Cycle

The test cycle used for type testing of the engine installation and ancillary fittings.

2.8 Engine Driven Blower

Pressure-charger driven mechanically from the engine crankshaft.

2.9 Flame Arrester (Flame Trap)

A device to prevent the transmission of a flame.

2.10 Flame Path

The shortest path through a flame-proof joint from the inside to the outside of the flame-proof enclosure.

2.11 Flame-Proof Enclosure

An enclosure which can withstand the pressure developed during an internal explosion and which prevents the transmission of the explosion to the surrounding atmosphere. The flame-proof enclosure includes all the gas passages associated with the inlet air, the engine combustion chambers and the exhaust gases, between the inlet flame arrester and the exhaust flame arrester assemblies inclusive.

2.12 Flame-Proof Equipment Supplier

The supplier of flame-proof equipment attached to or forming part of an engine.

2.13 Flame-Proof Joint

The place where the surfaces of two parts of a flame-proof enclosure come together and prevent the transmission of an internal explosion to the atmosphere surrounding the enclosure.

2.14 Gas Groups

Groups of gases corresponding to the equipment groups of EN 50 014 (BS 5501: Part 1).

2.15 Open Joints

One where an opening of the joint does not affect the integrity of the flame-proof enclosure. An open joint is not required to be leak-tight for the normal operation of the engine.

2.16 Potentially Flammable Atmosphere

An atmosphere which might contain flammable gases or vapours such as to require special precautions for the construction and use of diesel engines.

2.17 Spark Arrester

A device to prevent the emission of hot incandive sparks from the engine exhaust.

2.18 Turbocharger

Unit which delivers compressed air to the engine. It consists of a turbine driven by the exhaust gas, and an impeller, joined by a common shaft.

2.19 Zone 1

A zone in which an explosive gas-air mixture is likely to occur in normal operation (see BS 5345: Part 1).

2.20 Zone 2

A zone in which an explosive gas mixture is not likely to occur in normal operation, and if it occurs it will exist only for a short time (see BS 5345: Part 1).

3. STARTING SYSTEMS

3.1 Starter Motor

Starters shall be non-electric or electric suitable for Zone 2.

Alternatively for mobile equipment only, electric starters may be of convention design provided the electrical supply is off-engine and sited such that the starter can be used only in a non-hazardous area.

3.2 Decompressor Valves

The discharge from decompressor valves shall be vented into the flame-proof enclosure.

3.3 Cold-Starting Fluids

A permanently installed system for the injection of a cold-start fluid shall inject the fluid into the inlet air system between the inlet flame arrester and the inlet manifold.

The length and bore dimensions of the cold starting fluid jet shall be proportioned so that the jet is flameproof for substances in apparatus Group IIB.

3.4 Air Preheating Devices

Air preheating devices (such as electric glow plugs, electric grid heaters and pilot flame heaters) shall be installed only within the flameproof enclosure and shall not be installed in conjunction with a cold start fluid system.

All electrical connections shall conform to EN 50 018 (BS 5501: Pt 5).