



CEN Workshop Business Plan : “Water in diesel fuel emulsions for use in internal combustion engines”

1.) Background of the CEN Workshop

Diesel fuel emulsions (“Emulsion Fuels”) are the successful result of years of immense R&D efforts aimed at developing an environmental substitute for traditional diesel fuels. Emulsion Fuels are defined as emulsions of water in diesel fuel and are typically made of 10 to 20% mass/mass water mixed with very specific additives, including surfactants, and diesel fuels. The surfactant additives are used to stabilise the emulsion, so that the finely dispersed water droplets remain in suspension within the diesel fuel.

Emulsion Fuel technology has been developed for applications in diesel engines aimed at reducing polluting emissions. To date, Emulsion Fuels are the only fuels that reduce simultaneously emissions of nitrogen oxides, particulates and carbon dioxide of diesel engines without the need for any mechanical modifications. Emulsion Fuels are as safe as commercial diesel fuels and bring a high level of protection against corrosion and wear in the engine. From a technical viewpoint, Emulsion Fuels work as follows: as the emulsion is injected in the cylinder, the sudden vaporization of the microscopic water droplets promotes a finer, cloud-like atomisation of the fuel mixture which dramatically increases the contact surface between air and diesel oil, enhancing the combustion efficiency and reducing Particulate Matter (PM) across the complete size distribution as well as Smoke Opacity and Carbon Dioxide (CO₂). In parallel, due to the high heat of vaporisation of water, the conversion of liquid water contained in the fuel to steam reduces the peak combustion temperature leading to a reduction in the production of Nitrogen Oxides (NO_x).

When fuelled with Emulsion Fuels, diesel engines instantly achieve a substantial reduction in their emissions of PM, CO₂, and NO_x. There is even a greater reduction in smoke opacity. The typical performance of Emulsion Fuel would lead to up to 80% smoke reduction, up to 60% PM reduction, up to 30% NO_x reduction and up to 5% CO₂ reduction.

An increasing number of vehicles – particularly city buses - use Emulsion Fuel technology as an immediate solution for the reduction of polluting air emissions in the EU. More specifically, around 450 city buses in the UK (London and Nottingham), 1000 in France (Paris, Montpellier, Toulon) and 8,500 in Italy (80 towns and cities, among which: Milan, Padua, Florence, Bari, Rome, Catania, Turin). Emulsion Fuels are also suitable for off-road technologies, such as marine engines, locomotives, power generation equipment, construction equipment, as well as for heating and industrial boilers. For example, the Italian railway company has been experimenting the use of Emulsion Fuels in locomotives in two Italian regions for almost a year achieving excellent results, and is now extending the use of such fuels to other regions. The use of Emulsion Fuels has also started to develop outside the EU, notably in the United States (*e.g.*, in California, Ohio, Texas), where the ASTM (American Society for Testing and Materials) has set up a working group for the development of a standard for Emulsion Fuels for Northern America.

Despite their obvious advantages in terms of environmental (and indeed overall) performance, Emulsion Fuels have encountered a number of barriers to their wide spread. In particular, the absence of a pan-European standard results in trading obstacles due the fragmentation of, and distortions in, the European market.

2.) Origin of the CEN Workshop Proposal

The originator of this proposal is EEFMA, the European Emulsion Fuel Manufacturers' Association. EEFMA was established in January 2003 in order to represent the interests of manufacturers and licensors of the Emulsion Fuel environmental technology in Europe. Its current membership includes Total, Lubrizol and Cam Tecnologie (an affiliate of the Pirelli Group). One of EEFMA's primary goal is to promote the creation of a standard for Emulsion Fuels. Indeed, the current EEFMA members agree that a CWA specifying the requirements and test methods for the chemical and physical properties of water in Emulsion Fuels for use in internal combustion engines is crucial for the successful future development of such environmental technology.

The members of EEFMA and the Secretariat are as follows:

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3.) CEN Workshop Market Overview

The market for Emulsion Fuels is still an emerging market and we therefore cannot precisely identify suppliers and market sizes. However, a number of companies are working on this technology.

As for customers, Emulsion Fuels can have both transportation applications - particularly road transportation, marine engines, or locomotives – and other applications such as in power generation equipment, construction equipment, as well as in heating and industrial boilers. The customers in the EU are potentially all the buyers of traditional diesel fuel for the mentioned applications.

Markets covered by the technology are not only the EU and EFTA countries, but also third countries such as the USA. Other potential markets are the densely populated areas in the Far East, Latin America, and Northern Africa. Therefore, up-grading the document into an international standard is one of our long-term objectives.

As already mentioned above, despite their obvious advantages in terms of environmental (and indeed overall) performance, Emulsion Fuels have encountered a number of barriers to their wide spread. In particular, the absence of a pan-European standard results in trading obstacles due the fragmentation of, and distortions in, the European market. For example, although European vehicle/engine manufacturers have shown great interest in Emulsion Fuel technology, the absence of an harmonized standard that would guarantee the consistency of the product across their own markets has resulted in a reluctance to commit to the use of such fuels. The absence of a standard may impact on the equipment durability, on the economics linked to the production and sale of emulsions and on the emissions' performance, as demonstrated by numerous field and bench tests carried out by research institutes and OEMs.

In the absence of an agreement on common specifications, each country is likely to develop its own separately, making it difficult for manufacturers to export to other EU countries and thereby creating technical barriers within the Internal Market. For example, both Italy and France have developed national standards for Emulsion Fuels which are similar but present inconsistencies as regards water content of the emulsions.

This is the reason why we want to create a CEN Workshop.

Due to the practical difficulties as well as the lengthy procedure of developing a EN standard, it has been decided to start with a CEN Workshop Agreement ("CWA"). The proposers would ultimately like to see the CWA taken further by CEN and upgraded into a European Standard (EN).

4.) Workshop Participation

Representatives of the following key stakeholders, since they will be affected by the outcome of the CWA or anyway have an interest in the CWA, will be contacted by the Proposers:

- The automotive industry
 - ACEA, a European trade associations representing thirteen European car, truck and bus manufacturers
 - IVECO, a leading manufacturer of commercial vehicles and diesel engines
 - Renault Trucks, a leading manufacturer of commercial vehicles and diesel engines
 - European Association of Automotive Suppliers (CLEPA)

- The oil industry
 - Concawe, a European association regrouping major oil companies whose aim is to carry out research on environmental issues relevant to the oil industry
 - The European Biodiesel Board
 - Unione Petrolifera, the Italian oil industry Association
 - ENI (Agip)
 - British Petroleum

- The European Commission, particularly:
 - DG Transport (Unit D4 - Clean Transport)
 - DG Enterprise (Unit F5 - Automotive Industry)
 - DG Environment (Unit C1 - Air, Noise & Transport)

- The Public transport sector
 - RATP, the public transport company of the Île-de-France region (including Paris)

Thus, it would be optimal to involve these stakeholders in the elaboration of the CWA or at least to keep them informed.

5.) Objectives of the CEN Workshop

The proposed project aims at reducing the technical and non-technical barriers to the increased use of Emulsion Fuels. The main objective is to develop a CWA specifying the requirements and test methods for the chemical and physical properties of water in Emulsion Fuels for use in internal combustion engines. The development of such CWA is a prerequisite for Emulsion Fuel technology to be widely adopted for use in diesel engines, to the immediate benefit of cleaner air and of the environment in general.

6.) CEN Workshop Work Programme

The deliverable envisaged under this exercise is a CEN Workshop Agreement specifying the requirements and test methods for the chemical and physical properties of water in Emulsion Fuels for use in internal combustion engines.

The Action Plan stands as follows:

- The kick-off meeting will take place on 15 March. The meeting will decide on the BP and appoint a Chair and a Secretariat. During the meeting, basic information on the project will be presented and the business plan will formally be adopted. Based on that information, interested stakeholders should decide on their final participation. All technical details, documentation and requirements will be presented and evaluated during the second part of the meeting, which will be open exclusively to those interested parties who will effectively participate.
- Another 2 meetings may be needed in order to:
 - discuss additional technical data and requirements (where needed or appropriate); and
- The Chair will seek consensus on a CWA (consensus meaning “no major opposition” as opposed to “unanimity”).
- A final consensus will be reached.
- No public commenting period is envisaged.
- CEN will register the CWA as adopted.
- The Secretariat will consider the Business Plan as fulfilled.
- The CEN Workshop will be disbanded.
- The CEN Workshop working language will be English.

- It is the intention that the CWA will be published within 24 weeks of the kick-off meeting.

7.) CEN Workshop Structure and Resource Requirements

We envisage a very simple structure and organization. Also, in light of the fact that our technology is the mature result of many years of R&D and testing efforts by the EEFMA members, we do not expect that large resources will be needed to perfect the content of the CWA. Likewise, we do not anticipate the need to institute multiple Project Teams. Below follows a detailed description of the expected resources requirements associated with this project.

Secretariat

NEN, the Dutch CEN Member, is willing to provide the Workshop Secretariat, subject to kick-off confirmation.

Tasks to be carried out by the Secretariat include:

- Organize meetings, distribute documents and write minutes;
- Provide assistance in writing and editing the draft and final CWA;
- Support the Chairman and entertain contacts with the workshop members; and
- Distribute minutes/notes of meetings and drafts.

Total man-days required for the Secretariat: 10-15 + travel and subsistence, supported by EEFMA.

Chairman

EEFMA is prepared to nominate Mr. Richard Biggin as Chairman.

Total man-days required for the Chairman: 10-15, supported by EEFMA.

Proposers

Total man-days required for the Proposers: 8-12 for each Proposer, supported by companies to which the Proposers belong.

Participants

Total man-days required for the Participants: 6 for each participant, voluntary participation, supported by participating organization.

Sponsorship has been obtained from the proposers. Sponsors are automatically registered participants. Other registered participants will be required to pay a one-off fee of €600 as a contribution to the costs of the Secretariat.

All communications between CEN, the participants, the Proposers, the Secretariat and the Chairman will be ensured via e-mail.

8.) External Liaisons

The Workshop will seek appropriate liaison arrangements with:

- CEN/TC 19
- ASTM International

9.) Contact Points

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