

LUBETECH

NO.22



MWF - PRODUCT STEWARDSHIP AT MACH 2002



AN INITIATIVE OF THE BRITISH LUBRICANTS FEDERATION.

Concerns about health, safety and environmental (HSE) aspects of metalworking fluids (MWF) are not new. In several countries, including USA, Germany and Scandinavia, there is a more pro-active role about these aspects compared to the UK.

For this reason the BLF MWF Technology Group has taken a highly proactive approach to introduce Product Stewardship.

This article introduces the British Lubricants Federation Metalworking Fluid Stewardship Group (PSG), some of the issues being discussed within the group, as well as those being addressed by individual members.

INTRODUCTION.

The main purposes of metalworking fluids is to reduce friction at the contact points between tool and workpiece and between tool and chip, i.e. to lubricate, and to remove the deformation heat and friction heat arising during cutting, i.e. to cool. They also have the additional job of flushing away the chips and prevent dusting.

At the same time they should provide in-process corrosion control and not foam or leave sticky residues.

In addition, they should not increase the risks of skin irritation, have a long life, low misting properties and last, but not least, should be easily disposed of via a licenced waste oil collector.

There are two main groups of metalworking fluids: 1) neat oils, which are non-water miscible and used directly, i.e. undiluted and 2) water miscible fluids, which are diluted with water before use.

Neat oils are based upon mineral oils, synthetic oils or vegetable oils and may contain, in addition, other additives including extreme pressure agents, wetting agents, anti-misting agents, etc., as other ingredients.

Water miscible fluids may or may not contain: mineral oil, extreme pressure additives, corrosion inhibitors, emulsifiers, lubricity agents, and biocides.

During recent years many of the modifications to MWF's incorporated by MWF manufacturers have been driven by HSE concerns. Examples include elimination or minimization the HSE effects by prohibiting short chain chlorinated paraffin's, nitrosamine-forming agents and triazine type of

biocides. It is believed that in the UK the absence of legislation to outlaw specific components allowed some marketers to continue with outdated formulations, which fail to represent best practice. At the same time the amount of new HSE information about chemicals is increasing rapidly, hence an industry-wide approach to these issues is beneficial. The result of this is the introduction of the British Lubricants Federation Metalworking Fluid Stewardship Group.

PRODUCT STEWARDSHIP

There are already several schemes available for individual companies to implement environmental issues within management systems. Examples include the Responsible Care Program and ISO 14001 certification. Product stewardship is linked to these on a product level. Product stewardship aims to limit adverse HSE aspects during the full life cycle of the product, i.e. from raw materials, production, use and recycling to final disposal.

Members, who have signed a Code of Ethics promising to fulfil the Stewardship Principles, are metalworking fluid suppliers and raw material suppliers. Government agencies and an independent consultant are the associate partners.

Although the Product Stewardship Group as set up by the BLF has only existed about one year, it is unique as it includes HMG Agencies who regulate the metalworking industry and it will put the UK in the forefront of HSE issues.

RAW MATERIALS

In Europe HSE legislation is largely based on European Union (EU) ruling. It falls beyond the scope of this article to go into detail of this ruling, but it plays an important role in the selection of metalworking fluid ingredients.

It is estimated that out of the 100,000 known chemicals, 30,000 are commercially available. The EU issues lists describing how several hundreds of these 30,000 chemicals must be labelled. Examples of these labels include: Flammable, Toxic, Irritant, and Dangerous for the Environment.

Once a change in labelling is known, users may wish to look for alternative chemicals with less severe labelling. Also, the use of certain chemicals may be restricted by government based on the labelling of these chemicals. Below table lists some well-known (old) MWF ingredients.

Short chain chlorinated paraffin's.	Biocides	Nonylphenoethoxylates.
<p>Short chain chlorinated paraffins (SCCP) were used as lubricants in both watermiscible and neat oils. Studies have shown that these lubricants are toxic to the aquatic environment. Therefore, they are banned from metalworking fluids. Legislation is already implemented in the Netherlands that forbids the use of these SCCP in metalworking fluids.</p> <p>Alternatives to the SCCP are the Medium Chain Chlorinated Paraffins also chlorine-free alternatives.</p>	<p>Until recently probably the most widely used bactericide in metalworking fluids was Hexahydro-1,3,5-tris-(2-hydroxyethyl)-5-triazine.</p> <p>The EU has decided to classify this material as skin sensitiser from a concentration of 0.1%. In practice this would mean that metalworking fluid in use would be considered skin sensitizers (= may develop a skin allergy). Because it was expected that workers would not accept this labelling, most if not all metalworking fluids were reformulated to overcome this labelling. At this moment the biocide directive is in force which means that a lot of data on biocides will become available within the next 5 - 10 years. The members of the Stewardship Group have the advantage of participating in these discussions and will be kept up to date regarding any new information regarding biocides.</p>	<p>Nonylphenoethoxylates (NPE) are used as emulsifiers and washing agents. The concern with NPE is that they break down in the aquatic environment to nonylphenol (NP). This NP is poorly biodegradable and has the tendency to bioaccumulate. The NPE are banned for use in the Scandinavian countries and it is expected that they will be banned within the EU in the future.</p> <p><i>Table: examples of some (old) raw materials of MWF.</i></p>

PRODUCTS

Product development.

After having discussed the raw materials to make the modern metalworking fluid, we can now discuss the challenges we face to develop modern metalworking fluids. A successful fluid has the optimum balance between commercial, technical and HSE aspects. One of the HSE aspects is the labelling

of these products for which the ruling laid down in EU guidelines, known in the UK as COSHH (Control of Substances Hazardous to Health) regulations.

Depending on the labelling and the concentration of raw materials, the label of the metalworking fluid can be established. In addition it is possible to test some of the HSE aspects of each specific product as described in the table on Page II.