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OIL ADDITIVES

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The use of certain chlorinated and sulpho-chlorinated compounds as extreme pressure (EP) additives for lubricating oil and cutting fluids is a well established practice. It is also well known that such additives have a tendency to decompose, particularly under service conditions. A consequence is that ferrous metals with which these additives, or oils containing them, come in contact, tend to be stained and corroded.

It is thought that this effect results primarily from partial decomposition of the additive, with liberation of hydrogen chloride which attacks ferrous metals with formation of the corresponding metallic chloride. This in turn is hydrolysed by atmospheric moisture to ferric hydroxide, which forms a brown stain on the surface of the affected metal. The phenomenon is particularly evident in metal working operations during which both the iron and steel work pieces and also the iron and steel parts of machine tools which are flushed by the additive-containing cutting fluid tend to become stained.

Many chlorinated additives are sufficiently stable in practice to give no trouble from this cause, but additives having outstandingly high EP activity are prone to it.

An object of the present invention is to reduce or inhibit the staining and corrosion described above.

According to the present invention there is provided an extreme pressure oil additive for lubricating oils and cutting fluids comprising a liquid chlorinated or sulpho-chlorinated compound and an organic salt of a Group II metal which salt is soluble in the chlorinated or sulpho-chlorinated compound and in the lubricating oil or cutting fluid.

Suitable metal salts are the calcium, barium and zinc salts of naphthenic acids, though other metals of Group II, for example cadmium, and other organic acids, especially aliphatic carboxylic acids, both saturated and unsaturated for example 2-ethyl hexoic, lauric and stearic, oleic and linoleic acids, may be used, provided that the requirement of adequate solubility in mineral oil is met. Effective amounts of the Group II organic salt lie in the range 1.0 to 60.0 parts by weight 100 parts of chlorinated additive, and it may be applied either in the form of the pure salt, or, preferably, as a commercially available concentrate.

The extreme pressure oil additive may also contain an amount of lubricating oil or cutting fluid to facilitate dispersal of the additive when applied. Group II metals have the secondary advantage of low toxicity—a valuable feature, particularly in cutting fluids.

Chlorinated additives in which the invention is of outstanding value are sulpho-chlorinated fatty oils (the reaction product of a fatty oil and sulphur mono-chloride)

but the scope of the invention is not limited to use of the stabiliser in additives of this type.

The invention is illustrated by the following examples:

Example I

A blend of mineral oil 92 parts by weight, sulpho-chlorinated sperm oil 8 parts by weight and an oil-soluble organic salt of a Group II metal 0.7 part by weight was spread as a film on a standard steel plate (a Beeny plate) in presence of standard steel chippings, and the whole was stored in a closed air space over water for 48 hours. The following results were observed:

With zinc stearate, calcium stearate	The plate developed a slight stain.
With calcium naphthenate barium laurate, barium oleate, cadmium laurate	The plate remained unstained.

In a comparable test in absence of a salt according to the invention, a heavy brown stain developed.

The following further examples illustrate the application of the invention to chlorinated bodies other than the sulpho-chlorinated sperm oil of the above examples.

Example II

A liquid chlorinated propylene tetramer containing 40% by weight of chlorine was tested, as a 10% solution in a reference mineral oil, on a Beeny plate under the same conditions as above, both with and without additives according to the invention. The additive-free solution stained the plate, whereas solutions containing respectively 1% by weight of calcium naphthenate, barium laurate and calcium stearate produced no evidence of stains.

Example III

Under similar conditions a chlorinated sperm oil containing 30% by weight of chlorine stained the plate slightly while solutions containing 1% of calcium naphthenate and barium laurate were non-staining.

Example IV

A sulpho-chlorinated methyl fatty ester under the above conditions stained the plate but in the presence of 1% calcium naphthenate no trace of staining was evident.

What is claimed is:

1. An extreme pressure oil additive for lubricating oils and cutting fluids comprising

(a) a liquid reaction product of sulphur monochloride and a fatty ester, in an amount sufficient to impart extreme pressure properties when the additive is incorporated in a lubricating oil or cutting fluid, and

(b) a salt, soluble in the sulpho-chlorinated product and in the lubricating oil or cutting fluid, of a Group II metal and an acid selected from the group consisting of naphthenic acids and aliphatic carboxylic acids, said salt being present in an amount sufficient to prevent stain when the additive is incorporated in a lubricating oil or cutting fluids.

2. An extreme pressure oil additive as claimed in claim 1, wherein the salt is present in an amount between 1 and 60 parts by weight per 100 parts of sulpho-chlorinated product.

3. An extreme pressure oil additive as claimed in claim 1, which contains also a mineral oil fraction as used in extreme pressure lubricants and cutting fluids.

4. An extreme pressure oil additive as claimed in claim 1, wherein the salt is selected from the group consisting of zinc stearate, calcium stearate, calcium naphthenate, barium oleate, barium laurate, and cadmium laurate.

5. An extreme pressure lubricating oil or cutting fluid, containing an additive as claimed in claim 1.

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