

## **CORROSION INHIBITORS**

The whole point of a corrosion inhibitor is to provide a barrier which protects metal surfaces (any metal, not just steel) from a corrosive agent, usually water; needless to say, water with dissolved salts or acids is even more of a problem. Obviously, environments which are permanently bathed in oil such as engine and gearbox internals are well protected, but this has not always been the case. The old 'straight' additive-free mineral oils used in engines many years ago did not protect some areas of the engine from acid-containing water vapour arising from fuel combustion. The high rates of cylinder bore and piston ring wear common in engines 50 years ago were mainly due to corrosion rather than actual wear.

A film of straight oil gives a reasonable anti-corrosion film, but anything in the oil that is attracted to the surface to form a permanent barrier is a great improvement. This is why some anti-wear additives, and ester-type synthetics also double up as corrosion inhibitors. Also, the alkaline detergent compounds neutralise acidic gases arising from combustion, and dispersants 'wrap up' water droplets in the form of harmless emulsions when the oil is cold; this water is later evaporated off as the oil heats up. These chemicals, because they are not simply corrosion inhibitors, are present in substantial amounts, and in any good quality modern oil they do not and cannot 'run out'. Even so, good management helps: avoid short runs and change the oil regularly.

Although such multi-purpose additives protect most metals, the odd man out is copper, and alloys containing copper. These can be corroded by degraded oil at typical sump or gearbox temperatures to form oil-soluble copper compounds, which themselves accelerate oxidation of the oil, which increases the copper corrosion.....and so on. A special copper inhibitor is often added to oils which breaks the cycle by forming a resistant coating on copper, brass and bronze. Particularly where copper is present, the chlorinated anti-wear additives must be avoided. Because of their corrosive action they have not been used by responsible lubricant manufacturers for many years, but they are still sold at rip-off prices as 'miracle additives' by disreputable outfits.

Where metals are exposed to the elements a film of additived oil only gives temporary protection. Obviously a thick greasy or semi-solid film has a better chance of resisting wash-off and abrasion. The archetypal anti-corrosion was wool grease (lanolin), first used on chain mail armour, it was still popular into the 1970s. Now additived wax-or petroleum jelly based coatings are used. (There is a huge range of Fuchs 'Anticorit' products for the metal working industries.)

It may seem like shutting the stable door after the horse has bolted, but there are corrosion inhibitors that can be applied to wet metal, by dipping or spraying. These are the 'water displacing' types, which actually tunnel under a layer of water, causing the water to form droplets and run off. Apart from industrial products, the Fuchs/Silkolene 'All-In-One' is a 'WD' oil.

Au revoir, JR