Words for wise fluid users

A new HSE publication regarding coolant sumps and bacterial contamination is intended to help manufacturers comply with COSHH regulations. Steed Webzell reports on its potential impact

When the Health and Safety Executive began investigating ill-health among staff at the Powertrain Ltd plant in Longbridge, Birmingham, in 2004, few realised that the implications would be so far reaching.

At the car engine plant (at the time run by Phoenix Venture Holdings which went into administration when MG Rover collapsed in April 2005) 101 employees complained of the onset of occupational asthma linked to metalworking fluids. The HSE thought it was the largest incident of its kind in the world.

The illnesses were first detected at the end of 2003 when the Birmingham Chest Clinic saw a significant number of workers suffering from extrinsic allergic alveolitis (EAA), an inflammatory disease affecting the lungs. A survey of the plant found 84 workers had contracted occupational asthma and 24 had EAA, with some suffering from both. The chest clinic's Dr Alistair Robertson said at the time: "Some workers were severely disabled and about to go into a no-pay situation. They were very breathless even with minimum exertion and needed high doses of steroids."

HSE field director Sandra Caldwell commented: "The HSE investigation has been long and thorough, and we now know that the cause of the disease was mist from metalworking machines, which was widespread throughout the factory. While we do not know the precise agent within the mist that triggered the outbreak, we did find links to bacteria and used metalworking fluid."

The upshot is that the HSE has now updated its guidance on metalworking, adding a new publication to its MW Series – *COSHH essentials for machining with metalworking fluids*.

Fuchs' Ecocool Ultralife water-soluble coolants prevent bacteria proliferation

Termed 'guidance publications', already in the series are: 'Advice for managers' (MW0); 'Mist control – inhalation risks' (MW1); 'Fluid control – skin risks' (MW2); 'Sump cleaning – water mix fluids' (MW3); and 'Sump cleaning – neat oils' (MW4). The new publication resulting from the Longbridge episode is 'Managing sumps and bacterial contamination' (MW5).

Firms are free to take other action, as following HSE 'guidance' is not compulsory, but if machine shops follow the guidance, they will normally be doing enough to comply with the law. HSE inspectors seek to encourage compliance with the law and may refer to MW5 as illustrating good practice.

Importantly, there appears to be no agreed health-based limit for exposure to mist. However, MW5 starts off by stating that "fluid systems that contain water or water-mixes can become highly contaminated with harmful bacteria. Mists from these are more likely to lead to asthma and other lung diseases".

The guidance advises manufacturers

to cover sumps and keep them free from swarf or fines to less than 100 mg/litre – 100 ppm. It asks that tramp oil leaks (hydraulic oil, lubricant, gearbox oil) be minimised to less than 2 per cent and removed using coalescers or manually.

It also advises machine shops to undertake a series of maintenance, examination and testing procedures. These include checking input water quality (de-ionised water may be required), daily monitoring of fluid appearance and odour, weekly checks on fluid concentration (using a refractometer) and pH levels, regular measurement of sump fluid temperature (consider cooling the sump fluid), and adding biocide (to kill live bacteria) when necessary in accordance with supplier recommendations.

WEEKLY MONITORING

The big test, however, is to measure bacteria levels, once a week, using a dip slide. 'Good' control will indicate less than 1,000 CFU/ml (colony-forming units per millilitre of fluid) and that no further actions are required. 'Reasonable' control will suggest between 1,000 and 1 million CFU/ml: 'You may need to clean the system or change your biocide regime'. And finally,'poor control', equating to more than 1 million CFU/ml: 'Act immediately'. This normally means draining and cleaning.

So what are coolant suppliers doing to help machine shops minimise the amount of time they have to spend complying with the new guidance?

"Fuchs sees the HSE guidance as an important factor in coolant selection and in response has launched Ecocool Ultralife water-soluble coolants, which create an environment where bacteria find it difficult to proliferate," says Richard Rogers, industrial product manager.

"The development project, involving UK-based Fuchs chemists and engineers, and work with active trial sites, took 18 months to ensure that Ultralife fluids are based on the most robust current formulations to support customers to consistently meet the new guidelance.

"Apart from robust technology to meet HSE demands, many manufacturers are starting to understand that the choice of coolant is critical to meeting production efficiency targets as part of a TQM strategy," he adds. "Increased competition from the Far East has placed greater emphasis on quality control, continuous production improvement and business process improvement. Manufacturers want increased tool and feed speeds, longer tool life, and reduced waste generation and disposal costs."

Fuchs understands that modern cutting fluid performance is not determined by its ability to meet primary functions such as heat dissipation and suitability with metal type (assumed as a given) but is linked more to secondary demands such as low foaming, corrosion inhibition, detergency, cleanliness in operation, reduced sticky deposits, stain protection and most importantly to being 'biologically hard' to achieve quality improvements.

Fuchs also offers a new mobile coolant testing kit in response to the latest HSE guidelance. It includes 12 dip slides to monitor bacteria levels, a refractometer to check fluid concentration, pH strips and sterilising solution.

There still remain some 'unanswered' questions regarding the HSE's Powertrain investigation. For instance, the sump in question, which held over 200,000 litres was tested for bacteria levels three times a week. The answer here could lie in the amount of 'biocide' being used. If biocide is used there will be no live bacteria just dead ones, referred to as endotoxins by the HSE. These can only be detected by lab analysis and could be just as bad for health as live bacteria. If this is the case, perhaps biocide is not the answer?

Supplied by MacInnes Tooling, Hangsterfer coolants are all what are referred to as 'biostable' fluids. This means they do not contain biocides and, says managing director Jim Boyle, "quite a lot of our customers use them because in the past they have suffered skin irritation and dermatitis with normal biocide supported coolants".

All-Cool 3000, a low-oil emulsion with low levels of bacterial control agents

MacInnes has, in fact, launched a new coolant called All-Cool 3000. It is a low-oil emulsion with low levels of bacterial control agents, meaning it is does not need to carry a hazard warning label. It is designed to run with low bacteria levels in line with HSE recommendations.

PRODUCT STEWARDSHIP

Houghton Europe is a member of the UKLA (United Kingdom Lubricants Association) product stewardship group that works with the HSE to implement new guidance across industry. It promotes products such as the highly bacteria resistant Hocut 795 coolant. Added to this is Houghton's on-site fluid monitoring service where field technicians check and control coolants in use. In partnership with Swedish air filtration specialist Scandfilter, it also provides equipment that filters all particulates from machine tools areas including oil mist, fines and bacteria.

Many manufacturers will undoubtedly see the new HSE guidance as common sense, something in which Peter Blenkinsop, technical manager at Master Chemical Europe concurs: "In all honesty, although this is a new guideline, the

Lubricant supplier support role

Leeds-based Lone Star LWD Precision Engineering is a provider of engineered components to the oil, gas and petrochemical industries. As such, the company is at the forefront of health and safety and is a long standing customer for the Rocol range of lubricants, using predominately the TRI-Logic System.

These include the TRI-Logic EP maximum life extreme pressure cutting fluid, a heavy duty cutting fluid designed for arduous operations and difficult materials. TRI-Logic EP has also been carefully formulated to resist bacterial and fungal degradation in the sump.

Following the recent introduction by the HSE of new guidance for the management of cutting fluids, Lone Star LWD contacted Rocol for further advice, signing up to its Ultracare programme. Ultracare customers receive regular visits from a Rocol service engineer who monitors the condition of the fluid. In addition, operator training in best practice is offered and a metalworking fluid folder is provided to record full details of fluid checks and action taken.

Rocol says that by offering customers the Ultracare programme it is possible for users to save up to 40 per cent in metalworking fluid spend from a reduction in fluid usage, tool wear, downtime, labour costs and disposal.

practices it prescribes are already commonplace. Indeed in other European countries these are established methods of many years' standing. So any metalworking fluids manufacturer, such as Master Chemical, operating in the high end of the global market, is already producing biostable fluids.

"Naturally, product development at Master Chemical continues in the direction of maximum biostability but an important factor has been industry's corresponding move away from certain anti-bacterial agents such as formaldehyde donor biocides. Our focus is to minimise all hazardous additives. It is a move towards greater environmental responsibility and workforce safety, and also makes sound business sense as it ultimately minimises disposal costs."□