

Ignorance won't wash

The Solvent Emissions Directive comes into effect on 31 October 2007. With time running out, the advice is clear...act now or face the consequences.

Steed Webzell reports

However unpalatable, costly, or time consuming the exercise, a line has been drawn in the sand. From 31 October 2007 the Solvent Emissions Directive (SED) becomes effective and, with very few exceptions, manufacturers will have to change to safer alternatives to solvent degreasing.

So rather than bemoan the fact, look at the positives. These include a safer working environment for your employees, reduced or no harmful emissions, disposal cost savings and good PR for your company – replacing harmful solvents can be promoted as demonstrating "best practice" manufacturing.

Solvents affected by the new EU Regulation are trichloroethylene (trike), methylene chloride, perchloroethylene, n-propyl bromide and HCFC (hydrochlorofluorocarbon) solvents such as HCFC 141b. Everyone must comply – the few temporary exceptions being the precision cleaning of electrical parts and other components used in aerospace and certain military applications, for which the ban will be enforced from 31 December 2008.

NO GOING BACK

There is no going back only a way forward, so have you looked at the alternatives? To start with, do your parts actually need to be cleaned with solvents? (If so, there are now SED-compliant cost-effective solvent processes, described later.)

But, according to washing, cleaning and finishing expert Guyson, the answer in some cases is no; you may have simply



Kerry's Microsolve ultrasonic system uses non-ozone-depleting solvents such as 3M Novec HFE

always done it that way or you may prefer the perceived quality of cleaning – but without actually needing to use solvents.

Guyson suggests that selecting a cleaning machine should follow a full audit of your requirements – the appropriate cleanliness specification, throughput volume, total running costs, factory space – and budget. Then book some free cleaning trials.

There are many safe aqueous systems that are perfectly suitable for cleaning a wide range of components. The Guyson Allkajet 600 rotary washer, for example, delivers high quality cleaning and drying, and is used with great effect in batch manufacturing applications in the automotive, aerospace, medical and defence sectors.

The washing process combines periods of both partial and total submersion with high volume spraying of a special low temperature water-

based solution (pumped at a rate of up to 350 litres/min, at 15 bar pressure) through 14 high pressure spray jets. The deluge and turbulence produced immerses all component surfaces and penetrates awkward recesses.

The immersion phase provides the opportunity to use optional ultrasonic agitation to achieve even higher cleaning standards. At the end of the cycle, the cleaning chamber is emptied and flushed out to remove all traces of wash solution.

Rinsing is a repeat of the wash process using a heated rinse solution drawn from its own 450 litre tank. After draining, the components are dried with heated and blown compressed air.

AQUEOUS NO LONGER COSTLY

At surface preparation specialist Wheelabrator Group, Clean-Tek product range general manager Clive Ward, says: "Aqueous cleaning is no longer the costly process it once was and is highly effective in removing grease, oil, dust, tar, carbon, dirt and other contaminants."

Aqueous systems, such as the Clean-



Renishaw is using both MecWash aqueous washing and Aqua-Save technology

Tek range of top-load, front-load and conveyor spray wash cleaning systems, as well as ultrasonic tanks, help minimise the environmental impact of cleaning operations by using only 5 per cent aqueous non-hazardous detergent.

"For many businesses, the SED will be the single biggest threat to their

survival," adds Mr Ward. "They must make crucial decisions about the long term use of trike now and not leave it to the last minute, when it may be too late to avoid prosecution."

At Turbex, the washing and degreasing equipment supplier has observed a hardening of attitudes against solvents as a result of the SED. The company says that most companies are now aware of the serious health and safety, and/or environmental issues associated with solvents. As a result, the Turbex approach continues to be aqueous methods wherever possible.

INTEGRAL PHOSPHATING OPTION

Consider IMC, a Wrexham-based manufacturer of commercial bar and catering equipment which previously used a traditional solvent vapour degreaser. The company has just installed a Turbex AC aqueous

degreasing system as part of a host of environmentally friendly manufacturing initiatives. Significantly, IMC took the opportunity to gain product quality benefits by integrating an automatic phosphate coating stage into the Turbex system. This was achieved without any impact on the machine footprint.

The AC machine has three integral heated tanks and also intermediate cold rinse stages. The three heated processes are detergent washing, phosphating and rinsing. All stages are supplied by strategically located spray nozzles mounted on rotating spray bars. A PLC enables the operator to set up and select a number of different process requirements. For example, IMC uses the machine for degreasing only, or for degreasing and phosphating.

Paul Young, director at MecWash Systems, believes the SED will remove a potential confusion in the marketplace:

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Catering equipment manufacturer IMC has switched from solvent to aqueous cleaning

"We understand that some manufacturers using trike have been advised that they become exempt if they use less than 1 tonne (685 litres) a year. In fact, the only provision in this regard requires users to apply for a permit from the Environment Agency – either in respect of compliance or exemption where SED obligations cannot be met due to unacceptable cost or quality implications.

"Significantly, it is the twin issues of cost and quality that are fully addressed by the latest aqueous cleaning technology. The majority of industrial cleaning can be resolved through the use of water-based systems with no increase in operating costs or reduction in quality. Indeed, we can quote many cases where the cost of using aqueous systems is considerably less and the cleaning performance markedly better than those achieved by previous solvent degreasing equipment."

Because the cleaning process is so closely linked to quality and customer satisfaction, it should be seen as an integral part of a manufacturing process.

Often this can be most effective where it is linked to a specific manufacturing cell.

The use of the four MecWash Midi aqueous-based cleaning systems by measurement equipment manufacturer Renishaw is a prime example. Renishaw produces 330,000 components a month at its Stonehouse and Wotton-under-Edge facilities.

NO DRAINS REQUIRED

The four MecWash Midi installations are comprehensively specified and benefit from a built-in Aqua-Save wash water treatment system that cleans and recycles the wash and rinse solutions. Consequently, the wash installations do not need a connection to drains, allowing them to be sited where required within the production lines.

The choice of programmes available on the Midi provides rotational flood immersion washing, rinsing, final rinsing, high performance filtration, oil separation, and hot air and vacuum drying. This ensures that material such as swarf, coolant and deburring residue is removed from each component ahead of



further assembly operations. Renishaw previously used a series of ultrasonic dip tanks and solvent cleaning.

Of course aqueous cleaning is not the answer for every component. Some items, such as electronic parts, PCBs, precision optics, medical and aerospace components may need engineered fluids to provide the high level of cleanliness associated with solvent cleaning. Not to be confused with HCFCs (general use of which was banned from 2002), HFC (hydrofluorocarbon) and 3M Novec HFE (hydrofluoroether) do not contain chlorine or deplete the ozone layer.

Guyson's Kerry Microsolve ultrasonic cleaning systems attain high cleaning standards yet, crucially, keep running costs low. Solvent retention features unique to the latest Microsolve machines, including triple coil reflux cooling, vapour break, 150 per cent freeboard, auto top-up and solvent monitoring, and ensure the systems are safe and comply fully with environmental and safety legislation.

Guyson's Kerry Microsolve co-solvent systems generally provide two



Guyson's Allkajet 600 delivers high quality cleaning and drying

removes from the components any residues carried over from the primary cleaning tank. Cleaning is followed by a rinse in the vapour zone above the tanks and then a dwell in the freeboard zone to dry the components.

LIKE DISSOLVES LIKE

Anyone paying attention in Chemistry at school will remember that "like dissolves like", which is why chlorinated solvents are used to clean oil and grease from machined components, and water is able to flush away salts and other water-soluble matter. Problems arise, however, when using modern, high additive cutting oils that comprise a mixture of solvent-based and aqueous constituents.

To address this area, German manufacturer, Dürr Ecoclean (represented in the UK by Geo Kingsbury), has teamed up with Dow/Safechem to introduce a new cleaning system. Called Compact 80P, it harnesses the former's experience in manufacturing industrial cleaning machines and exclusively uses the latter's newly-developed Dowclene 1611 cleaning solution. Apart from being a good degreasant, the non-corrosive solution is also effective at removing water-based soil and oil-water emulsions as well as particulate matter, and dries without leaving residue.

Many washing and degreasing machine manufacturers and suppliers offer both aqueous and solvent-based technology, and there is little doubt that the SED is driving investment.

"Due to our methods and working



Dürr's Compact 80P supports the delivery of a new cleaning approach

practice we have increased our turnover year after year – in 2006 we secured orders totalling £3.5 million on cleaning degreasing plants for both hermetically sealed solvent systems and water-based systems," says Ebrahim Patel of IB Industries. "There is a need for effective cleaning and degreasing technology in the UK. In Germany in the 1990s, their solvent emission and ground water legislation meant manufacturers had to change old plant for more efficient systems. Our knowledge of aqueous cleaning systems from MAFAC and Elma, and hermetically sealed solvent cleaning systems from EVT and Höckh, offers customers the opportunity to benefit from engineers' experienced in dealing with solvent replacement in Europe since the 1990s." □

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cleaning stages, both with ultrasonics and filtration, followed by vapour rinsing and freeboard dry. In the first cleaning tank a mixture of 3M Novec HFE (hydrofluoroether) and a hydrocarbon solvating agent, agitated by ultrasonics and the boiling action, removes gross contamination from the components. Large quantities of soluble contamination can be taken up by the solvating agent, making the process suitable for heavy duty cleaning jobs.

In the second stage, pure HFE distillate, also ultrasonically assisted,

"Customers like the repeatability and good surface finish"



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