In house disposal of printing chemicals in the waste water

AN EXPERT REPORTS FROM THE COAL FACE (22). The disposal of used printing chemicals is both expensive and time consuming for a printer. The expert was asked to provide a solution to this disposal problem that made technical and economic sense. One condition was that the printer itself must be able to dispose of some of the printing chemicals in the waste water.

Over recent years the disposal costs for printing chemicals have risen constantly for many printers and now many printers are paying Euro 1.20 per kg to dispose of dirty damping solution. The task was therefore to design a device that would allow certain printing chemicals, such as dirty damping solution from the presses, to be processed by the printer itself to the point that they were harmless enough to be disposed of in the waste water.

PHOTO-OXIDATION + STERILIZATION. Together with a well known water treatment institute, photo-oxidation was selected as the best process for the pre-treatment of printing chemicals for disposal such as dirty damping solution. Extensive laboratory investigations preceded this decision.
Photo-oxidation is an oxidation process that takes place under ultraviolet illumination. The actual wavelength of the ultraviolet radiation is precisely 185 nm (1 nm = 10^{-9} m). At the same time ultraviolet radiation at a wavelength of 254 nm is used to sterilize the printing chemicals that are being disposed of.

Next, the photo-oxidation and sterilization reactor was developed and built (see picture). Numerous laboratory trials had shown that photo-oxidation proceeded more efficiently with the addition of small quantities of hydrogen peroxide to the printing chemicals being treated. This addition is handled fully automatically by the device's electronic controls (red arrow in picture). The complete reactor is 1 m long, 30 cm wide and 20 cm high. Control of the reactor radiation is also fully automatic and the process is reliable.
This reactor is capable of treating of around 1,000 litres of dirty damping solution overnight and the treated damping solution can then be disposed of down the drain immediately after its passage through the reactor without any problem or contravening any regulation.

Photo-oxidation and sterilization reactor (green arrow: addition of hydrogen peroxide, red arrow: electronic control).

LABORATORY INVESTIGATIONS. Laboratory investigations of the damping solution treated by the reactor and similar damping solution that had not been treated were carried out at the Institut Fresenius. The results of the laboratory chemical analysis show that the damping solution treated by the reactor complied with the most stringent requirements of the authorities for disposal into the sewerage network.

REQUIREMENTS. One requirement that printing chemicals that are to be disposed of in this way must satisfy is to be transparent to ultraviolet radiation at 185 nm and 254 nm.
This needs to be individually checked in advance.

ECONOMIC VIABILITY. The reactor itself costs around Euro 8,000 and the running costs for the disposal of 1,000 litres of dirty damping solution are roughly Euro 5 for the electricity and Euro 2 for the hydrogen peroxide. The core of the reactor, the radiator, has a lifespan of around 8,000 operating hours. The radiator output is constantly monitored electronically and should it deteriorate an alert is displayed on the control panel. Past experience suggests that this will happen every 8,000 operating hours. A replacement radiator for the reactor costs around Euro 3,800.

Problems in the graphics industry

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