United States
Environmental Protection
Agency

Air and Energy Engineering
Research Laboratory
Research Triangle Park, NC 27711

Research and Development

EPA/600/SR-94/131 November 1994

EPA **Project Summary**

Replacing Solvent Cleaning with Aqueous Cleaning

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The report documents actions taken by Robert Bosch Corporation, Charleston, SC, in replacing the cleaning solvents 1,1-2trichloro-1,2,2-trifluoroethane (CFC-113) and trichloroethylene (TCE) with aqueous solutions. Bosch has succeeded in eliminating all their CFC-113 use and, so far, has eliminated two-thirds of their TCE use. Their goal is to completely free of chlorinated cleaning solvents by the end of 1995.

This Project Summary was developed by EPA's Air and Energy Engineering Research Laboratory, Research Triangle Park, NC, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Overview

Experience of the Bosch Company at Charleston, SC, indicates that, with innovative engineering, it is possible to reduce, even eliminate, the use of solvents for a range of cleaning applications.

These changes in cleaning have not only responded to the environmental goals of the Montreal Protocol and EPA's 33/50 program, but have also resulted in improved cleaning at dramatically reduced costs. An early key decision was to replace their aging, large, central degreasing stations with several small cleaning units, each designed and dedicated for cleaning just one part, at one step, in the product assembly process. This strategy demanded reassessment of each cleaning step and the identification of apparatus and chemistry for optimizing each aqueous replacement. The report summarizes the actions taken to achieve aqueous cleaning of four typical components, previously cleaned with chlorinated solvents. The report provides quantitative comparisons of cleaning performance and costs of the old chlorinated (1988) and the new aqueous (1992) cleaning methods. For each of these components, the new aqueous cleaning step matched or exceeded the cleanliness levels of the old chlorinated cleaning methods, and did so at similar or lower costs.

The solvent replacement program, which was carried out, resulted in a major reduction in the use of chlorinated solvents. The facility totally eliminated the use of CFC-113 by 1993, from 544,000 lb (250,000 kg) in 1988. It reduced the use of TCE from 133,00 lb (60,00 kg) in 1988 to 43,000 lb (20,000 kg) in 1992. This conversion to aqueous cleaning also resulted in major solvent and utility cost reductions. The total non-labor annual cost reduction for these categories was greater than 90% of the 1988 solvent and utilities costs.

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Charles H. Darvin is the EPA Project Officer (see below).

The complete report, entitled "Replacing Solvent Cleaning with Aqueous Cleaning," (Order No. PB95-129128/AS; Cost: $17.50; subject to change) will be available only from:

National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
Telephone: 703-487-4650

The EPA Project Officer can be contacted at:

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EPA/600/SR-94/131

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