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# Laboratory Scale Evaluation of Hydra-Tone Graff-Off™ Coconut Oil-Based Degreaser

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# Notice

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# Abstract

This technical and economic assessment evaluated the effectiveness of a biodegradable, coconut oil-based degreaser called Graff-Off™. In immersion ("cold") cleaning and rinse tests, Graff-Off™ was compared to a conventional chlorinated solvent 1,1,1 trichloroethane (TCA) and to an alkaline cleaner Aeroclean DN-30 (DN-30). The cleaning process for Graff-Off™ and TCA was at room temperature and that of DN-30 was at 71° C. Both alternatives were found to be technically superior to TCA. Both alternative degreasers had lower cleaner costs and allowed a greater surface area to be cleaned per unit volume of degreaser than the TCA. Estimated savings were significant and capital requirements were modest. An economic assessment based on net present value, internal rate of return, and payback period indicated that Graff-Off™ and the DN-30 alkaline cleaner were extremely attractive alternatives to TCA (TCA assessment was based on immersion "cold" cleaning without vaporization and without TCA recycling).

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# Acronymns and Abbreviations

| | |
|---|---|
| ASTM | American Society for Testing and Materials |
| CAA | Clean Air Act |
| CFC | chlorofluorocarbons |
| COCF | Chain of Custody Form |
| DN-30 | Aeroclean DN-30 – an alkaline cleaner |
| EPA | United States Environmental Protection Agency |
| FTIR | Fourier Transform Infrared Spectroscopy |
| HBFC | hydrogen bromine fluorocarbons |
| HCFC | hydrogen chlorofluorocarbons |
| HTCI | Hydra-tone Chemicals, Inc. |
| IRR | internal rate of return |
| NPV | net present value |
| NRMRL | National Risk Management Research Laboratory |
| NVR | non-volatile residue |
| PCE | perchloroethylene |
| PE | purchased equipment |
| P2 | Pollution Prevention |
| QC | quality control |
| TCA | 1,1,1 trichloroethane – a solvent cleaner |
| TCE | trichloroethylene |
| TO | technical order |
| U.S. EPA | United States Environmental Protection Agency |
| VOCs | volatile organic compounds |

# Foreword

The U.S. Environmental Protection Agency is charged by Congress with protecting the Nation's land, air, and water resources. Under a mandate of national environmental laws, the Agency strives to formulate and implement actions leading to a compatible balance between human activities and the ability of natural systems to support and nurture life. To meet this mandate, EPA's research program is providing data and technical support for solving environmental problems today and building a science knowledge base necessary to manage our ecological resources wisely, understand how pollutants affect our health, and prevent or reduce environmental risks in the future.

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E. Timothy Oppelt, Director
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