

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2002

DateRun: 04/03/2002

Experimenters: Jason Marshall

ClientType: Chemical Company

ProjectNumber: Project #1

Substrates: Stainless Steel

PartType: Coupon

Contaminants: Adhesive, Coatings, Paints, Resins/Rosins

Cleaning Methods:

Analytical Methods:

Purpose: To identify possible replacement cleaners for methylene chloride

Experimental Procedure:

Results: The first list contained products that have been used for resin removal. The second lists contained products that have been used for adhesive removal. The final list was for products used specifically to replace Methylene Chloride in resin/adhesive removal.

| Products that have been used for Resin Removal | | | | |
|------------------------------------------------|--------------------------|------------------|-----------------|--------|
| Company Name: | Product Name: | Classification: | Substrate: | Trials |
| Bio Chem Systems | Bio T 300 B | Semi-Aqueous | Stainless Steel | 2 |
| Bio Chem Systems | Bio T 300 B | Terpene | Stainless Steel | 2 |
| Bio Chem Systems | Bio T Max | Terpene | Aluminum | 5 |
| Bio Chem Systems | Bio T Max | Terpene | Plastic | 2 |
| Bio Chem Systems | Bio T Max | Terpene | Stainless Steel | 2 |
| Brulin Corporation | Compliance | Caustic | Aluminum | 2 |
| Calgon Corporation | Geo Guard 2215 | Alkaline Aqueous | Aluminum | 1 |
| Chrisal USA, Inc. | Super CMF 240 | Alkaline Aqueous | Stainless Steel | 1 |
| Church & Dwight | Armaklean E 2002 | Alkaline Aqueous | Brass | 4 |
| Fine Organic Corporation | FO 2085 M | Alkaline Aqueous | Aluminum | 1 |
| Finger Lakes Chemicals | Resineater | Terpene | Copper | 1 |
| Finger Lakes Chemicals | Resineater | Terpene | Nickel | 1 |
| Finger Lakes Chemicals | Resineater | Terpene | Stainless Steel | 1 |
| Gemtek Products | SC 1000 | Alkaline Aqueous | Stainless Steel | 1 |
| ISP Technologies | Ship Shape Resin Cleaner | Organic | Stainless Steel | 1 |
| Kyzen Corporation | Ionox FCR | Semi-Aqueous | Aluminum | 1 |
| Kyzen Corporation | Ionox HC 2 | Alcohol | Plastic | 1 |
| Loctite Corporation | 7360 | Ester | Aluminum | 1 |

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|----------------------|--------------------|------------------|-----------------|---|
| Oakite Products | Inproclean 3800 | Alkaline Aqueous | Stainless Steel | 1 |
| Oakite Products | Inproclean 4000 T | Organic Terpene | Aluminum | 1 |
| Oakite Products | Inproclean 4000 T | Organic Terpene | Brass | 3 |
| Solvent Kleene, Inc. | D-Greeze 500 LO | Organic | Stainless Steel | 1 |
| Tarksol, Inc. | Tarksol HTF-50 | Semi-Aqueous | Aluminum | 2 |
| Tarksol, Inc. | Tarksol HTF-50 | Semi-Aqueous | Stainless Steel | 1 |
| U.S. Polychem Corp. | Polychem A 2000 XS | Alkaline Aqueous | Stainless Steel | 1 |
| W.R. Grace & Co. | Daraclean 232 | Alkaline Aqueous | Stainless Steel | 1 |
| W.R. Grace & Co. | Daraclean 282 | Alkaline Aqueous | Stainless Steel | 1 |
| Warren Chemical Co | Sea Wash 8 | Neutral Aqueous | Aluminum | 4 |

Products that have been used for Adhesive Removal

| CompanyName | ProductName | Classification | Substrate | Trials |
|------------------|-----------------------|----------------------|-----------------|--------|
| Alconox, Inc. | Citranox | Acidic Aqueous | Glass/Quartz | 4 |
| Aremco | Crystalbond 590 S | Powder Detergent | Ceramics | 1 |
| Bio Chem Systems | Bio T 200 A | Terpene | Aluminum | 2 |
| Bio Chem Systems | Bio T 200 A | Terpene | Brass | 2 |
| Bio Chem Systems | Bio T 200 A | Terpene | Copper | 2 |
| Bio Chem Systems | Bio T 200 A | Terpene | Nickel | 2 |
| Bio Chem Systems | Bio T 200 A | Terpene | Plastic | 2 |
| Bio Chem Systems | Bio T 200 A | Terpene | Stainless Steel | 2 |
| Bio Chem Systems | Bio T 300 B | Semi-Aqueous Terpene | Aluminum | 1 |
| Bio Chem Systems | Bio T 300 B | Semi-Aqueous Terpene | Brass | 1 |
| Bio Chem Systems | Bio T 300 B | Semi-Aqueous Terpene | Copper | 1 |
| Bio Chem Systems | Bio T 300 B | Semi-Aqueous Terpene | Nickel | 1 |
| Bio Chem Systems | Bio T 300 B | Semi-Aqueous Terpene | Plastic | 1 |
| Bio Chem Systems | Bio T 300 B | Semi-Aqueous Terpene | Stainless Steel | 2 |
| Bio Chem Systems | Bio T Max | Semi-Aqueous Terpene | Plastic | 2 |
| Bio Chem Systems | Bio T Max | Semi-Aqueous Terpene | Stainless Steel | 2 |
| Bio Chem Systems | Bio T Parts Washer NR | Terpene | Aluminum | 3 |

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| | | | | |
|-------------------------|----------------------------------|----------------------|-----------------|---|
| Bio Chem Systems | Bio T Parts Washer NR | Terpene | Brass | 3 |
| Bio Chem Systems | Bio T Parts Washer NR | Terpene | Copper | 3 |
| Bio Chem Systems | Bio T Parts Washer NR | Terpene | Nickel | 3 |
| Bio Chem Systems | Bio T Parts Washer NR | Terpene | Stainless Steel | 3 |
| Bio Chem Systems | Bio T Parts Washer NR | Terpene | Steel | 3 |
| Bio Chem Systems | Green Stuff (6325) | Alkaline Aqueous | Aluminum | 3 |
| Bio Chem Systems | Green Stuff (6325) | Alkaline Aqueous | Brass | 3 |
| Bio Chem Systems | Green Stuff (6325) | Alkaline Aqueous | Copper | 3 |
| Bio Chem Systems | Green Stuff (6325) | Alkaline Aqueous | Nickel | 3 |
| Bio Chem Systems | Green Stuff (6325) | Alkaline Aqueous | Plastic | 3 |
| Bio Chem Systems | Green Stuff (6325) | Alkaline Aqueous | Stainless Steel | 3 |
| Buckeye International | Shopmaster RC | Ester | Aluminum | 1 |
| Buckeye International | Shopmaster RC | Ester | Brass | 1 |
| Buckeye International | Shopmaster RC | Ester | Copper | 1 |
| Buckeye International | Shopmaster RC | Ester | Stainless Steel | 1 |
| Church & Dwight | Armaklean E 2001 | Alkaline Aqueous | Aluminum | 1 |
| Church & Dwight | Armaklean E 2001 | Alkaline Aqueous | Stainless Steel | 1 |
| CSA Inc | Bio Safe 1023 | Hydrocarbon | Stainless Steel | 1 |
| Dynamold Solvents, Inc. | DS-104 | Petroleum Distillate | Aluminum | 1 |
| Dynamold Solvents, Inc. | DS-104 | Petroleum Distillate | Brass | 1 |
| Dynamold Solvents, Inc. | DS-104 | Petroleum Distillate | Copper | 1 |
| Dynamold Solvents, Inc. | DS-104 | Petroleum Distillate | Nickel | 1 |
| Dynamold Solvents, Inc. | DS-104 | Petroleum Distillate | Stainless Steel | 4 |
| Dynamold Solvents, Inc. | DS-108 | Petroleum Distillate | Aluminum | 1 |
| Dynamold Solvents, Inc. | DS-108 | Petroleum Distillate | Brass | 1 |
| Dynamold Solvents, Inc. | DS-108 | Petroleum Distillate | Ceramics | 1 |
| Dynamold Solvents, Inc. | DS-108 | Petroleum Distillate | Copper | 1 |
| Dynamold Solvents, Inc. | DS-108 | Petroleum Distillate | Nickel | 1 |
| Dynamold Solvents, Inc. | DS-108 | Petroleum Distillate | Stainless Steel | 1 |
| Ecolink | 2005 | HCFC | Electronics | 1 |
| Ecolink | 2005 | HCFC | Plastic | 1 |
| Ecolink | Heavy Weight Non Butyl Detergent | Alkaline Aqueous | Aluminum | 2 |

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|------------------------------|----------------------------------|------------------|-----------------|---|
| Ecolink | Heavy Weight Non Butyl Detergent | Alkaline Aqueous | Glass/ Quartz | 2 |
| Ecolink | Heavy Weight Non Butyl Detergent | Alkaline Aqueous | Stainless Steel | 2 |
| Ecolink | Positron | Organic | Aluminum | 1 |
| Ecolink | Positron | Organic | Brass | 1 |
| Ecolink | Positron | Organic | Ceramics | 1 |
| Ecolink | Positron | Organic | Copper | 1 |
| Ecolink | Positron | Organic | Nickel | 1 |
| Ecolink | Positron | Organic | Plastic | 1 |
| Ecolink | Positron | Organic | Stainless Steel | 1 |
| Ecolink | Safe Strip | Organic | Stainless Steel | 2 |
| Ecolink | VG 151 | Terpene | Stainless Steel | 1 |
| EMKAY Chemical Co | Safety Wash CRC | Alkaline Aqueous | Aluminum | 3 |
| EMKAY Chemical Co | Safety Wash CRC | Alkaline Aqueous | Brass | 3 |
| EMKAY Chemical Co | Safety Wash CRC | Alkaline Aqueous | Stainless Steel | 3 |
| Finger Lakes Chemicals | 1/1/02 | Terpene | Glass/ Quartz | 1 |
| Finger Lakes Chemicals | 1/1/02 | Terpene | Stainless Steel | 1 |
| Finger Lakes Chemicals | Resineater | Terpene | Stainless Steel | 1 |
| Finish Line Technologies Inc | Bio Degradable Degreaser | Semi-Aqueous | Aluminum | 1 |
| Finish Line Technologies Inc | Bio Degradable Degreaser | Semi-Aqueous | Brass | 1 |
| Finish Line Technologies Inc | Bio Degradable Degreaser | Semi-Aqueous | Stainless Steel | 1 |
| Gemtek Products | ODOR-EX | Alkaline Aqueous | Alloys | 1 |
| Gemtek Products | ODOR-EX | Alkaline Aqueous | Brass | 1 |
| Gemtek Products | ODOR-EX | Alkaline Aqueous | Copper | 1 |
| Gemtek Products | ODOR-EX | Alkaline Aqueous | Nickel | 1 |
| Gemtek Products | ODOR-EX | Alkaline Aqueous | Stainless Steel | 1 |
| General Chemical Corporation | Aluminex 5834 | Alkaline Aqueous | Aluminum | 1 |
| General Chemical Corporation | Aluminex 5834 | Alkaline Aqueous | Brass | 1 |
| General Chemical Corporation | Aluminex 5834 | Alkaline Aqueous | Copper | 1 |
| General Chemical Corporation | Aluminex 5834 | Alkaline Aqueous | Nickel | 1 |
| General Chemical Corporation | Aluminex 5834 | Alkaline Aqueous | Stainless Steel | 1 |

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|------------------------------|---------------------------------------|------------------|-----------------|---|
| General Chemical Corporation | Aquaclean 4784 | Caustic | Aluminum | 1 |
| General Chemical Corporation | Aquaclean 4784 | Caustic | Brass | 1 |
| General Chemical Corporation | Aquaclean 4784 | Caustic | Copper | 1 |
| General Chemical Corporation | Aquaclean 4784 | Caustic | Stainless Steel | 1 |
| Heatbath Corporation | Alu-Kleen 36 | Acidic Aqueous | Aluminum | 2 |
| Heatbath Corporation | Alu-Kleen 36 | Acidic Aqueous | Stainless Steel | 2 |
| Heatbath Corporation | Multi-Kleen LX 1573 | Alkaline Aqueous | Stainless Steel | 1 |
| Heatbath Corporation | Power Wash Cleaner BCR | Alkaline Aqueous | Aluminum | 3 |
| Heatbath Corporation | Power Wash Cleaner BCR | Alkaline Aqueous | Brass | 3 |
| Heatbath Corporation | Power Wash Cleaner BCR | Alkaline Aqueous | Copper | 3 |
| Heatbath Corporation | Power Wash Cleaner BCR | Alkaline Aqueous | Stainless Steel | 3 |
| Inland Technologies Inc | Citrasafe | Terpene | Aluminum | 2 |
| Inland Technologies Inc | Citrasafe | Terpene | Brass | 2 |
| Inland Technologies Inc | Citrasafe | Terpene | Copper | 2 |
| Inland Technologies Inc | Citrasafe | Terpene | Stainless Steel | 2 |
| Innovative Organics Inc | Amber Clean SC 11 | Neutral Aqueous | Stainless Steel | 1 |
| International Products Corp | LF 2100 | Alkaline Aqueous | Alloys | 1 |
| International Products Corp | LF 2100 | Alkaline Aqueous | Brass | 1 |
| International Products Corp | LF 2100 | Alkaline Aqueous | Copper | 1 |
| International Products Corp | LF 2100 | Alkaline Aqueous | Nickel | 1 |
| International Products Corp | LF 2100 | Alkaline Aqueous | Stainless Steel | 1 |
| ISP Technologies | Ship Shape Resin Cleaner | Organic | Stainless Steel | 1 |
| Loctite Corporation | 7360 | Ester | Plastic | 1 |
| MacDermid | ND Supreme | Alkaline Aqueous | Aluminum | 1 |
| MacDermid | ND Supreme | Alkaline Aqueous | Stainless Steel | 1 |
| Safe Science | Safe Science All Purpose (Industrial) | Alkaline Aqueous | Stainless Steel | 4 |
| Safe Science | Safe Science Concrete/ Graffiti | Alkaline Aqueous | Copper | 6 |

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|----------------------|---------------------------------|----------------------|-----------------|---|
| Safe Science | Safe Science Concrete/ Graffiti | Alkaline Aqueous | Nickel | 6 |
| Safe Science | Safe Science Concrete/ Graffiti | Alkaline Aqueous | Stainless Steel | 6 |
| Safe Science | Safe Science Engine Degreaser | Terpene | Stainless Steel | 4 |
| Smart Sonic | 440-R SMT Detergent | Alkaline Aqueous | Aluminum | 1 |
| Smart Sonic | 440-R SMT Detergent | Alkaline Aqueous | Brass | 1 |
| Smart Sonic | 440-R SMT Detergent | Alkaline Aqueous | Copper | 1 |
| Smart Sonic | 440-R SMT Detergent | Alkaline Aqueous | Nickel | 1 |
| Smart Sonic | 440-R SMT Detergent | Alkaline Aqueous | Stainless Steel | 1 |
| Smart Sonic | 440-R SMT Detergent | Alkaline Aqueous | Steel | 1 |
| Solvent Kleene, Inc. | D-Greeze 1000 | Petroleum Distillate | Aluminum | 2 |
| Solvent Kleene, Inc. | D-Greeze 1000 | Petroleum Distillate | Brass | 2 |
| Solvent Kleene, Inc. | D-Greeze 1000 | Petroleum Distillate | Copper | 2 |
| Solvent Kleene, Inc. | D-Greeze 1000 | Petroleum Distillate | Stainless Steel | 2 |
| Solvent Kleene, Inc. | D-Greeze 500 LO | Organic | Plastic | 2 |
| Solvent Kleene, Inc. | D-Greeze 500 LO | Organic | Stainless Steel | 1 |
| Solvent Kleene, Inc. | D-Greeze GL 55 | Alkaline Aqueous | Aluminum | 1 |
| Solvent Kleene, Inc. | D-Greeze GL 55 | Alkaline Aqueous | Stainless Steel | 1 |
| Today & Beyond | Beyond-2001 | Alkaline Aqueous | Aluminum | 3 |
| Today & Beyond | Beyond-2001 | Alkaline Aqueous | Brass | 3 |
| Today & Beyond | Beyond-2001 | Alkaline Aqueous | Copper | 3 |
| Today & Beyond | Beyond-2001 | Alkaline Aqueous | Nickel | 3 |
| Today & Beyond | Beyond-2001 | Alkaline Aqueous | Plastic | 3 |
| Today & Beyond | Beyond-2001 | Alkaline Aqueous | Stainless Steel | 3 |
| Today & Beyond | Beyond-2002 | Alkaline Aqueous | Aluminum | 3 |
| Today & Beyond | Beyond-2002 | Alkaline Aqueous | Brass | 3 |
| Today & Beyond | Beyond-2002 | Alkaline Aqueous | Copper | 3 |
| Today & Beyond | Beyond-2002 | Alkaline Aqueous | Nickel | 3 |
| Today & Beyond | Beyond-2002 | Alkaline Aqueous | Plastic | 3 |
| Today & Beyond | Beyond-2002 | Alkaline Aqueous | Stainless Steel | 3 |
| Today & Beyond | Beyond-2003 | Alkaline Aqueous | Aluminum | 3 |
| Today & Beyond | Beyond-2003 | Alkaline Aqueous | Brass | 3 |

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|---------------------|-------------------------------|------------------|-----------------|---|
| Today & Beyond | Beyond-2003 | Alkaline Aqueous | Copper | 3 |
| Today & Beyond | Beyond-2003 | Alkaline Aqueous | Nickel | 3 |
| Today & Beyond | Beyond-2003 | Alkaline Aqueous | Plastic | 3 |
| Today & Beyond | Beyond-2003 | Alkaline Aqueous | Stainless Steel | 3 |
| Today & Beyond | Beyond-2004 | Alkaline Aqueous | Aluminum | 3 |
| Today & Beyond | Beyond-2004 | Alkaline Aqueous | Brass | 3 |
| Today & Beyond | Beyond-2004 | Alkaline Aqueous | Copper | 3 |
| Today & Beyond | Beyond-2004 | Alkaline Aqueous | Nickel | 3 |
| Today & Beyond | Beyond-2004 | Alkaline Aqueous | Plastic | 3 |
| Today & Beyond | Beyond-2004 | Alkaline Aqueous | Stainless Steel | 3 |
| Today & Beyond | Beyond-2005 | Alkaline Aqueous | Aluminum | 3 |
| Today & Beyond | Beyond-2005 | Alkaline Aqueous | Brass | 3 |
| Today & Beyond | Beyond-2005 | Alkaline Aqueous | Copper | 3 |
| Today & Beyond | Beyond-2005 | Alkaline Aqueous | Nickel | 3 |
| Today & Beyond | Beyond-2005 | Alkaline Aqueous | Plastic | 3 |
| Today & Beyond | Beyond-2005 | Alkaline Aqueous | Stainless Steel | 3 |
| Today & Beyond | Beyond-2009 | Organic | Stainless Steel | 4 |
| Tower Products, Inc | Tower 270 Cleaner Concentrate | Alkaline Aqueous | Nickel | 1 |
| Tower Products, Inc | Tower 270 Cleaner Concentrate | Alkaline Aqueous | Stainless Steel | 1 |
| Tower Products, Inc | Tower 270 Cleaner Concentrate | Alkaline Aqueous | Steel | 1 |
| Turco Products Inc | Turco 5948 DPM | Alkaline Aqueous | Aluminum | 3 |
| Turco Products Inc | Turco 5948 DPM | Alkaline Aqueous | Copper | 3 |
| Turco Products Inc | Turco 5948 DPM | Alkaline Aqueous | Plastic | 3 |
| Turco Products Inc | Turco 5948 DPM | Alkaline Aqueous | Stainless Steel | 3 |
| U.S. Polychem Corp. | 87 RB | Hydrocarbon | Aluminum | 1 |
| U.S. Polychem Corp. | 87 RB | Hydrocarbon | Brass | 1 |
| U.S. Polychem Corp. | 87 RB | Hydrocarbon | Copper | 1 |
| U.S. Polychem Corp. | 87 RB | Hydrocarbon | Nickel | 1 |
| U.S. Polychem Corp. | 87 RB | Hydrocarbon | Stainless Steel | 1 |
| U.S. Polychem Corp. | Hydropurge HPL 790 | Caustic | Stainless Steel | 2 |
| U.S. Polychem Corp. | Product 69 MC | Alcohol | Stainless Steel | 3 |

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|-------------------------------|---------------------|------------------|-----------------|---|
| Universal Photonics | Uni Clear | Terpene | Ceramics | 2 |
| Valtech Corporation | Valtron SP 2250-2LF | Alkaline Aqueous | Stainless Steel | 3 |
| W.R. Grace & Co. | Daraclean 200 | Alkaline Aqueous | Aluminum | 1 |
| W.R. Grace & Co. | Daraclean 200 | Alkaline Aqueous | Brass | 1 |
| W.R. Grace & Co. | Daraclean 200 | Alkaline Aqueous | Copper | 1 |
| W.R. Grace & Co. | Daraclean 200 | Alkaline Aqueous | Nickel | 1 |
| W.R. Grace & Co. | Daraclean 200 | Alkaline Aqueous | Stainless Steel | 1 |
| Warren Chemical Co | Sea Wash 8 | Neutral Aqueous | Aluminum | 4 |
| Westford Chemical Corporation | Biosolve | Neutral Aqueous | Aluminum | 6 |
| Westford Chemical Corporation | Biosolve | Neutral Aqueous | Ceramics | 3 |
| Westford Chemical Corporation | Biosolve | Neutral Aqueous | Copper | 6 |
| Westford Chemical Corporation | Biosolve | Neutral Aqueous | Nickel | 6 |
| Westford Chemical Corporation | Biosolve | Neutral Aqueous | Stainless Steel | 6 |
| Westford Chemical Corporation | Biosolve | Neutral Aqueous | Steel | 3 |

Products Used Specifically to replace Methylene Chloride in resin/adhesive removal

| Cleaner Mfr | Cleaning Chem |
|------------------------------|---------------------------------------|
| AG Environmental Products | Soy Gold 2000 |
| Buckeye International Inc | Shopmaster |
| Chrisal USA Inc | Super CMF 240 |
| Delta Omega Technologies Ltd | DOT 111/113 |
| Dynamold Solvents Inc | DS 104 |
| Ecolink Inc | Safe Strip |
| Bio Systems | Solsafe 245 |
| Bio Systems | Bio T 300 B |
| Bio Systems | Bio T Max |
| Finger Lakes Chemicals | Resineater |
| Gemtek Products | SC 1000 |
| Gemtek Products | SC Supersolve |
| ISP Technologies | Safe Strip Resin Cleaner |
| Mix | Rochester Midland Split |
| Safe CleanUp | Super Neutral |
| Safe Science | Safe Science All Purpose (Industrial) |
| Savogran Company | SI # 4 Coating Remover |
| Savogran Company | SI # 8 Coating Remover |
| Savogran Company | HD 34 Cleaner Degreaser |
| Savogran Company | SI # 4 Coating Remover |

CLEANING LABORATORY EVALUATION SUMMARY

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|----------------------|-----------------|
| Solvent Kleene Inc | D Greeze 500 LO |
| Tarksol Incorporated | HTF 50 |
| Today & Beyond | Beyond 2009 |
| WR Grace & Co Conn | Daraclean 232 |

Summary:

Conclusion:

Cleaning projects vary from case-to-case. To obtain more detailed information about any of the products listed, contact the lab at (978)934-3133.

Please note: The Toxics Use Reduction Institute's Surface Cleaning Laboratory can supply MSDSs and any available Technical Data Sheets for all chemical cleaners tested. Not all cleaners tested are ranked equally for environmental, health and safety considerations; some are selected for comparative purposes only. The most accurate, up-to-date information concerning cleaning chemistries can be obtained at the Institute's Technology Transfer Center (TTC) using Database TOMES: Toxicological, Occupational, Medical and Environmental Series.