

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 1999  
 DateRun: 08/02/1999  
 Experimenters: Jason Marshall, Nicole Vayo  
 ClientType: Brazing-Heat Treating  
 ProjectNumber: Project #1  
 Substrates: Stainless Steel  
 PartType: Coupon  
 Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil  
 Cleaning Methods: Immersion/Soak  
 Analytical Methods: Gravimetric

Purpose: To evaluate possible aqueous replacement cleaners for Trichloroethylene.

Experimental Procedure: Six cleaners were selected for evaluation based on vendor supplied information and through the use of the lab's Effective Test Conditions database. The cleaners were made into five percent solutions using DI water in 600 ml beakers. The solutions were heated to 130 F on a hot plate. Twenty-one preweighed coupons were contaminated with the quench oil and weighed again. Three coupons per solution were cleaned for five minutes using stir-bar-agitated immersion. Rinsing was performed using a tap water bath at 120 F for 30 seconds. Coupons were dried using a Master Appliance Corp, Hot-air gun model HG-301A at 500 F for one minute. After returning to room temperature, the coupons were weighed again and cleaning efficiencies were calculated.

SUBSTRATE MATERIAL: Stainless Steel Coupons (202-316 B-80)

CONTAMINANTS: Quenching Oil (CAS #s64742-54-7; 64742-56-9; 8052-42-4)

CONTAMINATING PROCESS USED: Coupons were coated with quench oil using handheld swab.

Results: Three cleaning, AW Chesterton, Calgon and US Polychem, solutions removed over 90% of the quench oil from the coupons. The other three, WR Grace, Gemtek and Savogran, removed 86-90% of the oil and water removed only 78% of the oil. Table 2 lists the efficiencies for each of the cleaning solutions.

|          | AW Chesterton | Calgon | US Polychem | WR Grace | Gemtek | Savogran | DI Water |
|----------|---------------|--------|-------------|----------|--------|----------|----------|
| Coupon 1 | 96.29         | 91.35  | 97.5        | 89.04    | 92.05  | 83.63    | 79.35    |
| Coupon 2 | 96.75         | 95.87  | 98.19       | 91.17    | 92.84  | 88.17    | 80.46    |
| Coupon 3 | 98.61         | 94.28  | 96.81       | 89.62    | 84.45  | 87.76    | 76.02    |
| Ave      | 97.21         | 93.84  | 97.5        | 89.94    | 89.78  | 86.52    | 78.61    |
| Std Dev  | 1.23          | 2.29   | 0.69        | 1.1      | 4.63   | 2.51     | 2.31     |

Summary:

|                         |   |               |                    |                                     |                      |
|-------------------------|---|---------------|--------------------|-------------------------------------|----------------------|
| <b>Substrates:</b>      | Stainless Steel                                       |               |                    |                                     |                      |
| <b>Contaminants:</b>    | Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil |               |                    |                                     |                      |
| <b>Company Name:</b>    | <b>Product Name:</b>                                  | <b>Conc.:</b> | <b>Efficiency:</b> | <b>Effective:</b>                   | <b>Observations:</b> |
| AW Chesterton           | KPC 820 N   | 5             | 97.21              | <input checked="" type="checkbox"/> |                      |
| Calgon Corporation      | Geo Guard 2215  | 5             | 93.84              | <input checked="" type="checkbox"/> |                      |
| US Polychem Corporation | Polyspray Jet 790 P                                   | 5             | 97.50              | <input checked="" type="checkbox"/> |                      |
| Magnaflux               | Daraclean 282 GF                                      | 5             | 89.94              | <input type="checkbox"/>            |                      |
| Gemtek Products         | SC Aircraft & Metal Cleaner Super Concentrate         | 5             | 89.78              | <input type="checkbox"/>            |                      |
| Savogran Company        | Dirtex Prepaint Cleaner                               | 5             | 86.52              | <input type="checkbox"/>            |                      |
| Water                   | DI Water  | 100           | 78.61              | <input type="checkbox"/>            |                      |

Conclusion: The AW Chesterton, Calgon and US Polychem products were effective in removing over 94% of the quench oil. These three solutions will be used to clean client supplied parts.