

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2004  
 DateRun: 08/22/2004  
 Experimenters: Jason Marshall  
 ClientType: Jewelry Mfr  
 ProjectNumber: Project #1  
 Substrates: Brass  
 PartType: Coupon  
 Contaminants: Buffing/Polishing Compounds  
 Cleaning Methods: Immersion/Soak  
 Analytical Methods: Gravimetric

Purpose: To evaluate drop in replacement solvents for TCE in removing buffing compound.

Experimental Procedure: Sixteen products were selected from the laboratory's database of test results based on client specific information. Each product was used at full strength in 250 ml beakers at room temperature. Forty-eight preweighed CDA260 Brass coupons were coated with the Matchless Metal Polishing Company K55-278 Liquid Tripoli Buffing compound (1317-85-8) using a hand held swab. Coupons were allowed to sit overnight and weighed a second time to determine the amount of soil added to each coupon. Three coupons were cleaned in each product for 5 minutes with no agitation. Coupons were air dried at room temperature. Once coupons were dry, final weights were recorded and efficiencies were calculated.

Results: Four of the sixteen products removed over 75% of the buffing compound in the five minutes of room temperature soaking. Another four removed over 63% and three removed over 55% of the buffing compound. The table lists the amount of soil added, the amount remaining and the efficiency for each coupon cleaned.

| Cleaner        | Initial wt | Final wt | % Removed |
|----------------|------------|----------|-----------|
| AK 225         | 0.6983     | 0.6266   | 10.27     |
|                | 0.2376     | 0.1905   | 19.82     |
|                | 0.3403     | 0.2727   | 19.86     |
| CCA            | 0.2445     | 0.1164   | 52.39     |
|                | 0.2430     | 0.1090   | 55.14     |
|                | 0.2668     | 0.1052   | 60.57     |
| MCA            | 0.3134     | 0.1474   | 52.97     |
|                | 0.3613     | 0.1695   | 53.09     |
|                | 0.2837     | 0.0826   | 70.88     |
| Heavy Duty C   | 0.3338     | 0.1694   | 49.25     |
|                | 0.2587     | 0.1341   | 48.16     |
|                | 0.3803     | 0.2097   | 44.86     |
| Flux Remover C | 0.2879     | 0.0968   | 66.38     |
|                | 0.4980     | 0.2324   | 53.33     |
|                | 0.2381     | 0.0706   | 70.35     |
| HFE 7100       | 0.2726     | 0.2687   | 1.43      |
|                | 0.3541     | 0.3350   | 5.39      |
|                | 0.3045     | 0.2972   | 2.40      |
| HFE 71DE       | 0.4460     | 0.2445   | 45.18     |
|                | 0.3428     | 0.1255   | 63.39     |
|                | 0.2119     | 0.0631   | 70.22     |
| HFE 7200       | 0.4060     | 0.3934   | 3.10      |
|                | 0.5930     | 0.5733   | 3.32      |
|                | 0.3123     | 0.3079   | 1.41      |
| Ensolv         | 0.3454     | 0.0899   | 73.97     |
|                | 0.2464     | 0.0545   | 77.88     |
|                | 0.3096     | 0.0672   | 78.29     |
| Ensolv A       | 0.4083     | 0.1541   | 62.26     |
|                | 0.4395     | 0.1330   | 69.74     |
|                | 0.4287     | 0.1461   | 65.92     |

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|                |        |        |       |
|----------------|--------|--------|-------|
| Lenium CP      | 0.1554 | 0.0954 | 38.61 |
|                | 0.3560 | 0.2557 | 28.17 |
|                | 0.2719 | 0.1328 | 51.16 |
| Lenium ES      | 0.3629 | 0.0566 | 84.40 |
|                | 0.2583 | 0.0308 | 88.08 |
|                | 0.2802 | 0.0471 | 83.19 |
| Lenium GS      | 0.2393 | 0.0342 | 85.71 |
|                | 0.4664 | 0.1420 | 69.55 |
|                | 0.4294 | 0.2016 | 53.05 |
| Metalnox M6960 | 0.3864 | 0.1070 | 72.31 |
|                | 0.3407 | 0.0487 | 85.71 |
|                | 0.3839 | 0.0616 | 83.95 |
| Solvon PB      | 0.4200 | 0.1062 | 74.71 |
|                | 0.2570 | 0.0648 | 74.79 |
|                | 0.2187 | 0.0282 | 87.11 |
| Solvon IP      | 0.3878 | 0.1355 | 65.06 |
|                | 0.6035 | 0.2438 | 59.60 |
|                | 0.4632 | 0.1589 | 65.70 |

Summary:

|                               |                                 |               |                    |                                     |                      |
|-------------------------------|---------------------------------|---------------|--------------------|-------------------------------------|----------------------|
| <b>Substrates:</b>            | Brass                           |               |                    |                                     |                      |
| <b>Contaminants:</b>          | Buffing/Polishing Compounds     |               |                    |                                     |                      |
| <b>Company Name:</b>          | <b>Product Name:</b>            | <b>Conc.:</b> | <b>Efficiency:</b> | <b>Effective:</b>                   | <b>Observations:</b> |
| AGA Chemical                  | AK 225                          | 100           | 16.65              | <input type="checkbox"/>            |                      |
| DuPont                        | Vertrel CCA                     | 100           | 56.04              | <input type="checkbox"/>            |                      |
| DuPont                        | Vertrel MCA                     | 100           | 58.98              | <input type="checkbox"/>            |                      |
| Chem Free Corporation         | SW-2 Heavy Grease Formula       | 100           | 47.42              | <input type="checkbox"/>            |                      |
| Micro Care                    | Flux Remover C                  | 100           | 63.35              | <input checked="" type="checkbox"/> |                      |
| 3M                            | HFE 7100                        | 100           | 3.07               | <input type="checkbox"/>            |                      |
| 3M                            | HFE 71DE                        | 100           | 59.60              | <input type="checkbox"/>            |                      |
| 3M                            | HFE 7200                        | 100           | 2.61               | <input type="checkbox"/>            |                      |
| Enviro Tech International Inc | Ensolv                          | 100           | 76.72              | <input checked="" type="checkbox"/> |                      |
| Enviro Tech International Inc | Ensolv A                        | 100           | 65.97              | <input checked="" type="checkbox"/> |                      |
| Petroferm Inc                 | Lenium CP (no longer available) | 100           | 39.31              | <input type="checkbox"/>            |                      |
| Petroferm Inc                 | Lenium ES                       | 100           | 85.22              | <input checked="" type="checkbox"/> |                      |
| Petroferm Inc                 | Lenium GS                       | 100           | 65.44              | <input checked="" type="checkbox"/> |                      |
| Kyzen Corporation             | Metalnox M6960                  | 100           | 80.66              | <input checked="" type="checkbox"/> |                      |
| Poly Systems USA Inc          | Solvon Kreussler PB             | 100           | 78.87              | <input checked="" type="checkbox"/> |                      |
| Poly Systems USA Inc          | Solvon Kreussler IP             | 100           | 63.45              | <input checked="" type="checkbox"/> |                      |

Conclusion:

The eight products that removed over 60% of the contaminant will be used in the next trial using the second supplied contaminant.