

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2008  
 DateRun: 01/31/2008  
 Experimenters: Jason Marshall  
 ClientType: Electronics Manufacturer  
 ProjectNumber: Project #1  
 Substrates: Copper  
 PartType: Coupon  
 Contaminants: Cutting/Tapping Fluids  
 Cleaning Methods: Mechanical Agitation  
 Analytical Methods: Gravimetric

Purpose: To evaluate products on second supplied cutting fluid.

Experimental Procedure: The six products were selected based on effectiveness on the previous two trials. All six products and one of the client supplied solvents were used at full strength in 250 ml beakers at room temperature. Twenty-one preweighed coupons were coated with Master Chemical Corporation Trim Sol sf (8002-05-9, 61789-85-3, 68410-99-1, 68991-48-0, 68603-15-6) cutting fluid using a handheld swab. The contaminated coupons were weighed a second time to determine the amount of soil added. Three coupons were immersed into each cleaning solution and manual raised and lowered in the cleaning solution to provide minimal mechanical agitation. After one minute of cleaning, the coupons were removed and dried for 30 seconds using compressed air at room temperature. Following air drying, the coupons were weighed a final time to determine the amount of soil remaining. Efficiency for each coupon was determined and average cleaning results for each product were calculated.

Results: Three products removed over 90% of the cutting fluid within one minute. Two more products removed over 80%. Only one product was not successful in removing the second cutting fluid. The table below lists the amount of soil added, the amount remaining and the affiance for each coupon cleaned.

| Cleaner         | Initial wt | Final wt | % Removed |
|-----------------|------------|----------|-----------|
| Shopmaster RC   | 0.1374     | 0.0130   | 90.54     |
|                 | 0.0677     | 0.0171   | 74.74     |
|                 | 0.1189     | 0.0220   | 81.50     |
| Soy Clear 1500  | 0.1412     | 0.0126   | 91.08     |
|                 | 0.0774     | 0.0402   | 48.06     |
|                 | 0.0991     | 0.0297   | 70.03     |
| Ionox HC 2      | 0.1254     | 0.0074   | 94.10     |
|                 | 0.0672     | 0.0164   | 75.60     |
|                 | 0.1175     | 0.0103   | 91.23     |
| Solsafe 245     | 0.1576     | 0.0005   | 99.68     |
|                 | 0.1621     | 0.0000   | 100.00    |
|                 | 0.2679     | 0.0002   | 99.93     |
| SC Actisolv     | 0.1769     | 0.0103   | 94.18     |
|                 | 0.2246     | 0.0128   | 94.30     |
|                 | 0.0950     | 0.0095   | 90.00     |
| DS 104          | 0.1797     | 0.0002   | 99.89     |
|                 | 0.0977     | 0.0005   | 99.49     |
|                 | 0.1842     | 0.0005   | 99.73     |
| BioSpirits 8020 | 0.2779     | 0.0189   | 93.20     |
|                 | 0.1027     | 0.0179   | 82.57     |
|                 | 0.1653     | 0.0138   | 91.65     |

Summary:

|                           |                      |                        |                    |                                     |                      |
|---------------------------|----------------------|------------------------|--------------------|-------------------------------------|----------------------|
| <b>Substrates:</b>        |                      | Copper                 |                    |                                     |                      |
| <b>Contaminants:</b>      |                      | Cutting/Tapping Fluids |                    |                                     |                      |
| <b>Company Name:</b>      | <b>Product Name:</b> | <b>Conc.:</b>          | <b>Efficiency:</b> | <b>Effective:</b>                   | <b>Observations:</b> |
| Buckeye International     | Shopmaster RC        | 100                    | 82.26              | <input checked="" type="checkbox"/> |                      |
| AG Environmental Products | Soy Clear 1500       | 100                    | 69.72              | <input type="checkbox"/>            |                      |
| Kyzen Corporation         | Ionox HC 2           | 100                    | 86.98              | <input checked="" type="checkbox"/> |                      |

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|                  |                            |     |       |                                     |  |
|------------------|----------------------------|-----|-------|-------------------------------------|--|
| Bio Chem Systems | Solsafe 245                | 100 | 99.87 | <input checked="" type="checkbox"/> |  |
| Gemtek Products  | SC Actisolv Safety Solvent | 100 | 92.83 | <input checked="" type="checkbox"/> |  |
| Dysol            | DS 104 Wipe Solvent        | 100 | 99.70 | <input checked="" type="checkbox"/> |  |
| Lihac Eaton Inc  | Biospirits 8020            | 100 | 89.14 | <input checked="" type="checkbox"/> |  |

**Conclusion:**

Three products worked better the previously used solvent and two others performed almost as well. The top products will be used on supplied parts.