

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2019

DateRun: 08/15/2019

Experimenters: Nicole Kebler, Julie Nguyen

ClientType: Electroplating Company

ProjectNumber: Project #1

Substrates: Aluminum, Ceramics, Copper

PartType: Part

Contaminants: Lubricating/Lapping Oils, Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Gravimetric, Visual

Purpose: To evaluate the effectiveness of heated dimethyl glutarate (130F) on removing Mystery Oil and Rustlick 50/50 on ceramic, copper, and aluminum coupons.

Experimental Procedure: Nine pre-weighed coupons, three for each substrate, were used for each contaminant, and the coupons were contaminated halfway on one side using a hand-held swab. Contaminated weights were recorded before immersing three coupons of the same substrate into a beaker with heated (130F) dimethyl glutarate for 15 minutes. Visual observations were documented every five minutes for the complete 15 minutes before taking final weights.

Results:

| Soil | Substrate | Initial wt. of cont. | Final wt. cont. | % Cont. Removed | Average |
|-----------------|-----------|----------------------|-----------------|-----------------|---------|
| Soluble Oil #35 | Ceramic | 2.0268 | -0.0001 | 100.00 | 96.10 |
| | | 0.0344 | 0.004 | 88.37 | |
| | | 0.9067 | 0.0008 | 99.91 | |
| | Copper | 0.0207 | 0.0004 | 98.07 | 98.93 |
| | | 0.0233 | 0.0003 | 98.71 | |
| | | 0.0432 | 0.0000 | 100.00 | |
| | Aluminum | 0.0067 | 0.0000 | 100.00 | 98.40 |
| | | 0.0145 | 0.0007 | 95.17 | |
| | | 0.0080 | 0.0000 | 100.00 | |
| Rustlick 50/50 | Ceramic | -0.7849 | 0.0088 | 101.12 | 101.67 |
| | | 0.3119 | 0.0002 | 99.94 | |
| | | 0.0456 | -0.0018 | 103.94 | |
| | Copper | 0.1686 | 0.0007 | 99.58 | 98.22 |
| | | 0.0797 | 0.0031 | 96.11 | |
| | | 0.1060 | 0.0011 | 98.96 | |
| | Aluminum | 0.0922 | 0.0060 | 93.49 | 95.03 |
| | | 0.1668 | 0.0048 | 97.12 | |
| | | 0.0885 | 0.0049 | 94.46 | |

Visual Observations:

Contaminant: Mystery Oil (Soluble Oil #35)

| Substrate | 5 Mins | 10 Mins | 15 Mins |
|-----------|------------------------------------------|------------------------------------------|-------------|
| Ceramic | - no visible bubbles - clear dilution | - no visible bubbles - clear dilution | - no change |
| Copper | - no visible bubbles - clear dilution | - no visible bubbles - clear dilution | - no change |

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| | | | |
|----------|------------------------------------------|------------------------------------------|-------------|
| Aluminum | - no visible bubbles - clear dilution | - no visible bubbles - clear dilution | - no change |
|----------|------------------------------------------|------------------------------------------|-------------|

Contaminant: Rustlick 50/50

| Cleaner | 5 Mins | 10 Mins | 15 Mins |
|----------|-------------------------------------------------------------------------|-----------------------------------|------------------------------------------------------|
| Ceramic | - soil visibly removing from coupon - soil rising to top of dilution | - soil visible at top of solution | - soil visible at top of solution - solution blue |
| Copper | - soil rising to top of solution | - soil visible at top of solution | - soil visible at top of solution - solution blue |
| Aluminum | - soil rising to top of solution | - soil visible at top of solution | - soil visible at top of solution - solution blue |

Summary:

| | | | | | |
|----------------------|------------------------------------|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Aluminum, Ceramics, Copper | | | | |
| Contaminants: | Lubricating/Lapping Oils, Oil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Fisher Scientific | Dimethyl glutarate (CAS:1119-40-0) | 100% | | <input checked="" type="checkbox"/> | |

Conclusion:

Heated dimethyl glutarate was effective at removing Mystery Oil or Rustlick 50/50. Next step is to test on parts provided by the client.