

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2020
 DateRun: 08/10/2020
 Experimenters: Justin Kiander
 ClientType: Cleaner Manufacturer
 ProjectNumber: Project #10
 Substrates: Stainless Steel
 PartType: Coupon
 Contaminants: Oil
 Cleaning Methods:
 Analytical Methods: Gravimetric, Visual
 Purpose: To test the effectiveness of Envirox Storm against Green Works AP.

Experimental Procedure: Two different types of soils were prepared. The first soil, maintenance soil, consisted of 10 g carbon black, 10 g iron oxide, 100 ml WD-40, 100 ml hydraulic oil, and 100 ml gear oil. Each component was placed in a 750 ml beaker and mixed for 20 minutes at room temperature with a magnetic stirrer. The second soil, production soil, was made by mixing 200 ml Quench oil and 200 ml cutting oil for 20 minutes at room temperature using a magnetic stirrer.

Approximately 100 mg of each soil was applied to a pre-weighed and pre-cleaned stainless-steel coupon onto one side only with use of a hand swab. The maintenance soil for the first set of coupons was baked in an oven for 30 minutes at a temperature of 40° C (105° F). For the production soil, the second set of coupons was baked in an oven for 30 minutes at 105° C (220 ° F). The coupons were then allowed to cool to room temperature and weighed a second time and recorded as dry weights.

All products were used a room temperature. Beakers were filled with enough fresh cleaner solution to completely submerge the contaminated portion of the coupons. Each coupon was placed in a beaker and were washed for 30 minutes using un-heated immersion cleaning only. The washing was followed by a rinse using tap water for 30 seconds. After the rinse, all coupons were air dried for 60 minutes and then placed in an oven to dry at 105° C for 30 minutes. The coupons were allowed to cool to room temperature and final weights were recorded.

| Results: | Soil | Cleaner | Coupon | Initial wt. of cont. | Final wt. cont. | % Cont. Removed | Average |
|----------|------------------|----------------|--------|----------------------|-----------------|-----------------|---------|
| | Maintenance Soil | Envirox Storm | 76 | 0.5479 | 0.0049 | 99.11 | 95.53 |
| | | | 81 | 0.7216 | 0.0525 | 92.72 | |
| | | | 93 | 0.5950 | 0.0312 | 94.76 | |
| | | Green Works AP | 78 | 0.4632 | 0.0964 | 79.19 | 81.47 |
| | | | 80 | 0.5036 | 0.0913 | 81.87 | |
| | | | 86 | 0.6117 | 0.1018 | 83.36 | |
| | Production Soil | Envirox Storm | 30 | 0.1141 | 0.0161 | 85.89 | 92.36 |
| | | | 69 | 0.5151 | 0.0207 | 95.98 | |
| | | | 97 | 0.7324 | 0.0351 | 95.21 | |
| | | Green Works AP | 84 | 0.6438 | 0.0284 | 95.59 | 94.44 |
| | | | 85 | 0.4231 | 0.0215 | 94.92 | |
| | | | 94 | 0.4480 | 0.0322 | 92.81 | |

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|----------|----------------------|---|-----------------|--------------------|-------------------------------------|----------------------|
| Summary: | Substrates: | | Stainless Steel | | | |
| | Contaminants: | | Oil | | | |
| | Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| | Envirox LLC | Envirox Storm | 100 | 93.74 | <input checked="" type="checkbox"/> | |
| | Clorox Company | Green Works General Purpose Cleaner Concentrate | 100 | 87.96 | <input checked="" type="checkbox"/> | |

Conclusion: Envirox Storm was effective in the removal of both contaminants and performed significantly better in comparison with Green Works AP in the maintenance soil removal.