# CLEANING LABORATORY EVALUATION SUMMARY

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| SCL #: | 2013 |
| DateRun: | 05/29/2013 |
| Experimenters: | Jonathan Oljey, Digvijay Devkota |
| ClientType: | Cleaner Manufacturer |
| ProjectNumber: | Project #1 |
| Substrates: | Stainless Steel |
| PartType: | Coupon |
| Contaminants: | Oil |
| Cleaning Methods: | Immersion/Soak |
| Analytical Methods: | Gravimetric |
| Purpose: | To evaluate the efficiency of two cleaners in GS 34 Soil-1 and GS 34 Soil- 2 from stainless steel coupons using immersion technique. |
| Experimental Procedure: | Stainless steel coupons were weighed. Half of these were soiled with GS 34 Soil-1 and the other half were soiled with GS 34 Soil-2. Both soils were applied at the loading of 100mg. The soiled coupons were oven dried for 30 minutes with 40 °C for GS 34 Soil-1 and 105 °C for GS 34 Soil-2. Dirty weights were recorded for all of the coupons.<br>Products were diluted at the 8:1 and 16:1 dilutions using DI water. The mixture was stirred using magnetic stir bar in a beaker. Three coupons were placed in the beaker for 20 minutes of immersion at a time then. The coupons were rinsed in DI water for 20 minutes for the same coupons. After the immersion cleaning and rinsing, the coupons were left for air dry for 30 minutes and over dry for 30 minutes again with the same temperature as before. Final weights were recorded, efficiencies were calculated and recorded. Soil 1: Maintenance soil = 10 grams of carbon black, 10 grams iron oxide, 100 ml WD-40, 100 ml hydraulic oil, and 100 ml gear oil. Soil 2: Production soil = 200 ml Quench Oil and 200 ml cutting oil |
| Results: | At the 8:1, ECS 770 was not effective in removing GS 34 Soil-1 and GS 34 Soil-2 at the 8:1 dilution. Multiclean Fury was more effective in removing GS 34 Soil-2 from the surface.<br>At the 16:1 ECS 770 was not effective in removing GS 34 Soil-1 and Soil-2 from the surface of stainless steel. The Multiclean Fury was effective in removing both soils from the surface of the stainless steel. |

| Cleaner | Initial wt | Final wt | % Removed | Cleaner | Initial wt | Final wt | % Removed |
|---|---|---|---|---|---|---|---|
| ECS770_8-1_GS34Soil1 | | | | ECS770_16-1_GS34Soil1 | | | |
| | 0.0881 | 0.0164 | 81.38 | | 0.0922 | 0.0710 | 22.99 |
| | 0.0866 | 0.0302 | 65.13 | | 0.0843 | 0.0769 | 8.78 |
| | 0.1062 | 0.0393 | 62.99 | | 0.0860 | 0.0519 | 39.65 |
| | 0.0774 | 0.0262 | 66.15 | | 0.1015 | 0.0768 | 24.33 |
| | 0.1060 | 0.0316 | 70.19 | | 0.1065 | 0.0803 | 24.60 |
| | 0.1061 | 0.0527 | 50.33 | | 0.0918 | 0.0621 | 32.35 |
| | 0.0972 | 0.0064 | 93.42 | | 0.0952 | 0.0827 | 13.13 |
| | 0.1065 | 0.0334 | 68.64 | | 0.1093 | 0.0726 | 33.58 |
| | 0.0956 | 0.0319 | 66.63 | | 0.1010 | 0.0740 | 26.73 |
| MulticleanFury_8-1_GS34Soil1 | | | | MulticleanFury_16-1_GS34Soil2 | | | |
| | 0.0824 | 0.0424 | 48.54 | | 0.0989 | 0.0182 | 81.60 |
| | 0.0842 | 0.0531 | 36.94 | | 0.1015 | 0.0220 | 78.33 |
| | 0.0695 | 0.0393 | 43.45 | | 0.1018 | 0.0388 | 61.89 |
| | 0.0748 | 0.0093 | 87.57 | | 0.0958 | 0.0169 | 82.36 |
| | 0.1015 | 0.0119 | 88.28 | | 0.0974 | 0.0073 | 92.51 |
| | 0.0864 | 0.0518 | 40.05 | | 0.0903 | 0.0029 | 96.79 |
| | 0.0739 | 0.0179 | 75.78 | | 0.0870 | 0.0080 | 90.80 |
| | 0.0978 | 0.0046 | 95.3 | | 0.0903 | 0.0082 | 90.92 |
| | 0.0806 | 0.0109 | 86.48 | | 0.1072 | 0.0071 | 93.38 |
| ECS770_8-1_GS34Soil2 | | | | ECS770_16-1_Soil2 | | | |
| | 0.0962 | 0.0297 | 69.13 | | 0.1024 | 0.0466 | 54.49 |
| | 0.1009 | 0.041 | 59.37 | | 0.1092 | 0.0535 | 51.01 |
| | 0.0928 | 0.0434 | 53.23 | | 0.1142 | 0.0468 | 59.02 |
| | 0.0912 | 0.0303 | 66.78 | | 0.1005 | 0.0231 | 77.01 |

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|---|---|---|---|---|---|---|---|
| | 0.0870 | 0.0281 | 67.70 | | 0.1063 | 0.0350 | 67.07 |
| | 0.0725 | 0.0365 | 49.66 | | 0.1105 | 0.0315 | 71.49 |
| | 0.1012 | 0.0295 | 70.85 | | 0.0878 | 0.0260 | 70.39 |
| | 0.0986 | 0.0310 | 68.56 | | 0.1040 | 0.0506 | 51.35 |
| | 0.0966 | 0.0351 | 63.66 | | 0.1025 | 0.0045 | 95.61 |
| MulticleanFury_8-1_GS34Soil2 | | | | MulticleanFury_16-1_GS34Soil2 | | | |
| | 0.0781 | 0.0003 | 99.62 | | 0.0724 | 0.0050 | 93.09 |
| | 0.0777 | 0.0002 | 99.74 | | 0.0922 | 0.0050 | 94.58 |
| | 0.1020 | 0.0021 | 97.94 | | 0.1665 | 0.0735 | 55.86 |
| | 0.0962 | 0.0008 | 99.17 | | 0.1044 | 0.0136 | 86.97 |
| | 0.1078 | 0.0005 | 99.54 | | 0.1002 | 0.0092 | 90.82 |
| | 0.0871 | 0.0156 | 82.09 | | 0.1078 | 0.0120 | 88.87 |
| | 0.0873 | 0.0039 | 95.53 | | 0.1048 | 0.0021 | 98.00 |
| | 0.0915 | 0.0018 | 98.31 | | 0.1156 | 0.0033 | 97.15 |
| | 0.0915 | 0.0019 | 97.92 | | 0.0911 | 0.0066 | 92.76 |

Summary:

| **Substrates:** | Stainless Steel | | | | |
|---|---|---|---|---|---|
| **Contaminants:** | Oil | | | | |
| **Company Name:** | **Product Name:** | **Conc.:** | **Efficiency:** | **Effective:** | **Observations:** |
| Enviroclean Solutions | ECS 770 Hard Surface Degreaser-Cleaner | 12.5 | 66.32 | ☐ | GS Soil 1 |
| Enviroclean Solutions | ECS 770 Hard Surface Degreaser-Cleaner | 6.25 | 45.76 | ☐ | GS Soil 2 |
| Tower Products Inc | Multi clean Fury 80 product | 12.5 | 81.86 | ☐ | GS Soil 1 |
| Tower Products Inc | Multi clean Fury 80 product | 6.25 | 87.04 | ☑ | GS Soil 2 |

Conclusion: The Multiclean Fury product worked better at both dilutions than the ECS 770 product.