# CLEANING LABORATORY EVALUATION SUMMARY

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|---|---|
| SCL #: | 2002 |
| DateRun: | 02/28/2002 |
| Experimenters: | Jason Marshall |
| ClientType: | Electromagnetic Manufacturer |
| ProjectNumber: | Project #3 |
| Substrates: | Sterling/Silver |
| PartType: | Part |
| Contaminants: | Lubricating/Lapping Oils |
| Cleaning Methods: | Ultrasonics |
| Analytical Methods: | OSEE |
| Purpose: | Follow up experiment based on client input |

Experimental Procedure:

Four products that were moderately successful during previous trial were diluted to 5% using DI water in 600 ml beakers and heated to 140 F on a hot plate. Solutions were immersed in a Crest 25 kHz ultrasonic tank filled with water at 140 F and degassed for 5 minutes.

Five pieces of silver tape were precleaned in Oakite Inproclean 3800 for 5 minutes using the ultrasonic tank. Baseline OSEE readings were measured. Each piece of tape was thinly coated with Atofina Copperskin 510 metal working compound (CAS#s: 64742-52-5, 123-95-5, 8016-28-2, 8002-13-9) . The contaminant was applied with a hand held swab and then wiped with a second tissue to simulate the amount of contaminant present after the drawing process. A second set of readings were recorded to determine the effect of the drawing compound on the OSEE readings of the silver tape.

Each piece of tape was cleaned for 4 seconds in the ultrasonic tank, followed by a 1 second DI water rinse at 140 F also in the ultrasonic tank. Parts were dried using a Master Appliance heat gun at 500 F for 10 seconds. Final OSEE Readings were made and compared to initial baseline.

For any cleaner that does not successfully clean at 4 seconds, a follow up cleaning will be performed under the same conditions except for the cleaning time. An 8 second cleaning time will be used.

Results:

Only one product, Crystal Simple Green, was successful in cleaning the silver tape in the 4 second cleaning. All of the cleaners except the BCS product showed improvement from the two-1 second cleaning results from the previous trial. After the 8 second cleaning, all of the products except the Houghton MTC-53 were effective at removing the lubricant from the tape. The tables below show the OSEE readings for both cleaning times.

| 4 Second Cleaning | | | | | |
|---|---|---|---|---|---|
| Cleaner | OSEE | Reading 1 | Reading 2 | Reading 3 | Average |
| | Baseline | 978 | 992 | 976 | 982.00 |
| BCS | Dirty | 38 | 42 | 98 | 59.33 |
| | Final | 393 | 810 | 394 | 532.33 |
| | Baseline | 981 | 989 | 991 | 987.00 |
| Brulin | Dirty | 38 | 50 | 45 | 44.33 |
| | Final | 847 | 981 | 872 | 900.00 |
| | Baseline | 982 | 992 | 991 | 988.33 |
| Houghton | Dirty | 123 | 43 | 55 | 73.67 |
| | Final | 966 | 652 | 988 | 868.67 |
| | Baseline | 987 | 780 | 987 | 918.00 |
| Sunshine | Dirty | 26 | 32 | 51 | 36.33 |
| | Final | 978 | 978 | 971 | 975.67 |
| | Baseline | 976 | 978 | 375 | 776.33 |
| Today | Dirty | 39 | 58 | 36 | 44.33 |
| | Final | 973 | 697 | 987 | 885.67 |
| | | | | | |
| 8 Second Cleaning | | | | | |
| Cleaner | OSEE | Reading 1 | Reading 2 | Reading 3 | Average |
| | Baseline | 968 | 980 | 983 | 977.00 |
| BCS | Dirty | 56 | 62 | 30 | 49.33 |

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|---|---|---|---|---|---|
| | Final | 980 | 982 | 978 | 980.00 |
| | Baseline | 974 | 974 | 978 | 975.33 |
| Brulin | Dirty | 59 | 14 | 54 | 42.33 |
| | Final | 977 | 986 | 802 | 921.67 |
| | Baseline | 948 | 965 | 974 | 962.33 |
| Houghton | Dirty | 32 | 53 | 65 | 50.00 |
| | Final | 582 | 766 | 175 | 507.67 |
| | Baseline | 987 | 979 | 978 | 981.33 |
| Today | Dirty | 56 | 47 | 62 | 55.00 |
| | Final | 977 | 968 | 979 | 974.67 |

Summary:

| **Substrates:** | Sterling/Silver | | | | |
|---|---|---|---|---|---|
| **Contaminants:** | Lubricating/Lapping Oils | | | | |
| **Company Name:** | **Product Name:** | **Conc.:** | **Efficiency:** | **Effective:** | **Observations:** |
| BCS Company | 251 SR | 5 | | ☑ | 8 seconds |
| Brulin Corporation | Aquavantage 1400 | 5 | | ☑ | 8 seconds |
| Houghton International | MTC 53 | 5 | | ☐ | |
| Simple Green | Crystal Simple Green Industrial Cleaner & Degreaser | 5 | | ☑ | 4 seconds |
| Today & Beyond | Beyond 2005 | 5 | | ☑ | 8 seconds |

Conclusion: Cleaning for 8 seconds yielded the highest number of effective products. Only one product did not show improvement with the additional cleaning.