

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2020  
 DateRun: 09/01/2020  
 Experimenters: Justin Kiander  
 ClientType: Metal Finishing  
 ProjectNumber: Project #1  
 Substrates: Steel  
 PartType: Coupon  
 Contaminants: Oil  
 Cleaning Methods: Immersion/Soak  
 Analytical Methods: Gravimetric, Visual

Purpose: The purpose of this experiment was to determine the effectiveness of 4 selected cleaners in removing Vanishing Oil from TURI zinc plated steel coupons using heated immersion.

Experimental Procedure: Four cleaners were prepared to the following concentrations: Liquinox 1% conc., Surface Cleanse 930 5% conc., Sta Sol ESS 160 100% conc., Smart Solve 605 100% conc. Solutions were placed onto hot plates and heated to 100°F. Three zinc plated steel coupons were obtained for each of the four cleaners. An initial weight was taken, then coupons were soiled with Vanishing Oil provided by the company and a soiled weight was recorded. Once solutions reached the proper temperature, coupons were submerged into their respective cleaners for 15 minutes. After 15 minutes had passed, coupons were removed from the solutions and dried with an air gun on the cool setting. Once coupons were dried, a clean weight was determined. A wipe step was conducted after clean weights were obtained and another weight measurement was taken to determine if wiping helped in the removal process. Effectiveness of the cleaners was then determined.

Results: Pre-wipe:

| Cleaner             | Initial wt. of cont. | Final wt. of cont. | % Cont. Removed | %AVG   |
|---------------------|----------------------|--------------------|-----------------|--------|
| Liquinox            | 0.0121               | 0.0033             | 72.73           | 107.72 |
|                     | 0.0158               | -0.0009            | 105.7           |        |
|                     | 0.0076               | -0.0034            | 144.74          |        |
| Surface Cleanse 930 | 0.0585               | 0.0032             | 94.53           | 76.69  |
|                     | 0.0164               | 0.011              | 32.93           |        |
|                     | 0.023                | -0.0006            | 102.61          |        |
| Sta Sol ESS 160     | 0.0299               | 0.0045             | 84.95           | 75.16  |
|                     | 0.02                 | 0.0156             | 22              |        |
|                     | 0.0135               | -0.0025            | 118.52          |        |
| Smart Solve 605     | 0.029                | 0.0063             | 78.28           | 64.72  |
|                     | 0.0126               | 0.0084             | 33.33           |        |
|                     | 0.0149               | 0.0026             | 82.55           |        |

Post-wipe:

| Cleaner             | Initial wt. of cont. | Final wt. of cont. | %Cont. Removed | %AVG   |
|---------------------|----------------------|--------------------|----------------|--------|
| Liquinox            | 0.0121               | 0.0024             | 80.17          | 110.62 |
|                     | 0.0158               | -0.0011            | 106.96         |        |
|                     | 0.0076               | -0.0034            | 144.74         |        |
| Surface Cleanse 930 | 0.0585               | 0.0038             | 93.50          | 91.64  |
|                     | 0.0164               | 0.0059             | 64.02          |        |
|                     | 0.0230               | -0.0040            | 117.39         |        |
| Sta Sol ESS 160     | 0.0299               | 0.0036             | 87.96          | 95.73  |
|                     | 0.0200               | 0.0046             | 77.00          |        |
|                     | 0.0135               | -0.0030            | 122.22         |        |
| Smart Solve 605     | 0.0290               | 0.0026             | 91.03          | 92.36  |
|                     | 0.0126               | 0.0048             | 61.90          |        |
|                     | 0.0149               | -0.0036            | 124.16         |        |

Summary:

## CLEANING LABORATORY EVALUATION SUMMARY

|                                    |  |               |                    |                                     |                                    |
|------------------------------------|--|---------------|--------------------|-------------------------------------|------------------------------------|
| <b>Substrates:</b>                 | Steel                                    |               |                    |                                     |                                    |
| <b>Contaminants:</b>               | Oil                                      |               |                    |                                     |                                    |
| <b>Company Name:</b>               | <b>Product Name:</b>                     | <b>Conc.:</b> | <b>Efficiency:</b> | <b>Effective:</b>                   | <b>Observations:</b>               |
| Alconox Inc                        | Liquinox                                 | 1%            | 110.62             | <input checked="" type="checkbox"/> | Minimal improvement with a wipe.   |
| International Products Corporation | Surface Cleanse Concentrated Neutral 930 | 5%            | 91.64              | <input checked="" type="checkbox"/> | Significant improvement with wipe. |
| JR Hess & Co., Inc.                | Sta-Sol ESS 160                          | 100%          | 95.73              | <input checked="" type="checkbox"/> | Significant improvement with wipe. |
| United Laboratories International  | Smart Solve 605                          | 100%          | 92.36              | <input checked="" type="checkbox"/> | Significant improvement with wipe. |

**Conclusion:**

The wipe step aided in the removal of the Vanishing Oil. After the wipe step, all cleaners were effective in removing the soil. Liquinox removed an average of 110.62% soil, Surface Cleanse 930 removed an average of 91.64%, Sta Sol ESS 160 removed an average of 95.73%, and Smart Solve 605 removed an average of 92.36%. The next step would be to incorporate a rinse step into the experiment to replace the wipe.