

# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2017  
 DateRun: 07/24/2017  
 Experimenters: Alicia McCarthy, Hayley Byra  
 ClientType: General  
 ProjectNumber: Project #1  
 Substrates: Aluminum  
 PartType: Coupon  
 Contaminants: Lubricating/Lapping Oils  
 Cleaning Methods: Immersion/Soak  
 Analytical Methods: Gravimetric, Visual

Purpose: To evaluate the effectiveness of five drop-in solvents at removing aged lubricant on aluminum alloys.

Experimental Procedure: Prew weighed aluminum coupons were tested for each cleaner. Coupons were soiled with Blasocut 2000 Universal lubricant (CAS 64742-52-5; 61790-44-1; 68608-26-4; 63449-39-8; 107-41-5; 770-35-4) using a swab to cover the bottom third of the substrate and air dried for 20 minutes. Coupons were then soaked in water for 10 minutes and air dried for four days before recording dirty weights. Coupons were immersed, three at a time, in a beaker with 200ml of the chosen cleaner at room temperature (68 F) for five minutes. Visual observations were taken during this time, and final weights were recorded after cleaning. This process was repeated for each cleaner on Blasocut 2000 Universal.

| Cleaner        | Initial wt. | Final wt. | % Removed | Average % Removed |
|----------------|-------------|-----------|-----------|-------------------|
| Fluosolv CX    | 0.0222      | 0.0031    | 86.04     | 78.16             |
|                | 0.0424      | 0.0123    | 70.99     |                   |
|                | 0.0430      | 0.0097    | 77.44     |                   |
| Fluosolv NC    | 0.0646      | 0.0009    | 98.61     | 98.07             |
|                | 0.0857      | 0.0016    | 98.13     |                   |
|                | 0.0475      | 0.0012    | 97.47     |                   |
| Solstice PF    | 0.0653      | 0.0011    | 98.32     | 98.37             |
|                | 0.1009      | 0.0027    | 97.32     |                   |
|                | 0.0938      | 0.0005    | 99.47     |                   |
| Solstice PF-2A | 0.0692      | 0.0012    | 98.27     | 98.09             |
|                | 0.0580      | 0.0013    | 97.76     |                   |
|                | 0.0735      | 0.0013    | 98.23     |                   |
| Vertrel Sion   | 0.1478      | 0.0000    | 100.00    | 99.62             |
|                | 0.0960      | 0.0005    | 99.48     |                   |
|                | 0.1123      | 0.0007    | 99.38     |                   |

Fluosolv CX had residue still on the coupons after five minutes of immersion. The other four drop-in solvents performed the same and no soil was visible after cleaning.

| <b>Substrates:</b>             |                     | Aluminum                 |             |                                     |               |
|--------------------------------|---------------------|--------------------------|-------------|-------------------------------------|---------------|
| <b>Contaminants:</b>           |                     | Lubricating/Lapping Oils |             |                                     |               |
| Company Name:                  | Product Name:       | Conc.:                   | Efficiency: | Effective:                          | Observations: |
| NuGeneration Technologies, LLC | FluoSolv CX         | 100                      | 78.16       | <input type="checkbox"/>            |               |
| NuGeneration Technologies, LLC | FluoSolv NC 786     | 100                      | 98.07       | <input checked="" type="checkbox"/> |               |
| Honeywell                      | Solstice PF with N2 | 100                      | 98.37       | <input checked="" type="checkbox"/> |               |

# CLEANING LABORATORY EVALUATION SUMMARY

|           |                        |     |       |                                     |  |
|-----------|------------------------|-----|-------|-------------------------------------|--|
| Honeywell | Solstice PF-2A with N2 | 100 | 98.09 | <input checked="" type="checkbox"/> |  |
| DuPont    | Vertrel Sion           | 100 | 99.62 | <input checked="" type="checkbox"/> |  |

**Conclusion:**

Four of the five drop-in solvents were effective at removing aged Blasocut 2000 Universal on aluminum. Next step would be to try incorporating agitation and increase immersion time. Not all products will be used in future testing due to EHS criteria and performance.