

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2017
 DateRun: 07/11/2017
 Experimenters: Alicia McCarthy, Hayley Byra
 ClientType: General
 ProjectNumber: Project #1
 Substrates: Aluminum
 PartType: Coupon
 Contaminants: Waxes
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric, Visual

Purpose: To evaluate the effectiveness of five drop-in solvents at removing wax from aluminum alloys.

Experimental Procedure: Preweighed aluminum coupons were tested for each cleaner. Coupons were soiled with Lenox Lube Tube Wax (CAS:8002-74-2; 57-11-4; 5989-27-5) using a swab to cover the bottom third of the substrate and dirty weights were recorded. 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.

| Cleaner | Initial wt. | Final wt. | % Removed | Average % Removed |
|----------------|-------------|-----------|-----------|-------------------|
| Fluosolv CX | 0.1554 | 0.1326 | 14.67 | 18.02 |
| | 0.0947 | 0.0767 | 19.01 | |
| | 0.0869 | 0.0692 | 20.37 | |
| Fluosolv NC | 0.8361 | 0.719 | 14.01 | 14.91 |
| | 0.8227 | 0.6897 | 16.17 | |
| | 1.1123 | 0.9504 | 14.56 | |
| Solstice PF | 0.8529 | 0.664 | 22.15 | 16.35 |
| | 0.8597 | 0.7561 | 12.05 | |
| | 0.8457 | 0.7202 | 14.84 | |
| Solstice PF-2A | 0.5232 | 0.4318 | 17.47 | 21.24 |
| | 0.416 | 0.3098 | 25.53 | |
| | 0.4061 | 0.3219 | 20.73 | |
| Vertrel Sion | 0.474 | 0.3752 | 20.84 | 41.73 |
| | 0.7537 | 0.2876 | 61.84 | |
| | 0.7268 | 0.4179 | 42.5 | |

Although drop-in solvents were ineffective at removing the wax completely, the wax was slightly lifting off the coupon with Fluosolv NC. An increase in immersion time may remove a higher percentage of the wax.

Summary:

| Substrates: | Aluminum | | | | |
|--------------------------------|------------------------|--------|-------------|--------------------------|---------------|
| Contaminants: | Waxes | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| NuGeneration Technologies, LLC | FluoSolv CX | 100 | 18.02 | <input type="checkbox"/> | |
| NuGeneration Technologies, LLC | FluoSolv NC 786 | 100 | 14.91 | <input type="checkbox"/> | |
| Honeywell | Solstice PF with N2 | 100 | 16.35 | <input type="checkbox"/> | |
| Honeywell | Solstice PF-2A with N2 | 100 | 21.24 | <input type="checkbox"/> | |

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| DuPont | Vertrel Sion | 100 | 41.73 | <input type="checkbox"/> | |
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Conclusion:

All five drop-in solvents were ineffective at removing wax from aluminum. Next step would be to add agitation and increase immersion time. Not all products will be evaluated in future testing due to EHS criteria and performance.