

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2005

DateRun: 04/08/2005

Experimenters: Jason Marshall

ClientType: Wire & Cable Mfr

ProjectNumber: Project #1

Substrates: Aluminum

PartType: Coupon

Contaminants: Mold Releases

Cleaning Methods: Ultrasonics

Analytical Methods: Gravimetric

Purpose: To evaluate semi-aqueous products for mold release cleaning using heated ultrasonics.

Experimental Procedure: Seven products were selected from the lab's database. The products were used at full strength. Products were heated to 120 F using a hot plate. Each product was suspended into a Crest 40 kHz ultrasonic tank filled with water at 120 F. The cleaning solutions were degassed for 5 minutes.

Twenty-one preweighed coupons were first coated with Valspar MR 225 mold release (100-41-4, 1330-20-7, 8052-41-3, 67-63-0, 108-88-3, 110-82-7, 64742-89-8), followed by a second coating with Valspar MR 225 Aerosol (75-28-5, 74-98-6, 100-41-4, 75-09-2). The coupons were placed into a convection oven at 150 F and allowed to cure overnight. After the coupons were cooled to room temperature, a second set of weights were recorded to determine the amount of contaminants were added.

Three coupons were cleaned in each product for five minutes using ultrasonic energy. After cleaning the coupons were removed and dried using compressed air at room temperature. Final weights were to be recorded after coupons were dry and efficiencies were calculated for each product.

Results: Six of the eight products were effective in removing over 80% of the contaminant mix after five minutes of ultrasonic cleaning. One product, Solsafe 245 removed 111%. Further testing would need to be conducted to ensure damage was not being done to the aluminum substrate and therefore this product was not considered to be effective. Finally, the last product, Canola Gold 110 was found to have removed over 97% of the contaminant even though the initial cleaning efficiency was only 56%. When the coupons were wiped with a paper towel, the remaining cleaner residue was removed resulting in the higher efficiency. A similar improvement was found for two of the three DBE 5 cleaned coupons. Efficiency increased from 83% to 93%. The table below lists the initial weights, final weights and efficiencies for each coupon cleaned.

| Cleaner | Initial wt | Final wt | % Removed |
|-----------------|------------|----------|-----------|
| Bio T Max | 0.0554 | 0.0054 | 90.25 |
| | 0.0401 | 0.0028 | 93.02 |
| | 0.0511 | 0.0006 | 98.83 |
| Solsafe 245 | 0.0365 | -0.0062 | 116.99 |
| | 0.0422 | -0.0030 | 107.11 |
| | 0.0527 | -0.0053 | 110.06 |
| DS 104 | 0.0413 | 0.0008 | 98.06 |
| | 0.0422 | 0.0006 | 98.58 |
| | 0.0426 | 0.0001 | 99.77 |
| D Greeze 500 Lo | 0.0356 | 0.0014 | 96.07 |
| | 0.0548 | 0.0057 | 89.60 |
| | 0.0360 | 0.0077 | 78.61 |
| Canola Gold 110 | 0.0236 | 0.0166 | 29.66 |
| | 0.0327 | 0.0090 | 72.48 |
| | 0.0226 | 0.0077 | 65.93 |
| SC Maxisolv | 0.0463 | 0.0014 | 96.98 |
| | 0.0444 | -0.0008 | 101.80 |
| | 0.0302 | -0.0005 | 101.66 |
| DBE 5 | 0.0392 | -0.0005 | 101.28 |
| | 0.0335 | 0.0033 | 90.15 |
| | 0.0317 | 0.0128 | 59.62 |

Wiped Surfaces

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| Cleaner | Initial wt | Dirty wt | % Removed |
|------------------|------------|----------|-----------|
| Canola Gold wipe | 0.0236 | -0.0002 | 100.85 |
| | 0.0327 | -0.0003 | 100.92 |
| | 0.0226 | 0.0018 | 92.04 |
| DBE 5 wipe | 0.0335 | 0.0000 | 100.00 |
| | 0.0317 | 0.0068 | 78.55 |
| | 0.0392 | -0.0005 | 101.28 |

Summary:

| Substrates: | Aluminum | | | | |
|---------------------------|--------------------------|--------|-------------|-------------------------------------|-----------------|
| Contaminants: | Mold Releases | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Bio Chem Systems | Bio T Max | 100 | 94.03 | <input checked="" type="checkbox"/> | |
| Bio Chem Systems | Solsafe 245 | 100 | 111.38 | <input type="checkbox"/> | |
| Dysol | DS 104 Wipe Solvent | 100 | 98.80 | <input checked="" type="checkbox"/> | |
| Transene Company, Inc. | D Greeze 500 LO | 100 | 88.09 | <input checked="" type="checkbox"/> | |
| AG Environmental Products | Canola Gold CE110 | 100 | 56.02 | <input type="checkbox"/> | 97.93 with wipe |
| Gemtek Products | Safe Care (SC) Maxi Solv | 100 | 100.14 | <input checked="" type="checkbox"/> | |
| Invista S.a.r.l | Flexisolv DBE 5 ester | 100 | 83.68 | <input checked="" type="checkbox"/> | 93.27 with wipe |

Conclusion:

The semi-aqueous products were very effective when used with ultrasonic cleaning.