

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2001
 DateRun: 08/23/2001
 Experimenters: Jason Marshall
 ClientType: Electronics Manufacturer
 ProjectNumber: Project #1
 Substrates: Ceramics
 PartType: Coupon
 Contaminants: Adhesive
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric
 Purpose: Evaluating cleaners for removal of 590 adhesive.

Experimental Procedure: Five cleaners were selected based on the previous trials. A sixth cleaner was also evaluated based on client request (590 Stripper). Luminox was used diluted to 30% with DI water in a 250 ml beaker. The 590 Stripper was made up according to client specifications, 5 oz into 1000 ml beaker. The remaining four cleaners were used at full strength. DS 108 was heated to 100 F and the other five were heated to 140 F on a hot plate. Eighteen preweighed ceramic coupons were coated with the Crystalbond 590 by heating the adhesive with a heat gun. After cooling to room temperature, "dirty" weights were measured. Three coupons were cleaned in each solution for 60 minutes. Observations were made after 10, 40 and 60 minutes.

Results: Two products, Buckeye Shopmaster and Ecolink Safe Strip, removed nearly all of the Crystalbond 590. Two other products, Dynamold DS 108 and Aremco 590 S Stripper removed over 80% of the contaminant. See Table 1 below for the efficiencies for each cleaner.

Table 1 Calculated Effectiveness

| Cleaner | Coupon 1 | Coupon 2 | Coupon 3 | Std Dev |
|---------------|----------|----------|----------|---------|
| Luminox | -18.08 | -2.59 | 2.57 | 10.75 |
| DS 108 | 95.32 | 85.73 | 82.62 | 6.62 |
| Shopmaster RC | 96.08 | 97.88 | 99.08 | 1.51 |
| Safe Strip | 100.03 | 99.89 | 99.98 | 0.07 |
| DBE-4 | 18.83 | 18.91 | 20.55 | 0.97 |
| 590 S | 81.25 | 98.15 | 81.44 | 9.71 |

Observations made at the three cleaning intervals are listed below in Table 2.

Table 2. Observations

| Time Interval | 10 | 30 | 60 |
|---------------|-------------------------|----------------------------------------------------|-------------------------------|
| Luminox | little dissolving | no change | no change |
| DS 108 | turning tan | softened-cloudy tan | same |
| Shopmaster RC | soft-light yellow color | dark yellow-bulk has fallen off cloudy dark yellow | |
| Safe Strip | turned cloudy brown | all clean | |
| DBE-4 | soft-light yellow color | soft-yellow | same |
| 590 S | soft-turned red | dark red-1 coupon nearly clean cloudy | dark red-1 completely cleaned |

Summary:

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| Substrates: | Ceramics |
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|-----------------------|-----------------------|---------------|--------------------|-------------------------------------|----------------------|
| Contaminants: | | Adhesive | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Alconox Inc | Luminox | 30 | -6.03 | <input type="checkbox"/> | |
| Dysol | DS 108 Wipe Solvent | 100 | 87.89 | <input checked="" type="checkbox"/> | |
| Buckeye International | Shopmaster RC | 100 | 97.68 | <input checked="" type="checkbox"/> | |
| EcoLink | Safe Strip | 100 | 99.97 | <input checked="" type="checkbox"/> | |
| Invista S.a.r.l | Flexisolv DBE 4 ester | 100 | 19.43 | <input type="checkbox"/> | |
| Aremco Products Inc | Crystalbond 590 S | | 86.95 | <input checked="" type="checkbox"/> | |

Conclusion:

The four effective products, Shopmaster RC, Safe Strip, DS 108 and Crystalbond 590 S Stripper will be evaluated in removing reed wax.