

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2002
 DateRun: 09/04/2002
 Experimenters: Jason Marshall
 ClientType: Cleaner Manufacturer
 ProjectNumber: Project #1
 Substrates: Steel
 PartType: Coupon
 Contaminants: Oil
 Cleaning Methods: Immersion/Soak
 Analytical Methods: Gravimetric

Purpose: To evaluate alternative rinsing methods.

Experimental Procedure: Nine preweighed 1020 steel coupons were coated with Citgo Quenching Oil 22 (64741-89-5, 8052-42-4) using a hand held swab. A second weighing was performed to determine the amount of contaminant added to the coupons. Three 600 ml beakers were filled with Bio Gold 2. Three coupons were cleaned for five minutes in separate beakers. The first set of coupons were rinsed in a tap water bath at 120 F for 15 seconds. The second batch were rinsed in a tap water spray at 120 F for 15 seconds. The final batch was rinsed using dry air blow off at room temperature. All nine coupons were dried for 1 minutes using a Master Appliance heat gun at 500 F. Once dried, final weights were recorded and efficiencies were calculated.

Results: Of the three rinsing methods evaluated, the hot water spray rinse improved cleaning efficiency the most. This method resulted in the least amount of residue being left on the coupon after rinsing. The air blow off method was nearly as successful, leaving slightly more film behind. The heated tap water bath did not improve efficiency from the unheated bath. The table below compares the results for the four rinsing methods from both trials.

Table 1. Cleaning Efficiencies

| Cleaner | Hot rinse | Hot spray | Air blow off | Cold Rinse Trial 1 |
|-------------|--------------|--------------|-----------------|-----------------------|
| Coupon 1 | 78.15 | 97.35 | 94.92 | 80.70 |
| Coupon 2 | 75.13 | 96.79 | 94.69 | 76.04 |
| Coupon 3 | 83.01 | 98.56 | 95.87 | 86.36 |
| Ave | 78.77 | 97.56 | 95.16 | 81.03 |
| Std Dev | 3.97 | 0.90 | 0.63 | 5.17 |

Summary:

| Substrates: | | Steel | | | | |
|-----------------------|--|--------|-------------|-------------------------------------|-----------------------|--|
| Contaminants: | | Oil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: | |
| Vertec BioSolvents | VertecBio Gold Unscented Part Cleaner | 100 | 78.77 | <input type="checkbox"/> | Heated bath rinse | |
| Vertec BioSolvents | VertecBio Gold Unscented Part Cleaner | 100 | 97.56 | <input checked="" type="checkbox"/> | Heated spray rinse | |
| Vertec BioSolvents | VertecBio Gold Unscented Part Cleaner | 100 | 95.46 | <input checked="" type="checkbox"/> | Air blow off rinse | |

Conclusion: During both trials, the effectiveness of the Vertec Bio Gold 2 was observed visually to be effective in removing the quench oil from the coupons. Despite these observations, the calculated efficiencies yielded different results. From the results of this trial, it appears that a more aggressive rinsing methodology will help to eliminate the cleaner residue from the surface of the parts.