

CLEANING LABORATORY EVALUATION SUMMARY

| SCL #: | 2004 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|---|--------------------|--------------------|-------------------------------------|----------------------|--------|--------|----------------------|--------|--|--------|--------|-------|----------------------|----------------------|---------------|--------------------|-------------------|----------------------|-------------------------|------------------|---|--------|-------------------------------------|-------|-------------------------|---------------------|--------|-------|-------------------------------------|--------|-------------------------|-----------------|---|--------|-------------------------------------|-------|--|--------|--------|-------|
| DateRun: | 07/08/2004 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimenters: | Jason Marshall | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ClientType: | Bicycle Manufacturer | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ProjectNumber: | Project #1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Substrates: | Titanium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| PartType: | Coupon | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Contaminants: | Fluxes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cleaning Methods: | Immersion/Soak | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Analytical Methods: | Gravimetric | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Purpose: | To evaluate client requested products on the fifth soil. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Experimental Procedure: | <p>The three cleaners were diluted to 5% using DI water in 600 ml beakers and heated to 120 F on a hot plate.</p> <p>Nine preweighed titanium coupons were coated with client supplied Wolverine Ultra Flux (1332-77-0, 10043-35-3, 7789-29-9, 11128-29-3, 151-21-3), using a hand held swab and then heated with a Master Appliance Heat Gun at 500 F for 10 minutes. Coupons were allowed to cool and then weighed a second time to determine the amount of soil added. Three coupons were cleaned in each solution for 5 minutes using stir-bar agitation. Coupons were rinsed in tap water for 15 seconds at 120 F, followed by air blow off at room temperature. Once dry, coupons were weighed a final time and efficiencies for each cleaner were calculated.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Results: | <p>All three products removed over 99% of the second oil. The table below lists the amount of soil added, the amount remaining and the efficiency for each coupon cleaned.</p> <table border="1"> <thead> <tr> <th>Cleaner</th> <th>Initial wt</th> <th>Final wt</th> <th>% Removed</th> </tr> </thead> <tbody> <tr> <td>M Aero</td> <td>1.1170</td> <td>0.0014</td> <td>99.87</td> </tr> <tr> <td></td> <td>1.2380</td> <td>0.0004</td> <td>99.97</td> </tr> <tr> <td></td> <td>0.8871</td> <td>0.0069</td> <td>99.22</td> </tr> <tr> <td>M Aero NS</td> <td>0.9014</td> <td>0.0039</td> <td>99.57</td> </tr> <tr> <td></td> <td>1.3230</td> <td>0.0009</td> <td>99.93</td> </tr> <tr> <td></td> <td>1.2541</td> <td>0.0001</td> <td>99.99</td> </tr> <tr> <td>M 400</td> <td>0.7871</td> <td>0.0013</td> <td>99.83</td> </tr> <tr> <td></td> <td>0.9139</td> <td>0.0038</td> <td>99.58</td> </tr> <tr> <td></td> <td>0.8060</td> <td>0.0035</td> <td>99.57</td> </tr> </tbody> </table> | Cleaner | Initial wt | Final wt | % Removed | M Aero | 1.1170 | 0.0014 | 99.87 | | 1.2380 | 0.0004 | 99.97 | | 0.8871 | 0.0069 | 99.22 | M Aero NS | 0.9014 | 0.0039 | 99.57 | | 1.3230 | 0.0009 | 99.93 | | 1.2541 | 0.0001 | 99.99 | M 400 | 0.7871 | 0.0013 | 99.83 | | 0.9139 | 0.0038 | 99.58 | | 0.8060 | 0.0035 | 99.57 |
| Cleaner | Initial wt | Final wt | % Removed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M Aero | 1.1170 | 0.0014 | 99.87 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1.2380 | 0.0004 | 99.97 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | 0.9139 | 0.0038 | 99.58 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Summary: | <table border="1"> <tr> <td>Substrates:</td> <td colspan="5">Titanium</td> </tr> <tr> <td>Contaminants:</td> <td colspan="5">Fluxes</td> </tr> <tr> <td>Company Name:</td> <td>Product Name:</td> <td>Conc.:</td> <td>Efficiency:</td> <td>Effective:</td> <td>Observations:</td> </tr> <tr> <td>Church & Dwight Co Inc.</td> <td>Armakleen M Aero</td> <td>5</td> <td>99.69</td> <td><input checked="" type="checkbox"/></td> <td></td> </tr> <tr> <td>Church & Dwight Co Inc.</td> <td>Armakleen M Aero NS</td> <td>5</td> <td>99.83</td> <td><input checked="" type="checkbox"/></td> <td></td> </tr> <tr> <td>Church & Dwight Co Inc.</td> <td>Armakleen M-400</td> <td>5</td> <td>99.66</td> <td><input checked="" type="checkbox"/></td> <td></td> </tr> </table> | Substrates: | Titanium | | | | | Contaminants: | Fluxes | | | | | Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: | Church & Dwight Co Inc. | Armakleen M Aero | 5 | 99.69 | <input checked="" type="checkbox"/> | | Church & Dwight Co Inc. | Armakleen M Aero NS | 5 | 99.83 | <input checked="" type="checkbox"/> | | Church & Dwight Co Inc. | Armakleen M-400 | 5 | 99.66 | <input checked="" type="checkbox"/> | | | | | |
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| Conclusion: | The supplied products will be tested on the sixth supplied soil using manual wiping at room temperature. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |