

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2019

DateRun: 08/06/2019

Experimenters: Nicole Kebler, Julie Nguyen

ClientType: Electroplating Company

ProjectNumber: Project #1

Substrates: Ceramics

PartType: Part

Contaminants: Lubricating/Lapping Oils, Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Visual

Purpose: To evaluate aqueous cleaning products for machine oil removal from Barry Industries parts and determine the best recommended product.

Experimental Procedure: One pre-soiled ceramic part was used per cleaner. Dilutions and temperatures used for each cleaner were based on vendor recommendations. Coupons were immersed with a stir bar individually for 15 minutes with visual observations being recorded every five minutes. Cleaned coupons were rinsed in heated (95° F) tap water for five minutes and dried for five minutes with an air gun. All Barry Industries parts were photographed after cleaning (see Appendix A). A final cleanliness ranking was conducted comparing to clean parts provided by Barry Industries.

Overall Cleanliness Rating Table

| Score | Description |
|-------|--|
| 1 | Total removal of contaminant. No residue. |
| 2 | Partial removal of contaminant. Some residue remaining. |
| 3 | Minimal removal of contaminant. Substantial amount of residue remaining. |

Results: Visual Observations
Ceramic

| Cleaner | 5 Mins | 10 Mins | 15 Mins | Rinse |
|---------|---|----------------------------------|---|---|
| 1 | - bubbles forming at top of dilution - oil appearance on surface | - soil still remaining on edges | - dilution is clear - thin rim of bubbles - some particles still floating | - dilution is clear - minimal bubbles - no color change |
| 2 | - small bubbles forming | - particles floating in dilution | - dilution is clear - thin rim of bubbles - some particles still floating | - dilution is clear - minimal bubbles - no color change |

CLEANING LABORATORY EVALUATION SUMMARY

| | | | | |
|---|--------------------------|--------------------|-----------------------------|---|
| 3 | - small bubbles floating | - bubbles swirling | - clear thin rim of bubbles | - dilution is clear - minimal bubbles - no color change |
|---|--------------------------|--------------------|-----------------------------|---|

Overall Cleanliness Ranking

| Cleaner | Ranking |
|---------|---------|
| 1 | 1 |
| 2 | 1 |
| 3 | 1 |

Summary:

| | | | | | |
|------------------------------------|-------------------------------|---------------|--------------------|-------------------------------------|----------------------|
| Substrates: | Ceramics | | | | |
| Contaminants: | Lubricating/Lapping Oils, Oil | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Brulin Corporation | Aquavantage 1400 | 5% | | <input checked="" type="checkbox"/> | |
| Hubbard Hall Inc | Emerald HD2 | 15% | | <input checked="" type="checkbox"/> | |
| International Products Corporation | Micro 90 Conc. | 2% | | <input checked="" type="checkbox"/> | |

Conclusion:

For the ceramic substrate, all chemistries evaluated were effective.