

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2008
 DateRun: 12/09/2008
 Experimenters: Jason Marshall
 ClientType: Electronics Manufacturer
 ProjectNumber: Project #1
 Substrates: Ceramics
 PartType: Part
 Contaminants: Carbon Deposits
 Cleaning Methods: Ultrasonics
 Analytical Methods: Visual

Purpose: To evaluate ultrasonic cleaning on supplied ceramic parts

Experimental Procedure: Three products and water were selected for testing the effectiveness of ultrasonic cleaning. Products were selected based on classification, one acid, one alkaline and one solvent. Water was selected as the control. The two aqueous products were diluted to 10% using DI water. All products were heated to 105 F in a Branson 40 kHz ultrasonic unit and degassed for at least 5 minutes. A portion of the supplied ceramic ring was immersed in the cleaning solution. Parts were rinsed in a tap water spray for 10 seconds at 100 F followed by air blow off at room temperature for 30 seconds. Observations were made after 10 minutes. If any of the products were partially successful, additional cleaning times would be conducted at 60, 90, 120, 150 and 180 minutes.

Results: After the first 10 minutes, the alkaline aqueous product showed the most signs of removing the carbon deposits from the surface. All of the products showed some signs of cleaning, including water. The alkaline aqueous product and the solvent were tested at additional cleaning times.

| Class | Product | Observations |
|----------|-------------------|---|
| Water | | 10 min - Some removal around the outer edge, dulling of coating color |
| Acid | Valtron SP 2275 | 10 min - Some removal that looked like scratches in the coating |
| Solvent | Smart Solve 605 | 10 min - Dulling of the coating |
| | | 30 min - No change; discontinue cleaning |
| Alkaline | Heavy Duty Answer | 10 min - Splotchy removal, lighter color of the coating |
| | | 60 min - Starting to have good removal |
| | | 90 min - Still getting cleaner |
| | | 120 min - More removal |
| | | 150 min - Very clean |
| | | 180 min - Almost completely clean |
| | | 210 min - Very little deposits left on surface |
| | | 240 min - Over 98% cleaned |

Summary:

| Substrates: | Ceramics | | | | |
|-----------------------------------|---------------------------|--------|-------------|-------------------------------------|---------------|
| Contaminants: | Carbon Deposits | | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| Environmental Care and Share | Heavy Duty Cleaner Answer | 10 | | <input checked="" type="checkbox"/> | |
| Valtech Corporation | Valtron SP 2275 | 10 | | <input type="checkbox"/> | |
| United Laboratories International | Smart Solve 605 | 100 | | <input type="checkbox"/> | |

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|-------|-------|-----|--|--------------------------|--|
| Water | Water | 100 | | <input type="checkbox"/> | |
|-------|-------|-----|--|--------------------------|--|

Conclusion:

Based on the success of the one alkaline aqueous product, additional testing could be performed on other alkaline aqueous products. Furthermore, other classifications not yet evaluated would be tested as well.