

CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2017
 DateRun: 06/12/2017
 Experimenters:
 ClientType: Cleaner Manufacturer
 ProjectNumber: Project #1
 Substrates: Copper
 PartType: Coupon
 Contaminants: Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil
 Cleaning Methods: Manual Wipe
 Analytical Methods: Gravimetric
 Purpose: To evaluate the efficiency of supplied cleaner (Quicksolv DMC) and a comparative solvent (acetone) in the removal of Nisseki SAS-60E and Cutting oil (Petroleum) from copper coupons.

Experimental
Procedure:

Soiling Process:

A set of twelve copper coupons were weighed on an analytical balance to determine their initial mass. Once this was completed half of the coupons were evenly soiled with half a gram of Nisseki SAS-60E oil, and the other half with half a gram of cutting oil petroleum using a handheld swab. The coupons were reweighed to determine the mass of the coupons with the contaminant applied.

Cleaning Process:

Three coupons that were soiled with Nisseki SAS-60E oil were placed on a Gardner Straight Line Washability unit. A Kimberly-Clark Wypal reinforced paper towel was attached to the cleaning sled and soaked with a spray of Quicksolv DMC. Each coupon was sprayed once with the same cleaning solution. The cleaning unit was run for 20 cycles (~33 seconds). This same process was run on another set of three copper coupons soiled with cutting oil petroleum. The remaining six coupons were run through the same process but cleaned with acetone. The coupons were allowed to dry for an hour before being weighed. Final weights were recorded, efficiencies were calculated and recorded.

Chemistries Evaluated: Quicksolv DMC, Acetone

Results:

The sample cleaner (Quicksolv DMC) was just as effective as the comparative cleaner (acetone) in removing the oils from the copper substrate. Both the Quicksolv DMC and the acetone had very high soil removal rates: the Quicksolv DMC cleaner had an overall efficacy of 98.12% for removing oil on copper coupons, while the acetone was able to remove 98.17% of the oils from the copper coupons.

| Cleaner | Soil | Initial wt. of Cont. (g) | Final wt. of Cont. (g) | Cont. Removed (%) | Avg. Cont. Removed (%) | Avg. Removal Efficacy (%) |
|------------------|----------------------------|-----------------------------------|---------------------------------|-------------------------|---------------------------------|------------------------------------|
| Quicksolv DMC | Nisseki SAS-60E | 0.4810 | 0.0030 | 99.38 | 98.84 | 98.12 |
| | | 0.4868 | 0.0057 | 98.83 | | |
| | | 0.4906 | 0.0082 | 98.33 | | |
| | Cutting Oil (Petroleum) | 0.4931 | 0.0110 | 97.77 | 97.39 | |
| | | 0.5049 | 0.0100 | 98.02 | | |
| | | 0.4973 | 0.0180 | 96.38 | | |
| Acetone | Nisseki SAS-60E | 0.3509 | 0.0102 | 97.09 | 97.68 | 98.17 |
| | | 0.4956 | 0.0065 | 98.68 | | |
| | | 0.1680 | 0.0046 | 97.26 | | |
| | Cutting Oil (Petroleum) | 0.5017 | 0.0129 | 97.43 | 98.66 | |
| | | 0.5187 | 0.0093 | 98.21 | | |
| | | 0.4983 | 0.0147 | 97.05 | | |

Summary:

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|--------------------------------|----------------------|---|--------------------|-------------------------------------|--|
| Substrates: | | Copper | | | |
| Contaminants: | | Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil | | | |
| Company Name: | Product Name: | Conc.: | Efficiency: | Effective: | Observations: |
| J.T. Baker | Acetone | 100 | 97.60 | <input checked="" type="checkbox"/> | Nisseki SAS-60E 97.68; Cutting Oil (Petroleum) 97.56 |
| Inventec Performance Chemicals | Quicksolv DMC | 100 | 98.51 | <input checked="" type="checkbox"/> | |

Conclusion:

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The Quicksolv DMC performed at the same level as the comparative solvent, Acetone.