# CLEANING LABORATORY EVALUATION SUMMARY

SCL #: 2020

DateRun: 12/08/2020

Experimenters: Justin Kiander

ClientType: Metal Working

ProjectNumber: Project #1

Substrates: Steel

PartType: Part

Contaminants: Oil

Cleaning Methods: Immersion/Soak

Analytical Methods: Visual

Purpose: The purpose of this experiment was to determine the effectiveness of top cleaners on parts provided by the company.

Experimental Procedure: Cleaners were prepared to the following concentrations: Metalnox 6386 100%, Smart Solve 605 100%, Dimethyl Glutarate 100%, and SC Aircraft & Metal Cleaner 20%. One high-speed steel drill part was obtained for each of the cleaners being tested. Metalnox 6386 and Smart Solve 605 were kept at room temperature, while Dimethyl Glutarate and SC Aircraft & Metal were heated to 120°F with a stir bar added for agitation. A swab was used to spread oil provided by the company along the head of the drill. Once solutions reached the proper temperature, parts were submerged into their respective cleaners. The part cleaned by Metalnox was submerged for 15 minutes. Parts cleaned with remaining cleaners were submerged for 30 minutes. After 30 minutes, parts cleaned with Smart Solve and SC Aircraft were placed into a deionized water bath for 30 seconds. The bath for Smart Solve was kept at room temperature, while the bath for SC Aircraft was heated to 120°F. Parts were then fully dried with a heat gun. Once dry, a white glove test was conducted to confirm removal of oil. Effectiveness of cleaners was determined.

Results:

| Cleaner | Observations |
|---|---|
| Metalnox 6386 | Post Clean & Dry: Appears to be effective, no oil residue visible |
| Smart Solve 605 | May not have had enough solution for accurate testing. Post Clean: Appeared to be a residue which disappeared with drying. |
| Dimethyl Glutarate | Post Clean & Dry: Appears to be effective, no oil residue visible |
| SC Aircraft & Metal | During the cleaning process: oil droplets forming and falling into solution. Solution became foggy, indicating removal of soil occurring. Post Clean: Appeared to be a residue that disappeared with drying. |

Although some cleaners possessed a residue following the cleaning process, a white glove test confirmed the full removal of oil from parts, with no visible oil remaining, after the drying process. The most effective cleaners were Metalnox 6386 and Dimethyl Glutarate as these cleaners effectively removed the oil without forming a residue. Smart Solve 605 and SC Aircraft were also effective and could be potential alternative choices as well. Next steps would be to discuss results with lab management to potentially suggest a list of alternatives.

Summary:

| **Substrates:** | Steel | | | | |
|---|---|---|---|---|---|
| **Contaminants:** | Oil | | | | |
| **Company Name:** | **Product Name:** | **Conc.:** | **Efficiency:** | **Effective:** | **Observations:** |
| Kyzen Corporation | Metalnox M6386 | 100% | 100.00 | ☑ | Appeared effective with no oil residue remaining |
| United Laboratories International | Smart Solve 605 | 100% | 100.00 | ☑ | A residue was present following the cleaning process which disappeared after the drying stage. |
| Fisher Scientific | Dimethyl glutarate (CAS:1119-40-0) | 100% | 100.00 | ☑ | Appeared effective with no oil residue remaining. |
| Gemtek Products | | 20% | 100.00 | ☑ | A residue was present following the cleaning process which |

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| | SC Aircraft & Metal Cleaner Super Concentrate | | | | disappeared after the drying stage. |

Conclusion: Upon completion of testing, it was determined that all cleaners were effective at removing the oil from parts. The most effective cleaners were Metalnox 6386 and Dimethyl Glutarate as these cleaners did not form a residue following the cleaning process. Next steps would be to discuss results with lab management to potentially create a list of alternatives for the company.