CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2012
DateRun:	08/27/2012
Experimenters:	Heidi Wilcox
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Aluminum, Brass, Copper, Stainless Steel, Steel
PartType:	Coupon
Contaminants:	Cutting/Tapping Fluids, Lubricating/Lapping Oils, Oil
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Gravimetric
Purpose:	The contract called for room temperature testing of immersion, manual wiping, ultrasonic and low pressure spray cleaning technology using the solvent provided to the TURI lab
Experimental Procedure:	This testing was being performed to give baseline performance of the solvent for the metal working industry. Representative substrate coupons of stainless steel, mild steel, aluminum, brass and copper were used throughout the testing. The representative soils use for the industry sector were lithium grease, mineral oil, a general lubricant, buffing compound, cutting fluid, tapping fluid and GS 34 ASTM standard soils representing production and maintenance oils. Overall testing has shown that all soils, except one, were able to be removed, to the satisfactory gravimetric removal percentage of 85%, by at least one cleaning equipment type. The one soil not removed to 85% efficiency was the printer's ink, which was only tested by manual wiping using the Gardner Straight Line Washability unit in the TURI lab to simulate standardized hand wiping cleaning. It was removed to 81.11 percent efficiency so a retest with the right dried film of ink may show a good removal efficiency. This test along with a test to further represent the products usage in the market permanent marker on metal coupons to simulate removal of printing ink will be done. Other areas of interest in the preliminary results are that the solvent does not seem to be harming any of the softer metal coupons during testing. Grease was able to be removed by manual wiping, ultrasonics and low pressure spray but not immersion cleaning. This is not uncharacteristic. It shows that more energy will remove this soil. The buffing compound was not removed by room temperature immersion but this is to be expected. Buffing compound usually need heat or energy to remove it. As we see in subsequent testing low flow pressure was able to remove buffing compound at room temperature. This is a good result. Heated ultrasonics also removed the buffing compound, which was expected. Finally cutting fluid was removed by immersion cleaning at room temperature but not with low flow spray. This is questionable so we will be retesting this trial. Before signing a contract we tried the solvent heated ultrasonic cleaning trials and it worked on buffing compound and grease. We will try room temperature ultrasonics on oil, tapping fluid and grease and do heated ultrasonics on oil and taping fluid to round out the contract. Preliminary conclusions show that this solvent should be a viable option for the metal cleaning industry. Further testing suggestions will be to do more specific soils for different metal finishing industries as well as to try other cleaning methods such as high pressure spray, vapor degreasing, solvent drying and heated immersion. Other options are to do testing on color changes on soft metals when heat is used, spotting and streaking during drying and working on identification of any film or residue left on coupons or parts that may impair adhesion of coatings or paint. In this instance we would want to see if adhesion is affected and then use the solvent with a rinse and dry option if needed to see if any adhesion issues are remedied.

Results:

Overall Average for oil			96.21
Immersion	Oil - Mineral Oil	Aluminum	103.12
	Lubricant	Copper	99.84
	Cutting fluid	Mild steel	98.20
	GS 34 Standard Soil	Stainless steel	97.13
	GS 34 Standard Soil 2 (Maint soil)	Stainless steel	98.87
Manual Wiping	Oil	Mild Steel	100.88
		Aluminum	99.22

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Ultrasonics (120 F)	Oil - Mineral Oil		
Low Pressure Spray	Lubricant	Copper	99.81
	Cutting fluid	Mild steel	68.81
Overall Average for grease			77.10
Immersion	General Lithium Grease	Stainless steel	3.24
Manual Wiping	Grease	Stainless Steel	86.89
Ultrasonics (120 F)	Grease	Stainless Steel	97.46
		Brass	98.87
Low Pressure Spray	General Lithium Grease	Stainless steel	99.03
Overall Average for buffing compound			82.26
Immersion	Buffing compound (Solid)	Brass	27.66
Ultrasonics (120 F)	Buffing compound	Brass	98.28
		Stainless Steel	104.07
Low Pressure Spray	Buffing compound (Solid)	Brass	99.01
Overall Average for ink			81.11
Manual Wiping	Ink (printers ink)	Aluminum	81.11

Summary:

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Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Kreussler	Kreussler K 4	100	96.21	☑	

Conclusion: Product was successful on most oils using immersion, wipe, spray and ultrasonics.