CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2023
DateRun:	08/17/2023
Experimenters:	Alexander Symko, Amelia Wagner
ClientType:	Metal
ProjectNumber:	Project #1
Substrates:	Copper, Stainless Steel
PartType:	Coupon
Contaminants:	Greases, Lubricating/Lapping Oils
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Wipe
Purpose:	To find an effective alternative to nPB in removing metal working fluid and grease from copper and stainless steel rings
Experimental Procedure:	Two cleaners were chosen to be tested, Cleaner 1. Waterworks Heavy Duty Degreaser 1:4 dilution (the highest vendor recommended dilution), and Cleaner 2. Ruff Stuff Water Based Degreaser 100% concentration. Three types of substrates were supplied by the company, being copper rings, steel discs (female) and steel discs (male). Two soils were tested with each cleaner, Soil A. Moly Dee (the most difficult soil for the company to remove), and Soil B. Tap Magic EP-extra (the most used soil). Three coupons of each substrate were used for each soil, meaning a total of 18 coupons were used for each cleaner. The coupons were soiled by dabbing the soils on using a swab. The coupons were then subjected to 15 minutes of unheated immersion in their respective cleaner with a stir bar set to 200 rpm. Once the coupons were removed, their cleanliness was determined with a white glove test. Each coupon was wiped with a white cotton glove. If any soil came off onto the glove the coupons were declared to still be soiled. If no soil came off onto the glove the coupons were declared clean.

Results:

Cleaner	Soil	Substrate	White Glove Test
1. Waterworks Heavy Duty Degreaser 1:4	A	Copper	X
		Copper	X
		Copper	X
		Steel (F)	X
		Steel (F)	X
		Steel (F)	X
		Steel (M)	X
		Steel (M)	X
		Steel (M)	X
	B	Copper	X
		Copper	X
		Copper	X
		Steel (F)	X
		Steel (F)	O
		Steel (F)	O
		Steel (M)	X
		Steel (M)	O
		Steel (M)	X
2. Ruff Stuff Water Based Degreaser 100%	A	Copper	X
		Copper	X
		Copper	X
		Steel (F)	X
		Steel (F)	X
		Steel (F)	X
		Steel (M)	X
		Steel (M)	X
		Steel (M)	X
	B	Copper	X
		Copper	X

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		Copper	X
		Steel (F)	X
		Steel (F)	X
		Steel (F)	X
		Steel (M)	O
		Steel (M)	O
		Steel (M)	O

Cleaner 2 attacked the copper, stripping the substrate and turning it blue.

Summary:

Conclusion: Neither Cleaner 1. Waterworks Heavy Duty Degreaser 1:4 or Cleaner 2. Ruff Stuff Water Based Degreaser were effective in removing the soils using unheated ultrasonics. Cleaner 2 will be discontinued from use due to its attacking of the copper substrate. Cleaner 1 will be tested with heated immersion.