CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2022
DateRun:	09/19/2022
Experimenters:	Jason Marshall
ClientType:	Tool Manufacturer
ProjectNumber:	Project #1
Substrates:	Steel
PartType:	Part
Contaminants:	Inks
Cleaning Methods:	Ultrasonics
Analytical Methods:	Visual
Purpose:	To evaluate selected products for UV ink removal using heated ultrasonics
Experimental Procedure:	Selected products were used at full strength in a heated ultrasonic bath. Base temperature started at 85 F and gradually finished at 120 F due to the ultrasonic energy heating the solutions. Two frequencies were utilized for cleaning. The first was a low energy unit at 80kHz and the second was the more common parts cleaning frequency of 40kHz. Each solution was degassed (removal of any excess bubbles to improve energy transmission) for 10 minutes. A saw blade was immersed into a solution and cleaned for 9-10 minutes. At the end of each cleaning cycle parts were observed for paint removal. Testing completed after a total 30 minutes.
Results:	The introduction of heated ultrasonics greatly improved removal of the UV cured ink from the saw blades. The 80 kHz cleaning for two of the solutions resulted in nearly complete removal of the ink from the immersed portion of the blades. In the 40kHz tank, cleaning was far more effective with the first cleaning interval surpassing the 30 minutes of cleaning at the 80kHz range. The table lists the observations and temperatures for each solution used.

80 kHz Cleaning

Product	Time	Temp	Observations
SC Supersolv	9	86	No visual removal. When wiped, paint was being removed
	18	100	Some blue coming off on its own without a wipe. Flakes of paint falling off into solution
	27	105	Almost removed paint to base
	30	110	Good removal. Remaining blue paint was puckering on surface
Solvent Mix 1 60% D limonene; 31% Benzyl Benzoate; 9 dimethyl glutarate	9	86	good removal. Blue paint coming off, more so with wiping. Yellow paint was still on surface.
	18	100	Yellow coming off without wipe. Flakes of paint falling off on own into solution
	27	105	Down to base metal. Some fine yellow paint lines remaining
	30	110	Very good. Only faint yellow lines left

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Bitu Ox Blo NT	9	110	Sine paint on sharp edges peeled off without wipe.
	18	115	Solution become milky white.
	27	120	Paint only has splotchy level of removal
	30	120	Solution more cloudy - paint being dissolved into solution

40 kHz Cleaning

Product	Time	Temp	Observations
SC Supersolv	10	90	Good removal. Similar to the 27 minute level of cleaning at 80 kHZ. Flakey chips in solution
	20	93	Down to base metal
	30	105	Spots of blue remained in the etched in letters/ numbers
Solvent Mix 1 60% D limonene; 31% Benzyl Benzoate; 9 dimethyl glutarate	10	90	Good removal. Similar to the 27 minute level of cleaning at 80 kHZ frequency.
	20	93	Nearly fully removed. Some yellow
	30	105	Trace amount of yellow
Bitu Ox Blo NT	10	105	Base part used from 80 kHz testing - clumps of white paint coming off
	20	110	More clumps falling off. About a 1/3 of the base metal visible
	30	110	About half the surface free from paint

Summary:

Substrates:	Steel
Contaminants:	Inks

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Gemtek Products	SC Supersolve Safety Solvent	100		☑	Very effective using 40 kHz
No Specific Vendor	Solvent Mix 60% D-limonene; 31% Benzyle Benzoate; 9% dimethyl glutarate	100		☑	Very effective at 40 kHz
Green Way Products	Bitu Ox Blo NT	100		☑	Mostly effective with 40 kHz

Conclusion: Two products were successful with the heated 40kHz ultrasonics on the UV ink removal from the steel blades within 30 minutes.