CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2015
DateRun:	03/18/2015
Experimenters:	Luis Raudales, Abigail Giarrosso, Alicia McCarthy
ClientType:	General
ProjectNumber:	Project #1
Substrates:	Wood
PartType:	Part
Contaminants:	Paints
Cleaning Methods:	Immersion/Soak
Analytical Methods:	Visual
Purpose:	To evaluate six supplied products for removal of lead paint and milk paint from strips of wood from pieces of a chair with immersion and manual scrubbing at room temperature 68˚F and heated between 130 ˚F-140˚F before manually scrubbing.
Experimental Procedure:	One of six supplied cleaning products, D-Zolve, was diluted with DI water at room temperature to vendor recommended concentration for cleaning (20% DI water in 100ml). All other Products were ready to use and placed in 100ml of 100% concentration in a glass beaker. A pre-painted piece of wood was placed in each beaker with one of the products for five minutes. All pieces of wood were removed and scrubbed manually with abrasive pads. Visual observations of removal were ranked from total removal to no removal. They were then placed back into the solution and the process repeated until the end of 30 minutes for both lead paint samples and milk paint samples at room temperature. Another run of the test considered a group of pieces from the same product using one submerged period of 30 minutes. Another test with the same products were used on the painted wood samples and heated between 130 ˚F-140˚F for five-minute intervals with manual scrubbing for a total of 30 minutes. Wood pieces were then placed back into the heated beakers for a continuous 30 minutes, removed, manually scrubbed and then visually observed for the last time. Visual Performance ranking: 1)Excellent removal 2)Good removal 3)Fair removal 4)Soften Paint 5)No removal
Results:	When working with the lead paint, heating Chimista between 130˚F-140˚F was the best at removing the paint the fastest and cleanest. D-Zolve, especially when heated, was the second best at cleanly removing the lead paint. Sky Kleen and Zemasol Avoc only were able to remove a small portion of the paint from the wood, and we were unable to test Zemasol Avoc heated due to its flash point. Graffiti remover and Bio circle did not work at all even when heated. The two best at both room temperature and heated were the Chimista and the D-Zolve. On the milk paint, the Graffiti Remover almost did not need to be scrubbed to be able to remove the milk paint from the wood. The Soy Gel was the second best at removing the paint from the wood. Chimista and Bio circle left small particles in the solvent and made it difficult to remove. Sky Kleen did not remove a lot of paint from the wood. The table below shows the behavior by scrubbing paint from the wood every five minutes. The evaluation is based on visual comparison of the coupons after each time they were scrubbed. Room Temperature Soil: Lead Paint

Cleaner	5 min	10 min	15 min	20 min	25 min	30 min
Zemasol Avoc	3	2	4	5	3	5
Chimista	3	1	1	1	5	1
Sky Kleen	3	2	3	3	4	5
Graffiti Remover	5	5	4	5	5	4
Bio Circle CB 100	3	3	5	4	2	3
D-Zolve	4	5	2	2	3	2

Heated at 130˚F-140 ˚F

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Soil: Lead Paint

Cleaner	5 min	10 min	15 min	20 min	25 min	30 min
Zemasol Avoc	N/A	N/A	N/A	N/A	N/A	N/A
Chimista	1	1	1	1	1	1
Sky Kleen	4	4	4	2	2	2
Graffiti Remover	2	2	3	3	3	3
Bio Circle CB 100	3	3	3	4	4	4
D-Zolve	3	3	2	2	1	1

Room Temperature

Soil: Milk Paint

Cleaner	5 min	10 min	15 min	20 min	25 min	30 min
Zemasol Avoc	5	3.5	2.5	2	2	1.5
Chimista	3	2	1.5	1	1	1
Sky Kleen	5	4.5	4	3.5	2.5	2
Graffiti Remover	3	2	1.5	1.5	1	1
Bio Circle CB 100	4	3.5	3	2	2	1.5
Soy Gel	3	1.5	1.5	1.5	1	1

Observation:

Lead Paint

When heated between 130˚F-140 ˚F, Chimista was the best at removing lead paint the quickest. D-Zolve may have taken longer to remove but it was the cleanest removal by the end of 30 minutes heated. We could not test the Zemasol under heat due to its flash point. The two best at both room temperature and heated were the Chimista and the D-Zolve. Sky Kleen sort of removed most of the paint closer to 30 minutes, but it was not as effective as the other two products mentioned.

Milk Paint

The best is Graffiti Remover. The paint didn’t need a lot of scrubbing to be removed. Paint faded almost by itself. Chimista second but left small particles that were difficult to remove. Soy Gel, works excellent too, but it is difficult to handle and also affect the green sponge. Zemasol left a few particles difficult to remove, and Sky Kleen left some spots. The table shows the results of one 30 minutes period submersion.

Soil: Lead Paint

Cleaner	30 min
Zemasol	3
Chimista	1
Sky Kleen	4
Graffiti Remover	5
Bio Circle CB 100	5
D-Zolve	2

Soil: Milk Paint

Cleaner	30 min
Zemasol Avoc	2.5
Chimista	2
Sky Kleen	4
Graffiti Remover	1
Bio Circle CB 100	2
Soy Gel	1.5

Observations:

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Lead Paint

Chimista was the best at removing the lead paint. D-Zolve was the second best. Sky Kleen and Zemasol Avoc only removed a little bit. Graffiti remover and Bio circle did not work. Milk Paint Graffiti remover almost did not need to be scrubbed to work. Soy gel, second best, same comments than before. Chimista and Bio circle work alike. Sky Kleen did not remove much paint.

Summary:

Substrates:	Wood				
Contaminants:	Paints				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Solutia	Sky Kleen 1000 (Aviation Solvent)		0.00	☐	
Transene Company, Inc.	D Zolve 1012		0.00	☑	
Twin Rivers Technologies	Graffiti Remover		0.00	☑	
J Walter Inc.	Bio Circle CB 100		0.00	☑	
Franmar Chemical	Soy Gel Paint Stripper		0.00	☐	
TBF Environmental Technologies	ZemaSol		0.00	☐	
Chimista Specialty Chemicals	GreenStrip 10 Biobased paint stripper		0.00	☑	

Conclusion:

Graffiti Remover and Bio circle are the best at removing Milk Paint. Chimista and D-Zolve are the best for removing Lead Paint.