CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2005
DateRun:	02/01/2005
Experimenters:	Jason Marshall
ClientType:	Optical Manufacturer
ProjectNumber:	Project #4
Substrates:	Plastic
PartType:	Part
Contaminants:	Mold Releases
Cleaning Methods:	Ultrasonics
Analytical Methods:	Goniometry
Purpose:	To evaluate alternative cleaners for removing mold release agent from polycarbonate lenses.
Experimental Procedure:	Seven alternatives chemistries were selected from the laboratory's database of test results based on client supplied information. Water was also used as a control. Six of the products were diluted to 5% using DI water in 600 ml beakers. The seventh product (Solsafe 245) was used at full strength. All products were heated to 130 F in a Crest 40 kHz ultrasonic unit filled with tap water. Each was also degassed for 5 minutes. Each lens was analyzed using contact angle goniometry prior to cleaning. Three measurements were made for each lens. One supplied part was immersed into a cleaning solution and cleaned for 5 minutes, followed by a DI water spray rinse at room temperature for 15 seconds and dried using air blow off at room temperature for 30 seconds. Following drying, the lenses were analyzed again using goniometry. Two parts cleaned by client with current solvent were also analyzed (after cleaning only).
Results:	The seven cleaning products all lowered the contact angle readings. Water cleaning resulted in an increase in the contact angle, signifying that the lens was dirtier after being subjected to the DI water cleaning. The table lists the initial contact angles, final angles, average values for both as well as the difference in the readings for each lens cleaned.

Coupon # / Part Description	Initial Reading	Final Reading	Aver Initial Reading	Aver Final Reading	Difference
60-3	58	55			
Aquavantage 1400	74	55			
	75	58	69	56	13
60-4	50	55			
Shopmaster LpH	70	65			
	75	65	65	62	3
60-31	52	50			
Daraclean 283	70	50			
	55	48	59	49	10
60-14	65	50			
Polyspray Jet 790 xs	75	48			
	52	51	64	50	14
3x	61	50			
Valtron SP 2200	80	60			
	80	65	74	58	15
x4	62	58			
Beyond 2002	68	65			
	60	60	63	61	2
3-111	62	55			
Solsafe 245	69	70			
	68	55	66	60	6
iv-4	50	70			
Water	65	65			

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	73	70	63	68	-6
Benchmark 12	65	48			
Water	80	65			
	78	65	74	59	15
Benchmark F12 1	58	64			
Valtron SP 2200	75	59			
	70	55	68	59	8
Benchmark F12 2	65	60			
Solsafe 245	65	64			
	64	62	65	62	3
7		20			
Current Solvent		63			
		55		46	
8		44			
Current Solvent		60			
		25		43	

Summary:

Substrates:	Plastic
Contaminants:	Mold Releases

Company Name:	Product Name:	Conc.:	Efficiency:	Effective:	Observations:
Brulin Corporation	Aquavantage 1400	5	0.00	☑	
Buckeye International	Shopmaster LPH	5	0.00	☐	
Magnaflux	Daraclean 283	5	0.00	☑	
US Polychem Corporation	Polyspray Jet 790 XS	5	0.00	☑	
Valtech Corporation	Valtron SP 2200	5	0.00	☑	
Today & Beyond	Beyond 2002	5	0.00	☐	
Bio Chem Systems	Solsafe 245	100	0.00	☐	
Water	Water	100	0.00	☐	

Conclusion:

Four of the seven products lowered the contact angle by more than 10 degrees. The lenses cleaned with the current solvent had lower average contact angle measurements then the alternative products. However, the readings for the current solvent were more inconsistent than the alternative products. The current solvent readings ranged from 20 to 63. After analysis was completed it was noted that some of the lenses had water spots on the back side of lens. These could be eliminated with better rinsing drying. All lenses will be sent back to client for analysis.