CLEANING LABORATORY EVALUATION SUMMARY

SCL #:	2009
DateRun:	06/01/2009
Experimenters:	Jason Marshall
ClientType:	Cleaner Manufacturer
ProjectNumber:	Project #1
Substrates:	Glass/Quartz
PartType:	Coupon
Contaminants:	Films
Cleaning Methods:	Manual Wipe
Analytical Methods:	Force Measurement
Purpose:	To evaluate residue via coefficient of friction for multipurpose aerosol cleaners

Experimental Procedure:

Coefficient of friction was measured with an IMASS, Inc SP-102B-3M90 Slip/Peel Tester (Figure 1). Two types of friction coefficients were measured using this instrument. The first, Static CoF, was determined by obtaining the force required to move the specimen from a stationary position. The second, Sliding CoF (or Kinetic), was found by measuring the average force required to maintain movement at a certain rate. Measured forces will have peaks and valleys in the amount of force needed to keep moving. Average these values results and dividing by the weight of the object will result in the desired coefficient.
Figure 1. IMASS Slip/Peel Tester

The Slip/Peel tester was first adjusted to ensure that the device was properly calibrated for the sled weight being used. A coupon was then placed and clamped onto the bed of the device. The speed of the bed was set to 45”/min. The instrument records two values, the peak, the valley and calculates the average. The device was run three times per coupon for measuring the Static CoF and three times to measure the Kinetic CoF. Each coupon’s value was averaged and then the values for each finish (three coupon averages) were averaged to get one value for the Static Coefficient of Friction and one value for the Kinetic Coefficient of Friction. The coupons were then sprayed with the supplied cleaning product. The cleaner had a 5 second dwell time on the glass coupons and then was wiped off using a Kmberly-Clark Wypall X60 reinforced wiper. A second set of readings for SCoF were recorded for the treated surface. Following the SCoF a second application of the cleaner was applied to the measuring the KCoF.

These values for treated coupons were compared to the CoF for the same untreated coupons to determine the effect on CoF.
Coefficient of Friction = Ratio of tractive (pulling) force to the normal force (sled weight):
CoF = F/N = (Tractive force)/(Normal Force) = (meter reading)/(sled weight)
Sled weight = 1

Results:

Three products (A00166, A0170 and SD-20) resulted in an increase in the coefficient of friction for both static and kinetic. The Formula 409 caused in a decrease in both values. One product (Mr. Jinx) had minor changes up and down for the static CoF but decreased for the kinetic CoF.

Initial CoF	Static			Kinetic		
Coupon	Peak	Valley	Aver	Peak	Valley	Ave
A	540	309	458	578	331	492
	593	331	472	695	329	494
	581	328	483	566	330	491
B	576	274	456	560	267	443
	571	273	455	583	261	460
	600	266	469	585	258	461
C	433	337	382	477	324	398
	487	334	397	471	314	398
	493	337	404	513	329	408
D	513	405	451	578	449	512
	558	446	490	591	457	509
	597	441	515	598	460	522
E	518	414	431	500	416	469
	491	403	453	515	418	478
	445	408	462	525	419	483
Initial Averages						
	Static			Kinetic		

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	Peak	Valley	Average	Peak	Valley	Average
A	571	323	471	613	330	492
B	582	271	460	576	262	455
C	471	336	394	487	322	401
D	556	431	485	589	455	514
E	485	408	449	513	418	477

Treated CoF

	Static			Kinetic		
Coupon #	Peak	Valley	Average	Peak	Valley	Average
A	873	617	751	701	497	615
	854	590	720	720	507	616
	862	650	762	755	541	659
B	721	443	615	724	588	691
	1046	459	662	915	563	802
	1032	432	775	921	506	793
C	900	427	542	726	515	652
	672	449	572	796	528	718
	730	476	609	822	521	719
D	511	430	471	481	260	383
	564	442	478	510	271	400
	574	459	486	546	291	434
E	393	212	315	435	251	345
	394	213	297	426	232	330
	483	205	306	416	214	329
	Static			Kinetic		
Product	Peak	Valley	Average	Peak	Valley	Average
A	863	619	744	725	515	630
B	933	445	684	853	552	762
C	767	451	574	781	521	696
D	550	444	478	512	274	406
E	423	210	306	426	232	335

Final - Initial

		Static			Kinetic			
Product	Peak	Valley	Average	Peak	Valley	Average	Static	Kinetic
A: A00166	292	296	273	112	185	138	increase CoF	increase CoF
B: A00170	351	174	224	277	290	307	increase CoF	increase CoF
C: Spartan	296	115	180	294	199	295	increase CoF	increase CoF
D: Claire	-6	13	-7	-77	-181	-109	-/+ CoF	decrease CoF
E: Formula 409	-61	-198	-143	-88	-185	-142	decrease CoF	decrease CoF

Summary:

Substrates:	Glass/Quartz				
Contaminants:	Films				
Company Name:	**Product Name:**	**Conc.:**	**Efficiency:**	**Effective:**	**Observations:**
Amrep Inc	Aspire Heavy Duty Multipurpose Cleaner A00166 Aerosol	100	0.00	☑	Rank = 1
Amrep Inc	Misty All Purpose Cleaner A00170 Aerosol	100	0.00	☑	Rank = 1
Spartan Chemical Company	SD 20 All Purpose Degreaser Aerosol	100	0.00	☑	Rank = 1
Claire Manufacturing	Mr Jinx All Purpose Cleaner Aerosol	100	0.00	☐	Rank = 4
Clorox Company	Formula 409 All Purpose Cleaner	100	0.00	☐	Rank = 5

Conclusion:

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Aspire compared equally to the Misty product and the Spartan product, all three increased the coefficient of friction after application to the glass surface.