



PROJECT CODE: 2116

*ISO 17025 Accredited
Certificate No. 1873.01*

TEST REPORT

THE DETERMINATION OF TAR, NICOTINE AND CARBON MONOXIDE IN MAINSTREAM SMOKE WITH AND WITHOUT A SPECIAL FILTER

Prepared for:

**Safety Shield Inc.
PO Box 190236
Brooklyn, NY 11219**

April 26, 2006

The results in this test report relate only to the samples identified in this report. The information is confidential and is only to be used by the client identified in this report. Arista Laboratories accepts no liability in the use of this report or the results contained, herein. The original controlled report shall not be reproduced without written approval of Arista Laboratories, Inc.



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APPENDIX A – Tar, Nicotine, and Carbon Monoxide



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I. STUDY OVERVIEW

The objective of this study was to determine the deliveries of tar, nicotine and carbon monoxide in mainstream cigarette smoke with and without a special filter.

Test cigarettes for this study consisted of five cigarette types, which are listed in Table I. The Selected analyte groups that were determined are listed in Table II.

The laboratory control cigarette for this project was the Kentucky Reference 2R4F cigarette.

A minimum of eight observations per brand were determined for mainstream smoke, as specified by the client.

The results were electronically submitted to the client on April 24, 2006.

Analytical Methods and results are included in the attached Appendices.

II. TESTING FACILITY

Activities were conducted at Arista Laboratories, 1941 Reymet Road Richmond, VA. 23237.

III. TEST CIGARETTES

A. Receipt, storage and conditioning of test cigarettes

- Two hundred cigarettes of each type were received on March 10, 2006.
- The brand code designations are given in Table I.
- Cigarettes were stored at ambient conditions until required for testing.
- Before smoking, cigarettes were conditioned according to Arista SOP QP-18 Handling of Test Items.

Table I. Brand Coding and Sampling

Client Sample I.D.	Arista Brand Code	Safety Shield Filter
Camel	4426	No
Camel	5169	Yes
Marlboro FF	4428	No
Marlboro FF	5166	Yes
Newport	4429	No
Newport	5167	Yes
Pall Mall	4430	No
Pall Mall	5168	Yes
Dunhill	4432	No
Dunhill	5170	Yes



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B. Constituent List

The analyses requested are listed in Table II. All applicable SOPs have been fully validated. For lists of specific compounds in each analyte group, refer to the Appendices.

Table II. Constituent List

Analyte Group	Arista SOP	Validation Report
Tar, Nicotine, and CO	T-001 v.4/ T-007 v.1	V-005 and V-005-2

C. Sample Generation and Records

Smoking was performed under FTC smoking conditions. Randomized run orders were generated for each analysis. The project was completed with the electronic submission of the final data set.

IV. QUALITY STATEMENTS/SIGNATURES

The analytical results in the attached appendices were reviewed for consistency and evaluated for outliers where deemed necessary. All outliers were noted and repeats conducted if cause was determined. All tests were conducted in accordance with Arista Laboratories quality and technical procedures.

QA
Review: _____ Date _____
S. P. Burton, QA Manager

Management
Approval: _____ Date _____
A. M. Martin, Associate Laboratory Director



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APPENDIX A

Analysis of Mainstream Cigarette Smoke for Tar, Nicotine and Carbon Monoxide

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DETERMINATION OF TAR, NICOTINE AND CARBON MONOXIDE IN MAINSTREAM SMOKE

I. PRINCIPLE OF METHOD

The analytical methods used for this study are detailed in Arista SOP T-001, Determination of Nicotine and Water in Smoke Condensates – Gas Chromatographic Method, and Arista SOP T-007, Determination of Carbon Monoxide in Vapor Phase Cigarette Smoke.

This method applies to the measurements of nicotine and water in total particulate matter (TPM) from cigarette smoke collected on a 44mm Cambridge filter pad. The smoke condensate collected on the pad is dissolved in iso-propanol. Subsequently, an aliquot of the sample solution is analyzed by gas chromatography (GC), and the nicotine and water content of the smoke condensate is determined. Using the nicotine and water values, and the measured wet total particulate matter (WTPM), the tar content is then calculated. The resulting data is reported in milligrams per cigarette (mg/cig) for each smoke sample.

For carbon monoxide determination, the smoke is collected in gas sampling bags attached to the smoking machine. A non-dispersive infrared absorption method (NDIR) is used to measure the CO concentration in the vapor phase in percent by volume (%vol). Using the number of cigarettes, puff counts, puff volume and ambient conditions, the %CO is converted to milligrams per cigarette (mg/cig).

Mainstream TNC Test Report for:
 Safety Shield Inc.
 PO Box 190236
 Brooklyn NY 11219

Project Code: 2116
 Project Start Date: 10-Mar-06
 Arista SOP #: T-001/T-007
 Smoking Protocol: FTC
 Authorized By: A. Martin
 Title: Assoc Lab Dir

For questions or concerns, please see the customer feedback form at <http://www.aristalabs.com>

Run#	Client Code	Arista Code	Puffs (/cigt)	MS TPM (mg/cigt)	CO (mg/cigt)	Water (mg/cigt)	Nicotine (mg/cigt)	Tar (mg/cigt)
C00082-4426J	Camel	2006SN018863	8.7	17.54	12.08	1.98	1.18	14.38
C00082-4426K	Camel	2006SN018865	8.8	18.92	11.55	2.20	1.19	15.53
C00082-4426M	Camel	2006SN018859	9.0	18.34	12.72	1.72	1.23	15.39
C00082-4426N	Camel	2006SN018860	8.8	18.72	13.01	1.94	1.22	15.56
C00082-4426Q	Camel	2006SN018858	9.0	19.34	12.58	2.13	1.22	15.99
C00083-4426B	Camel	2006SN018861	8.4	17.78	12.54	1.76	1.21	14.81
C00083-4426D	Camel	2006SN018862	8.5	19.00	13.84	2.06	1.21	15.73
C00083-4426F	Camel	2006SN018864	8.5	17.74	12.20	1.78	1.17	14.79
Average			8.7	18.42	12.57	1.95	1.20	15.27
sd			0.2	0.67	0.68	0.18	0.02	0.55
%RSD			2.6	3.7	5.4	9.2	1.8	3.6
C00087-5169M	Camel with Safety Shield Filter	2006SN020867	9.3	2.86	11.11	0.12	0.28	2.46
C00087-5169N	Camel with Safety Shield Filter	2006SN020864	8.9	5.78	12.99	0.34	0.42	5.02
C00087-5169O	Camel with Safety Shield Filter	2006SN020865	9.3	4.44	10.98	0.24	0.31	3.89
C00087-5169S	Camel with Safety Shield Filter	2006SN020869	9.5	3.84	11.98	0.19	0.31	3.34
C00088-5169J	Camel with Safety Shield Filter	2006SN020863	8.6	5.84	10.19	0.38	0.41	5.05
C00088-5169K	Camel with Safety Shield Filter	2006SN020868	9.2	9.46	12.12	0.78	0.64	8.04
C00088-5169M	Camel with Safety Shield Filter	2006SN020870	8.8	6.40	10.24	0.40	0.44	5.56
C00089-5169B	Camel with Safety Shield Filter	2006SN020866	8.3	5.24	11.00	0.29	0.37	4.58
Average			9.0	5.48	11.33	0.34	0.40	4.74
sd			0.4	1.99	0.97	0.20	0.11	1.68
%RSD			4.5	36.2	8.6	58.6	28.7	35.3

Arista Laboratories, Inc.
 1941 Reymet Rd.
 Richmond, Va. 23237

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 Authorized By: A. Martin
 Title: Assoc Lab Dir

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Run#	Client Code	Arista Code	Puffs (/cigt)	MS TPM (mg/cigt)	CO (mg/cigt)	Water (mg/cigt)	Nicotine (mg/cigt)	Tar (mg/cigt)
C00083-4428G	Marlboro FF	2006SN018887	8.0	17.58	13.12	2.18	0.99	14.41
C00084-4428C	Marlboro FF	2006SN018891	7.4	15.84	12.77	1.44	0.98	13.42
C00084-4428D	Marlboro FF	2006SN018886	7.8	18.14	13.45	2.26	1.09	14.79
C00084-4428E	Marlboro FF	2006SN018893	7.6	17.08	13.43	1.89	0.99	14.20
C00084-4428J	Marlboro FF	2006SN018888	7.6	16.46	12.56	1.58	1.02	13.86
C00084-4428M	Marlboro FF	2006SN018890	8.1	17.48	13.90	2.15	1.04	14.29
C00084-4428S	Marlboro FF	2006SN018892	8.1	18.06	13.85	2.17	1.07	14.82
C00085-4428G	Marlboro FF	2006SN018889	7.7	18.16	14.43	2.76	1.08	14.32
Average			7.8	17.35	13.44	2.05	1.03	14.26
sd			0.3	0.85	0.62	0.42	0.04	0.46
%RSD			3.3	4.9	4.6	20.2	4.3	3.2
C00087-5166D	Marlboro with Safety Shield Filter	2006SN020846	8.3	5.62	8.53	0.21	0.40	5.01
C00087-5166G	Marlboro with Safety Shield Filter	2006SN020842	8.6	4.44	10.92	0.09	0.30	4.05
C00087-5166K	Marlboro with Safety Shield Filter	2006SN020840	8.2	6.76	12.64	0.53	0.44	5.79
C00087-5166L	Marlboro with Safety Shield Filter	2006SN020845	8.5	4.74	10.21	0.24	0.34	4.16
C00087-5166R	Marlboro with Safety Shield Filter	2006SN020844	8.7	5.16	10.07	0.22	0.35	4.59
C00087-5166T	Marlboro with Safety Shield Filter	2006SN020839	7.9	6.68	12.52	0.40	0.43	5.85
C00088-5166F	Marlboro with Safety Shield Filter	2006SN020843	7.9	3.78	7.26	0.10	0.27	3.41
C00089-5166G	Marlboro with Safety Shield Filter	2006SN020908	7.6	3.72	10.03	0.49	0.30	2.93
C00089-5166I	Marlboro with Safety Shield Filter	2006SN020907	8.1	4.64	10.24	0.21	0.32	4.11
Average			8.2	5.06	10.27	0.28	0.35	4.43
sd			0.4	1.11	1.71	0.16	0.06	0.99
%RSD			4.4	22.0	16.6	57.8	17.3	22.3

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Run#	Client Code	Arista Code	Puffs (/cigt)	MS TPM (mg/cigt)	CO (mg/cigt)	Water (mg/cigt)	Nicotine (mg/cigt)	Tar (mg/cigt)
C00083-4429I	Newport	2006SN018901	7.3	20.00	14.72	2.72	1.13	16.15
C00083-4429Q	Newport	2006SN018894	7.4	21.02	15.26	3.06	1.21	16.75
C00083-4429R	Newport	2006SN018898	7.5	22.58	15.56	4.00	1.22	17.36
C00084-4429A	Newport	2006SN018899	7.3	19.84	15.22	2.86	1.32	15.66
C00084-4429B	Newport	2006SN018897	7.2	20.84	15.45	3.29	1.19	16.36
C00084-4429G	Newport	2006SN018895	7.6	22.08	15.28	3.75	1.25	17.08
C00084-4429K	Newport	2006SN018900	7.5	20.40	14.52	3.05	1.20	16.15
C00084-4429O	Newport	2006SN018896	7.6	20.28	13.91	2.91	1.23	16.14
Average			7.4	20.88	14.99	3.21	1.22	16.46
sd			0.1	0.99	0.56	0.45	0.05	0.56
%RSD			2.0	4.7	3.7	14.1	4.4	3.4
C00087-5167P	Newport with Safety Shield Filter	2006SN020847	8.0	13.16	11.83	1.08	0.92	11.16
C00088-5167A	Newport with Safety Shield Filter	2006SN020850	7.5	6.32	13.88	0.58	0.36	5.38
C00088-5167B	Newport with Safety Shield Filter	2006SN020854	7.5	9.08	11.61	0.93	0.63	7.52
C00088-5167D	Newport with Safety Shield Filter	2006SN020853	7.5	6.04	12.84	0.36	0.37	5.31
C00088-5167I	Newport with Safety Shield Filter	2006SN020852	8.0	4.28	11.23	0.24	0.27	3.77
C00088-5167S	Newport with Safety Shield Filter	2006SN020849	7.9	8.20	15.81	0.73	0.45	7.02
C00089-5167E	Newport with Safety Shield Filter	2006SN020848	8.1	1.72	6.92	0.46	0.24	1.02
C00089-5167H	Newport with Safety Shield Filter	2006SN020910	8.0	4.02	6.05	0.26	0.37	3.39
C00089-5167J	Newport with Safety Shield Filter	2006SN020909	8.0	6.70	8.67	0.48	0.48	5.74
Average			7.8	6.61	10.98	0.57	0.45	5.59
sd			0.3	3.32	3.21	0.29	0.21	2.87
%RSD			3.3	50.1	29.2	51.4	46.1	51.4

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Run#	Client Code	Arista Code	Puffs (/cigt)	MS TPM (mg/cigt)	CO (mg/cigt)	Water (mg/cigt)	Nicotine (mg/cigt)	Tar (mg/cigt)
C00083-4430L	Pall Mall	2006SN018904	10.5	17.66	11.42	1.64	1.21	14.81
C00083-4430M	Pall Mall	2006SN018903	10.2	17.28	11.57	1.77	1.19	14.32
C00084-4430N	Pall Mall	2006SN018909	10.1	16.38	11.36	1.65	1.19	13.54
C00084-4430P	Pall Mall	2006SN018908	10.0	16.98	11.14	1.87	1.21	13.90
C00084-4430T	Pall Mall	2006SN018906	10.5	16.80	11.11	1.77	1.20	13.83
C00085-4430E	Pall Mall	2006SN018907	9.8	16.56	12.01	1.74	1.17	13.65
C00085-4430I	Pall Mall	2006SN018902	9.9	16.24	10.95	1.82	1.14	13.28
C00085-4430J	Pall Mall	2006SN018905	9.7	16.24	10.53	1.66	1.17	13.41
Average			10.1	16.77	11.26	1.74	1.19	13.84
sd			0.3	0.51	0.44	0.08	0.02	0.51
%RSD			3.0	3.1	3.9	4.8	2.0	3.7
C00087-5168B	Pall Mall with Safety Shield Filter	2006SN020858	9.5	4.72	10.58	0.26	0.33	4.13
C00087-5168C	Pall Mall with Safety Shield Filter	2006SN020862	10.2	3.80	9.09	0.04	0.27	3.49
C00087-5168I	Pall Mall with Safety Shield Filter	2006SN020856	9.9	9.36	11.60	0.75	0.59	8.02
C00088-5168L	Pall Mall with Safety Shield Filter	2006SN020860	10.4	4.86	4.64	0.40	0.38	4.08
C00088-5168P	Pall Mall with Safety Shield Filter	2006SN020859	10.9	3.42	6.46	0.00	0.23	3.20
C00088-5168Q	Pall Mall with Safety Shield Filter	2006SN020861	10.6	4.38	5.34	0.22	0.31	3.85
C00088-5168R	Pall Mall with Safety Shield Filter	2006SN020857	11.1	2.38	4.75	0.14	0.18	2.06
C00089-5168D	Pall Mall with Safety Shield Filter	2006SN020855	9.9	4.18	10.95	0.57	0.31	3.30
Average			10.3	4.64	7.93	0.30	0.33	4.02
sd			0.5	2.07	2.95	0.26	0.12	1.75
%RSD			5.3	44.6	37.2	87.7	38.0	43.5

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Run#	Client Code	Arista Code	Puffs (/cigt)	MS TPM (mg/cigt)	CO (mg/cigt)	Water (mg/cigt)	Nicotine (mg/cigt)	Tar (mg/cigt)
C00083-4432K	Dunhill	2006SN018926	9.6	13.34	11.70	0.66	1.00	11.68
C00083-4432N	Dunhill	2006SN018921	9.6	13.10	11.66	0.79	0.99	11.32
C00083-4432O	Dunhill	2006SN018922	10.1	13.68	11.94	0.82	1.08	11.78
C00084-4432H	Dunhill	2006SN018927	9.7	13.18	12.32	0.68	1.05	11.45
C00084-4432I	Dunhill	2006SN018923	9.4	12.64	11.97	0.67	0.99	10.98
C00084-4432R	Dunhill	2006SN018925	9.7	13.50	13.05	0.80	1.05	11.65
C00085-4432C	Dunhill	2006SN018928	9.5	13.14	12.38	0.90	0.99	11.25
C00085-4432F	Dunhill	2006SN018924	9.3	13.54	12.87	0.97	1.04	11.53
Average			9.6	13.27	12.24	0.79	1.02	11.46
sd			0.2	0.33	0.52	0.11	0.04	0.26
%RSD			2.5	2.5	4.2	14.3	3.5	2.3
C00087-5170F	Dunhill with Safety Shield Filter	2006SN020872	9.5	3.70	11.02	0.00	0.30	3.40
C00087-5170H	Dunhill with Safety Shield Filter	2006SN020871	9.8	2.98	9.58	0.00	0.24	2.74
C00088-5170C	Dunhill with Safety Shield Filter	2006SN020877	9.6	2.58	9.45	0.08	0.19	2.31
C00088-5170E	Dunhill with Safety Shield Filter	2006SN020875	9.3	6.24	10.07	0.25	0.48	5.51
C00088-5170G	Dunhill with Safety Shield Filter	2006SN020873	10.2	3.22	5.73	0.20	0.27	2.75
C00088-5170H	Dunhill with Safety Shield Filter	2006SN020878	10.2	3.46	7.11	0.07	0.29	3.10
C00088-5170N	Dunhill with Safety Shield Filter	2006SN020876	10.1	5.20	11.60	0.12	0.38	4.70
C00089-5170C	Dunhill with Safety Shield Filter	2006SN020874	10.4	1.24	3.49	0.34	0.12	0.78
Average			9.9	3.58	8.51	0.13	0.28	3.16
sd			0.4	1.54	2.81	0.12	0.11	1.45
%RSD			4.0	43.2	33.0	91.7	39.0	45.8

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Run#	Client Code	Arista Code	Puffs (/cigt)	MS TPM (mg/cigt)	CO (mg/cigt)	Water (mg/cigt)	Nicotine (mg/cigt)	Tar (mg/cigt)
C00081-0912G	KY2R4F	LabContrl	8.7	11.04	12.79	0.75	0.84	9.45
C00081-0912S	KY2R4F	LabContrl	8.9	11.50	12.59	0.99	0.85	9.66
C00082-0912F	KY2R4F	LabContrl	9.0	11.56	13.74	0.82	0.86	9.88
C00082-0912O	KY2R4F	LabContrl	9.4	11.84	12.72	0.98	0.92	9.94
C00083-0912A	KY2R4F	LabContrl	8.4	11.32	13.65	0.86	0.84	9.62
C00083-0912E	KY2R4F	LabContrl	8.6	10.86	12.56	0.73	0.81	9.32
C00084-0912F	KY2R4F	LabContrl	9.1	11.48	13.57	0.84	0.89	9.75
C00084-0912Q	KY2R4F	LabContrl	9.2	10.08	12.15	0.82	0.82	8.44
C00085-0912A	KY2R4F	LabContrl	8.9	11.08	13.39	0.95	0.88	9.25
C00087-0912E	KY2R4F	LabContrl	8.9	10.96	12.38	0.76	0.82	9.38
C00087-0912J	KY2R4F	LabContrl	8.9	10.58	13.04	0.75	0.82	9.01
C00088-0912O	KY2R4F	LabContrl	9.0	10.04	12.35	0.79	0.84	8.41
C00088-0912T	KY2R4F	LabContrl	9.3	11.18	12.19	0.76	0.80	9.62
C00089-0912A	KY2R4F	LabContrl	8.6	10.68	11.05	0.74	0.81	9.13
C00089-0912F	KY2R4F	LabContrl	8.7	10.72	10.73	0.79	0.82	9.11
Average			8.9	10.99	12.59	0.82	0.84	9.33
sd			0.3	0.52	0.87	0.09	0.03	0.46
%RSD			3.1	4.7	6.9	10.6	4.0	4.9

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