ACCESSION NUMBER 2037

LORILLARD QUALITY CONTROL

GREENSBORO

TRIAL PROCESS AND MANUFACTURING RUN COMPARING LORILLARD RL AND TAMAG READY FLAKE RL USING TRUE BLUE 85 BLEND AND CIGARETTES - FINAL REPORT

SUBMITTED BY: Michael C. Cohn MCC

REPORT NUMBER: QA-203 DATE: 2/22/84

SUMMARY OR ABSTRACT:

A trial process run and a trial manufacturing run, comparing Lorillard RL vs Tamag Ready Flake RL, were conducted on December 14, 1983 and December 19, 1983, respectively. A Control (#1716) and Test (#1717) Sample blend of TRUE Blue 85 were prepared using 5000 lbs. for each. Both blends, free of byproducts, were used to manufacture cigarettes on Mark IX Makers at specified floor weights.

Data suggest that a product of comparable characteristics can be manufactured using Tamag Ready Flake RL.

ACKNOWLEDGMENT:

We wish to express our sincere gratitude to the personnel of Product Development, Research, Leaf, Smoking, Production Quality Control, Manufacturing, Primary Process, and our own Quality Assurance staff for their kind and efficient assistance in the completion of this project.

MCC/swc

Attachments

xc:
Dr. A. W. Spears
Mr. D. R. Tedder
Mr. R. P. Edwards
Dr. C. I. Lewis
Mr. H. R. Pearman, Jr.
Mr. O. R. Manduley
Dr. F. J. Schultz
Mr. C. L. Tucker, Jr.
Mr. J. F. Moorefield II
Mr. A. B. Hudson
Mr. H. J. Minnemeyer
Mr. T. M. Larson
Ms. S. D. Sharpe
Mr. R. C. Young
Mr. M. F. Reich
Mr. R. L. Thomas
Mr. J. S. Bullock
Mr. L. W. Ammons
Mr. A. Sallez
Library

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As requested by Mr. D. R. Tedder a trial process and manufacturing run, under Quality Assurance Project Number 203, were conducted on December 14, 1983 and December 19, 1983, respectively.

This report summarizes the objectives, methods, results, and conclusions based on the data obtained.

I. OBJECTIVES

To determine difference or similarity in the following:

1. Taste
2. Machinability
3. Physical Characteristics
4. Chemical Characteristics

II. METHOD

1. A preliminary taste evaluation was performed using TRUE BLUE 85 cigarettes with Lorillard RL (Control) and with Tamag Ready Flake RL (Test) when fresh and after a designated period of time.

2. A lot of TRUE BLUE 85 blend containing Lorillard RL and one containing Tamag Ready Flake RL (5000 lbs. each) were blended, cut, and processed on December 14, 1983. The Tamag Ready Flake RL was not moisturized at the Vacudyne.

3. Both the Control lot (#1716) and the Test lot (#1717) used the same final casing and top flavor and both were processed with no byproducts added.

4. Both samples were preliminarily tested for machinability and to obtain additional taste panel samples, using a Mark IX, on the afternoon of December 14, 1983.

5. Both samples were run through Mark IX makers on December 19, 1983. Production Quality Control machinability analysis, cigarette defect audits and packer defect data collection were performed during this period. No byproducts were collected in the mezzanine.

6. The blending and manufacturing specifications as requested by Mr. D. R. Tedder and as written by Mr. T. M. Larson, are attached (Attachments 1, 2, 3).

7. The sampling logistics, distribution plan, experimental design, and analyses performed are listed in the attached Quality Assurance project outline (Attachment 4).

III. ANALYTICAL RESULTS

1. The Expert Taste Panel evaluation indicates initial similarity, between control and test, with fresh cigarettes;after a designated period of cigarette aging, however, differences occur with the test sample being slightly harsher, flatter, and burnt. (Refer to Attachment 5.)

ANALYTICAL RESULTS (cont'd.)

2. The PQC Efficiency Audit indicates slightly fewer partially filled tubes and packer kick outs due to loose ends on the test (#1717) than on the control (#1716);both samples, however, were reasonably low. (Refer to Attachment 6.)

3. Tamag Ready Flake RL is thinner than Lorillard RL by a factor of 3.5 times. (Refer to Attachment 7.)

4. Physical properties of cigarettes produced were very similar; the moisture of the test (#1717) cigarettes was 1.3% higher than that of the control (#1716), however, (Refer to Attachment 8);percent PT in each blend was simiar but both were high by 2.0 to 2.5%. (Refer to Attachment 7.)

5. The moisture content of the Tamag Ready Flake RL was 12.44% as received; the Tamag RL was not moisturized at the Vacudyne;the Lorillard RL measured 16.09% moisture after the Vacudyne.

6. Specific Volume (Filling Value) was slightly lower for the Test (#1717) than for the Control (#1716) in the Dryer Input, Dryer Output, Cut Storage, and Cigarette samples. (Refer to Attachment 9.)

7. Particle Size Distribution was comparable in the Dryer Input and Dryer Output samples; although in Cut Storage samples the Control (#1716) had more longs and less shorts, in the Cigarette samples the Test (#1717) had more longs (7%), less shorts (4%), and less fines (3%). (Refer to Attachment 10.)

8. Percent Humectants, both in RL samples and Cut Storage samples, were comparable. (Refer to Attachment 11.)

9. Leaf Analysis showed comparable results with the exception of Volume; in the Dryer Input, Dryer Output, and RL samples the Test (#1717) had lower volume than the Control (#1716). (Refer to Attachment 12.)

10. Smoking Analysis showed no appreciable difference between Test (#1717) and Control (#1716). (Refer to Attachment 13.)

11. The Vapor Phase Analyses Permanent Gas Phase showed the Test (#1717) lower in Oxygen, Nitrogen, Carbon Monoxide, Carbon Dioxide, Nitric Oxide, and Hydrogen Cyanide than the Control (#1716). (Refer to Attachment 14.)

12. The Vapor Phase Analyses Organic Vapor Phase showed the Test (#1717) lower in 2-Methyl Furan, Methyl Ethyl Ketone, and Acetonitrile and higher in Isoprene, Acetaldehyde, Acetone, Acrolein, Benzene, and Toluene than the Control (#1716). (Refer to Attachment 14.)

IV. SUMMARY

Taste characteristics need to be somewhat improved over time. Otherwise, this experiment indicates that cigarettes can be manufactured using Tamag Ready Flake R L without detriment to Machinability Efficiency, Chemical Characteristics, or Physical Characteristics.

V. RECOMMENDATIONS

In accordance with the 2/16/84 meeting with Mr. D. R. Tedder, the following are recommended.

1. Some method of taste enhancement of the Tamag RL should be investigated.

2. In future trial process runs, the Tamag RL should be moisturized at the Vacudyne.

3. In future trial manufacturing runs, specific volume (filling value) and particle size distribution data should be obtained on maker garniture samples as well as cut storage, dryer output, and dryer input samples.

4. Perform complete byproduct material balance using selected major blend, using Tamag RL and Control.

5. Utilize and monitor Tamag RL in various blends to insure compatability throughout the process/production spectrum.

Otherwise, these analytical findings should be utilized by Management to evaluate this product with the possiblity that it may be a promising alternative to Lorillard RL.

ATTACHMENT 1

Date: 12/8/83 83-M-1

Sample No. 1716
Type of Cigarette True Blue 85
Batch Size 5000 lbs.

Original Request Made By D.R. Tedder on 12/2/82
Purpose of Sample Evaluation of Ready Flake RL
Sample Specifications Written By T.M. Larson

BLEND	CASING	RFCASING	FINAL FLAVOR	MENTHOL
True I	None	7782	7356	None

Cigarettes		Filters		
			Section A	Section B
Maker	MK 9			
Length	84.0 mm		10mm	15mm
Filter Length	25.0 mm	Kind	Plastic	1.8/42,000
Circumference	24.8 mm		True Production	Production
Weight	85.4 g/100	Rod Length		120 mm
Paper	540 HC	Pressure Drop		643 mm
Tip. Paper	60 mm White	Circumference		24.0 mm
	5 lines, Prod.	Weight		88.4 g/100
Tip. Paper Por.	4399 C	Plast.		7% Kent
Glue Roller	A	Plug Wrap		E-626
Air Dilution	Approx. 50%	Plug Wrap Por.		1509-C
		Comb. Wrap		Sch. 65MI
		Comb. Wrap Por.		6800 C

Wrapping		Responsibility	
Labels	Production	Tobacco Blend	A. Sallez
Closures -	Production	Filter Production	Production
Tear Tape	Production	Making & Packing	O. Manduley
Cartons	Production	Shipping	-
Markings	Sample No. on ea. ctn.	Sample Requistion (Form 02:20:06)	O. Manduley

Requirements		Laboratory Analysis:
Laboratory	As Required	As required by Q.A.
Other	As Required	

Special Requirements

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Director, Product Development

ATTACHMENT 2

Date: 12/8/83 83-M-1

Sample No. 1717
Type of Cigarette True Blue 85
Batch Size 5000 lbs.

Original Request Made By D.R. Tedder on 12/2/82

Purpose of Sample Evaluation of Ready Flake RL

Sample Specifications Written By T.M. Larson

BLEND	CASING	RECASING	FINAL FLAVOR	MENTHOL
Attached	None	7782	7356	None

Cigarettes

Maker	MK 9
Length	84.0 mm
Filter Length	25.0 mm
Circumference	24.8 mm
Weight	85.4 g/100
Paper	540 HC
Tip. Paper	60 mm White
	5 lines, Prod.
Tip. Paper Por.	4399 C
Glue Roller	A
Air Dilution	Approx. 50%

Filters

	Section A	Section B
Kind	Plastic	Production
True Production		1.8-42,000
Rod Length		120 mm
Pressure Drop		643 mm
Circumference		24.0 mm
Weight		88.4 g/100
Plast.		7% Kent
Plug Wrap		E-626
Plug Wrap Por.		1509-C
Comb. Wrap		Sch. 65MI
Comb. Wrap Por.		6800 C

Wrapping

Labels	Production TB 85
Closures	Production TB 85
Tear Tape	Production TB 85
Cartons	Production TB 85
Markings	Sample No. on ea. ctn.

Responsibility

Tobacco Blend	A. Sallez
Filter Production	Production
Making & Packing	O. Manduley
Shipping	-
Sample Requistion (Form 02:20:06)	O. Manduley

Requirements

Laboratory	As Required
Other	As Required

Laboratory Analysis:
As required by Q.A.

Special Requirements

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Director, Product Development

ATTACHMENT 3

Sample #1717-83 December 8, 1983

Blend

Burley	40%	2,000 lbs.
Turkish	10%	500 lbs.
Flue-Cured	9%	450 lbs.
P.T.	20%	1,000 lbs.
RL	21%	1,050 lbs.
	100%	5,000 lbs.

Burley - TB 85 - 40%
Turksih - TB 85 - 10%
Flue-Cured - TB 85 - 9%
P.T. - TB 85 - 20%
RL Tamag Ready Flake - 21%

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ATTACHMENT 4

QUALITY ASSURANCE PROJECTS DATE REQUESTED: 12/2/83

PROJECT # QA-203 PRIORITY - 1

PROJECT NAME: Analytical Evaluation of READY FLAKE versus Lorillard Reconstituted Leaf and the Possible Effects on our Final Product Cost and Quality Characteristics

REQUESTED BY: Mr. D. R. Tedder

OBJECTIVE: Conduct a dynamic test to evaluate the economic feasibility and the resulting physical and chemical quality characteristics with the intended purpose of reducing production cost while maintaining product quality.

STEPS IN PROPOSED METHOD OF SOLUTION:	COMPLETION DATE	PROJECTED COST
I. Preliminary		
A. Discussion/meeting of intra-departmental participants (Quality Assurance) to discuss project logistics.	12/6/83	
B. Discussion/meeting of inter-departmental participants (Tom Larson/Product Development, Allen Sallez/Primary Process) to discuss project dynamics and logistics.	12/8/83	
II. Manufacturing Parameters		
A. Blending Department		
1. Blend TRUE BLUE 85's tobacco using Lorillard R.L. to a total of 5,000 pounds as the control blend.		
2. Blend TRUE BLUE 85's tobacco using READY FLAKE R.L. to a total of 5,000 pounds as the test blend.		
3. Both tobacco blends should be blended on the same day.		
4. Both tests and control blends should be run using the same flavor and casing mixtures and under the same run conditions.	12/15/83	To be furnished by Leaf and Production.
B. Cutting Department		
1. The test and control blends are to be cut on the same cutters.		
2. The test and control blends are to be run on the same dryers at the same flow rate.	12/15/83	To be furnished by Production.

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STEPS IN PROPOSED METHOD OF SOLUTION:	COMPLETION DATE	PROJECTED COST
C. Making Department		
1. Cigarettes made from both blends shall be made on the same makers.		
2. Set brand code numbers to "Special" at the Production Line to run both Control and Sample.		
3. Cigarettes should be made on the same day from both blends.	12/19/83	To be furnished by Production.
III. Sampling		
A. Blending		
1. Obtain ten pounds of the control and test R.L.	12/15/83	
2. Collect samples of all casings and flavors used.	12/15/83	$50.00
B. Cutting		
1. Obtain one pound of cut tobacco from each cutter used for the control and test blend.		
2. Collect two samples of tobacco (approximately 5 pounds each) throughout the run for each blend at locations before and after the dryer and at cut storage. The samples taken at all locations should be representative of the entire run.		
3. Collect one sample of "puffed" tobacco throughout each of the two runs at the Ohmart.	12/15/83	$85.00

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STEPS IN PROPOSED METHOD OF SOLUTION:	COMPLETION DATE	PROJECTED COST
C. Making Department		
1. Obtain two random trays of cigarettes from each maker used for the test and control cigarettes.	12/19/83	$200.00
D. Packing Department		
1. Collect one randomized cigarette case of each of the two samples.	12/19/83	$200.00
IV. Testing ** (See Page 5)		
A. Blending Department		
1. Test both R.L. samples for:		
a. Electron Micrograph - 2a b. Leaf Analysis - 2c c. Thickness - 1a d. Volume Index - 1k e. Humectant Content - 1e	(test sample only)	
2. Test casing and flavoring for:		
a. Specific Gravity - 1d b. Total Solids - 1d	1/2/84	$750.00
B. Cutting Department		
1. Cutter Sample - Measure strip widths for each cutter on the two blends - 3a		
2. Run the following tests on the control and test tobacco for samples collected before the dryers, after the dryers, puffed tobacco, and cut storage.		

STEPS IN PROPOSED METHOD OF SOLUTION:	COMPLETION DATE	PROJECTED COST
a. Moisture - 1f b. Filling Value - 1g c. Particle Size - 1h d. Humectant Content (Cut Storage Only) - 1e e. Leaf Analysis - 2c	1/2/84	$725.00
C. Making Department		
1. Test randomized pack cigarettes from each blend for the following: (1i unless otherwise noted) a. Tobacco Moisture - 1f b. Tobacco Particle Size - 1h c. Circumference d. Length e. Plug Length f. Paper & Plug Weight g. Cigarette Weight h. Pressure Drop (Total and Tobacco Column) i. Air Dilution j. % Puffed Tobacco 1j k. Cigarette Yield l. Firmness m. Smoking Analysis - 2b n. Vapor Phase Analysis - 2b o. Taste Panel	1/16/84	$975.00
2. Perform P.Q.C. pack defeat audit - 3b.		
3. Perform loose end test; Packer waste and Packer efficiency.	1/16/84	$250.00
V. Report and Recommendation		
A. Report - Based on all data obtained from each sampling area.		
B. Recommendation - Based on the results of the tests performed, recommendations will be proposed as related to cost and quality.	1/20/84	$300.00
		$3535.00

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**Analysis to be performed by:

1. Quality Assurance
   a. Twenty-Five Strips
   b. Ten Gram Sample
   c. Fifteen Pounds (Five Pounds in Each Test Area)
   d. One Determination Each
   e. Fifty Grams (Five Determinations - Ten Grams Each)
   f. Sixteen Determinations (Four Per Sample)
   g. Eight Determinations (Two Per Sample)
   h. Ten Determinations (100 Grams Each)
   i. Twenty-Five Cigarettes
   j. Ten Cigarettes
   k. One Hundred Grams

2. Research
   a. One Random Strip
   b. Two Cartons (Each Sample)
   c. Four Hundred Grams (Each Sample)

3. Production Quality Control
   a. One Pound for Each Cutter
   b. Two Hundred Packs

		% Participation
Leader:	M. C. Cohn	16.0%
Members:	C. I. Lewis	0.5%
	H. R. Pearman, Jr.	0.5%
	D. A. Hicks	1.0%
	O. R. Manduley	1.0%
	S. D. Sharpe	0.5%
	Technicians	66.0%
	Research	5.0%
	P. Q. C.	5.0%
	Leaf Department	1.0%
	Production	5.0%

ATTACHMENT 5

Lorillard

MEMORANDUM

February 14, 1984

TO: O. R. Manduley

FROM: T. D. Jessup

SUBJECT: True RL with Tamag RL

On December 5, 1983 a True Blue 85 sample was run in the factory that utilized Tamag RL as a replacement for Lorillard RL. This sample was compared to a control True Blue 85 that was processed in the factory on the same date.

Taste panel results are attached.

T. D. Jessup

/lp:2

Attachment

Xc: A. B. Hudson
T. M. Larson
F. J. Schultz
J. H. Smith
C. L. Tucker

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ATTACHMENT 5

Expert Panel Results (Fresh Cigarettes)

	Control	Sample
Impact	10	10
Taste Amplitude	10	10.5
Overall Acceptability	10	10.5

Expert Panel Results (Aged Cigarettes - 7 weeks old)

	Control	Sample
Impact	10	11
Taste Amplitude	10	11
Overall Acceptability	10	9

Sample considered harsher, flatter and burnt

Factory Panel

Control 18
Sample 15
No Pref. 12

It should be noted that the air dilution of the control averaged 46% and the air dilution of the sample averaged 55%; therefore, the factory panel compared a 5 mg control to a 4 mg sample.

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ATTACHMENT 6

QA-203/RL EVALUATION: POC EFFICIENCY AUDIT

POC CIGARETTE AUDIT

	#1716-CONTROL	#1717-TEST
NUMBER PACKS TESTED	300	300
PARTIALLY FILLED TUBES	1	0

POC PACKER DATA

	#1716-CONTROL	#1717-TEST
NUMBER TRAYS INSPECTED	2	2
LOOSE ENDS	3	0

QA-203/RL EVALUATION: CUTTER STRIP WIDTHS

	#1716-CONTROL	#1717-TEST
CUTTER #4		
STRIP WIDTH(mm)	0.8110	0.8333
(STD.DEV.)	0.0567	0.0485
CUTS PER INCH	31.32	30.48
CUTTER #5		
STRIP WIDTH(mm)	0.8374	0.8598
(STD.DEV.)	0.0462	0.0603
CUTS PER INCH	30.26	29.54

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ATTACHMENT 7

QA-203/RL EVALUATION: %EXPANDED TOBACCO/CIGARETTES

	#1716-CONTROL	#1717-TEST
	20.3273	21.3894
	23.4252	22.2635
	20.8171	20.1465
	21.1538	25.7658
	17.7331	23.7354
	22.2222	21.8579
	23.0624	23.3028
	22.4762	22.5688
	22.2826	19.8543
	24.0809	24.5681
AVERAGE:	22.0581	22.5453
STD.DEV.:	1.8226	1.8660

QA-203/RL EVALUATION: RL THICKNESS

	#1716-LORILLARD RL	#1717-READY FLARE RL
	0.0282	0.0083
	0.0284	0.0083
	0.0265	0.0086
	0.0287	0.0073
	0.0324	0.0089
	0.0271	0.0080
	0.0273	0.0082
	0.0278	0.0087
	0.0290	0.0088
	0.0324	0.0073
AVERAGE:	0.02878	0.00824
STD.DEV.:	0.00205	0.00057

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ATTACHMENT 8

3A-203/RL EVALUATION: PHYSICAL PROPERTIES/CIGARETTES

	#1714-CONTROL	#1717-TEST
%MOISTURE/CIGARETTES	12.11	13.00
TOBACCO WT.(200 CIGTS.)	171.7762	172.0613
FIRMNESS (mm DEPRESSION)	1.25	1.35
(STD.DEV.)	(0.1223)	(0.1269)
%AIR DILUTION	53.0	52.0
(STD.DEV.)	(4.0457)	(4.2743)
PRESSURE DROP(UNENCAPSULATED)	73.0	72.0
(STD.DEV.)	(5.1036)	(6.6267)
PRESSURE DROP(TOBACCO)	59.0	56.0
(STD.DEV.)	(6.1727)	(6.4430)
CIRCUMFERENCE(mm)	25.00	24.94
(STD.DEV.)	(0.0865)	(0.0439)
OVERALL LENGTH(mm)	83.6	83.6
(STD.DEV.)	(0.2768)	(0.2291)
TIPPING LENGTH(mm)	29.7	29.8
(STD.DEV.)	(0.4358)	(0.2533)
OUTER PLUG LENGTH(mm)	10.1	10.1
(STD.DEV.)	(0.5895)	(0.4213)
INNER PLUG LENGTH(mm)	15.0	14.9
(STD.DEV.)	(0.5759)	(0.4330)
PAPER WT.(25 CIGTS.)	2.5065	2.6083
OUTER PLUG WT.(25 CIGTS.)	1.7479	1.7873
INNER PLUG WT.(25 CIGTS.)	2.2769	2.3154

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ATTACHMENT 9

QA-203 / RL PROJECT: SPECIFIC VOLUME (FILLING VALUE) / CUT TOBACCO

NOTE: VALUES LISTED FOR DRYER INPUT AND DRYER OUTPUT ARE UNCORRECTED AND PERTAIN TO THE RESPECTIVE MOISTURE. VALUES LISTED FOR CUT STORAGE AND PT ARE CORRECTED TO FILLING VALUE CURVES GENERATED ACCORDING TO STANDARD PROCEDURE.

	SPECIFIC VOLUME	% MOISTURE
DRYER INPUT / #1716(CONTROL)	358.20	19.84
	357.66	19.81
AVERAGE:	357.93	19.82
DRYER INPUT / #1717(TEST)	340.14	19.37
	345.84	19.26
AVERAGE:	342.99	19.32
DRYER OUTPUT / #1716(CONTROL)	457.80	15.14
	448.65	15.17
AVERAGE:	453.22	15.16
DRYER OUTPUT / #1717(TEST)	442.65	15.11
	433.88	15.10
AVERAGE:	438.26	15.10
CUT STORAGE / #1716(CONTROL)	545.12	14.39
	550.91	14.39
AVERAGE:	548.02	14.39
CUT STORAGE / #1717(TEST)	534.47	12.74
	530.85	12.74
AVERAGE:	532.66	12.74

EXPECTED CUT STORAGE RANGE (#1716/CONTROL): 514.28-541.53

EXPECTED CUT STORAGE RANGE (#1717/TEST) : 517.21-544.56

VIRGINIA PT	784.99	13.99
	804.64	14.05
AVERAGE:	794.31	13.98

EXPECTED VIRGINIA PT RANGE : 775.82-878.04

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ATTACHMENT 9

OA-203/RL PROJECT:SPECIFIC VOLUME(FILLING VALUE)/CIGARETTES

	#1716(CONTROL)	#1717(TEST)
SPECIFIC VOLUME	517	551
	521	553
	530	537
AVERAGE	523	547
PERCENT MOISTURE	13.35	11.90
	12.90	11.80
	12.65	11.90
AVERAGE	12.87	11.87
SPECIFIC VOLUME(CORRECTED TO 13% MOISTURE)	519	507
	517	505
	516	493
AVERAGE	517	502

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QA-203/RL EVALUATION: %DISTRIBUTION OF PARTICLE SIZE

% DISTRIBUTION OF PARTICLE SIZE

REQUESTED BY: MR. D.TEDDER
01/05/84
DRYER INPUT/ #1716-CONTROL/ 1000 GRAMS

SAMPLE #	#8	#10	#16	#20	#40	PAN	LONGS	SHORTS	FINES
1	60.12	7.46	19.29	9.06	2.87	1.15	67.60	28.35	4.05

% DISTRIBUTION OF PARTICLE SIZE

REQUESTED BY: MR. D.TEDDER
01/05/84
DRYER INPUT/ #1717-TEST/ 1000 GRAMS

SAMPLE #	#8	#10	#16	#20	#40	PAN	LONGS	SHORTS	FINES
1	60.65	7.33	18.97	8.82	2.93	1.09	68.23	27.79	3.98

% DISTRIBUTION OF PARTICLE SIZE

REQUESTED BY: MR. D.TEDDER
01/06/84
DRYER OUTPUT/ #1716-CONTROL/ 1000 GRAMS

SAMPLE #	#8	#10	#16	#20	#40	PAN	LONGS	SHORTS	FINES
1	47.58	8.72	23.07	13.65	4.78	2.20	56.30	36.72	6.98

% DISTRIBUTION OF PARTICLE SIZE

REQUESTED BY: MR. D.TEDDER
01/06/84
DRYER OUTPUT/ #1717-TEST/ 1000 GRAMS

SAMPLE #	#8	#10	#16	#20	#40	PAN	LONGS	SHORTS	FINES
1	46.64	7.74	22.93	15.52	5.11	2.06	54.38	38.45	7.16

% DISTRIBUTION OF PARTICLE SIZE

REQUESTED BY: MR. D.TEDDER
01/04/84
CUT STORAGE/ #1716-CONTROL/ 1000 GRAMS

SAMPLE #	#8	#10	#16	#20	#40	PAN	LONGS	SHORTS	FINES
1	50.76	10.48	21.61	11.68	3.91	1.56	61.24	33.29	5.47

% DISTRIBUTION OF PARTICLE SIZE

REQUESTED BY: MR. D.TEDDER
01/04/84
CUT STORAGE/ #1717-TEST/ 1000 GRAMS

SAMPLE #	#8	#10	#16	#20	#40	PAN	LONGS	SHORTS	FINES
1	46.65	8.95	22.90	15.19	4.74	1.58	55.60	38.08	6.32

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ATTACHMENT 10

OA-203/RL EVALUATION: %DISTRIBUTION OF PARTICLE SIZE

% DISTRIBUTION OF PARTICLE SIZE

REQUESTED BY: MR. D.TEDDER
01/09/84
VIRGINIA PT/ 500 GRAMS

SAMPLE #	#8	#10	#16	#20	#40	PAN	LONGS	SHORTS	FINES
1	37.39	14.35	28.95	14.06	4.16	1.12	51.74	42.98	5.28

% DISTRIBUTION OF PARTICLE SIZE

REQUESTED BY: MR. D.TEDDER
01/04/84
CIGARETTES/ #1716-CONTROL/ 100 GRAMS

SAMPLE #	#8	#10	#16	#20	#40	PAN	LONGS	SHORTS	FINES
I	16.41	9.14	35.62	27.13	10.26	1.43	25.55	62.76	11.69

% DISTRIBUTION OF PARTICLE SIZE

REQUESTED BY: MR. D.TEDDER
01/04/84
CIGARETTES/ #1717-TEST/ 100 GRAMS

SAMPLE #	#8	#10	#16	#20	#40	PAN	LONGS	SHORTS	FINES
1	19.80	12.69	36.10	22.50	7.66	1.25	32.49	58.60	8.91

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ATTACHMENT 11

. . . QA 203 (RL Evaluation): Percent Humectants

PROP GLY SLOPE= 0.00337508609831 INTERCEPT= -0.00389643999996
GLYCERINE SLOPE= 0.00218296291494 INTERCEPT= -0.0185342439338
YEAR IS 1984

BRAND		DATE(MO-DAY)	PROPYLENE	GLYCERINE
1716/CUT	1		1.29	2.25
1716/CUT	2		1.31	2.24
1716/CUT	3		1.29	2.46
1716/CUT	4		1.29	2.49
1716/CUT	5		1.30	2.44
		Avg.	1.296	Avg. 2.376
		S.D.	0.0089	S.D. 0.1210

BRAND		DATE(MO-DAY)	PROPYLENE	GLYCERINE
1717/CUT	1		1.45	2.45
1717/CUT	2		1.16	2.23
1717/CUT	3		1.19	2.18
1717/CUT	4		1.27	2.29
1717/CUT	5		1.20	2.26
		Avg.	1.254	Avg. 2.270
		S.D.	0.1167	S.D. 0.1088

PROP GLY SLOPE= 0.00338338562267 INTERCEPT= -0.00336044499997
GLYCERINE SLOPE= 0.00222490122139 INTERCEPT= -0.0179145933898
YEAR IS 1984

BRAND		DATE(MO-DAY)	PROPYLENE	GLYCERINE
1716/RL	1		0.11	0.51
1716/RL	2		0.14	0.48
1716/RL	3		0.11	0.45
1716/RL	4		0.12	0.44
1716/RL	5		0.11	0.46
		Avg.	0.118	Avg. 0.468
		S.D.	0.0130	S.D. 0.0277

BRAND		DATE(MO-DAY)	PROPYLENE	GLYCERINE
1717/RL	1		0.21	0.38
1717/RL	2		0.21	0.40
1717/RL	3		0.21	0.39
1717/RL	4		0.21	0.40
1717/RL	5		0.21	0.40
		Avg.	0.210	Avg. 0.394
		S.D.	0.000	S.D. 0.0089

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ATTACHMENT 12

QA-203/RL EVALUATION: LEAF ANALYSIS

	%NIT	%TVB	%NIC	VOL	%ASH	%TRS
#1716/LORILLARD RL	2.09	0.25	0.85	205	20.8	4.9
#1717/READYFLAKE RL	2.00	0.29	0.90	142	18.9	5.3
#1716/DRYER INPUT	2.91	0.56	2.00	222	17.7	4.1
#1717/DRYER INPUT	2.80	0.55	2.00	209	17.7	4.6
#1716/DRYER OUTPUT	2.90	0.54	2.05	223	17.7	4.1
#1717/DRYER OUTPUT	2.70	0.52	1.96	200	17.0	5.2
#1716/CUT STORAGE	2.73	0.51	2.07	247	16.6	6.5
#1717/CUT STORAGE	2.70	0.48	2.08	247	16.1	6.7
#1716/#1717 PT	2.10	0.35	2.22	434	12.3	15.5

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ATTACHMENT 13

QA-203 / RL PROJECT: SMOKING ANALYSIS / CIGARETTES

	#1716/CONTROL	#1717/TEST
WEIGHT/CONTROL (gm/cigt)	0.694	0.702
WEIGHT/FILTER (gm/cigt)	0.965	0.870
PRESSURE DROP/CONTROL (mm/cigt)	59.3	62.7
PRESSURE DROP/ENCAPS (mm/cigt)	112.9	115.2
AIR DILUTION (%)	52.0	54.0
NICOTINE/CONTROL (mg/cigt)	1.47	1.46
NICOTINE/FILTER (mg/cigt)	0.52	0.46
CARBON MONOXIDE/CONTROL (mg/cigt)	15.7	15.6
CARBON MONOXIDE/FILTER (mg/cigt)	6.1	6.4
DPM / CONTROL (mg/cigt)	24.2	24.4
DPM / FILTER (mg/cigt)	5.8	5.5
CPM / CONTROL (mg/cigt)	22.8	23.1
CPM / FILTER (mg/cigt)	5.3	5.1
PUFF COUNT / CONTROL (/cigt)	5.8	5.7
PUFF COUNT / FILTER (/cigt)	6.9	6.9
FILTER EFFICIENCY/NICOTINE	64.3	68.3
FILTER EFFICIENCY/CARBON MONOXIDE	61.5	61.7
FILTER EFFICIENCY/DPM	76.0	77.5
FILTER EFFICIENCY/CPM	76.7	78.0

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ATTACHMENT 14

QA-203/RL PROJECT: COMPLETE VAPOR PHASE ANALYSES

PERMANENT GAS PHASE (mg/cigt)

	#1716(CONTROL)	#1717(TEST)
OXYGEN	49.9	48.3
NITROGEN	192.6	185.4
CARBON MONOXIDE	7.3	6.5
CARBON DIOXIDE	32.8	26.2
NITRIC OXIDE (ug/cigt)	168.0	145.1
HYDROGEN CYANIDE (ug/cigt)	49.0	44.0

ORGANIC VAPOR PHASE (ug/cigt)

	#1716(CONTROL)	#1717(TEST)
ISOPRENE	212.9	248.2
ACETALDEHYDE	279.1	351.6
ACETONE	250.3	275.0
ACROLEIN	67.0	72.0
2-METHYL FURAN	35.9	38.3
METHYL ETHYL KETONE	72.3	40.6
BENZENE	52.7	57.3
TOLUENE	69.7	87.3
ACETONITRILE	97.2	90.5
SMOKE pH	7.07	7.23
PUFF/CIGT	6.60	6.60

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