AIR POLLUTION CONTROL DISTRICT

434 SOUTH SAN PEDRO STREET, LOS ANGELES, CALIF. 90013 - MADISON 9-4711 / COUNTY OF LOS ANGELES

PRESSURE SENSITIVE
TAPES AND LABELS
AP-42
Section 4.2.2.9
Reference Number
18

TEST
CONDUCTED AT

AVERY LABEL CO.
1616 SOUTH CALIFORNIA AVENUE
MONROVIA, CALIFORNIA

ON

NOVEMBER 27, 1974

REPORT
ON THE

EMISSIONS TO THE ATMOSPHERE FROM TWO AFTERBURNERS SERVING LABEL STOCK COATING AND LAMINATING SYSTEM C-30

BY

R. N. Milner — Supv. A. P. Engineer I
W. L. Oaks — Air Pollution Engineer
S. Banerjee — Air Pollution Engineer Asst.

SOURCE TESTING SECTION
REPORT NO. C-2198

Robert J. MacKnight
Director of Engineering

Howard DeVorkin
Supv. A. P. Engineer III

ISSUED MAR 21 1975

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

Test No. C-2198

INTRODUCTION

Pursuant to a request from K. R. Evans, of the Solvent Processing Unit, a source test to determine compliance with Rule 66 was performed on two afterburners, hereafter designated as No. 1, controlling the lacquer and prime lines, and No. 2, controlling the adhesive lines.

This equipment is located at 1616 South California Ave., Monrovia, California.

Messrs. R. Milner, W. Oaks, S. Banerjee, J. Reese, J. Kraim and J. Bazes of the Source Testing Section conducted the test. Test arrangements were made through Ron Mabry, Manager-Manufacturing Engineering. Mr. Evans was present during the test and his recorded observations are appended to this report.

RESULTS

No. 1 afterburner efficiency at an operating temperature of 1460°F was 98%. Emissions to the atmosphere were 4.7 lbs/hr as carbon.

No. 2 afterburner efficiency at an operating temperature of 1370°F was 63%. Emissions to the atmosphere were 371 lbs/hr as carbon including CO, which itself was 4820 ppm or about 216 lbs/hr as carbon.

SAMPLING AND ANALYTICAL PROCEDURES

Gas Flow Rate

The gas flow rates at the afterburner inlets were measured by conventional traverse procedures using a pitot tube, Magnehelic gage and a mercury-in-glass thermometer. The flow rates were measured at two different operating conditions, as requested, and are recorded on pages 3 and 4.

The gas flow rates were converted to the dry basis. The afterburner outlet dry gas flow rate was calculated from the inlet wet gas flow rate using natural gas combustion relationships.

Total Organics

The gases at the inlets and outlets of each afterburner were sampled for organic materials using duplicate sampling trains, each consisting of a special stainless steel trap immersed in dry ice, followed by an evacuated 8-liter flask. A restriction orifice, block valve and vacuum gage located between the trap and the flask were used to monitor the sampling rate. Sampling was for a period of approximately 40 minutes.

The samples were analyzed by "TCA Method" as outlined in Paper No. 74-190, presented by the APCD at the National APCA meeting, June, 1974, and in a District publication of August, 1974.

The results of individual analyses for CO, CO_2, CH_4 and other organics are shown on pages 3 and 4 of this report. All concentrations are expressed as equivalent CO_2, on the dry basis. Total organics in the afterburner outlet gases include any increase in CO concentration over the inlet carbon monoxide concentration.

Approved _____

db:3/12/75

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

TEST NO. C-2198

DATE 11/27/74

SUMMARY OF DATA AND RESULTS

(For Rule 66 Evaluation)

EQUIPMENT AND TEST CONDITIONS

Name of Firm: Avery Label Co.
Basic Equipment: Two Drying Ovens (Lacquer and Prime) C-30
Control Equipment: Afterburner #1
Process Description: Web-Type Lacquer and Prime Drying Oven
Test Date: 11-27-74
Run Number:
A/B Temperature, °F
- Plant instrument: 1490
- APCD measurement: 1460

RESULTS

A/B Inlet

Concentrations as CO_2, ppm. by volume, dry basis

	Inlet No. 1	Inlet No. 2	
CO			23
CO_2			1622
Total Organics			15719
Gas flow rate, scfm (dry)	5632**	3250**	8880
Gas temperature, °F	160	92	

A/B Outlet

Concentrations as CO_2, ppm. by volume, dry basis

CO	N.D.
CO_2	39200
Total Organics	289
(*)	
Gas flow rate, scfm (dry)	8560
Gas temperature, °F	1460

EMISSION RATES AND AFTERBURNER EFFICIENCY

Organics, as carbon, lb./hr.	
Inlet	265
Outlet	4.7
Efficiency, %	98
Oxides of Nitrogen, as NO_2 (Outlet)	
ppm by vol.	
lb./hr.	

NOTES: (*) Including increase in CO, if any, across the afterburner
** Minimum gas flow rates (wet) for Inlet Nos. 1 and 2 are 2490 SCFM and 3270 SCFM, respectively.
N.D. - None detected.

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

TEST NO. C-2198

DATE 11/27/74

SUMMARY OF DATA AND RESULTS

(For Rule 66 Evaluation)

EQUIPMENT AND TEST CONDITIONS

Name of Firm Avery Label Co.
Basic Equipment Adhesive Oven C-30
Control Equipment Afterburner No. 2
Process Description Web-Type Adhesive Drying Oven
Test Date 11-27-74
Run Number
A/B Temperature, °F
  Plant instrument 1140
  APCD measurement 1370

RESULTS

A/B Inlet

Concentrations as CO_2, ppm. by volume, dry basis

CO			32
CO_2			1590
Total Organics			21970
	Inlet No. 1	Inlet No. 2	
Gas flow rate, scfm (dry)	13260**	10960**	24220
Gas temperature, °F	110	145	

A/B Outlet

Concentrations as CO_2, ppm. by volume, dry basis

CO	4820
CO_2	28500
Total Organics	3485
(*)	8273
Gas flow rate, scfm (dry)	23600
Gas temperature, °F	1370

EMISSION RATES AND AFTERBURNER EFFICIENCY

Organics, as carbon, lb./hr.
  Inlet 1010
  Outlet 371
Efficiency, % 63

Oxides of Nitrogen, as NO_2 (Outlet)
  ppm by vol.
  lb./hr.

NOTES: (*) Including increase in CO, if any, across the afterburner
** Minimum gas flow rates (wet) for Inlet Nos. 1 and 2 are 4700 SCFM and 12,400 SCFM, respectively.

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

TEST NO. C- 2198

DATE 11/27/74

ANALYSES FOR CO_2, CO, AND ORGANICS

EQUIPMENT: Afterburner No. 1

SAMPLE STATION	FLASK				TRAP	TOTAL ORGANICS
	CO_2	CO	CH_4	BACK-FLUSH		
Inlet No. 1	737 752 745	N.D. N.D.	N.D. N.D.	326 437	17100 13600	17400 14000 15700(a)
Inlet No. 2	3160 3120 3140	63 65 64	53 N.D. 27	276 254	14400 16500	14700 16800 15750(a)
Outlet	39700 38700 39200	N.D. N.D.	N.D. N.D.	N.D. 55	240 282	240 337 289

1) Efficiency (Concentration Basis) = $100\,\frac{15719 - 289}{15719}$ = 98 %

2) Gas Flow Rates, scfm (dry):

Inlet 8880 Outlet 8560

3) Organic Flow Rates, lb./hr. as carbon:

Inlet = $60 \times 10^{-6} \times 12/379 \times$ 8880 $\times$ 15719 = 265.0

Outlet = $60 \times 10^{-6} \times 12/379 \times$ 8560 $\times$ 289 = 4.7

4) Efficiency (Weight Basis) = $100\,\frac{265 - 4.7}{265}$ = 98 %

NOTES: All concentrations in ppm volume as CO_2, dry basis.

* Including increase in CO, if any, across the afterburner. *

N.D. - None detected

(a) See page 6 for weighted average calculations.

TEST NO. C- 2198

DATE 11/27/74

ANALYSES FOR CO_2, CO, AND ORGANICS

EQUIPMENT: **Afterburner #2**

SAMPLE STATION	FLASK				TRAP	TOTAL ORGANICS
	CO_2	CO	CH_4	BACK-FLUSH		
Inlet #1	1390 1370 1380	34 11 23	N.D. N.D.	1010 1740	25600 22300	26600 24000 25300(a)
Inlet #2	1800 1880 1840	43 38 41	N.D. N.D.	2410 1750	15100 16600	17500 18400 17950(a)
Outlet	27600 29400 28500	5100 4530 4820	62 38 50	1690 1730	1960 1490	3710 3260 3485 8273*

1) Efficiency (Concentration Basis) = $100 \dfrac{21970 - 8273}{21970}$ = 62 %

2) Gas Flow Rates, scfm (dry):

Inlet 24220 Outlet 23600

3) Organic Flow Rates, lb./hr. as carbon:

Inlet = $60 \times 10^{-6} \times 12/379 \times$ 24220 $\times$ 21970 = 1010

*Outlet = $60 \times 10^{-6} \times 12/379 \times$ 23600 $\times$ 8273 = 371

4) Efficiency (Weight Basis) = $100 \dfrac{1010 - 371}{1010}$ = 63 %

NOTES: All concentrations in ppm volume as CO_2, dry basis.

* Including increase in CO, if any, across the afterburner. (Weighted Avg.)

(a) See page 7 for weighted average calculations.

N.D. - None detected.

WEIGHTED AVERAGE CALCULATIONS

I. Afterburner No. 1

	SCFM (Wet)	SCFM (Dry)
Inlet No. 1	5640	5630
Inlet No. 2	3270	3250
Total	8910	8880

Inlet No. 1 Factor = $\frac{5630}{8880}$ = 0.634

Inlet No. 2 Factor = $\frac{3250}{8880}$ = 0.366

Compound	Inlet No. 1	Inlet No. 2	Weighted Avg.
CO	N.D.	23	23
CH_4	N.D.	10	10
CO_2	472	1150	1622
Organic	9954	5765	15719

Outlet Volume SCFM (Dry) = 8560.

II. Afterburner No. 2

	SCFM (Wet)	SCFM (Dry)
Inlet No. 1	13300	13260
Inlet No. 2	11000	10960
Total	24300	24220

Inlet No. 1 Factor = $\frac{13260}{24220}$ = 0.547

Inlet No. 2 Factor = $\frac{10960}{24220}$ = 0.453

Compound	Inlet No. 1	Inlet No. 2	Weighted Avg.
CO	13	19	32
CH_4	N.D.	N.D.	--
CO_2	755	834	1590
Organics	13840	8130	21970

Outlet Volume SCFM (Dry) = 24300.

N.D. - None detected.

AIR POLLUTI CONTROL DISTRICT -- COUNTY OF , ANGELES

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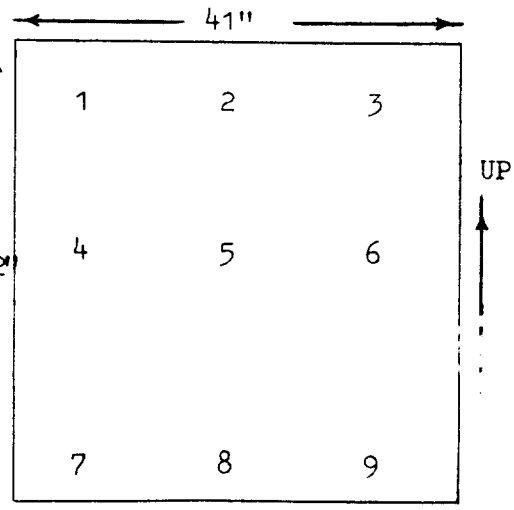
SAMPLING STATION A/B No. 1 Inlet No. 1 DATE 11/27/74

GAS VELOCITY DATA

Normal and Minimum Flows

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC
	1	.02	160	10.2	.02	160	10.2	.02	160	10.2
	2	.02		10.2	.02		10.2	.02		10.2
	3	.02		10.2	.02		10.2	.02		10.2
	4	.02		10.2	.03		12.5	.02		10.2
	5	.02		10.2	.02		10.2	.03		12.5
	6	.02		10.2	.02		10.2	.02		10.2
	7	.02		10.2	0		0.0	.01		7.2
	8	.02		10.2	.02		10.2	.03		12.5
	9	0		0.0	.01		7.2	.01		7.2
	Avg. 1-9			9.1			9.0			10.0
	1	.01		7.2	.02		10.2	.01		7.2
	2	.01		0.0	.01		7.2	.01		7.2
	3	.01		7.2	.01		7.2	0		0.0
	4	.01		7.2	.01		7.2	0		0.0
	5	.01		0.0	0		0.0	0		0.0
	6	-		0.0	-		0.0	0		0.0
	7	.01		7.2	.02		10.2	.01		7.2
	8	.01		7.2	.01		7.2	.01		7.2
	9	0		0.0	0		0.0	0		0.0
	Avg. 1-9			4.0			5.5			3.2
	Static =	-5" H_2O								

	Low	High
A. INDICATED VELOCITY (TRAVERSE) FT/SEC	4.2	9.4
B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC		
C. FLUE FACTOR, A/B		
D. PITOT CORRECTION FACTOR	1.00	
E. GAS DENSITY CORRECTION FACTOR (assumed)	1.00	
F. GAS PRESSURE IN STACK, IN. HG. ABS.	29.5	
G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$	1.01	
H. CORRECTED VELOCITY: AxDxExG, FT/SEC		
OR BxCxDxExG, FT/SEC	4.2	9.5
J. AREA OF FLUE, SQ. FT.	11.96	
K. AVERAGE FLUE TEMPERATURE, °F	160	
L. FLOW RATE, HxJx60, CFM	3010	6820
M. FLOW RATE, (F/29.9)x520xL/(K+460), SCFM	2490	5640



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SAMPLING STATION A/B No. 1, Inlet No. 2 DATE 11/27/74

GAS VELOCITY DATA

Normal and minimum flows

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC
	1	0.01	92	6.8	.01	92	6.8	.01	92	6.8
	2									
	3									
	4									
	5									
	6									
	7									
	8									
	9									
	10									
	11									
	12									
	13									
	14									
	15									
	16									
	17									
	18									
	19									
	20									
	Avg. 1-20			6.8			6.8			6.8
	Static =	-.01" H_2O								

A. INDICATED VELOCITY (TRAVERSE) FT/SEC 6.8

B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC

C. FLUE FACTOR, A/B

D. PITOT CORRECTION FACTOR 1.00

E. GAS DENSITY CORRECTION FACTOR 1.00 (assumed)

F. GAS PRESSURE IN STACK, IN. HG. ABS. 29.9

G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$ 1.00

H. CORRECTED VELOCITY, AxDxExG, FT/SEC 6.8

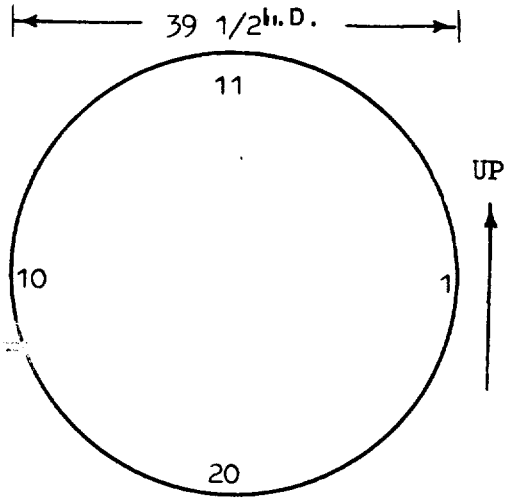
OR BxCxDxExG, FT/SEC

J. AREA OF FLUE, SQ. FT. 8.5

K. AVERAGE FLUE TEMPERATURE, °F 92

L. FLOW RATE, HxJx60, CFM 3470

M. FLOW RATE, (F/29.9)x520xL/(K+460), SCFM 3270



AIR POLLUTI CONTROL DISTRICT -- COUNTY OF L ANGELES

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SAMPLING STATION A/B No. 2, Inlet No.1 DATE 11/27/74

GAS VELOCITY DATA

Normal Flow

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. ^oF	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. ^oF	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. ^oF	VELOCITY FT/SEC
	1	.60	110	53.6	.55	110	51.3	.50	110	49.0
	2	.45		46.4	.45		46.4	.40		43.8
	3	.70		57.9	.60		53.6	.65		55.8
	4	.05		15.5	.12		24.0	.10		21.9
	5	.05		15.5	.03		12.0	.04		13.8
	6	.04		13.8	.05		15.5	.02		9.8
	7	.05		15.5	.05		15.5	.06		17.0
	8	-		0	.01		6.9	-		0
	9	-		0	-			.01		6.9
	Avg. 1-9			24.2			25.0			24.2
		Static = -2.8" H_2O								

A. INDICATED VELOCITY (TRAVERSE) FT/SEC 24.5

B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC

C. FLUE FACTOR, A/B

D. PITOT CORRECTION FACTOR 1.00

E. GAS DENSITY CORRECTION FACTOR

F. GAS PRESSURE IN STACK, IN. HG. ABS. 29.7

G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$ 1.00

H. CORRECTED VELOCITY, AxDxExG, FT/SEC 24.5

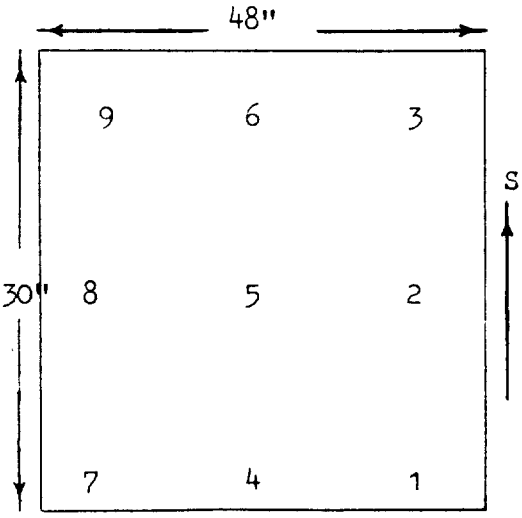
OR BxCxDxExG, FT/SEC

J. AREA OF FLUE, SQ. FT. 10.0

K. AVERAGE FLUE TEMPERATURE, ^oF 110

L. FLOW RATE, HxJx60, CFM 14700

M. FLOW RATE, (F/29.9)x520xL/(F+460), SCFM 13300



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SAMPLING STATION A/B No. 2, Inlet No. 2 DATE 11/27/74

GAS VELOCITY DATA

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. ^oF	VELOCITY FT/SEC	Normal Flow VEL. HEAD IN. H_2O	TEMP. ^oF	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. ^oF	VELOCITY FT/SEC
11:00	1	0.10	130	22.3	0.08	130	19.9	0.10	130	22.3
	2	.09		21.1	.08		19.9	.09		21.1
	3	.09		21.1	.07		18.6	.08		19.9
	4	.09		2.11	.08		19.9	.08		19.9
	5	.09		21.1	.08		19.9	.10		22.3
	6	.10		22.3	.10		22.3	.10		22.3
	7	.07		18.6	.06		17.3	.07		18.6
	8	.10		22.3	.10		22.3	.11		23.4
	9	.10		22.3	.12		24.4	.12		24.4
	0	.11		23.4	.10		22.3	.11		23.4
	11	.09		21.1	.09		21.1	.09		21.1
	12	.07		18.6	.07		18.6	.09		21.1
	13	.06		17.3	.06		17.3	.06		17.3
	14	.05		15.8	.06		17.3	.09		21.1
	15	.08		19.9	.07		18.6	.09		21.1
	16	.10		22.3	.10		22.3	.09		21.1
	17	.11		23.4	.10		22.3	.11		23.4
	18	.10		22.3	.09		21.1	.07		18.6
	Avg. 1-18			20.9			20.3			21.2
	Static =	-2" H_2O								

A. INDICATED VELOCITY (TRAVERSE) FT/SEC 20.8

B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC

C. FLUE FACTOR, A/B

D. PITOT CORRECTION FACTOR 1.00

E. GAS DENSITY CORRECTION FACTOR 1.00 (assumed)

F. GAS PRESSURE IN STACK, IN. HG. ABS. 29.75

G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$ 1.00

H. CORRECTED VELOCITY, AxDxExG, FT/SEC 20.8

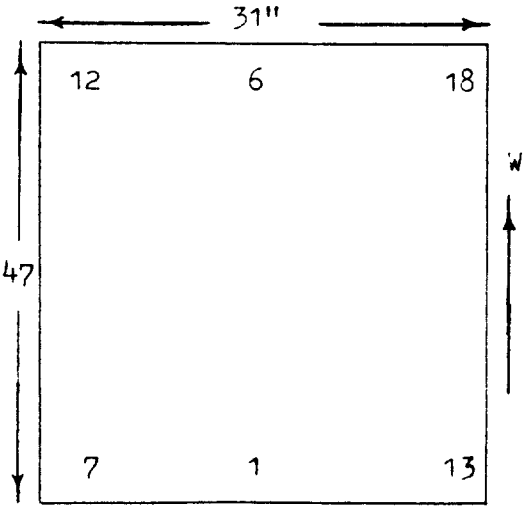
OR BxCxDxExG, FT/SEC

J. AREA OF FLUE, SQ. FT. 10.12

K. AVERAGE FLUE TEMPERATURE, ^oF 130

L. FLOW RATE, HxJx60, CFM 12600

M. FLOW RATE, (F/29.9)x520xL/(K+460), SCFM 11000



AIR POLLUTI CONTROL DISTRICT -- COUNTY OF , ANGELES

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SAMPLING STATION A/B No. 2, Inlet No. 1 DATE 11/27/74

GAS VELOCITY DATA

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. ^oF	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. ^oF	VELOCITY FT/SEC	Minimum Flow VEL. HEAD IN. H_2O	Minimum Flow TEMP. ^oF	Minimum Flow VELOCITY FT/SEC
	1	.08	110	19.6	.09	110	20.8	.08	110	19.6
	2	.05		15.5	.03		12.0	.03		12.0
	3	.02		9.8	.02		9.8	.02		9.8
	4	-		0	-		0	-		0
	5	.0		0	0		0	.0		0
	6	.01		6.9	.02		9.8	.01		6.9
	7	.01		6.9	.01		6.9	.01		6.9
	8	.02		9.8	.03		12.0	.02		9.8
	9	.02		9.8	.02		9.8	.01		6.9
	Avg. 1-9			8.7			9.0			8.0
		Static = -5" H_2O								

A. INDICATED VELOCITY (TRAVERSE) FT/SEC 8.6

B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC

C. FLUE FACTOR, A/B

D. PITOT CORRECTION FACTOR 1.00

E. GAS DENSITY CORRECTION FACTOR 1.00 (assumed)

F. GAS PRESSURE IN STACK, IN. HG. ABS. 29.5

G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$ 1.01

H. CORRECTED VELOCITY, AxDxExG, FT/SEC 8.7

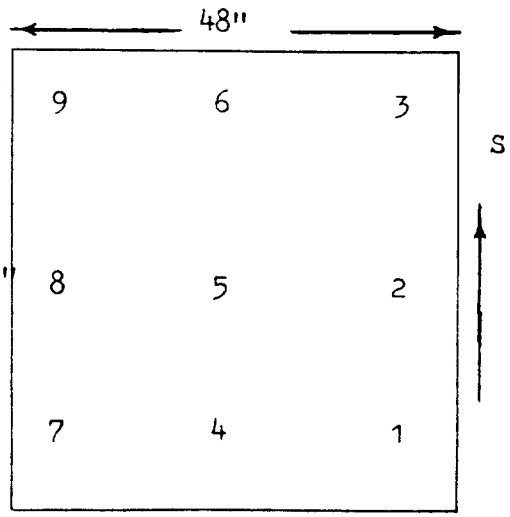
OR BxCxDxExG, FT/SEC

J. AREA OF FLUE, SQ. FT. 10.0

K. AVERAGE FLUE TEMPERATURE, ^oF 110

L. FLOW RATE, HxJx60, CFM 5220

M. FLOW RATE, (F/29.9)x520xL/(K+460), SCFM 4700



AIR POLLUTI CONTROL DISTRICT -- COUNTY OF ; ANGELES

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SAMPLING STATION A/B No. 2, Inlet No. 2 DATE 11/27/74

GAS VELOCITY DATA

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. ^oF	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. ^oF	VELOCITY FT/SEC	Minimum Flow VEL. HEAD IN. H_2O	Minimum Flow TEMP. ^oF	Minimum Flow VELOCITY FT/SEC
	1	0.10	145	22.6	0.10	145	22.6	0.10	145	22.6
	2	.10		22.6	.09		21.4	.10		22.6
	3	.08		20.2	.09		21.4	.09		21.4
	4	.10		22.6	.09		21.4	.09		21.4
	5	.11		23.7	.11		23.7	.10		22.6
	6	.11		23.7	.11		23.7	.11		23.7
	7	.08		20.2	.07		18.9	.07		18.9
	8	.17		29.4	.12		24.7	.16		28.5
	9	.17		29.4	.14		26.7	.17		29.4
	10	.17		29.4	.12		24.7	.18		30.3
	11	.12		24.7	.10		22.6	.15		27.6
	12	.08		20.2	.10		22.6	.13		25.7
	13	.05		16.0	.07		18.9	.06		17.5
	14	.10		22.6	.10		22.6	.11		23.7
	15	.12		24.7	.12		24.7	.12		24.7
	16	.14		26.7	.14		26.7	.15		27.6
	17	.14		26.7	.15		27.6	.14		26.7
	18	.10		22.6	.11		23.7	.12		24.7
	Avg. 1-18			23.8			23.3			24.4
	Static =	-2" H_2O								

A. INDICATED VELOCITY (TRAVERSE) FT/SEC 23.8

B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC

C. FLUE FACTOR, A/B

D. PITOT CORRECTION FACTOR 1.00

E. GAS DENSITY CORRECTION FACTOR 1.00 (assumed)

F. GAS PRESSURE IN STACK, IN. HG. ABS. 29.75

G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$ 1.00

H. CORRECTED VELOCITY, AxDxExG, FT/SEC 23.8

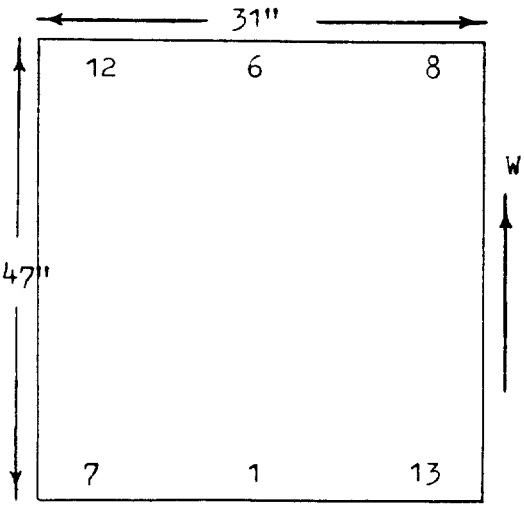
OR BxCxDxExG, FT/SEC

J. AREA OF FLUE, SQ. FT. 10.12

K. AVERAGE FLUE TEMPERATURE, ^oF 145

L. FLOW RATE, HxJx60, CFM 14500

M. FLOW RATE, (F/29.9)x520xL/(K+460), SCFM 12400



AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

ENGINEERING DIVISION

OBSERVATIONS DURING SOURCE TEST NO. C-2198

NAME OF FIRM: Avery Label Company, A Division of Avery Products Corp. DATE OF TEST: 11/27/74

EQUIPMENT TESTED: Two Hirt Afterburners Serving Label Stock Coating and Laminating System C-30 PERMIT APPL. NO.: A-77652, 3

HOURS OF OBSERVATION: FROM [X] A.M. [ ] P.M. 9:10 TO [ ] A.M. [X] P.M. 12:50 WEATHER: clear WIND: South -- Slight

NAMES & TITLES OF PERSONS CONTACTED: Ron Mabry, Manufacturing Engineering

REPORT BY: K. R. Evans, Senior A.P. Engineer

OBSERVATIONS MADE AND DATA RECORDED DURING TEST:

APPLICATION NO. A-77652

AIR POLLUTION CONTROL SYSTEM CONSISTING OF:

1. AFTERBURNER, HIRT, MODEL NO. HFL 35 MX, 8'-0" O.D. x 23'-8" L., SERIAL NO. 9281271, 33,000,000 BTU PER HOUR DIRECT GAS-FIRED.

2. EXHAUST SYSTEM WITH ONE 50-H.P. BLOWER VENTING ONE OVEN (ADHESIVE) ON THE LARGE (C-30) COATING LINE.

APPLICATION NO. A-77653

AIR POLLUTION CONTROL SYSTEM CONSISTING OF:

1. AFTERBURNER, HIRT, MODEL NO. HFL 30 M, 8'-0" O.D. x 23'-3" L., SERIAL NO. 8390171, 9,700,000 BTU PER HOUR DIRECT GAS-FIRED.

2. EXHAUST SYSTEM WITH ONE 50-H.P. BLOWER VENTING TWO OVENS (LACQUER AND PRIME) ON THE LARGE (C-30) COATING LINE.

HISTORY AND OBJECTIVES

Avery Label submitted applications for the C-30 Coating Line (A-64268) and an afterburner (A-64267) for emissions control from the Lacquer oven on 2-3-71. Control facilities for the Adhesive and Prime ovens were not to be installed, since the solvents to be used were complying and the coatings were not heat curing. However, these uncontrolled emissions were estimated to total 48 tons per day, and the two applications were denied 4-22-71. Application Nos. A-68000 for the line, A-68001 for the afterburner, and A-67999 for a new and larger afterburner were received 7-6-71. The originally proposed afterburner would now control emissions from the prime oven in addition to the lacquer oven. The new afterburner would be for the adhesive oven. Authorities to construct were granted 7-16-71. During a field evaluation made 3-27-73, the oven-afterburner

control interlocks, stated as a condition on the authorities to construct, were noted to be missing.

Before the system could be source tested (Rule 17 cancellation extended past 7-16-73) the applicant notified the District on 8-6-73, that major oven changes were proposed to decrease air throughput and, thus, fuel use. The applications for these changes were received 9-12-73, and included replacing the Model HFL-30 M Afterburner with a Model HFL-15 unit to serve the prime and lacquer ovens. Incomplete data were supplied with the applications, and by 10-9-73, while still waiting for the data, the applicant was informed that source testing would be completed and P/O's issued on the original applications. When preparing for the tests, high CO in the large A/B exit was found and further test efforts were canceled. The applicant stated, on 11-27-73, that the Model HFL-30 M Afterburner would be retained in its existing service and modified. Following the applicant's written request, the application for the Model HFL-15 afterburner was retained to cover the modification. Originally, the oven changes were scheduled for completion during November. This date was then changed first to December, then to March, 1974, and finally, April 29, through May 3. The applicant continued to postpone sending the new minimum oven exhaust flows and the proposed changes to the small afterburner. Flow data were received finally on 3-15-74. Estimated minimum combustion chamber velocities, based on afterburner dimensions then available, showed 14.6 ft/sec for the large afterburner and 2.8 ft/sec for the small afterburner. The applicant was told, on 4-10-74, that velocities could be no lower than 15 ft/sec. When afterburner modifications still had not been received by 4-22-74, the applicant was called for an office conference. Hirt, who had proposed to install an Inconel baffle, agreed during an office conference on 4-23-74 to also extend the length of the ignition tube in the Model HFL-30 M Afterburner to provide a retention time of 0.3 sec. with a velocity of 15 ft/sec (2060 scfm flow to A/B). The applicant agreed to hold the minimum flow to 2100 scfm rather than the planned 1670 scfm. The authorities to construct, dated 5-3-74, contained conditions stating the minimum flows to be processed by both afterburners.

This source test was requested to determine system compliance with Rule 66. It was originally scheduled for 11-14-74 but was postponed to reinstall the Inconel baffle in the small afterburner which Hirt reported to have fallen as determined by an inspection on 11-13-74.

DESCRIPTION

The process for producing pressure-sensitive label stock consists of: (1) preparing the thin, transparent paper which becomes the label-backing by printing identification marking, lacquer coating, drying, adhesive coating and drying; (2) preparing the paper which becomes the actual label by prime coating (about 35% of time) and drying; and (3) joining the two paper webs, up to 70 inches wide, to produce a single web. Priming is applied only if the stock will be used to produce removable labels. Adhesives used to produce permanent labels do not require priming. However, the prime oven may be used to control moisture content for control of paper curl or to condition plastic webs. The equipment used in preparing the backing web includes: (1) backing turret unwind, (2) flexographic printer and dryer, (3) lacquer reverse roll coater, (4) lacquer oven, (5) adhesive reverse roll

coater, and (6) adhesive oven. The flexographic dryer is heated by circulating hot air from the lacquer oven. The equipment for preparing the face web includes: (1) face turret unwind, (2) prime reverse roll coater, and (3) prime oven. The two webs are joined on the laminator, and the single web is rolled for further processing or shipping on the product winder.

The three ovens are multizoned with each zone having a gas burner to heat makeup air and a circulating fan. Zones 1 through 4 are the lacquer oven. Zones 5 through 9 are the adhesive oven. Zones 10 and 11 are the prime oven. Zones 1, 5, 6, and 10 are exhausted to the afterburners and are automatically controlled by analyzer controllers which adjust both air makeup and exhaust flows to hold hydrocarbon concentrations at a safe level below the LEL. A fixed air rate enters each nonvented zone. These pass from zone to zone counter to the direction of the webs and are exhausted from the controlled zones.

The ovens are designed for a web speed of 500 fpm. The normal maximum is 300 fpm. Speed is changed from run to run and is based on the solvent loadings which can be safely handled. Built-in safety devices slow the system if hydrocarbon concentrations reach high levels and will, finally, shut it down if necessary.

The Model HFL 35 MX afterburner handles the Zones 5 and 6 exhaust flows (adhesive). Stops on the zone exhaust dampers are placed so that the total flow does not drop below 9000 scfm. This is the estimated minimum which will provide adequate mixing to give good combustion. The revised Model HFL 30 M afterburner handles the Zone 1 (lacquer) and Zone 10 (prime) exhaust flows. A stop on the Zone 1 exhaust damper prevents flow from going below 2100 scfm which is the estimated minimum for satisfactory afterburner operation.

OBSERVATIONS

This source test was made at a time when a run requiring prime coating was in production. Seventy-inch webs were being coated with Lacquer L-20 (Code No. 20-L), Adhesive K-03 (Code No. 2-A), and Primer B-01 (Code No. 1-PO). Web speeds averaged 231 fpm which is above the specified maximum 225 fpm for these coatings. The large afterburner temperature recorder controller showed 1440°F. The small afterburner temperature recorder controller showed 1490°F. The Lacquer Zone 1 exhaust vent had the automatically controlled damper about 25% open. A minimum opening stop on this damper prevents less than about 20% closure. Adhesive Zone 5 was operating with the exhaust damper about 50% open. A minimum opening stop on this damper prevents less than about 25% closure. Adhesive Zone 6 was operating with the exhaust damper against the minimum stop which holds the damper about 40% open. The Primer Zone 10 will not be required by permit condition to have a minimum exhaust flow and thus does not have a minimum stop. The damper was about 10% open.

The source testing was conducted in two parts. The first was made with the system operating as described above to obtain samples for determining afterburner efficiencies. The second was conducted to measure zone exhaust flows only with all dampers against the minimum stops. Average data recorded

ENGINEERING DIVISION

OBSERVATIONS DURING SOURCE TEST NO. C-2198

during both runs are as follows:

Run	1	2
Time	9:35 - 10:20	
Web speed, fpm	231	81
Afterburner Temperature, °F		
Model No. HFL 35 MX	1440	1440
Model No. HFL 30 M	1490	1480

Oven and Zone	Temperature, °F (1)			%LEL	Temperature, °F	%LEL
	Spec	Control Setting	Reading		Reading	
Lacquer 1	180	228	228	39	228	22
Lacquer 2	180	220	220	7	220	4
Lacquer 3	180	220	220		220	
Lacquer 4	180	230	232		232	
Adhesive 5	100	100	104	40	120	51
Adhesive 6	130	160	160	40	170	13
Adhesive 7	170	175	174	21	175	7
Adhesive 8	200	203	201	10	200	3
Adhesive 9	Heat off		150	0	150	0
Prime 10	150	150	102	35	105	10
Prime 11	150	150	115	7	115	4

(1) The specification temperatures are those actually required in the zone. The control temperatures are measured in the recirculating ducts after the fireboxes and may be higher to obtain the desired zone readings.

As noted during previous evaluations, the odor of solvent was strong in the room near the roll coaters. No visible emissions were noted from leaks or from any exhaust stack. Solvent contained in the applied coatings were estimated from data supplied 9-6-74 for all coatings used on the C-30 line. These data show the contained solvents for each coating during 24 hours of continuous operations at web speeds of 400 fpm. For the Lacquer L-20, the solvent rate was:

$$\frac{231 \text{ fpm}}{400 \text{ fpm}} \times \frac{1750 \text{ gal}/24 \text{ hrs}}{24 \text{ hrs}} \times 6.27 \text{ lbs/gal} = 264 \text{ lbs/hr}$$

For the ADhesive K-03 the solvent rate was:

$$\frac{231 \text{ fpm}}{400 \text{ fpm}} \times \frac{10{,}806 \text{ gals}/24 \text{ hrs}}{24 \text{ hrs}} \times 5.75 \text{ lbs/gal} = 1492 \text{ lbs/hr}$$

For the Primer B-01 the solvent rate was:

$$\frac{231 \text{ fpm}}{400 \text{ fpm}} \times \frac{787 \text{ gals}/24 \text{ hrs}}{24 \text{ hrs}} \times 6.20 \text{ lbs/gal} = 117 \text{ lbs/hr}$$

Conditions to be stated on permits to operate this coating line will require the

saving of instrument charts showing hydrocarbon concentrations of the zone exhaust flows and showing temperatures of the afterburners. Also the position of the Zone 10 atmospheric vent damper is to be logged. Thus, recent records were requested for examination to determine if the afterburners were in operation at all times when solvent was being discharged from the ovens. Correlating the LEL strip charts with the corresponding circular afterburner charts was found difficult since times were not clearly defined on the strip charts. On some days, afterburner shutdowns were shown when hydrocarbon concentrations appeared to remain at normal levels. These records are to be improved by (1) making sure that the strip chart shows the correct time and (2) saving the 4-point Zone 1, 5, 6 and 10 LEL strip chart rather than the 11-point Zone 1 through 11 LEL strip chart. No record was logged of the position of the Zone 10 atmospheric vent damper. However, a second pen is on order for installation on the Model No. HFL 30 M afterburner temperature chart which will record air pressure on the damper actuator and thus its position.

mn:12-26-74

AIR POLLU' 'N CONTROL DISTRICT -- COUNTY O OS ANGELES

REQUEST FOR SOURCE TEST OR SAMPLE ANALYSIS

SOURCE TESTING COPY

TEST NO. C-2198

SOURCE LOCATION DATA

1. FIRM NAME Avery Label Company, A Div. of Avery Products Corp. PHONE NO. 969-3311
2. ADDRESS 1616 South California Ave. CITY Monrovia
3. REPRESENTATIVE TO CONTACT Ron Mabry TITLE Manager Mfg. Engineering

REQUEST INITIATION DATA

4. REQUEST INITIATED BY K. R. Evans, Senior A.P. Engineer DIVISION Engineering
5. REQUEST APPROVED BY R. C. Murray, Supv. Engineer III DATE 6/5/74
6. REASON FOR REQUEST:
   - ☐ COURT OR HEARING BOARD ACTION
   - ☒ PERMIT PENDING A-77652,3,4
   - ☐ SUSPECTED VIOLATION

SOURCE AND SAMPLE DATA

7. TYPE OF REQUEST: ☒ SOURCE TEST ☐ SAMPLE SUBMITTED FOR ANALYSIS
8. BASIC EQUIPMENT: (INCL. INDEX CODE NO.) Label Stock Coating & Laminating System C-30
9. CONTROL EQUIPMENT: (INCL. INDEX CODE NO.) Hirt Model No. HFL 35MX and Model No. HFL 30M Afterburners
10. POINTS TO BE TESTED OR DESCRIPTION AND SOURCE OF EACH SAMPLE SUBMITTED
    a. Inlet and outlet of both afterburners when entire system is operating at specified conditions for the coatings being applied.
    b. Lacquer oven exhaust. (flow measurement only--see 11 below)
    c. Adhesive oven exhaust. (flow measurement only--see 11 below)
11. TEST FOR FOLLOWING CONSTITUENTS:
    a. Total organics for Rule 66 compliance.
    b. Measure the lacquer oven exhaust flow when the oven is at minimum loading and the control damper is against the minimum flow stop.
    c. Measure the adhesive oven exhaust flow when the oven is at minimum loading and the control damper is against the minimum flow stop.
12. SPECIAL INSTRUCTIONS:
    The large A/B handles the adhesive oven exhaust. The smaller A/B handles the combined exhaust from the lacquer and prime ovens. The prime roll coater is down 65% of the time. Give applicant 3 days notice so a run using the prime roll coater can be set up. Applicant will install additional sample points (needed on square ducting) and scaffolding. Minimum exhaust flow for the lacquer and adhesive ovens are needed to check compliance with permit conditions.

ACTION BY SOURCE TESTING UNIT

13. DATE RECEIVED SEP 10 1974 PRIORITY A
14. DATE SENT TO ANALYTICAL LABORATORY
15. DATE REPORT ISSUED MAR 21 1975
16. DISTRIBUTION OF COPIES

REMARKS

Rule 17 date 5/3/76

db

600519

Test No. C-2198

INTRODUCTION

Pursuant to a request from K. R. Evans, of the Solvent Processing Unit, a source test to determine compliance with Rule 66 was performed on two afterburners, hereafter designated as No. 1, controlling the lacquer and prime lines, and No. 2, controlling the adhesive lines.

This equipment is located at 1616 South California Avenue, Monrovia, California.

Messrs. R. Milner, W. Oaks, S. Banerjee, J. Reese and J. Bazes of the Source Testing Section conducted the test. Test arrangements were made through Ron Mabry, Manager -- Manufacturing Engineering. Mr. Evans was present during the test and his recorded observations are appended to this report.

RESULTS

No. 1 afterburner efficiency at operating temperature of 1460°F was 98 %. Emissions to the atmosphere ~~was~~ 4.7 lbs/hr as carbon.

No. 2 afterburner efficiency at operating temperature of 1370°F was 63 %. Emissions to the atmosphere ~~was~~ 371 lbs/hr as carbon including CO, which was 4820 ppm or ~~0.48 vol. %~~

SAMPLING AND ANALYTICAL PROCEDURES

Gas Flow Rate

The gas flow rates at the afterburner inlets were measured by conventional traverse procedures using a pitot tube, Magnehelic gage and a mercury-in-glass thermometer. The flow rates were measured at two different operationg conditions, as requested, and are recorded on pages 2 and 3.

~~This~~ gas flow rate ~~was~~ converted to dry basis. The afterburner outlet dry gas flow rate was calculated from the inlet ~~dry~~ gas flow rate using natural gas combustion relationships.

Total Organics

The gases at the inlets and outlets of each afterburner were sampled for organic materials using duplicate sampling trains, each consisting of a special stainless steel trap immersed in dry ice, followed by an evacuated 8-liter flask. A restriction orifice, block valve and vacuum gage located between the trap and the flask were used to monitor the sampling rate. Sampling was for a period of approximately 40 minutes.

The samples were analyzed by "TCA Method" as outlined in Paper No. 74-190, presented by the APCD at the National APCA meeting, June, 1974, and in a District publication of August, 1974.

The results of individual analyses for CO, CO_2, CH_4 and other organics are shown on pages 2 and 3 of this report. All concentrations are expressed as equivalent CO_2, on the dry basis. Total organics in the afterburner outlet gases include any increase in CO concentration over the inlet carbon monoxide concentration.

Approved _____

mn:3-4-75

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

TEST NO. C-2198

DATE 11-27-74

SUMMARY OF DATA AND RESULTS

(For Rule 66 Evaluation)

EQUIPMENT AND TEST CONDITIONS

Name of Firm **Avery Label Co.**
Basic Equipment **Two Drying Ovens (lacquer and prime)**
Control Equipment **Afterburner #1**
Process Description **Web-Type Lacquer and Prime Drying Oven**
Test Date 11-27-74
Run Number 1
A/B Temperature, °F
Plant instrument 1490
APCD measurement 1460

RESULTS

A/B Inlet

Concentrations as CO_2, ppm. by volume, dry basis

CO	23
CO_2	1622
Total Organics	15719

	Inlet No. 1	Inlet No. 2	
Gas flow rate, scfm (dry)	5632**	3250**	8880
Gas temperature, °F	160	92	

A/B Outlet

Concentrations as CO_2, ppm. by volume, dry basis

CO	N.D.
CO_2	37250
Total Organics	289
(*)	

Gas flow rate, scfm (dry)	8560
Gas temperature, °F	1460

EMISSION RATES AND AFTERBURNER EFFICIENCY

Organics, as carbon, lb./hr.	
Inlet	265
Outlet	4.7
Efficiency, %	98

Oxides of Nitrogen, as NO_2 (Outlet)
ppm by vol.
lb./hr.

NOTES: (*) Including increase in CO_2 if any, across the afterburner

** Minimum gas flow rates (wet) for Inlet Nos. 1 and 2 are 2490 SCFM and 3270 SCFM respectively.

N.D - None detected

600626

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

TEST NO. C-2198

DATE 11-27-74

SUMMARY OF DATA AND RESULTS

(For Rule 66 Evaluation)

EQUIPMENT AND TEST CONDITIONS

Name of Firm **Avery Label Co.**
Basic Equipment **Adhesive Oven**
Control Equipment **Afterburner No. 2**
Process Description **Web-Type Adhesive Drying Oven**
Test Date **11-27-74**
Run Number
A/B Temperature, °F
- Plant instrument 1440
- APCD measurement 1370

RESULTS

A/B Inlet

Concentrations as CO_2, ppm. by volume, dry basis

CO	32
CO_2	1590
Total Organics	21970

	Inlet No. 1	Inlet No. 2	
Gas flow rate, scfm (dry)	13260 **	10960 **	24220
Gas temperature, °F	110	145	

A/B Outlet

Concentrations as CO_2, ppm. by volume, dry basis

CO	4820
CO_2	28500
Total Organics	3485
(*)	8273

Gas flow rate, scfm (dry)	23600
Gas temperature, °F	1370

EMISSION RATES AND AFTERBURNER EFFICIENCY

Organics, as carbon, lb./hr.

Inlet	1010
Outlet	371
Efficiency, %	63

Oxides of Nitrogen, as NO_2 (Outlet)

ppm by vol.	
lb./hr.	

NOTES: (*) Including increase in CO_2, if any, across the afterburner

** **Minimum gas flow rates for Inlet Nos. 1 and 2 are** 4700 SCFM and 12400 SCFM, respectively.

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

TEST NO. C- 2198

DATE 11-27-74

ANALYSES FOR CO_2, CO, AND ORGANICS

EQUIPMENT: **Afterburner No. 1**

SAMPLE STATION	FLASK				TRAP	TOTAL ORGANICS
	CO_2	CO	CH_4	BACK-FLUSH		
Inlet No. 1	737 ✓ 752 ✓ 745 ✓	* N.D. * N.D.	N.D.* N.D.*	326 ✓ 437 ✓	17100 ✓ 13600 ✓	17400 ✓ 14000 ✓ 15700 (a) ✓
Inlet No. 2	3160 ✓ 3120 ✓ 3140 ✓	63 ✓ 65 ✓ 64	53 ✓ N.D.* 27 ✓	276 ✓ 254 ✓	14400 ✓ 16500 ✓	14700 ✓ 16800 ✓ 15750 (a) ✓
Outlet	39700 ✓ 38700 ✓ 39200 ✓	* N.D. * N.D.	* N.D. * N.D.	* N.D. 55 ✓	240 ✓ 282 ✓	240 ✓ 337 ✓ 289 ✓

1) Efficiency (Concentration Basis) = $100 \dfrac{15719 - 289}{15719}$ = 98.2 ✓ %

2) Gas Flow Rates, scfm (dry):

Inlet 8880 ✓ Outlet 8560 ✓

3) Organic Flow Rates, lb./hr. as carbon:

Inlet = $60 \times 10^{-6} \times 12/379 \times 8880 \times 15719$ = 265.0 ✓

Outlet = $60 \times 10^{-6} \times 12/379 \times 8560 \times 289$ = 4.7 ✓

4) Efficiency (Weight Basis) = $100 \dfrac{265 - 4.7}{265}$ = 98.2 ✓ %

NOTES: All concentrations in ppm volume as CO_2, dry basis.

* Including increase in CO, if any, across the afterburner. *

N.D - None detected

5) See Page 6 for [illegible] calculations.

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

+5

PAGE ~~+2~~

TEST NO. C- 2198

DATE 11-27

ANALYSES FOR CO_2, CO, AND ORGANICS

EQUIPMENT: Afterburner #2

SAMPLE STATION	FLASK				TRAP	TOTAL ORGANICS
	CO_2	CO	CH_4	BACK-FLUSH		
INLET #1	1390 ✓ 1370 ✓	34 ✓ 11	ND N.D.	1010 ✓ 1740 ✓	25600 ✓ 22300 ✓	26600 ✓ 24000 ✓ 2[illegible] ✓(a)
INLET #2	1500 ✓ 1[illegible] 1840	43 ✓ 35 41 ✓	N.D. N.D.	[illegible] 175	[illegible]	[illegible] (a)
[illegible]	276[illegible] [illegible] [illegible]	[illegible] [illegible] 20 ✓	[illegible] 3.[illegible] [illegible]	[illegible] 1733 ✓	[illegible]	3[illegible] [illegible] 73 ✓

1) Efficiency (Concentration Basis) = 100 [illegible] = 62.8 ✓ %

2) Gas Flow Rates, scfm (dry):

Inlet 24220 ✓ Outlet ~~[illegible]~~ 360 ✓

3) Organic Flow Rates, lb./hr. as carbon:

Inlet = 60 X 10^{-6} x 12/379 X 24220 X 21970 ✓ = ~~[illegible]~~ 1010 ✓

* Outlet = 60 X 10^{-6} X 12/379 X ~~[illegible]~~ X 8273 = ~~[illegible]~~ 371 ✓

4) Efficiency (Weight Basis) = 100 ~~[illegible]~~ ← [illegible] = 64 63.0 %

NOTES: All concentrations in ppm volume as CO_2, dry basis.

* Including increase in CO, if any, across the afterburner. (weighted avg)

(a) See page +6 for weighted average calculations

N.D. — None Detected

WRIGHTED AVERAGE CALCULATIONS

I. AFTERBURNER NO.1

	SCFM (WET)	SCFM (DRY)
INLET No.1	5640	5630
INLET No.2	3270	3250
TOTAL	8910	8880

INLET NO.1 FACTOR = $\frac{5630}{8880}$ = 0.634

INLET NO.2 FACTOR = $\frac{3250}{8880}$ = 0.366

COMPOUND	INLET NO.1	INLET NO.2	WEIGHTED AVG.
CO	N.D.	23	23
CH_4	N.D.	10	10
CO_2	472	1150	1622
ORGANIC	9954	5765	15719

OUTLET VOLUME SCFM (DRY) = 8560.

II. AFTERBURNER NO.2

	SCFM (WET)	SCFM (DRY)
INLET No.1	13300	13260
INLET No.2	11000	10960
TOTAL	24300	24220

INLET NO.1 FACTOR = $\frac{13260}{24220}$ = 0.547

INLET NO.2 FACTOR = $\frac{10960}{24220}$ = 0.453

COMPOUND	INLET NO.1	INLET NO.2	WEIGHTED AVG.
CO	13	19	32
CH_4	N.D.	N.D.	—
CO_2	755	834	1590
ORGANICS	13840	8130	21970

OUTLET VOLUME SCFM (DRY) = 24300

AIR POLLUT CONTROL DISTRICT -- COUNTY OF S ANGELES

TEST NO. C-2198 PAGE #7

SAMPLING STATION No. 3 ~~PDCT LAG Power Blg~~ INLET DATE 11-27-74

GAS VELOCITY DATA

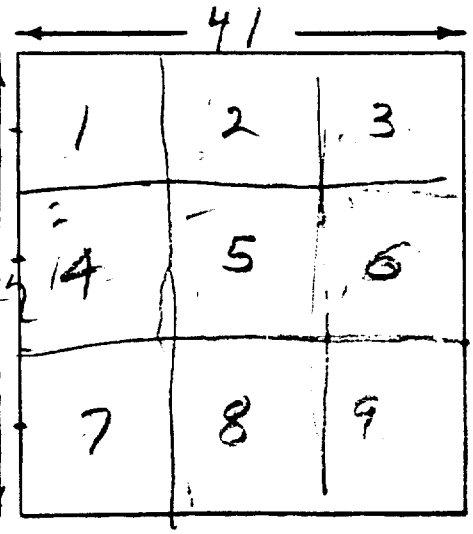
(A/B No. 1 INLET NO. 1) NORMAL AND MINIMUM FLOWS

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC
	1	.02	160	10.2	.02	160	10.2	.02	160	10.2
	2	.02		10.2	.02		10.2	.02		10.2
	3	.02		10.2	.02		10.2	.02		10.2
	4	.02		10.2	.03		12.5	.02		10.2
	5	.02		10.2	.02		10.2	.03		12.5
	6	.02		10.2	.02		10.2	.02		10.2
	7	.02		10.2	0		0.0	.01		7.2
	8	.02		10.2	.02		10.2	.03		12.5
	9	0		0.0	.01		7.2	.01		7.2
	Avg 1-9		9.1	~~9.07~~		9.0	~~8.99~~			10.0
	1	.01		7.2	.02		10.2	.01		7.2
	2	0		0.0	.01		7.2	.01		7.2
	3	.01		7.2	.01		7.2	0		0.0
	4	.01		7.2	.01		7.2			0.0
	5	0		0.0	0		0.0			0.0
	6	—		0.0	—		0.0			0.0
	7	.01		7.2	.02		10.2	.01		7.2
	8	.01		7.2	.01		7.2	.01		7.2
	9	0		0.0	0		0.0	0		0.0
	Avg 1-9			4.0			5.3			3.2

Static -5" H_2O

~~Bar. 29.9~~

	LOW	HIGH
A. INDICATED VELOCITY (TRAVERSE) FT/SEC	4.2	9.4
B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC		
C. FLUE FACTOR, A/B		
D. PITOT CORRECTION FACTOR	1.00	
E. GAS DENSITY CORRECTION FACTOR	1.00	
F. GAS PRESSURE IN STACK, IN. HG. ABS.	29.5	
G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$	1.01	
H. CORRECTED VELOCITY, AxDxExG, FT/SEC		
OR 3xCxDxExG, FT/SEC	4.2	9.5
J. AREA OF FLUE, SQ. FT.	11.96	
K. AVERAGE FLUE TEMPERATURE, °F	160	
L. FLOW RATE, HxJx60, CFM	3010	6820
M. FLOW RATE, (F/29.9)x520xL/(K+460), SCFM	2490	5640



~~STATIC~~ 1.0

R-1 60D485

AIR POLLUTION CONTROL DISTRICT -- COUNTY LOS ANGELES

TEST NO. C-2198 (A/B NO. 1, inlet #2) PAGE 8

SAMPLING STATION ~~A/No. 2 ROUND LAC/Prime A/B INLET~~ DATE 11-27

GAS VELOCITY DATA

NORMAL AND MINIMUM FLOWS

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC
		0.01	12	6.8 ✓	.01	92	2.3	.01	92	2.3
		.01			.01					
		.01			.01					
		.01			.01					
		.01			.01					
		.01			.01					
		.01			.01					
		.01			.01					
		.01			.01					
		.01			.01					
		.01			.01					
	Avg 1-20			6.5			6.3			6.4

Station 1-01

A. INDICATED VELOCITY (TRAVERSE) FT/SEC 6.8 ✓

B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC

C. FLUE FACTOR, A/B

D. PITOT CORRECTION FACTOR 1.00 ✓

E. GAS DENSITY CORRECTION FACTOR 1.00 (Assumed) ✓

F. GAS PRESSURE IN STACK, IN. HG. ABS. 29.9 ✓

G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$ 1.00 ✓

H. CORRECTED VELOCITY, AxDxExG, FT/SEC 6.5 ✓

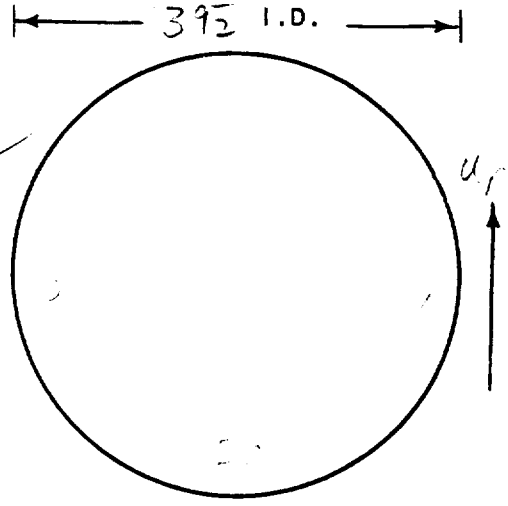
OR BxCxDxExG, FT/SEC

J. AREA OF FLUE, SQ. FT. 8.5 ✓

K. AVERAGE FLUE TEMPERATURE, °F 92 ✓

L. FLOW RATE, HxJx60, CFM 3470 ✓

M. FLOW RATE, (F/29.9)x520xL/(K+460), SCFM 3270 ✓



R-1 60D483

~~LAC/Prime A/B INLET~~ ST. NO. 1

AIR POLLUTION CONTROL DISTRICT -- COUNTY OF LOS ANGELES

+9

TEST NO. C-2198

PAGE ~~1~~

SAMPLING STATION ~~NO 5 Outlet~~

DATE 11-27-74

GAS VELOCITY DATA

NORMAL FLOW

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC
	1	.60	110	53.6	.55	0	51.3	.50	110	49.0
	2	.45		46.4	.45		46.4	.40		43.8
	3	.70		57.9	.60		53.6	.65		55.2
	4	.05		15.5	.12		24.0	.10		21.9
	5	.05		15.5	.03		12.0	.04		13.8
	6	.04		13.8	.05		15.5	.02		7.8
	7	.05		15.5	.05		15.5	.06		17.0
	8	—		0	.01		6.9	—		0
	9	—		0	—			.01		6.9
	Avg 1-9			24.2			25.0			24.2

Static -2.8" H_2O

A. INDICATED VELOCITY (TRAVERSE) FT/SEC 24.5

B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC

C. FLUE FACTOR, A/B

D. PITOT CORRECTION FACTOR 1.0

E. GAS DENSITY CORRECTION FACTOR

F. GAS PRESSURE IN STACK, IN. HG. ABS. 29.7

G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$ 1.02

H. CORRECTED VELOCITY, AxDxExG, FT/SEC 24.5

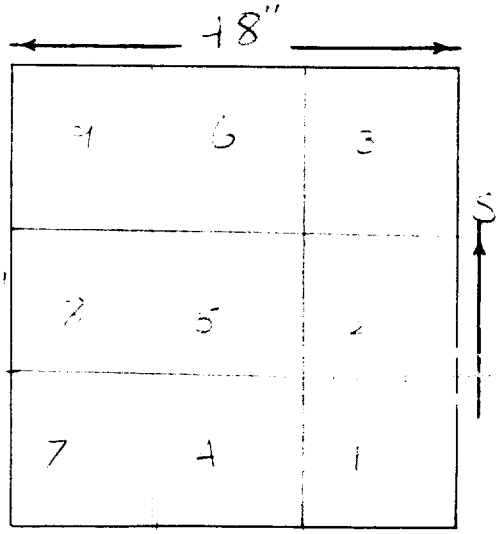
OR BxCxDxExG, FT/SEC

J. AREA OF FLUE, SQ. FT. 10.5

K. AVERAGE FLUE TEMPERATURE, °F 110

L. FLOW RATE, HxJx60, CFM 14700

M. FLOW RATE, (F/29.9)x520xL/(K+460), SCFM 13350



R-1 60D485

AIR POLLUTION CONTROL DISTRICT -- COUNTY OF LOS ANGELES +10

TEST NO. C-2198 ~~VERTICAL ADHESIVE~~ PAGE +2

SAMPLING STATION ~~A/B No. 6~~ A/B INLET ON STINEWAY DATE 11-27-74

(A/B No. 2, Inlet No. 2)

GAS VELOCITY DATA

NORMAL FLOW

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC
				22.3			17.7			22.3
				21.1			19.7			21.1
				21.1			18.6			19.9
				21.1			19.9			19.9
				21.1			19.9			20.3
				22.3			22.3			22.9
				18.6			17.3			18.6
				22.3			22.3			23.4
				22.3			23.4			23.4
				23.4			22.3			23.4
				21.1			21.1			21.1
				18.6			18.6			21.1
				17.3			17.3			17.3
				15.8			17.3			21.1
				17.9			18.6			21.1
				23.3			22.3			21.1
				23.4			22.3			23.4
				22.3			21.1			23.2
	Avg. 1-18			20.9			20.3			21.2
	Static = -2 H_2O									

A. INDICATED VELOCITY (TRAVERSE) FT/SEC 20.8

B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC

C. FLUE FACTOR, A/B

D. PITOT CORRECTION FACTOR 1.00

E. GAS DENSITY CORRECTION FACTOR 1.00 (Assumed)

F. GAS PRESSURE IN STACK, IN. HG. ABS. 29.75

G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$ 1.00

H. CORRECTED VELOCITY, AxDxExG, FT/SEC 20.8

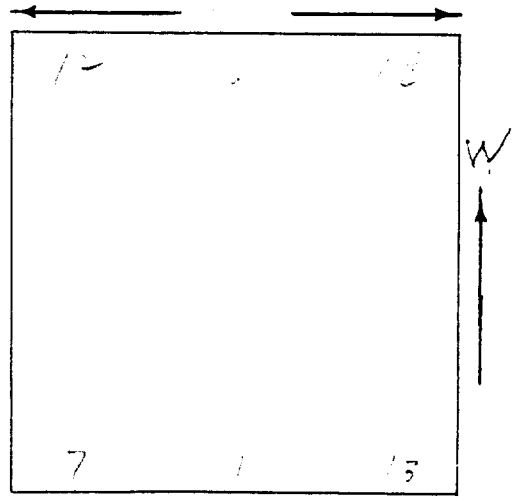
OR BxCxDxExG, FT/SEC

J. AREA OF FLUE, SQ. FT. 10.12

K. AVERAGE FLUE TEMPERATURE, °F 130

L. FLOW RATE, HxJx60, CFM 12600

M. FLOW RATE, (F/29.9)x520xL/(K+460), SCFM 11000



R-1 60D485

AIR POLLUTI CONTROL DISTRICT -- COUNTY OF ANGELES +11

TEST NO. C-2198 PAGE ~~1~~ 2

SAMPLING STATION ~~NO 5 [illegible]~~ A/B No.2, INLET No.1 DATE 11-27-74

~~[illegible]~~

GAS VELOCITY DATA

MINIMUM FLOW

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC
	1	.08	110	19.6	.09	110	20.8	.08	110	19.6
	2	.05		15.5	.03		12.0	.03		12.0
	3	.02		9.8	.02		9.8	.02		9.8
	4	—		0	—		0	—		0
	5	0		0	0		0	0		0
	6	.01		6.9	.02		9.8	.01		6.9
	7	.01		6.9	.01		6.9	.01		6.9
	8	.02		9.8	.03		12.0	.02		9.8
	9	.02		9.8	.02		9.8	.01		6.9
	Avg 1-9			8.7			9.0			8.6

Valve -5" H_2O

A. INDICATED VELOCITY (TRAVERSE) FT/SEC 8.6

B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC

C. FLUE FACTOR, A/B

D. PITOT CORRECTION FACTOR 1.0

E. GAS DENSITY CORRECTION FACTOR 1.00 (Assumed)

F. GAS PRESSURE IN STACK, IN. HG. ABS. 29.5

G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$ 1.01

H. CORRECTED VELOCITY, AxDxExG, FT/SEC 8.7

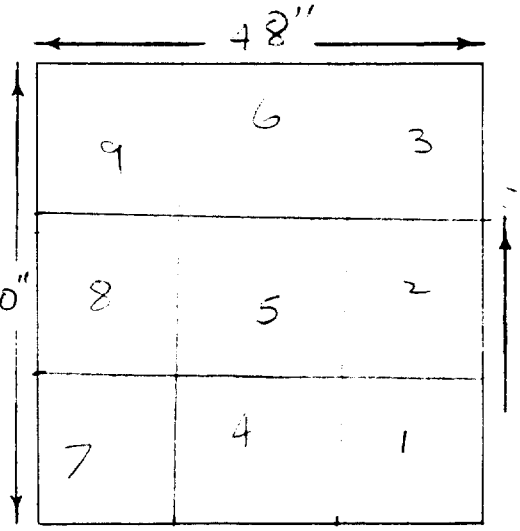
OR BxCxDxExG, FT/SEC

J. AREA OF FLUE, SQ. FT. 10.0

K. AVERAGE FLUE TEMPERATURE, °F 110

L. FLOW RATE, HxJx60, CFM 5220

M. FLOW RATE, (F/29.9)x520xL/(K+460), SCFM 4700



R-1 60D485

AIR POLLUTION CONTROL DISTRICT -- COUNTY OF LOS ANGELES

TEST NO. [illegible] PAGE [illegible]

SAMPLING STATION [illegible] DATE [illegible]

GAS VELOCITY DATA

A/B No. 2, INLET No. 2 — MINIMUM FLOW

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC
	1	0.10	145	22.6	[illegible]	145	22.6	0.10	145	22.6
				22.6			21.4	.10		22.6
		.10		20.2	.09		21.4	[illegible]		21.4
		.10		22.6	[illegible]		21.4	[illegible]		21.4
		[illegible]		23.7	.11		23.7	[illegible]		22.6
		[illegible]		23.7	[illegible]		23.7	[illegible]		23.7
		.09		20.2	.07		18.9	.07		18.9
		.13		24.4	.13		24.7	[illegible]		28.5
		.13		24.4	.14		26.7	[illegible]		24.4
		.13		24.4	.12		24.7	.12		30.3
		.12		24.7	.10		22.6	[illegible]		27.6
		[illegible]		20.2	[illegible]		22.6	[illegible]		25.7
		[illegible]		16.9	[illegible]		18.9	[illegible]		17.5
		[illegible]		22.6	[illegible]		22.6	[illegible]		24.7
		[illegible]		24.7	[illegible]		24.7	[illegible]		24.7
		[illegible]		26.7	[illegible]		26.7	[illegible]		27.6
		[illegible]		26.7	[illegible]		27.6	[illegible]		26.7
		.11		22.6	[illegible]		23.7	[illegible]		24.7
	Avg 1-18			23.8			23.3			24.4

A. INDICATED VELOCITY (TRAVERSE) FT/SEC 23.8

B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC

C. FLUE FACTOR, A/B

D. PITOT CORRECTION FACTOR 1.00

E. GAS DENSITY CORRECTION FACTOR 1.00 (Assumed)

F. GAS PRESSURE IN STACK, IN. HG. ABS. 29.75

G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$ 1.00

H. CORRECTED VELOCITY, AxDxExG, FT/SEC 23.8

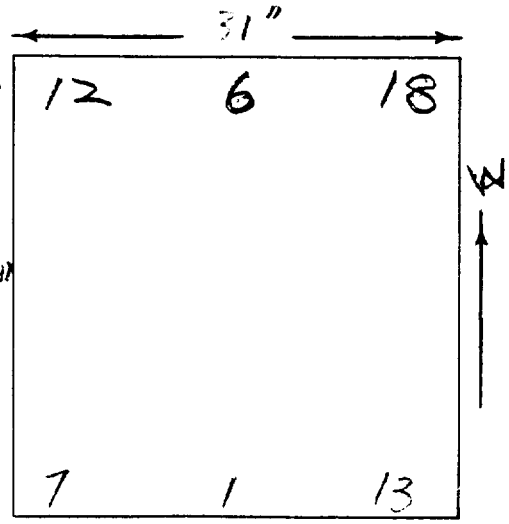
OR BxCxDxExG, FT/SEC

J. AREA OF FLUE, SQ. FT. 10.12

K. AVERAGE FLUE TEMPERATURE, °F 145

L. FLOW RATE, HxJx60, CFM 14500

M. FLOW RATE, (F/29.9)x520xL/(K+460), SCFM 12400



R-1 60D485

AIR POLLU N CONTROL DISTRICT - COUNTY OF S ANGELES

TECHNICAL SERVICES DIVISION

REPORT OF TOTAL COMBUSTION ANALYSIS (TCA) FOR CARBONACEOUS MATTER

Name of Company: **Avery Label**

Equipment Tested: **2 Afterburners**

Test No. C- 2198 Test Date: 11/27/74

Test Requested by: R. N. Milner

Date of Report: 12/31/74

Page No. 1 of 2

Laboratory No. 73334-1

Ref. Book No. 462S-83

Sample Identification Items	Sampling Points					
	A/B No. 1 Inlet No. 1 X		A/B No. 1 Inlet No. 2 X		A/B No. 1 Outlet	
Volume, Liters (Nominal)	8	8	8	8	8	8
Tank Identification	68	69	88	89	64	65
Trap Identification	AB	Q	AA	AD	11	104
Probe Identification						

Breakdown of Sample Items for Analysis:	Results of Analyses of Samples Listed Above, as PPM CO_2 :[a]					
Tank Contents:[b]						
CO_2 actually present[c]	737	752	3160	3120	39700	38700
CO actually present	*	*	63	65	*	*
CH_4	*	*	53	*	*	*
Backflush[d]	326	437	276	254	*	55
Trap Contents[e]	17100	13600	14400	16500	240	282
Probe Contents[f]						
Total Organic Carbon[g] (Rounded)	17400	14000	14700	16800	240	337

a) All results expressed in terms of equivalent CO_2 volume, ppm.
b) All gaseous fraction of sample not captured in a dry-ice-cooled trap.
c) CO_2 present in sample as such. Every other result is expressed as concentration of CO_2 which results from complete oxidation of carbon in each item described.
d) Backflush includes all gaseous organic compounds except CH_4.
e) Carbon compounds or carbon-containing materials captured in the trap.
f) Carbon compounds or carbon-containing materials captured in the probe.
g) Sum of all concentrations listed above EXCEPT CO and CO_2 actually present.

* None detected.

70D004

Report Approved by: abr B. Moon

AIR POLLUTION CONTROL DISTRICT -- COUNTY OF LOS ANGELES

TEST NO. _____ No. 5 PAGE _____

SAMPLING STATION Ranger Inlet DATE 11-27-74

GAS VELOCITY DATA

(11/5 No. 2 Inlet No. 1)

TIME	POINT	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC	VEL. HEAD IN. H_2O	TEMP. °F	VELOCITY FT/SEC
	1	.60	110	53.6	.55		51.3	.50		49.0
	2	.45		46.4	.45		46.4	.47		48.8
	3	.70		[illegible]	[illegible]		53.6	.65		55.3
	4	.05		15.5	.12		24.0	.10		21.9
	5	.05		15.5	.08		12.0	.04		13.8
	6	.04		13.8	.02		15.5	.02		9.8
	7	.05		15.5	.05		15.5	.06		17.0
	8	—			.01		6.9	—		0.0
	9	—			—			.01		6.9
	Low Flow									
	1	0.08		19.6	.09		20.8	.08		19.6
	2	.05		15.5	.03			.03		
	3	.02		9.8	.02			.02		
	4	neg.			[illegible]			neg		
	5	0.0			0.0			0.0		
	6	.01		6.9	.02			.01		
	7	.01			.01			.01		
	8	.02			.03			.02		
	9	.02			.02			.01		
	Static =	-2.8" H_2O								
	Static	-5" H_2O								

A. INDICATED VELOCITY (TRAVERSE) FT/SEC _____

B. INDICATED VELOCITY (REFERENCE PT.) FT/SEC _____

C. FLUE FACTOR, A/B _____

D. PITOT CORRECTION FACTOR _____

E. GAS DENSITY CORRECTION FACTOR _____

F. GAS PRESSURE IN STACK, IN. HG. ABS. _____

G. GAS PRESS. CORREC. FACTOR, $\sqrt{29.9/F}$ _____

H CORRECTED VELOCITY, AxDxExG, FT/SEC _____

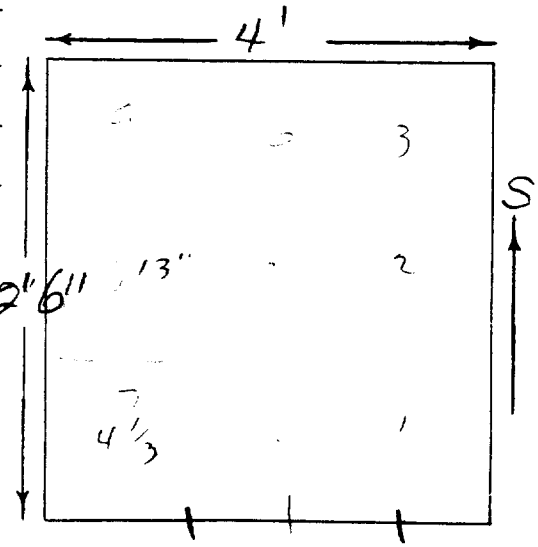
OR BxCxDxExG, FT/SEC _____

J. AREA OF FLUE, SQ. FT. _____

K. AVERAGE FLUE TEMPERATURE, °F _____

. FLOW RATE, HxJx60, CFM _____

FLOW RATE, (F/29.9)x520xL/(K+460), SCFM _____



AIR POLLU N CONTROL DISTRICT - COUNTY OF S ANGELES

TECHNICAL SERVICES DIVISION

REPORT OF TOTAL COMBUSTION ANALYSIS (TCA) FOR CARBONACEOUS MATTER

Name of Company: Avery Label

Equipment Tested: 2 Afterburners

Test No. C- 2198 Test Date: 11/27/74

Test Requested by: R. N. Milner

Date of Report: 12/31/74

Page No. 1 of 2

Laboratory No. 73334-1

Ref. Book No. 462S-83

Sample Identification Items	Sampling Points					
	A/B No. 1 Inlet No. 1 X		A/B No. 1 Inlet No. 2 X		A/B No. 1 Outlet	
Volume, Liters (Nominal)	8	8	8	8	8	8
Tank Identification	68	69	88	89	64	65
Trap Identification	AB	Q	AA	AD	11	104
Probe Identification						
Breakdown of Sample Items for Analysis:	**Results of Analyses of Samples Listed Above, as PPM CO_2:[a]**					
Tank Contents:[b]						
CO_2 actually present[c]	737	752	3160	3120	39700	38700
CO actually present	*	*	63	65	*	*
CH_4	*	*	53	*	*	*
Backflush[d]	326	437	276	254	*	55
Trap Contents[e]	17100	13600	14400	16500	240	282
Probe Contents[f]						
Total Organic Carbon[g] (Rounded)	17400	14000	14700	16800	240	337

a) All results expressed in terms of equivalent CO_2 volume, ppm.
b) All gaseous fraction of sample not captured in a dry-ice-cooled trap.
c) CO_2 present in sample as such. Every other result is expressed as concentration of CO_2 which results from complete oxidation of carbon in each item described.
d) Backflush includes all gaseous organic compounds except CH_4.
e) Carbon compounds or carbon-containing materials captured in the trap.
f) Carbon compounds or carbon-containing materials captured in the probe.
g) Sum of all concentrations listed above EXCEPT CO and CO_2 actually present.

* None detected.

700004

Report Approved by: abr B. mon

AIR POLLU N CONTROL DISTRICT - COUNTY OF S ANGELES

TECHNICAL SERVICES DIVISION

REPORT OF TOTAL COMBUSTION ANALYSIS (TCA) FOR CARBONACEOUS MATTER

Name of Company: Avery Label

Date of Report: 12/31/74

Equipment Tested: 2 Afterburners

Page No. 2 of 2

Test No. C- 2198 Test Date: 11/27/74

Laboratory No. 73334-1

Test Requested by: R. N. Milner

Ref. Book No. 462S-83

Sample Identification Items	Sampling Points					
	A/B No. 2 Inlet No. 1		A/B No. 2 Inlet No. 2		A/B No. 2 Outlet	
Volume, Liters (Nominal)	8	8	8	8	8	8
Tank Identification	80	81	76	77	78	79
Trap Identification	C	AG	B	A	94	14
Probe Identification						

Breakdown of Sample Items for Analysis:	Results of Analyses of Samples Listed Above, as PPM CO_2:[a]					
Tank Contents:[b]						
CO_2 actually present[c]	1390	1370	1800	1880	27600	29400
CO actually present	34	11	43	38	5100	4530
CH_4	*	*	*	*	62	38
Backflush[d]	1010	1740	2410	1750	1690	1730
Trap Contents[e]	25600	22300	15100	16600	1960	1490
Probe Contents[f]						
Total Organic Carbon[g] (Rounded)	26600	24000	17500	18400	3710	3260

a) All results expressed in terms of equivalent CO_2 volume, ppm.
b) All gaseous fraction of sample not captured in a dry-ice-cooled trap.
c) CO_2 present in sample as such. Every other result is expressed as concentration of CO_2 which results from complete oxidation of carbon in each item described.
d) Backflush includes all gaseous organic compounds except CH_4.
e) Carbon compounds or carbon-containing materials captured in the trap.
f) Carbon compounds or carbon-containing materials captured in the probe.
g) Sum of all concentrations listed above EXCEPT CO and CO_2 actually present.

* None detected.

70D004

Report Approved by: Abe B. Moon

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

TEST NO. C-2198

PAGE 1

DATE 11-27

SUMMARY OF DATA AND RESULTS

(For Rule 66 Evaluation)

EQUIPMENT AND TEST CONDITIONS

Name of Firm AVERY LABEL

Basic Equipment Tin Decal Oven (Thermal Fluid Heated)

Control Equipment Afterburner

Process Description Vinyl Film Laminate & Printing Ovens

Test Date 11-27-74

Run Number 1

A/B Temperature, °F

Plant instrument 1410

APCD measurement 1400

RESULTS

A/B Inlet

Concentrations as CO_2, ppm. by volume, dry basis

CO 23

CO_2 400

Total Organics 1200

INLET #1 / INLET #2

Gas flow rate, scfm (dry) 2132 (*) / 3250 (*)

Gas temperature, °F 160 / 92

A/B Outlet

Concentrations as CO_2, ppm. by volume, dry basis

CO

CO_2 3000

Total Organics 22

(*)

Gas flow rate, scfm (dry)

Gas temperature, °F 1400

EMISSION RATES AND AFTERBURNER EFFICIENCY

Organics, as carbon, lb./hr.

Inlet 2.65

Outlet 4.7

Efficiency, % 99.2

Oxides of Nitrogen, as NO_2 (Outlet)

ppm by vol.

lb./hr.

NOTES: (*) Including increase in CO, if any, across the afterburner

* MINIMUM GAS FLOWRATES FOR INLETS NO. 1 & 2 ARE 2490 SCFM (WET) AND 3270 SCFM (WET).

60D626

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

TEST NO. C-2198

PAGE 1

DATE 7-27

SUMMARY OF DATA AND RESULTS

(For Rule 66 Evaluation)

EQUIPMENT AND TEST CONDITIONS

Name of Firm [illegible]

Basic Equipment [illegible]

Control Equipment [illegible]

Process Description [illegible]

Test Date 7-27-71

Run Number 1

A/B Temperature, °F

Plant instrument 1440

APCD measurement 1370

RESULTS

A/B Inlet

Concentrations as CO_2, ppm. by volume, dry basis

CO 32

CO_2 1511

Total Organics 21770

Gas flow rate, scfm (dry) 13760 12960

Gas temperature, °F 110 [illegible]

A/B Outlet

Concentrations as CO_2, ppm. by volume, dry basis

CO [illegible]

CO_2 29500

Total Organics 3442

(*) 2273

Gas flow rate, scfm (dry) 226[illegible]

Gas temperature, °F 18[illegible]

EMISSION RATES AND AFTERBURNER EFFICIENCY

Organics, as carbon, lb./hr.

Inlet 15[illegible]

Outlet 271

Efficiency, % 63.3

Oxides of Nitrogen, as NO_2 (Outlet)

ppm by vol. [illegible]

lb./hr. [illegible]

NOTES: (*) Including increase in CO, if any, across the afterburner

* MINIMUM GAS FLOW RATES FOR INLETS NO. 1 & 2 ARE 4700 SCFM (WET) AND 12 400 SCFM (WET).

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AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

TEST NO. C- 2108

PAGE 1 2

DATE 11-27

ANALYSES FOR CO_2, CO, AND ORGANICS

EQUIPMENT: After burner #1

SAMPLE STATION	FLASK				TRAP	TOTAL ORGANICS
	CO_2	CO	CH_4	BACK-FLUSH		
INLET #1	737 ✓	*	*	326 ✓	17100 ✓	17405 ✓
	752 ✓	*	*	437 ✓	13600 ✓	14050 ✓
	744 ✓					
INLET #2	3160 ✓	63	53	276 ✓	14400 ✓	14 [illegible]
	3120 ✓	65 ✓	*	254 ✓	16500 ✓	16 [illegible] ✓
	3140 ✓	[illegible] ✓	27			
OUTLET	39700	*	*	*	[illegible] ✓	[illegible] ✓
	39700	*	*	55 ✓	[illegible]	337
	39200					

1) Efficiency (Concentration Basis) = $\frac{100 \text{ [illegible]}}{\text{[illegible]}}$ = [illegible] %

2) Gas Flow Rates, scfm (dry):

Inlet [illegible] 0 ✓ Outlet [illegible] ✓

3) Organic Flow Rates, lb./hr. as carbon:

Inlet = $60 \times 10^{-6} \times 12/379 \times$ [illegible] 0 ✓ $\times$ [illegible] = [illegible] 265 ✓

Outlet = $60 \times 10^{-6} \times 12/379 \times$ [illegible] $\times$ [illegible] = [illegible] 4.7 ✓

4) Efficiency (Weight Basis) = $\frac{100 \text{ [illegible]}}{\text{[illegible]}}$ = [illegible] 97.2 % 98.2 ✓

NOTES: All concentrations in ppm volume as CO_2, dry basis.

* Including increase in CO, if any, across the afterburner. *

AIR POLLUTION CONTROL DISTRICT - COUNTY OF LOS ANGELES

Test No. C-2198

+6

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11-27-74

CALCULATION OF INLET VOLUMES FOR AFTERBURNER NO. 1

No. 1 Inlet

SCFM wet = 5640 $\qquad \frac{5640}{(1 + .02 \times .0745)}$

dry = 5630

No. 2 Inlet

SCFM wet = 3270 $\qquad \frac{3270}{(1 + .02 \times .3140)}$

dry = 3250

A/B Inlet SCFM (wet) = 5640 + 3270 = 8910

SCFM (dry) = 5630 + 3250 = 8880

Factor For Inlet Concentration Figures

	No. 1	No. 2	(1 + 2 wt. avg.)
Factor	.634	.366	
CO	N.D.	23	23
CH_4	N.D.	10	10
CO_2	472	1150	1622
Organic	9954	5765	15719

Calculation of Outlet Volume ~~(wet = 8910)~~ INLET VOLUME SCFM (wet) = 8910

$$SCFM(Dry) = \frac{8910}{(1 + .01 \times 3.92)} \frac{(1 + .01 \times 1622)}{(1 + .02 \times 1622)}$$

$$= \frac{8910 \times 1.001622}{1.0392 \times 1.003244} = 8560 \text{ SCFM}$$

N D - None Detected

~~B~~ +7

ENGINEERING DIVISION
APPLICATION PROCESSING AND CALCULATIONS

CALCULATION OF INLET VOLUMES A/B #2

No 1 INLET
SCFM WET = 13300 ✓
DRY = 13260 ✓

$\frac{13300}{1-.02 \times 13}$ ✓

No 2 INLET
SCFM WET = 11000 ✓
DRY 10960 ✓

$\frac{11000}{1+.02 \times .1540}$

A/B INLET SCFM (WET) 13300 + 11000 = 24300
SCFM (DRY) = 13260 + 10960 = 24220

INCINERATOR INLET CONCENTRATION FIGURES

	No. 1	No. 2	(1+2 W+AV.)
FACTOR	.547 ✓	.453 ✓	
CO	13 ✓	19 ✓	32 ✓
CH_4	N.D.	N.D.	—
CO_2	755 ✓	834 ✓	1590 ✓
CYCLINGS	13840 ✓	8130 ✓	21970 ✓

CALCULATION OF [illegible]

DRY VOLUME $\frac{24300 \text{ ✓}}{(1+.01 \times 28500 \text{ ✓})} \quad \frac{1.00159}{(1+.01 \times 1590)} = \frac{23600}{1+.02 \times 1590 \text{ ✓}}$ ✓ ~~22900~~

1.0285 1.00318

INLET VOLUME
SCFM (WET) = 24300

N. D - None detected