PS Form 3811, July 1983 447-845

DOMESTIC RETURN RECEIPT

● **SENDER: Complete items 1, 2, 3 and 4.**

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☒ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to: Mr. Joseph Cummings
Plant Manager
Metal Container Corp.
1100 North Ellis Road
Jacksonville, FL 32205-6257

4. Type of Service:	Article Number
☐ Registered ☐ Insured ☒ Certified ☐ COD ☐ Express Mail	P 274 007 725

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X Cathy Goos

7. Date of Delivery
7/25/87 PA

8. Addressee's Address (*ONLY if requested and fee paid*)
SAME AS # 3

P 274 007 725

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

☆ U.S.G.P.O. 1985-480-794

PS Form 3800, June 1985

Sent to Joseph Cummings
Metal Container Corp.

Street and No.
1100 North Ellis Road

P.O., State and ZIP Code
Jacksonville, FL 32205-6257

Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$

Postmark or Date
Mailed: 07/23/87
Permit: AC 16-127873

file

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMIT

Mr. Joseph Cummings
Plant Manager
Metal Container Corporation
1100 North Ellis Road
Jacksonville, Florida 32205-6257

July 23, 1987

Enclosed is construction permit No. AC 16-127873 to install/reactivate a thermal oxidizer for Can Coating Line No. 1 at your facility located in Jacksonville, Duval County, Florida. This permit is issued pursuant to Section 403, Florida Statutes.

Any Party to this permit has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this permit is filed with the Clerk of the Department.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

for John C Brown Jr
C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management

Copy furnished to:

J. Cole NE District
J. Woosley, BESD
J. Stier
C. Nolan, P.E.

Final Determination

Anheuser-Busch Companies, Inc.

Metal Container Corporation

Can Coating Line No. 1

Permit Number: AC 16-127873

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

July 16, 1987

Final Determination

Anheuser-Busch Companies' application for a permit to install/ reactivate a thermal oxidizer for Can Coating Line No. 1 at their facility in Jacksonville, Florida, has been reviewed by the Bureau of Air Quality Management.

Public Notice of the Department's Intent to Issue the construction permit was published in the Florida Times-Union on June 15, 1987.

Copies of the Preliminary Determination have been available for public inspection at the Department's Southeast District office, the Bio-Environmental Services Division (BESD) in Jacksonville and the Bureau of Air Quality Management in Tallahassee.

Comments were received from Mr. Robert M. Lanham, Environmental Engineer, for Anheuser-Busch Companies. His comments were in regard to Specific Conditions Nos. 2, 5, 7 (AC 16-127873); Specific Conditions Nos. 4A and 4B (AC 16-50418) and Specific Conditions No. 2 (AC 16-57752, AC 16-57753).

The Bureau has considered his comments and agrees to change the above mentioned conditions as requested since there is not an emission increase in the total permitted emissions of 400.3 tons of VOC per year for the entire facility.

The Specific Conditions will be changed as follows:

AC 16-127873

Specific Condition #2: Changed from 0.12 tons/day, 3.48 tons/month to 0.16 tons/day, 4.80 tons/month.

Specific Condition #5: Changed from 1.10 tons/day, 33 tons/month. to 1.43 tons/day, 42.90 tons/month.

Specific Condition #7: Quarterly reports deleted.

AC 16-50418

Specific Condition #4A: Changed from 1.10 tons/day, 33 tons/month. to 1.43 tons/day, 42.90 tons/month.

Specific Condition #4B: Quarterly reports deleted.

AC 16-57752, -57753

Specific Condition #2: Changed from 1.10 tons/day, 33 tons/month to 1.43 tons/day, 42.90 tons/month.

The final action of the Department is to issue the permit as noted during the public notice period.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

PERMITTEE:
Metal Container Corporation
1100 North Ellis Road
Jacksonville, FL 32205-6257

Permit Number: AC 16-127873
Expiration Date: January 31, 1988
County: Duval County
Latitude/Longitude: 30° 20' 15" N
81° 44' 42" W
Project: Can Coating Line No. 1

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (FAC) Rules 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the construction of Can Coating Line No. 1. This facility will be located at the Metal Container Corporation's existing complex in Jacksonville, Duval County, Florida. The UTM coordinates of the site are zone 17, 428.440 km East and 3356.377 km North.

Attachments:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16), dated October 28, 1986.

2. Department's letter dated December 23, 1986.

3. Metal Container Corporation's letter dated January 20, 1987.

4. Metal Container Corporation's letter dated July 14, 1987.

5. WAIVER OF 90 DAY TIME LIMIT dated May 21, 1987, with an expiration date of July 31, 1987.

6. Robert M. Lanham's (ABC) letter dated July 14, 1987.

Protecting Florida and Your Quality of Life

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the Department will review this permit periodically and may initiate enforceable action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and system of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by the Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and,

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the Department with the following information:

a. a description of and cause of non-compliance; and,

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the Department, may be used by the Department as evidence in any enforcement case arising under the Florida Statutes or Department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

- ( ) Determination of Best Available Control Technology (BACT).
- ( ) Determination of Prevention of Significant Deterioration (PSD).
- (x) Compliance with New Source Performance Standards.
- (x) Determination of Lowest Achievable Emission Rate (LAER).

14. The Permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under Department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the Department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by Department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and,
- the results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. This permit supercedes permit No. AO 16-55208.

SPECIFIC CONDITIONS:

2. Maximum VOC emissions for Can Coating Line No. 1 shall not exceed 0.16 tons/day, 4.80 tons/month, and 41.8 tons per year (LAER Determination). Compliance with this emission rate shall be determined by EPA Reference Methods 25 or 25A, or any other method approved by the Department. Reporting and recordkeeping requirements shall be as described in 40 CFR 60.495, Subpart WW, NSPS for Beverage Can Surface Coating Industry.

3. Can Coating Line No. 1 shall comply with applicable requirements of 40 CFR 60, Subpart WW, NSPS for Beverage Can Surface Coating Industry.

4. The VOC emissions from the following sources (Lines Nos. 2, 3, and 4) shall not exceed the following RACT standards:

A) 2.8 pounds per gallon of coating (0.34 kilograms per liter), excluding water, delivered to the coating applicator of;

   (a) Sheet basecoat (exterior and interior) and overvarnish, or

   (b) Two-piece can exterior (basecoat and overvarnish) operation.

B) 4.2 pounds per gallon of coating (0.50 kilograms per liter), excluding water delivered to the coating applicator from two- and three-piece can interior body spray and two-piece can exterior end (spray or roll coat) operations.

5. The total permitted emissions for the facility shall not exceed 1.43 tons of VOC per day, 43 tons of VOC per month, and 400.3 tons of VOC per year.

6. Compliance with RACT regulations shall be determined by the procedures described in 45 FR 80824: For any 24-hour period, compliance shall be based on total actual emissions calculated from daily units of production records (number of each type of can, sheet etc), application rates of each coating (gallons/units of production), and solvents and solids content of each coating. This will then be compared to the total allowable emissions for that production mix to verify each coating complied with applicable emission limitations. The pounds of solvent per gallon of coating are be based on a certified analysis of the VOC content of each coating given to the user by the supplier. This analysis must be verifiable by laboratory analyses.

7. The permittee will be required to submit annual reports (24-hour basis) on the actual operation and emissions of the facility. These

SPECIFIC CONDITIONS:

reports shall be sent to the Duval County Bio-Environmental Services Division (BESD) office to assess emissions and maintain VOC emissions inventory. The quantity of cans processed during that year shall be included in the report. This report shall also include manufacturer's certifications, coating usage records, hours of operation, and test results. EPA Reference Methods 25 or 25A, or any other method approved by the Department, shall be used to verify compliance with the VOC emission rate.

8. This facility shall comply with all the requirements specified in the EPA policy memorandum 40 CFR Part 51, "Compliance with VOC Emission Limitations for Can Coating Operations", Federal Register/Vol 45, No. 237, December 8, 1980/Rules and Regulations (45 FR 80824).

9. According to FAC Rule 17-2.620(1)(a), no person shall store, pump, handle, process, load, unload, or use in any process or installation volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems deemed necessary and ordered by the Department. Currently, there are no control strategies associated with this operation other than crew efficiency to minimize pollutant emissions. The following procedures shall be utilized to minimize pollutant emissions, but shall not be limited to:

- maintain tightly fitting covers, lids, etc., on all containers of VOC when they are not being handled, tapped, etc.;
- where possible and practical, procure/fabricate a tightly fitting cover for any open trough, basin, bath, etc., of VOC so that it can be covered when not in use;
- all fittings, valve lines, etc., shall be properly maintained;
- all VOC spills shall be attended to immediately and the waste properly disposed of, recycled, etc.

10. No objectionable odors are allowed from this facility.

11. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, he must notify the Department in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit.

12. To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with compliance records, test results, and Certificate of

SPECIFIC CONDITIONS:

Completion, to the BESD 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate.

13. If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application.

14. In conjunction with the review of the application to modify Can Coating Line No. 1 (AC 16-127873), the following requests have been approved:

A) Approval of a schedule for start-up and emissions testing of thermal oxidizers No. 1 and No. 2.

B) Approval to begin installation of the necessary ductwork to vent the three basecoater oven exhausts to the existing thermal oxidizers.

In addition, to be consistent with the new construction permit for Can Coating Line No. 1 and pursuant to FAC Rule 17-2.650(1)(f)1., the construction permits for Can Coating Lines Nos. 2, 3, and 4 will be amended as follows:

Permit Nos. AC 16-57752: Can Coating Line No. 3
AC 16-57753: Can Coating Line No. 4

Specific Condition No. 2

From:

The amounts and formulas of each coating and solvent shall be recorded on a daily basis. The formula should include pounds of VOC per gallon of coating, less water, and should be based on a certified analysis of each coating given by the supplier. These records and certifications shall be made available for Department inspection upon request.

SPECIFIC CONDITIONS:

To:

Compliance shall be determined by the procedure described in 45 FR 80824: For any 24-hour period, compliance shall be based on total actual emissions calculated from daily units of production records (number of each type of can, sheet, etc) application rates of each coating (gallons units of production), solvents and solids content of each coating. This would then be compared for that production mix to verify that each coating line complied with applicable emission limitations. The total allowable VOC emissions for the can manufacturing facility shall not exceed 1.43 tons per day, 43 tons per month, and 400.3 tons per year. The pounds of solvent per gallon of coating shall be based on a certified analysis of the VOC content of each coating given to the user by the supplier. This analysis must be verifiable by laboratory analysis. These records and certifications shall be made available upon the Department's request.

Permit No. AC 16-50418: Can Coating Line No. 2

Specific Condition No. 4

From:

Compliance with the emission limitations shall be determined by a material balance of VOC purchased and those reclaimed. The difference shall be presumed to be emitted to the atmosphere. An annual compliance report shall be submitted to the BESD. This report shall contain solvent usage, manufacturer's statement of VOC content, gallons of coating used, and hours of operation.

To:

A)

3. Compliance shall be determined by the procedures described in 45 FR 80824: For any 24-hour period, compliance shall be based on total actual emissions calculated from daily units of production records (number of each type of can, sheet, etc), application rates of each coating (gallons/units of production), solvents and solids content of each coating. This would then be compared to the total allowable emissions for that production mix to verify each coating complied with applicable emission limitations. The total allowable VOC emissions

SPECIFIC CONDITIONS:

for the can manufacturing facility shall not exceed 1.43 tons of VOC per day, 43 tons of VOC per month, and 400.3 tons of VOC per year. The pounds of solvent per gallon of coating shall be based on a certified analysis of the VOC content of each coating given to the user by the supplier. This analysis must be verifiable by laboratory analyses.

B)

The permittee will be required to submit annual reports (24-hour basis) on the actual operation and emission of the facility. These reports shall be sent to the BESD office to assess emissions and maintain VOC inventory. The quantity of cans processed during that year shall be included in the report. This report shall also include manufacturer's certifications, coating usage records, hours of operation and test results. EPA Reference Methods 25 or 25A, or any other method approved by the Department, shall be used to verify compliance with the VOC emission rate.

<u>The following conditions shall be added to all permits</u>:

a) This facility shall comply with all the requirements specified in the EPA policy memorandum 40 CFR Part 51, "Compliance with VOC Emission Limitations for Can Coating Operations", Federal Register/Vol 45, No. 237, December 8, 1980/Rules and Regulations (45 FR 80824).

b) This facility shall comply with FAC Rule 17-2.650(1)(f)1., RACT regulations for Can Coating Operations.

c) According to FAC Rule 17-2.620(1)(a), no person shall store, pump, handle, process, load, unload, or use in any process or installation volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems deemed necessary and ordered by the Department. The following procedures shall be utilized to minimize pollutant emissions, but shall not be limited to:

SPECIFIC CONDITIONS:

- o maintain tightly fitting covers, lids, etc., on all containers of VOC when they are not being handled, tapped, etc.;
- o where possible and practical, procure/fabricate a tightly fitting cover for any open trough, basin, bath, etc., of VOC so that it can be covered when not use;
- o all fittings, valve lines, etc., shall be properly maintained;
- o all VOC spills shall be attended to immediately and the waste properly disposed of, recycled, etc.

8. No objectionable odors are allowed for this facility.

Issued this 21st day of July, 1987

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

Dale Twachtmann, Secretary

Lowest Achievable Emission Rate (LAER) Determination
Metal Container Corporation
Duval County

The applicant has submitted a request to reinstate can line No. 1 from a standby to a full-time basis, with the line speed being increased to 1,000 cans per minute. The can line, which will apply the coatings to beer and soft drink cans, is scheduled to operate continuously 8,760 hours per year.

The Metal Container Corporation is located in Duval County, which is currently designated nonattainment for the pollutant ozone, Rule 17-2.410(1), FAC. The proposed reinstatement of can line No. 1 will result in an increase of 42.5 tons of volatile organic compounds (VOCs) per year. VOCs are considered to be precursors to ozone, thus the modification of can line No. 1 is subject to a LAER determination as set forth in Rule 17-2.510, FAC, New Source Review (NSR) for nonattainment areas. In accordance with the provisions of the NSR rule for nonattainment areas, the overvarnish and bottom varnish operations from three existing lines will be ducted to thermal oxidizers to provide an offset of 45.7 tons of VOCs per year.

Date of Receipt of LAER Application:

January 21, 1987

Review Group Members

This determination was based upon comments received from the Stationary Source Control Section.

LAER Determination by DER:

Pollutant	Emission Limit
Ozone (VOC)	Emissions limited by using a combination of low solvent water-borne coatings* and catalytic oxidation of emitted VOC vapors.

*VOC content of solvents shall be limited to the following:

White Basecoat	-	1.77 lbs VOC/gal - H_2O
Bottom Varnish	-	1.92 lbs VOC/gal - H_2O
Over Varnish	-	2.29 lbs VOC/gal - H_2O
Inside Spray	-	3.62 lbs VOC/gal - H_2O

LAER Determination Rationale:

The procedure for determining LAER is set forth in Rule 17-2.640, FAC. In accordance with this procedure, the determination of LAER shall not allow the modified source to emit any affected pollutant in excess of the amount allowable under any applicable Environmental Protection Agency Standard of Performance for New Stationary Sources (NSPS) promulgated pursuant to 40 CFR Part 60.

The coating of beverage cans is regulated under Subpart WW of NSPS. In accordance with this regulation, VOC emissions are limited to 0.29 kilogram per liter of coating solids for exterior base coating operations, 0.46 kilogram per liter of coating solids for overvarnish coating operations, and 0.89 kilogram per liter of coating solids for inside spray coating operations. The applicant has indicated that the VOC emissions for the exterior base coating, overvarnish coating, and the inside spray coating operations are 0.28, 0.40, and 0.88 kilograms per liter of coating solids, respectively. These emission rates are less than the specified NSPS limitations and are thereby consistent with the LAER determination guidelines.

In addition to ensuring compliance with applicable NSPS, the Department, when preparing a LAER determination, shall give consideration to and make a determination that reflects: 1) information published by the USEPA including the BACT/LAER Clearinghouse, 2) the most stringent emission limitation which is contained in the implementation plan of any state, 3) the most stringent emission limitation which is achieved in practice, and 4) all scientific engineering, technical material, or other relevant information available to the Department.

The latest (May 1986) BACT/LAER Clearinghouse summary lists data for four facilities with can coating operations. Of the facilities listed, two of the listings had LAER determinations in which LAER was determined to be a 95% efficient thermal incinerator. One of these two facilities consisted of a 1,000 cans per minute line which is identical in throughput to the line proposed for this facility in Jacksonville. The LAER determination for the 1,000 cans per minute line listed in the BACT/LAER Clearinghouse had listed the VOC emissions as being 26.0 tons per year. The estimated emissions of the Jacksonville facility with the proposed LAER are 41.8 tons of VOCs per year, which would suggest that LAER is not being applied when compared to the facility with lower emission rate.

It is important to note, however, that the emission rate from the facility in Jacksonville has included the emissions for clean-up solvents, and the line will be coating 16 ounce cans instead of the smaller 12 ounce cans coated at the other facility. When these differences are taken into account, the LAER proposed for the Jacksonville facility is consistent with the LAER determinations for facilities permitted prior to this time.

The literature research indicates that the use of low solvent coatings in conjunction with thermal incineration of the VOC emissions represents LAER. The Department thereby agrees that the VOC emission limiting strategies for the No. 1 can coating line, as proposed by the applicant, is LAER.

Details of the Analysis may be Obtained by Contacting:

Barry Andrews, P.E., BACT Coordinator
Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended by:

for John C. Brown Jr
C. H. Fancy, P.E., Deputy Chief, BAQM

Date: July 20, 1987

Approved by:

Dale Twachtmann, Secretary

Date: 7/22/87

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

For Routing To Other Than The Addressee

To: ______________________ Location: ______________
To: ______________________ Location: ______________
To: ______________________ Location: ______________
From: ______________________ Date: ______________

TO: Dale Twachtmann

THRU: Howard Rhodes

for John C Brown Jr

FROM: Clair Fancy

DATE: July 16, 1987

SUBJ: Approval of Construction Permit No. AC 16-127873
Anheuser-Busch Companies, Inc.
Metal Container Corporation

Attached for your approval and signature is a construction permit to install/reactivate a thermal oxidizer for Can Coating Line No. 1 at their facility in Jacksonville, Duval County, Florida. There were comments received during the public notice period.

Day 90 after which this permit will be issued by default is July 31, 1987.

The Bureau recommends approval and signature.

CHF/MJ/s

attachment

Check Sheet

Company Name: METAL CONTAINER CORPORATION
Permit Number: AC 16-127873
PSD Number:
Permit Engineer:

Application:

- ☑ Initial Application
  - ☑ Incompleteness Letters
  - ☑ Responses
  - ☑ Waiver of Department Action
  - ☐ Department Response
  - ☐ Other

Cross References:

- ☐
- ☐
- ☐

Intent:

- ☑ Intent to Issue
- ☑ Notice of Intent to Issue
- ☑ Technical Evaluation
- ☑ BACT or [✓ LAER] Determination
- ☑ Unsigned Permit

  Correspondence with:
  - ☐ EPA
  - ☐ Park Services
  - ☐ Other
- ☑ Proof of Publication
  - ☐ Petitions - (Related to extensions, hearings, etc.)
  - ☐ Waiver of Department Action
  - ☐ Other

Final Determination:

- ☑ Final Determination
- ☑ Signed Permit
- ☑ BACT or [✓ LAER] Determination
  - ☐ Other

Post Permit Correspondence:

- ☑ Extensions/Amendments/Modifications
- ☑ Other

Revision #5 09/09/94 KKW

ANHEUSER-BUSCH COMPANIES

April 20, 1989

Mr. Herbert Wilson
Department of Health, Welfare
  and Bio-Environmental Services
Air and Water Pollution Control
421 West Church Street, Suite 412
Jacksonville, Florida 32202

Re: **Metal Container Corporation**
Jacksonville, Florida
Can Coating Line No. 1
Construction Permit No. AC-16-127873

Dear Mr. Wilson:

Attached for your information and review is a completed DER Form 17-1.202(3), a check in the amount of $300, and the Entropy capture/destruction efficiency test report for Line No. 1 at the Metal Container Corporation plant in Jacksonville, Florida. As you are aware, the delay in applying for this operating permit was due to continued efforts to increase capture efficiency around the coating equipment on Line 1. The plant has achieved remarkable improvement in capture efficiency due to the addition of additional ductwork around the equipment and increasing the volume of air being drawn from these areas. The improvement in capture efficiencies are shown in the table below.

Line 1
Capture Efficiencies

	January 1987	February 1989
Basecoater	82.5%	99.7%
Printer	35.0%	100+%
Inside Spray	66.4%	97.6%

While these modifications had a major positive impact on capture efficiencies, the increased air flows have had a negative effect on destruction efficiency. During earlier tests, it was determined that a 90+% destruction efficiency could be obtained by operating the thermal oxidizer at 1250^{o}F. Since that test, the old burners have been replaced and it was assumed that this would improve the destruction efficiency. However, this was not the case. The Entropy report indicates that the destruction efficiency has been reduced and it is assumed that this is due to the increased air flows. The week after we received Entropy's results, Smith Engineering was brought in to correct the problem with our destruction efficiency.

In an effort to save time, we are requesting that you accept the attached test report verifying the improved capture efficiencies and issue an operating permit on the premise that Smith Engineering will correct and retest the destruction efficiency in the near future. The Smith test report will be submitted to your office as soon as it becomes available.

If you have any questions concerning this test report or request, please contact me at (314) 577-4168.

Sincerely,

ANHEUSER-BUSCH COMPANIES, INC.

Bob Lanham

Robert M. Lanham
Environmental Engineer

RML:cd

Att.

cc: Mr. Clair H. Fancy, P.E. FDER

RL420

bcc: J. L. Stein
C. E. Briscoe
F. J. Hruby
J. V. Stier
R. A. Baker
J. H. Schamburg
M. M. Accardo
G. L. Reynolds
J. E. Reed

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

AIR POLLUTION SOURCES
CERTIFICATE OF COMPLETION OF CONSTRUCTION*

PERMIT NO. AC16-127873 DATE: 4-20-89

Company Name: Metal Container Corporation County: Duval

Source Identification(s): Can Coating Line No. 1

Actual costs of serving pollution control purpose: $

Operating Rates: 800-1000 cans/minute Design Capacity: 1000 cans/minute

Expected Normal 900 cans/minute During Compliance Test 806 CPM

Date of Compliance Test: February 7, 8, & 10, 1989 (Attach detailed test report)

Test Results:

Pollutant	Actual Discharge	Allowed Discharge
VOC	see attached report	0.19 tons/day

Date plant placed in operation:

This is to certify that, with the exception of deviations noted**, the construction of the project has been completed in accordance with the application to construct and Construction Permit No. AC16-127873 dated October 5, 1988.

A. Applicant:

Robert M. Lanham
Name of Person Signing (Type)

Robert Lanham Environmental Engineer
Signature of Owner or Authorized Representative and Title

Date: 4/20/89 Telephone: (314) 577-4168

B. Professional Engineer:

J. H. Schamburg
Name of Person Signing (Type)

John H Schamburg
Signature of Professional Engineer

Metal Container Corporation
Company Name

Florida Registration No. 29984

Date: 21 April 89

(Seal)

10733 Sunset Office Drive
Sunset Hills, MO 63127
Mailing Address

(314) 957-9556
Telephone Number

*This form, satisfactorily completed, submitted in conjunction with an existing application to construct permit and payment of application processing fee will be accepted in lieu of an application to operate.

**As built, if not built as indicated include process flow sketch, plot plan sketch, and updates of applicable pages of application form.

DER Form 17-1.202(3) Effective November 30, 1982

● **SENDER:** Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☒ Show to whom delivered, date, and addressee's address. ↑*(Extra charge)*↑
2. ☐ Restricted Delivery ↑*(Extra charge)*↑

3. Article Addressed to:

Mr. Robert M. Lanham
Anheuser-Busch Companies, Inc.
Executive Office
St. Louis, Missouri 63118-1852

4. Article Number
P 274 007 469

Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X C Fernandez

7. Date of Delivery

8. Addressee's Address *(ONLY if requested and fee paid)*

PS Form **3811**, Mar. 1987 ★ U.S.G.P.O. 1987-178-268 **DOMESTIC RETURN RECEIPT**

P 274 007 469

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

★ U.S.G.P.O. 1985-480-794

Sent to
Mr. Robert M. Lanham

Street and No.
Executive Office, Anheuser-Busch Companies

P.O., State and ZIP Code
St. Louis, MO 63118-1852

Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$

Postmark or Date
Mailed: 10-11-88
Permit: AC 16-127873

PS Form 3800, June 1985

Florida Department of Environmental Regulation

Twin Towers Office Bldg. • 2600 Blair Stone Road • Tallahassee, Florida 32399-2400

Bob Martinez, Governor Dale Twachtmann, Secretary John Shearer, Assistant Secretary

October 5, 1988

Mr. Robert M. Lanham
Environmental Engineer
Anheuser-Bush Companies, Inc.
Executive Office
St. Louis, Missouri 63118-1852

Dear Mr. Lanham:

Re: Can Coating Line No. 1
Construction Permit No. AC 16-127873.

The Department is in receipt of your letter dated March 22, 1988, requesting an extension of the expiration date of permit No. AC 16-127873 for Can Coating Line No. 1, in Jacksonville, Florida. This request is acceptable. The expiration date will be changed as follows:

From: October 1, 1988
To: July 1, 1989

This letter must be attached to the above mentioned permit and shall become part of the permit.

<u>Attachment to be Incorporated</u>:

Mr. Robert M. Lanham's letter of September 13, 1988.

Sincerely,

Dale Twachtmann

Dale Twachtmann
Secretary

DT/plm

cc: Bill Stewart, N.E. Dist.
Khurshid Mehta, BES

For Routing To Other Than The Addressee

To: ______ Location: ______
To: ______ Location: ______
To: ______ Location: ______
From: ______ Date: ______

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

TO: Dale Twachtmann

FROM: Steve Smallwood

SUBJ: Extension of Permit

DATE: October 5, 1988

Attached for your approval and signature is a letter extending the expiration date of Metal Container Corporation's permit for can coating line No. 1 at its Jacksonville, Florida plant.

I recommend your approval and signature.

SS/TH/s

attachment

DHL EXP #164-1907-162
9-13-88
St. Louis, MO

file copy

ANHEUSER-BUSCH COMPANIES

September 13, 1988

RECEIVED
SEP 14 1988
DER - BAQM

Mr. Clair H. Fancy, P.E.
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Metal Container Corporation
Permit to Construct No. AC16-127873

Dear Mr. Fancy:

Metal Container Corporation (MCC) was issued a permit to construct on July 21, 1987 for can coating Line No. 1 at its Jacksonville, Florida plant. The expiration date of this permit was January 31, 1988. Preliminary compliance testing on this line revealed a need to improve VOC capture efficiency around several areas of the process. On November 10, 1987, the expiration date was extended until July 1, 1988 to allow MCC time to improve the capture efficiency and complete the required source tests. On March 18, 1988, MCC applied for and received an additional extension until October 1, 1988 to install a respray machine and connect additional ductwork into thermal oxidizer (T.O.) No. 1. On May 4, 1988, Environmental Science and Engineering (ESE) conducted the required source tests in order for MCC to apply for a permit to operate within the 90-day time frame established by Florida Regulations. MCC did not receive the test results from ESE until July 1, 1988. The results are inconsistent with previous testing data and those expected with the significant engineering modifications made.

The initial capture efficiency tests, performed by Entropy, Inc. in January, 1987, indicated an overall average capture efficiency of 56.3%. Since that test, the following items were completed to improve capture efficiencies:

1. Increase flowrate in ductwork to carry more air volume to T.O. #1.
2. Increase size of Line 1 spray elevator exhaust fan.
3. Repair leaks in exhaust shroud on Line 1 spray elevator.
4. Enclose Line 1 doubling conveyor.
5. Install new exhaust duct, drop-out box, and fan on Line 1 spray machines, and exhaust Line 1 sprayers into T.O. #1 duct.

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

BEST AVAILABLE COPY

DESTINATION STATION

DHL
WORLDWIDE EXPRESS®

FORWARDER AIRBILL NO.
1 2 9 3 4 2 1 8 3

DATE [illegible]

SHIPPER'S ACCOUNT NO.: 01 4910 308

SHIPPER'S REFERENCE: 164-1907-162

ORIGIN	DESTIN.
STL	TLH

PIECES	WEIGHT
1	1

FROM (SHIPPER)

ANHEUSER BUSCH INCORPORATED
R. M. LANHAM 202-4
ONE BUSCH PLACE
ST LOUIS, MO

TELEX / PHONE
ZIP CODE 63118

TO (CONSIGNEE) PLEASE USE FULL ADDRESS, NO P.O. BOX

MR. C. H. FANCY
FLORIDA DEPT. OF ENV. REGULATIONS
TWIN TOWERS OFFICE BLDGE.
2600 BLAIR STONE ROAD
TALLAHASSEE, FL 32399-2400

TELEX / PHONE
ZIP CODE

SERVICE	CHARGE
DOCUMENT ☐	
EXPRESS DOCUMENT ☐	
WORLDWIDE PKG. EXPRESS ☐	
VISA PAK ☐	
SIGNATURE SERVICE ☐	
SATURDAY SERVICE ☐	
INSUR ☐	
HANDLING ☐	
ONFWD ☐	
DUTY ☐	
TOTAL	

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SHIPPER'S SIGNATURE X

PICKED UP BY DHL DATE / /
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☐ BILL SHIPPER
☐ BILL RECIPIENT (U.S. DEST. ONLY)

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DATE / /
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CA/AWB/9/85 6946-1143

6. Cover Line 1 Printer/Overvarnish unit with exhaust hood and exhaust to T.O. #1.

7. Cleaned all ductwork into T.O. #1.

8. Cut inspection ports into T.O. ducts for routine cleaning and inspection.

9. Repaired sticking or damaged dampers found in initial trials.

MCC was confident that these improvements would easily increase the overall capture efficiencies to the required level of 70%. The tests completed by ESE indicated an average capture efficiency of only 27.7%. This is nearly a 50% reduction in capture after the completion of all the work. For nearly a month we attempted to obtain the raw data from ESE to determine where the problem was, but were unsuccessful. We are confident that this is not the correct capture efficiency.

MCC has contracted with Smith Engineering and METCO, Inc. to test and adjust thermal oxidizer No. 1 on September 19, 1988. We are currently in the process of scheduling for Entropy, Inc. to perform capture efficiency tests in early October. Entropy did an excellent job in January, 1987 performing capture efficiency tests on Line 1, 2, 3 and 4.

In order for MCC to complete the necessary testing and submit a final report, we must again request an extension of the construction permit until July 1, 1989.

We sincerely appreciate your continued cooperation in this matter, and would be happy to meet with you and further discuss this situation should you feel it necessary. If you have any questions concerning this request or wish to arrange a meeting, please contact me at (314) 577-4168.

Sincerely,

ANHEUSER-BUSCH COMPANIES, INC.

Bob Lanham

Robert M. Lanham
Environmental Engineering and
Site Services Department

RML:cd

RML91288

cc: D. Hall - BESD
copied: Teresa Heron
Bill Stewart, NE Dist.
CHF/BT

● **SENDER:** Complete items 1 and 2 when additional services are desired, and complete items 3 and 4.
Put your address in the "RETURN TO" Space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☒ Show to whom delivered, date, and addressee's address. *(Extra charge)*
2. ☐ Restricted Delivery *(Extra charge)*

3. Article Addressed to:

Mr. Robert M. Lanham
Environmental Engineer
Anheuser-Busch Companies, Inc.
Executive Office
One Busch Place
St. Louis, MO 63118-1852

4. Article Number
P 274 010 373

Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X

7. Date of Delivery

8. Addressee's Address *(ONLY if requested and fee paid)*

ST. LOUIS MO MARYVILLE GA. STA.
APR 15 1988

PS Form 3811, Mar. 1987 ★ U.S.G.P.O. 1987-178-268 **DOMESTIC RETURN RECEIPT**

P 274 010 373

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to: Mr. Robert M. Lanaham
~~Anheuser-Busch Companies,~~ In
Street and No.: Executive Office
One Busch Place
P.O., State and ZIP Code: St. Louis, MO 63118-1852

Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$

Postmark or Date

Mailed: 04/12/88
Permit: AC 16-127873
Metal Container - Amendment

★ U.S.G.P.O. 1985-480-794

PS Form 3800, June 1985

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

April 8, 1988

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Robert M. Lanham
Environmental Engineer
Anheuser-Busch Companies, Inc.
Executive Office
St. Louis, Missouri 63118-1852

Dear Mr. Lanham:

Re: Can Coating Line No. 1
Construction Permit No. AC 16-127873

The Department is in receipt of your letter dated March 22, 1988, requesting an extension of the expiration date of permit No. AC 16-127873 for Can Coating Line No. 1 in Jacksonville, Florida. This request is acceptable. The expiration date will be changed as follows:

From: July 1, 1988

To: October 1, 1988

This letter must be attached to the above mentioned permit and shall become part of the permit.

Attachment to be Incorporated:

Mr. Robert M. Lanham's letter of March 22, 1988.

Sincerely,

Dale Twachtmann

Dale Twachtmann
Secretary

DT/ss

cc: Jerry Woosley
Copied: Bill Stewart, NE Dist.

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

FOR ROUTING TO OTHER THAN THE ADDRESSEE

To: ____________ Loctn: ____________
To: ____________ Loctn: ____________
To: ____________ Loctn: ____________
From: ____________ Date: ____________

TO: Dale Twachtmann

FROM: Howard L. Rhodes

SUBJECT: Modification to State Construction
Anheuser-Busch Companies, Inc. - Can Coating Line No. 1
Permit Number: AC 16-127873

DATE: April 8, 1988

Attached for your approval and signature is a permit modification letter prepared by Central Air Permitting to Anheuser-Bush Companies, Metal Container Corporation. The facility is located in Jacksonville, Florida.

I recommend your approval and signature.

HLR/aqm/th

Attachment

RECEIVED
APR 12 1988
DER - BAQM

RECEIVED
APR 11 1988
Office of the Secretary

DHL 069 583721

PM
3.21.88
St. Louis, MO

File Copy

ANHEUSER-BUSCH COMPANIES

March 18, 1988

RECEIVED
MAR 22 1988
DER - BAQM

Mr. Clair H. Fancy, P.E.
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Metal Container Corporation
Construction Permit No. AC16-127873

Dear Mr. Fancy:

Metal Container Corporation was issued a permit to construct on July 21, 1987 for can coating Line No. 1 at its Jacksonville, Florida plant. The expiration date of that original permit was January 31, 1988. On November 10, 1987 the expiration date was extended until July 1, 1988 to allow Metal Container time to improve capture efficiency around several areas of the process and complete the required source testing in order to apply for an operating permit within the 90 day time frame required by Florida regulations.

Since that time Metal Container discovered that one piece of equipment, an inside respray machine, was inadvertently omitted from the original application package. This omission was explained in a February 23, 1988 letter to Mr. William Thomas. On March 8, 1988 a modification to the construction permit was issued to allow the installation of this equipment. Installation of this equipment is presently underway and will be completed in the near future. However, connection of the ductwork from this equipment into thermal oxidizer No. 1 can not be completed until mid-April. Performing a source test prior to this date would not be a true measure of the emissions being released from this line.

Therefore, in order to obtain useful, accurate test data we are requesting that the expiration date of this permit be extended until October 1, 1988.

We appreciate your continued cooperation in this matter and if you have any questions concerning this request, please contact me at (314) 577-4168.

Sincerely,

Bob Lanham

Mr. Robert M. Lanham
Environmental Engineer

Copied: Teresa Heron
CHF/BT
} 3.23.88

RML/vrg
cc: J. Woosley-BESD

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

BEST AVAILABLE COPY

DHL
WORLDWIDE EXPRESS®

069583721

DESTINATION STATION

FORWARDER AIRBILL NO.
0 6 9 5 8 3 7 2 1

DATE	3 21
ORIGIN	DESTIN.
STL	TLH
PIECES	WEIGHT
1	ON

SHIPPER'S ACCOUNT NO.: 814910308
SHIPPER'S REFERENCE: 164-1907-162

FROM (SHIPPER)

ANHEUSER BUSCH
ONE BUSCH PLACE
ST LOUIS MO

TELEX / PHONE:
ZIP CODE: 63118

TO (CONSIGNEE) PLEASE USE FULL ADDRESS, NO P.O. BOX

MR. CLAIR H. FANCY, PE
FLORIDA DEPT. OF ENV. REGULATION
TWIN TOWERS OFFICE BLDG.
2600 BLAIR STONE ROAD
TALLAHASSEE, FL

TELEX / PHONE:
ZIP CODE: 32399-2400p

RECEIVED
MAR 22 1988
DER-BAQM

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ONE LETTER SIZE ENVELOPE

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EXPRESS DOCUMENT ☐	
WORLDWIDE PKG. EXPRESS ☐	
VISA PAK ☐	
SIGNATURE SERVICE ☐	
SATURDAY SERVICE ☐	
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ONFWD ☐	
DUTY ☐	
TOTAL	

FC

3.23.88

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METHOD OF PAYMENT ☐ BILL SHIPPER ☐ BILL RECIPIENT (U.S. DEST. ONLY)

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DATE / /
TIME AM PM

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AIRBILL – NON NEGOTIABLE

6946-0842
CA/AWB/9/85

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Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for additional service(s) requested.

1. ☒ Show to whom delivered, date, and addressee's address.
2. ☐ Restricted Delivery.

3. Article Addressed to:

Mr. Joseph Cummings
Anheuser-Busch
Metal Container Corporation
1100 North Ellis Road
Jacksonville, FL 32205-6257

4. Article Number
P 274 010 430

Type of Service:
☐ Registered
☒ Certified
☐ Express Mail
☐ Insured
☐ COD

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X Joyce Parkinson

7. Date of Delivery
3/11/88 Pr

8. Addressee's Address *(ONLY if requested and fee paid)*
SAME AS
#3

PS Form 3811, Feb. 1986

DOMESTIC RETURN RECEIPT

P 274 010 430

RECEIPT FOR CERTIFIED MAIL
NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

Sent to
Joseph Cummings
Anheuser-Busch
Street and No.
Metal Container Corporation
P.O., State and ZIP Code
1100 North Ellis Road

Postage Jacksonville, FL 32205-6257	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$

Postmark or Date
Mailed: 03/10/88
Permit: AC 16-127873

☆ U.S.G.P.O. 1985-480-794

PS Form 3800, June 1985

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

March 8, 1988

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. Joseph Cummings
Anheuser-Busch
Metal Container Corporation
1100 North Ellis Road
Jacksonville, Florida 32205-6257

Dear Mr. Cummings:

Re: AC16-127873 Can Coating Line No. 1 with Inside Respray Machine

The Department is in receipt of Mr. Robert M. Lanham's letter dated February 23, 1988, requesting that the respray machine be included in the above referenced permit. This request is acceptable.

The Department agrees to change the applicable conditions as requested since there is not an emissions increase in the total permitted emissions of 400.3 tons of VOC per year for the entire facility.

The Specific Conditions will be changed as follows:

<u>AC 16-127873</u>

Specific Condition #2: Changed from 0.16 tons/day, 4.80 tons/month to 0.19 tons/day, 5.7 tons/month.

Specific Condition #5: Changed from 1.43 tons/day, 43 tons/month. to 1.62 tons/day, 48.60 tons/month.

<u>AC 16-50418</u>

Specific Condition #4A: Changes from 1.43 tons/day, 43 tons/month. to 1.62 tons/day, 48.60 tons/month.

<u>AC 16-55752, -57753</u>

Specific Condition #2: Changed from 1.43 tons/day, 43 tons/month. to 1.62 tons/day, 48.60 tons/month.

A copy of this letter must be attached to your construction permit and shall become a part of the permit.

Attachment to be Incorporated

Mr. Robert M. Lanham's letter of February 23, 1988.

Sincerely,

Dale Twachtmann

Dale Twachtmann
Secretary

DT/ss

cc: Robert H. Lanham
Jerry Woosley

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

For Routing To Other Than The Addressee

To: Clair Location:
To: Location:
To: Location:
From: Date:

TO: Dale Twachtmann

FROM: Howard L. Rhodes

SUBJ: Amendment to Construction Permit Nos. AC 16-127873, AC 16-50418, AC 16-55752 and AC 16-57753
Anheuser-Busch
Metal Container Corporation

DATE: March 8, 1988

RECEIVED
MAR 9 1988
Office of the Secretary

Attached for your approval and signature is a letter prepared by Central Air Permitting that will extend the expiration date of the given construction permits issued to the above mentioned company. These extensions will enable them to apply for an operating permit.

The request is not controversial. I recommend these extension be approved.

HLR/aqm/th

attachment

RECEIVED
MAR 10 1988
DER - BAQM

BEST AVAILABLE COPY

DHL
0695 83931

File Copy

ANHEUSER-BUSCH COMPANIES

RECEIVED
FEB 24 1988
DER-BAQM

February 23, 1988

Mr. William Thomas
State of Florida
Department of Environmental Regulation
Twin Towns Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399

Re: Metal Container Corporation - Jacksonville Florida
Construction Permit No. AC16 - 127873

Dear Mr. Thomas:

On October 28, 1986 an application was filed with the Department of Environmental Regulation for the construction of Can Coating Line No. 1 at Metal Container Corporation in Jacksonville, Florida. Construction Permit No. AC16-127873 was issued on July 21, 1987 by your office. Since that time it has been discovered that one piece of equipment, an inside respray machine, was inadvertently omitted from the application package. We are requesting that the construction permit be modified to include this piece of equipment.

This machine will be used to periodically respray cans which require an additional layer of internal protection. It is estimated that only eight million cans would be resprayed per year. The maximum speed for this machine will be 400 cans per minute. All cans from this machine will go into Inside Bake Oven No. 1. Yearly emissions from this source are calculated to be 0.66 tons. The attached spreadsheet shows maximum daily emissions from Line No. 1 including the respray machine.

The permit modifications requested are:

1) include the respray machine in the construction permit,
2) increase the maximum daily emissions to 0.19 tons.

We are not requesting that the annual emission rate be increased due to the installation of this equipment. The additional emissions should remain within the annual limitations originally accepted.

If this modification meets with your approval, please contact me immediately so that installation of this equipment can begin. If at all possible, we would like to commence installation of this equipment on

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

BEST AVAILABLE COPY

2/24/88

~~Cliff~~ ~~BF~~ } FYI

OK. Teresa is preparing amendment Letter - BT

(M)

Okay

DHL
WORLDWIDE EXPRESS®

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SHIPPER'S ACCOUNT NO.	14910308
SHIPPER'S REFERENCE	164-1907-162
DATE	2/23/88
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DESTIN.	TLH
PIECES	1
WEIGHT	1

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FEB 24 1988
DER - BAQM

FROM (SHIPPER)

ANHEUSER BUSCH
ONE BUSCH PLACE
ST LOUIS MO

TELEX / PHONE

ZIP CODE 63118

TO (CONSIGNEE) PLEASE USE FULL ADDRESS, NO P.O. BOX

MR WILLIAM THOMAS
STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATIONS
TWIN TOWNS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FL

TELEX / PHONE

ZIP CODE 32399

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EXPRESS DOCUMENT ☐	
WORLDWIDE PKG. EXPRESS ☐	
VISA PAK ☐	
SIGNATURE SERVICE ☐	
SATURDAY SERVICE ☐	
INSUR ☐	
HANDLING ☐	
ONFWD ☐	
DUTY ☐	
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THIS IS A NON-NEGOTIABLE AIRBILL SUBJECT TO THE TERMS AND CONDITIONS PRINTED ON THE REVERSE OF THE SHIPPER'S COPY. IN TENDERING THIS SHIPMENT, SHIPPER AGREES THAT DHL SHALL NOT BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING FROM THE CARRIAGE OF THIS SHIPMENT. DHL DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, WITH RESPECT TO THIS SHIPMENT. THE LIABILITY OF DHL FOR ANY LOSS OR DAMAGE SHALL BE LIMITED TO U.S. $100.00. INSURANCE COVERAGE IS AVAILABLE UPON SHIPPER'S REQUEST AND PAYMENT OF INSURANCE CHARGES. THERE ARE NO AGREED STOPPING PLACES FOR THIS SHIPMENT. INTERNATIONAL SHIPPERS PLEASE ALSO READ THE WARSAW CONVENTION NOTICE ON THE REVERSE OF THE AIRBILL.

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☐ BILL RECIPIENT (U.S. DEST. ONLY)

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PLEASE PRINT NAME

DATE / /

TIME AM PM

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FORWARDER AIRBILL – NON NEGOTIABLE

6946-0842

CA/AWB/9/85

March 1, 1988. If you have any questions or need additional information concerning this request, please contact me at (314) 577-4168. Thank you for your continued cooperation in this matter.

Sincerely,

ANHEUSER-BUSCH COMPANIES, INCORPORATED

Bob Lanham

Mr. Robert M. Lanham
Environmental Engineer

RML/vrg
Att.
22288

cc: Mr. J. F. Cummings,
MCC-Jacksonville

CC: Teresa Nixon } 2/24/88 mr
CHF IBT

METAL CONTAINER CORPORATION
JACKSONVILLE FLORIDA BEVERAGE CAN MANUFACTURING FACILITY
WORST-CASE DAY; LINE ONE VOC EMISSIONS
FEBRUARY 21, 1988

CAN LINE NUMBER ONE OPERATING ON ALL 16 OUNCE CANS
75% OF ALL BEER CANS ARE WHITE BASECOATED
100% OF ALL CANS ARE OVERVARNISHED
LINE AT 80% EFFICIENCY, T.O. @ 90% EFFICIENCY

MAXIMUM CAN PRODUCTION		RESPRAY @ 400 CPM	
PER MINUTE:	1000	PER MINUTE:	400
PER HOUR:	60000	PER HOUR:	24000
PER DAY :	1.152E+06	PER DAY:	5.760E+05

COATING/SOLVENT	MANUFACTURERS IDENTIFICATION	LBS VOC/GAL LESS WATER	% SOLIDS (VOL)	% SOLVENT (VOL)	% WATER (VOL)	POUNDS VOC/GAL SOLIDS	GALLONS PER M CANS	GALLONS COATING APPLIED	SOLIDS APPLIED (GALS)	OVERALL CONTROL EFFICIENCY	TONS VOC/DAY
100 % BEER CAN PRODUCTION											
WHITE BASECOAT	PPG 3606	1.77	0.425	0.134	0.441	2.34	0.153	132.19	56.18	0.594	0.027
INSIDE SPRAY	CELANESE 3500	3.73	0.173	0.168	0.659	7.34	0.267	307.58	53.21	0.664	0.066
BOTTOM VARNISH	INMONT Z125	1.91	0.376	0.140	0.484	2.61	0.005	5.76	2.17	0.594	0.001
OVERVARNISH	INMONT S145-121A	2.29	0.416	0.190	0.394	3.34	0.133	153.22	63.74	0.559	0.047
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	6.71	0.000	1.000	0.000	0.00	0.004	4.61	0.00	0.000	0.015
										EMISSIONS	0.156
RESPRAY	GLIDDEN 640-C-677	3.60	0.160	0.166	0.675	7.33	0.267	153.79	24.55	0.664	0.030
										TOTAL EMISSIONS	0.186

PS Form 3811, July 1983 447-845

● **SENDER:** Complete items 1, 2, 3 and 4.

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☒ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to: Robert M. Lanham
Anheuser-Busch Companies, Inc.
Metal Container Corporation
1100 North Ellis Road
Jacksonville, FL ~~32206-6257~~ 32205

4. Type of Service:
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number: P 274 007 653

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X

6. Signature – Agent
X M. Middlebrooks

7. Date of Delivery
11/21/87

8. Addressee's Address *(ONLY if requested and fee paid)*
SAME AS # 3

DOMESTIC RETURN RECEIPT

P 274 007 653

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED
NOT FOR INTERNATIONAL MAIL
(See Reverse)

★ U.S.G.P.O. 1985-480-794

Sent to Robert M. Lanham
~~Metal Container Corporation~~

Street and No.
1100 North Ellis Road

P.O., State and ZIP Code
Jacksonville, FL 32206-6257

Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt showing to whom and Date Delivered	
Return Receipt showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$

Postmark or Date
Mailed: 11/18/87
Permit: AC 16-127873

PS Form 3800, June 1985

File Copy

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

November 10, 1987

Mr. Robert M. Lanham
Environmental Engineer
Anheuser-Busch Companies, Inc.
Metal Container Corporation
1100 North Ellis Road
Jacksonville, Florida 32206-6257

Dear Mr. Lanham:

We are in receipt of your October 22, 1987, letter requesting an extension of your construction permit No. AC 16-127873 for Can Coating Line No. 1 at Jacksonville, Florida. This request is acceptable. The expiration date will be changed as follows:

From: January 31, 1988
To: July 1, 1988

A copy of this letter must be attached to your construction permit and become a part of the permit.

Attachment to be Incorporated:

Mr. Robert M. Lanham's letter of October 22, 1987.

Sincerely,

Dale Twachtmann

Dale Twachtmann
Secretary

DT/ks

cc: J. Woosley

Protecting Florida and Your Quality of Life

ATTACHMENT

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

For Routing To Other Than The Addressee

To: ______________________ Location: ______________
To: ______________________ Location: ______________
To: ______________________ Location: ______________
From: ____________________ Date: __________________

TO: Dale Twachtmann

THRU: Howard Rhodes HR

FROM: Clair Fancy for CHF

DATE: November 12, 1987

SUBJ: Amendment to Construction Permit No. AC 16-127873
Anheuser-Busch Companies, Inc.
Metal Container Corporation

Attached for your approval and signature is a letter that will extend the expiration date of the given construction permit issued to the above mentioned company. This extension will allow additional time for completing the required testing and submitting a complete report to the agency.

The request is not controversial. The Bureau recommends this extension be approved.

CHF/mj

attachment

RECEIVED
NOV 13 1987
Office of the Secretary

file

ANHEUSER-BUSCH COMPANIES

DER
OCT 26 1987
BAQM

October 22, 1987

Mr. Clair H. Fancy, P.E.
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Metal Container Corporation
Permit to Construct No. AC16-127873

Dear Mr. Fancy:

Metal Container Corporation was issued a permit to construct on July 21, 1987 for can coating Line No. 1 at its Jacksonville, Florida plant. The expiration date of this permit is January 31, 1988. Preliminary compliance testing on this line revealed a need to improve VOC capture efficiency around several areas of the process. The plant is presently fabricating equipment that, once installed, is expected to achieve the required capture efficiencies. We will not be able to complete the equipment fabrication/installation and the required compliance testing within the time period of the permit as issued. Therefore, we are requesting that the expiration date of this permit be extended until July 1, 1988. This additional time will allow us to complete the required testing and submit a complete report to the agency within 90 days of the expiration date.

Thank you for your continued cooperation in this matter. If you have any questions concerning this request, please contact me at (314) 577-4168.

Sincerely,

ANHEUSER-BUSCH COMPANIES, INC.

Bob Lanham

Robert M. Lanham
Environmental Engineer

cc: Mr. J. Woosley
Bio-Environmental Services
515 W. 6th Street
Jacksonville, FL 32206

Copied: Teresa Heron
CHF/BT
Bill Stewart
10/26/87

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

ANHEUSER-BUSCH COMPANIES

One Busch Place
St. Louis, MO 63118-1852

R. M. Lanham

PRESORTED
FIRST CLASS

SAINT LOUIS
OCT 23 '87
MO.

U.S. POSTAGE
.18
P.B. METER
3329427

10/26

~~CHF~~;
~~BT~~
FYI

Thanks

Mr. Clair H. Fancy, P.E.
Florida DER
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

AC 16-127873

ANHEUSER-BUSCH COMPANIES

DER
JUL 15 1987
BAQM

EXPRESS MAIL

July 14, 1987

Mr. Bill Thomas
Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Mr. Thomas:

Anheuser-Busch Companies appreciates the opportunity to comment on the proposed permit (Permit Number: AC16-127873) for the Metal Container Corporation in Jacksonville, Florida, and respectfully submits the following comments for your consideration.

These comments concern Specific Conditions 2, 5 and 7. These conditions restrict the daily emissions for Line 1, the daily emissions for the entire facility, and require quarterly material balance reports. The daily and monthly maximum emissions in the proposed permits are not true maximum limits but are merely an arithmetic average of the yearly maximum limits based on a 365-day year. I have estimated the true maximum daily plant emissions; these calculations are attached for your approval. On the subject of quarterly material balance reports, it is felt that this is an unnecessary burden for both Metal Container Corporation and the Duval County Bio-Environmental Services Division (BESD). The annual operational reports that are required should be sufficient documentation of coating usages. The plant maintains a daily log of VOC emissions which is available for inspection at any time.

On behalf of Anheuser-Busch Companies, I thank you for the opportunity to submit these comments and request that they be incorporated into the final permit.

Sincerely,

Robert Lanham

Robert M. Lanham
Environmental Engineer

RML:cd
Enc.

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

Metal Container Corporation - Jacksonville
Comments on Permit Numbers AC-16-127873, -50418, -57752, -57753

AC-16-127873

Specific Condition 2: Change from 0.12 tons/day, 3.48 tons/month to 0.16 tons/day, 4.80 tons/month.

Specific Condition 5: Change from 1.10 tons/day, 33 tons/month to 1.43 tons/day, 42.90 tons/month.

Specific Condition 7: Delete quarterly reports.

AC-16-50418

Specific Condition 4A: Change from 1.10 tons/day, 33 tons/month to 1.43 tons/day, 42.90 tons/month.

Specific Condition 4B: Delete quarterly reports

AC-16-57752, -57753

Specific Condition 2: Change from 1.10 tons/day, 33 tons/month to 1.43 tons/day, 42.90 tons/month.

METAL CONTAINER CORPORATION
JACKSONVILLE FLORIDA BEVERAGE CAN MANUFACTURING FACILITY
WORST-CASE DAY; FACILITY VOC EMISSIONS
JULY 7, 1987

100% OF ALL BEER CANS ARE WHITE BASECOATED
100% OF ALL CANS ARE OVERVARNISHED
ALL LINES @ 90% EFFICIENCY

MAXIMUM CAN PRODUCTION PER DAY

LINE 1 @ 1000 CPM:	1.296E+06
LINE 2 @ 1400 CPM:	1.814E+06
LINE 3 @ 1400 CPM:	1.814E+06
LINE 4 @ 1400 CPM:	1.814E+06

COATING/SOLVENT	MANUFACTURERS IDENTIFICATION	LBS VOC/GAL LESS WATER	% SOLIDS (VOL)	% SOLVENT (VOL)	% WATER (VOL)	POUNDS VOC/GAL SOLIDS	GALLONS PER M CANS	GALLONS COATING APPLIED	SOLIDS APPLIED (GALS)	OVERALL CONTROL EFFICIENCY	TONS VOC/DAY
LINE 1 - 100 % 16 OZ BEER CAN PRODUCTION											
WHITE BASECOAT	PPG 3606	1.77	0.425	0.134	0.441	2.34	0.153	198.29	84.27	0.720	0.028
INSIDE SPRAY	CELANESE 3500C	3.73	0.173	0.168	0.659	7.34	0.267	346.03	59.86	0.720	0.062
BOTTOM VARNISH	INMONT Z125	1.91	0.376	0.140	0.484	2.61	0.005	6.48	2.44	0.450	0.002
OVERVARNISH	INMONT S145-121A	2.29	0.416	0.190	0.394	3.34	0.133	172.37	71.71	0.450	0.066
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	6.71	0.000	1.000	0.000	0.00	0.004	5.18	0.00	0.000	0.000
										TOTAL EMISSIONS	0.157
LINE 2 - 100 % 16 OZ BEER CAN PRODUCTION											
WHITE BASECOAT	PPG 3606	1.77	0.425	0.134	0.441	2.34	0.153	277.60	117.98	0.000	0.138
INSIDE SPRAY	CELANESE 3500C	3.73	0.173	0.168	0.659	7.34	0.267	484.44	83.81	0.000	0.308
BOTTOM VARNISH	INMONT Z125	1.91	0.376	0.140	0.484	2.61	0.005	9.07	3.41	0.747	0.001
OVERVARNISH	INMONT S145-121A	2.29	0.416	0.190	0.394	3.34	0.133	241.32	100.39	0.747	0.042
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	6.71	0.000	1.000	0.000	0.00	0.004	7.26	0.00	0.000	0.000
										TOTAL EMISSIONS	0.489
LINE 3 - 100 % 12 OZ BEER CAN PRODUCTION											
WHITE BASECOAT	PPG 3606	1.77	0.425	0.134	0.441	2.34	0.115	208.66	88.68	0.000	0.104
INSIDE SPRAY	CELANESE 3500C	3.73	0.173	0.168	0.659	7.34	0.245	444.57	75.90	0.000	0.282

BOTTOM VARNISH	INMONT Z125	1.91	0.376	0.140	0.484	2.61	0.005	9.07	3.41	0.747	0.001
OVERVARNISH	INMONT S145-121A	2.29	0.416	0.190	0.394	3.34	0.100	181.44	75.48	0.747	0.032
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	6.71	0.000	1.000	0.000	0.00	0.003	5.44	0.00	0.000	0.000
										TOTAL EMISSIONS	0.419
LINE 4 - 100 % 12 OZ BEER CAN PRODUCTION											
WHITE BASECOAT	PPG 3606	1.77	0.425	0.134	0.441	2.34	0.115	208.66	88.68	0.000	0.104
INSIDE SPRAY	CELANESE 3500C	3.73	0.173	0.168	0.659	7.34	0.200	362.88	62.78	0.000	0.230
BOTTOM VARNISH	INMONT Z125	1.91	0.376	0.140	0.484	2.61	0.005	9.07	3.41	0.747	0.001
OVERVARNISH	INMONT S145-121A	2.29	0.416	0.190	0.394	3.34	0.100	181.44	75.48	0.747	0.032
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	6.71	0.000	1.000	0.000	0.00	0.003	5.44	0.00	0.000	0.000
										TOTAL EMISSIONS	0.367
										TOTAL FACILITY EMISSIONS	1.432

METAL CONTAINER CORPORATION
JACKSONVILLE FLORIDA BEVERAGE CAN MANUFACTURING FACILITY
WORST-CASE DAY; LINE ONE VOC EMISSIONS
JULY 7, 1987

CAN LINE NUMBER ONE OPERATING ON ALL 16 OUNCE CANS
100% OF ALL BEER CANS ARE WHITE BASECOATED
100% OF ALL CANS ARE OVERVARNISHED
LINE AT 90% EFFICIENCY

MAXIMUM CAN PRODUCTION

PER MINUTE:	1000
PER HOUR:	60000
PER DAY :	1.296E+06

COATING/SOLVENT	MANUFACTURERS IDENTIFICATION	LBS VOC/GAL LESS WATER	% SOLIDS (VOL)	% SOLVENT (VOL)	% WATER (VOL)	POUNDS VOC/GAL SOLIDS	GALLONS PER M CANS	GALLONS COATING APPLIED	SOLIDS APPLIED (GALS)	OVERALL CONTROL EFFICIENCY	TONS VOC/DAY
100 % BEER CAN PRODUCTION											
WHITE BASECOAT	PPG 3606	1.77	0.425	0.134	0.441	2.34	0.153	198.29	84.27	0.720	0.028
INSIDE SPRAY	CELANESE 3500C	3.73	0.173	0.168	0.659	7.34	0.267	346.03	59.86	0.720	0.062
BOTTOM VARNISH	INMONT Z125	1.91	0.376	0.140	0.484	2.61	0.005	6.48	2.44	0.450	0.002
OVERVARNISH	INMONT S145-121A	2.29	0.416	0.190	0.394	3.34	0.133	172.37	71.71	0.450	0.066
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	6.71	0.000	1.000	0.000	0.00	0.004	5.18	0.00	0.000	0.000
										TOTAL EMISSIONS	0.157

PM
6-24-87
Saint Louis, MO.

ANHEUSER-BUSCH COMPANIES

June 23, 1987

DER
JUN 26 1987
BAQM

Ms. Teresa Heron
Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

Dear Ms. Heron:

Metal Container Corporation
Jacksonville, FL
Can Line No. 1
AC 16-127873

Attached is a copy of the public notice published in the June 15, 1987, issue of The Florida Times-Union. It is anticipated that the current 90-day time limit waiver to July 31, 1987, will be adequate for your needs. Please let me know if I can provide any further assistance.

Very truly yours,

J. V. Stier
Manager - Environmental Affairs

JVS:cmh
att.

cc Messrs. Kurshid Mehta - BESD ✓
J. F. Cummings - MCC-Jacksonville

copied;
Teresa Heron. 6/26/87 WMH

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

The Florida Times-Union **Jacksonville Journal**

FLORIDA PUBLISHING COMPANY

Publishers

JACKSONVILLE, DUVAL COUNTY, FLORIDA

STATE OF FLORIDA
COUNTY OF DUVAL

Before the undersigned authority personally appeared Jerry Wendell who on oath says that he is Retail Advertising Supervisor of The Florida Times-Union, and Jacksonville Journal, daily newspapers published at Jacksonville in Duval County, Florida; that the attached copy of advertisement, being a Legal Notice

in the matter of Notice of Intent

in the ______________________ Court,

was published in The Florida Times-Union

in the issues of June 15

Affiant further says that the said The Florida Times-Union and Jacksonville Journal are each newspapers published at Jacksonville, in said Duval County, Florida, and that the said newspapers have each heretofore been continuously published in said Duval County, Florida, The Florida Times-Union each day, and Jacksonville Journal each day except Sundays, and each has been entered as second class mail matter at the postoffice in Jacksonville, in said Duval County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in said newspaper.

Sworn to and subscribed before me this 15th day of June A.D. 19 87

Jerry Wendell

Notary Public,
State of Florida at Large.

My Commission Expires NOTARY PUBLIC, STATE OF FLORIDA
My commission expires Feb. 19, 1989

DA 444

State of Florida
Department of Environmental Regulation
Notice of Intent

The Department gives notice of its intent to issue a permit to Metal Container Corporation to install/reactivate a thermal oxidizer for the Can Coating Line No. 1 at their existing facility in Jacksonville, Duval County, Florida. A determination of lowest achievable emission rate (LAER) was required.

Persons whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative determination (hearing) in accordance with Section 120.57, Florida Statutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code, and must be filed (received) in the Department's Office of General Counsel, 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32399-2400, within fourteen (14) days of publication of this notice. Failure to file a petition within this time period constitutes a waiver of any right such person has to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Rule 28-5.207, Florida Administrative Code, at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009 Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Dept. of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
Dept. of Environmental Regulation
Northeast District
3426 Bills Road
Jacksonville, Florida 32207
Duval County Bio-Environmental Services
Division
515 West 6th Street
Jacksonville, Florida 32206

Any person may send written comments on the proposed action to Mr. Bill Thomas at the Department's Tallahassee address. All comments mailed within 30 days of the publication of this notice will be considered in the Department's final determination.

PS Form 3811, July 1983 447-845

● **SENDER: Complete items 1, 2, 3 and 4.**

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☒ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:

Joseph Cummings
Plant Manager
ABC-Metal Container Corporation
1100 North Ellis Road
Jacksonville, FL 32205-6257

4. Type of Service:

☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number: P 408 531 188

Always obtain signature of addressee or agent and DATE DELIVERED.

5. Signature – Addressee
X Joyce Barclay

6. Signature – Agent
X

7. Date of Delivery
6/1/87 PA

8. Addressee's Address *(ONLY if requested and fee paid)*
SAME AS ABOVE

DOMESTIC RETURN RECEIPT

P 408 531 188

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to
Joseph Cummings

Street and No.
ABC-Metal Container Corp.
1100 North Ellis Road

P.O., State and ZIP Code
Jacksonville, FL 32205-6257

Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$

Postmark or Date
5/29/87
AC 16-127873

PS Form 3800, Feb. 1982

File Copy

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

May 22, 1987

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. Joseph Cummings
Plant Manager
Metal Container Corporation
1100 North Ellis Road
Jacksonville, Florida 32205-6257

Dear Mr. Cummings:

Attached is one copy of the Technical Evaluation and Preliminary Determination and proposed permit to install/reactivate a thermal oxidizer for the Can Coating Line No. 1 at your existing Jacksonville, Duval County, facility.

Please submit, in writing, any comments which you wish to have considered concerning the Department's proposed action to Mr. Bill Thomas of the Bureau of Air Quality Management.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/bm

Attachments

cc: J. Woosley
J. Stier
C. Nolan, P.E.

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In the Matter of
Application for Permit by:

Anheuser-Busch Companies, Inc.
Metal Container Corporation
1100 North Ellis Road
Jacksonville, Florida 32205-6257

DER File No. AC 16-127873

INTENT TO ISSUE

The Department of Environmental Regulation hereby gives notice of its intent to issue a permit (copy attached) for the proposed project as detailed in the application specified above. The Department is issuing this Intent to Issue for the reasons stated in the attached Technical Evaluation and Preliminary Determination.

The applicant, Metal Container Corporation, applied on November 25, 1986, to the Department of Environmental Regulation for a permit to install/reactivate a thermal oxidizer for the Can Coating Line No. 1 at their existing facility in Jacksonville, Duval County, Florida.

The Department has permitting jurisdiction under Chapter 403, Florida Statutes and Florida Administrative Code Rules 17-2 and 17-4. The project is not exempt from permitting procedures. The Department has determined that an air construction permit was needed for the proposed work.

Pursuant to Section 403.815, F.S. and DER Rule 17-103.150, FAC, you (the applicant) are required to publish at your own expense the enclosed Notice of Proposed Agency Action on permit application. The notice must be published one time only in a section of a major local newspaper of general circulation in the county in which the project is located and within thirty (30) days from receipt of this intent. Proof of publication must be provided to the Department within seven days of publication of the notice. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permit.

The Department will issue the permit with the attached conditions unless petition for an administrative proceeding (hearing) is filed pursuant to the provisions of Section 120.57, F.S. A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes. Petitions must comply with the requirement of Florida Administrative Code Rules 17-103.155 and 28-5.201 (copies enclosed) and be filed with (received by) the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant must be filed within fourteen (14) days of receipt of this intent. Petitions filed by other persons must be filed within fourteen (14) days of publication of the public notice or within fourteen (14) days of receipt of this intent, whichever first occurs. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, Florida Statutes, concerning the subject permit application. Petitions which are not filed in accordance with the above provisions will be dismissed.

Executed in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

Copies furnished to:

J. Woosley, BESD
J. Cummings, Metal Container Corporation
J. Stier, Anheuser-Busch Companies, Inc.
C. Nolan, P.E.

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF INTENT TO ISSUE and all copies were mailed before the close of business on May 29, 1987.

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to §120.52(9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

R Bruce Mitchell
Clerk

5/29/87
Date

State of Florida
Department of Environmental Regulation
Notice of Intent

The Department gives notice of its intent to issue a permit to Metal Container Corporation to install/reactivate a thermal oxidizer for the Can Coating Line No. 1 at their existing facility in Jacksonville, Duval County, Florida. A determination of lowest achievable emission rate (LAER) was required.

Persons whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative determination (hearing) in accordance with Section 120.57, Florida Statutes. The petition must conform to the requirements of Chapters 17-103 and 28-5, Florida Administrative Code, and must be filed (received) in the Department's Office of General Counsel, 2600 Blair Stone Road, Twin Towers Office Building, Tallahassee, Florida 32399-2400, within fourteen (14) days of publication of this notice. Failure to file a petition within this time period constitutes a waiver of any right such person has to request an administrative determination (hearing) under Section 120.57, Florida Statutes.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the proposed agency action. Therefore, persons who may not wish to file a petition may wish to intervene in the proceeding. A petition for intervention must be filed pursuant to Rule 28-5.207, Florida Administrative Code, at least five (5) days before the final hearing and be filed with the hearing officer if one has been assigned at the Division of Administrative Hearings, Department of Administration, 2009, Apalachee Parkway, Tallahassee, Florida 32301. If no hearing officer has been assigned, the petition is to be filed with the Department's Office of General Counsel, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Failure to petition to intervene within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, Florida Statutes.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at:

Dept. of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dept. of Environmental Regulation
Northeast District
3426 Bills Road
Jacksonville, Florida 32207

Duval County Bio-Environmental Services Division
515 West 6th Street
Jacksonville, Florida 32206

Any person may send written comments on the proposed action to Mr. Bill Thomas at the Department's Tallahassee address. All comments mailed within 30 days of the publication of this notice will be considered in the Department's final determination.

RULES OF THE ADMINISTRATIVE COMMISSION
MODEL RULES OF PROCEDURE
CHAPTER 28-5
DECISIONS DETERMINING SUBSTANTIAL INTERESTS

28-5.15 Requests for Formal and Informal Proceedings

(1) Requests for proceedings shall be made by petition to the agency involved. Each petition shall be printed, typewritten or otherwise duplicated in legible form on white paper of standard legal size. Unless printed, the impression shall be on one side of the paper only and lines shall be double spaced and indented.

(2) All petitions filed under these rules should contain:

- (a) The name and address of each agency affected and each agency's file or identification number, if known;
- (b) The name and address of the petitioner or petitioners;
- (c) All disputed issues of material fact. If there are none, the petition must so indicate;
- (d) A concise statement of the ultimate facts alleged, and the rules, regulations and constitutional provisions which entitle the petitioner to relief;
- (e) A statement summarizing any informal action taken to resolve the issues, and the results of that action;
- (f) A demand for the relief to which the petitioner deems himself entitled; and
- (g) Such other information which the petitioner contends is material.

Technical Evaluation
and
Preliminary Determination

Anheuser-Busch Companies, Inc.

Metal Container Corporation

Can Coating Line No. 1

Permit Number: AC 16-127873

Florida Department of Environmental Regulation
Bureau of Air Quality Management
Central Air Permitting

May 22, 1987

I. SYNOPSIS OF APPLICATION

I.1 Applicant Name and Address

Anheuser-Busch Companies, Inc.
Metal Container Corporation
1100 North Ellis Road
Jacksonville, Florida 32206-6257

I.2 Reviewing and Process Schedule

Date of Receipt of Application: November 25, 1986

30 Days Completeness Review: December 23, 1986

Response to Incompleteness Letter: January 21, 1987

Application Completeness Day: January 21, 1987

Waiver of 90 Day Time Limit: July 31, 1987

II. FACILITY INFORMATION

II.1 Facility Location

Metal Container Corporation is located at 1100 North Ellis Road in Jacksonville, Duval County, Florida. The UTM coordinates are zone 17, 428.440 km East and 3356.377 km North.

II.2 Standard Industrial Classification Code

This source is classified as follows:

Major Group No. - 34 FABRICATED METAL PRODUCTS, EXCEPT MACHINERY AND TRANSPORTATION EQUIPMENT

Group No. - 347 COATING, ENGRAVING, AND ALLIED SERVICES

Industry No. - 3479 COATING, ENGRAVING, AND ALLIED SERVICES, NOT ELSEWHERE CLASSIFIED

II.3 Facility Category

Metal Container Corporation (MCC) is classified as a major emitting facility for volatile organic compounds (VOC). The total VOC permitted emissions for this facility is currently 403.5 tons per year.

III. PROJECT DESCRIPTION

Can Coating Line No. 1 will be reinstated from a standby to a full-time operation. The emissions from the overvarnish and bottom varnish operations from the three other lines will be ducted to the existing thermal oxidizer No. 2 in order to provide an overall decrease in facility emissions of 3.2 tons of VOC per year.

III.1 Background Information

The following is a list of the chronological activities that have occurred at the plant since 1981.

o Year 1981 - The plant switched to water based coating technology. The Department determined this year (1981) to be the baseline date for contemporaneous increases or decreases. Actual emissions of 315.5 TPY plus RACT credit of 48.0 TPY formed the baseline of 363.5 TPY. Previously, the plant used solvent-based coatings and controlled VOC by thermal oxidation. Application renewals for operating permits were submitted and permits to operate were issued on October 29, 1981 (AO 16-44656, 57, 58, and 59). Applications to construct overvarnish units on Can Coating Lines 1 and 2 were submitted on November 18, 1981.

o Year 1982 - Permits to construct (overvarnish) on Can Coating Lines 1 and 2 were issued (AC 16-50417, 18). These permits allowed Can Coating Lines 1 and 2 the use of overvarnish on the outside surface of white basecoated cans in order to increase the can thickness to alleviate abrasion problems encountered during shipping of the product. Emissions level increase of 45.1 tons per year VOC was subject to limited new source review requirements.

Certificates of Completion of Construction were submitted on April 23, 1982, for AC 16-50417, 18. Permits to operate the overvarnish unit on Lines 1 and were 2 issued (AO 16-55208, 10). They will expire on May 31, 1987.

Applications to construct overvarnish units on Can Coating Lines 3 and 4 were submitted on July 1, 1982. These lines were permitted for the addition of a roll coating unit to the existing dry offset lithography unit. Permits to construct (overvarnish) on Can Coating Lines 3 and 4 were issued (AC 16-57752, 53). Total plant emissions were limited to 403.5 tons of VOC per year to avoid a significant net emissions increase. Certificates of Completion of Construction were submitted for AC 16-57752 and -57753 on October 21, 1982. Permits to operate Can Coating Lines 1, 2, 3, and 4 (AO 16-55208, -62285, and -62287), including overvarnish units on all lines, were issued on December 1, 1982, and expire on May 31, 1987.

o Year 1984 - Necker/Flanger Lube Reduction

o Year 1985 - Request to modernize line speeds from 950 to 1,400 cans per minute for Can Coating Lines 2, 3, and 4. Can Coating Line No. 1 was to remain as a back-up line. Actual emissions were projected at less than 403.5 tons VOC per year, so no significant emission increase occurred.

o Year 1986 - Specific Conditions 2 and 4 of Construction Permit Nos. AC 16-57752 and -57753 were modified to reflect modernized lines. On August 18, 1986, MCC requested to reinstate Line No. 1 from a standby to a full-time basis and to increase the speed of the line to 1,000 cans per minute. The overvarnish and bottom varnish operations from the three modernized lines will be ducted to the line thermal oxidizer No. 2 in order to provide an offset of 45.7 tons per year. The application was submitted on November 26, 1986. On September 30, 1986, MCC requested approval of a schedule for start-up and emissions testing of thermal oxidizer Nos. 1 and 2. This request was approved on October 6, 1986.

o Year 1987 - Additional information received on January 21, 1987, for the modification of Can Coating Line No. 1. On January 22, 1987, the schedule for start-up and emission testing program was extended from February to April 1987. On February 6, 1987, MCC requested approval to begin installation of the necessary duct work to vent the three basecoater oven exhausts to the existing thermal oxidizer. This request was approved on March 4, 1987. On March 30, 1987, the schedule for start-up and emission testing program was extended from April 1, 1987, to October 1, 1987.

A summary of the annual VOC emissions is shown below.

Year	Allowable VOC Emissions (TPY)
1980	366.3
1981	315.5
1982	363.5
	403.5
1983-86	403.5
1987	400.2

IV. RULE APPLICABILITY

The proposed project is subject to preconstruction review under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (FAC) Rules 17-2 and 17-4.

Metal Container Corporation is located in an area (Duval County) currently designated nonattainment for volatile organic compounds (VOC).

The proposed project, a modification to Can Coating Line No. 1, will be reviewed under FAC Rule 17-2.510, New Source Review (NSR) for nonattainment area, although FAC Rule 17-2.510 would not require the full nonattainment new source review since the application of thermal oxidizers to Can Coating Lines Nos. 2, 3, and 4 will provide an overall net reduction of emissions for the facility. Federal rules (netting individual units in a nonattainment area) will require the application of LAER. Thus the proposed application of thermal oxidizers in conjunction with low solvent technology will reduce emissions below RACT limits to provide offsets. Application of the same controls to Can Coating Line No. 1 as LAER will assure compliance with both State (FAC Rule 17-2.510) and federal rules (40 CFR 51, Vol. No. 233, Emissions Trading Policy Statement).

Metal Container Corporation has proposed the use of waterborne coatings and incineration of the VOC emitted from the three ovens as LAER determination for this facility. A detailed description of the LAER determination is attached.

The modification of Can Coating Line No. 1 will increase emissions by 42.5 tons of VOC per year. The overall project, reinstating Can Coating Line No. 1 from stand-by to a full time basis and ducting the overvarnish and bottom varnish operations from the three modernized lines to thermal oxidizer No. 2, will provide a contemporaneous emissions decrease of 45.7 tons of VOC per year. A net emissions decrease of 3.2 tons of VOC per year is expected for this facility.

This facility shall comply with FAC Rule 17-2.650(1)(f)(1), Reasonably Available Control Technology (RACT) for Can Coating Operations; FAC Rule 17-2.620, General Pollutant Emission Limiting Standards; Lowest Achievable Emission Rate (LAER); and, New Source Performance Standard for Beverage Can Surface Coating Industry, 40 CFR 60, Subpart WW.

V. SOURCE IMPACT ANALYSIS

V.1 Emission Limitations

The operation of the can coating facility will produce emissions of volatile organic compounds to the atmosphere.

The largest portion of the VOC emissions will result from methyl ethyl ketone, methyl chloroform and butyl cellosolve used as solvents.

The following summary shows the permitted emissions for this facility. These permitted emissions are in compliance with all applicable requirements of FAC Rule 17-2 and New Source Performance Standards for Beverage Can Surface Coating Industry, 40 CFR 60, Subpart WW.

Emissions Summary
Volatile Organic Compounds
Allowable Emissions

The permitted emissions for the whole plant are 1.10 tons of VOC per day, 33.3 tons of VOC per month, and 400.2 tons of VOC per year.

Maximum permitted emissions for Can Coating Line No. 1 shall not exceed 41.8 tons VOC per year (LAER Determination).

The RACT regulations for this can coating facility (Can Coating Lines Nos. 1, 2, 3, 4) are as follows:

A) 2.8 pounds per gallon of coating (0.34 kilograms per liter), excluding water, delivered to the coating applicator of;

  (a) Sheet basecoat (exterior and interior) and overvarnish, or

  (b) Two-piece can exterior (basecoat and overvarnish) operation.

B) 4.2 pounds per gallon of coating (0.50 kilograms per liter), excluding water delivered to the coating applicator from two- and three-piece can interior body spray and two-piece can exterior end (spray or roll coat) operations.

Compliance for each coating line shall be determined as follows:

> For any 24-hour period, the total actual VOC emissions shall be calculated from daily units of production records (e.g., number of each type of can, sheet, etc.), application rates of each coating (e.g., gallons/units of production), solvent and solids content of each coating, and control efficiency. This would then be compared to the total allowable emissions for that production mix to verify each coating complied with applicable RACT emission limitations.

On an annual basis, compliance with the VOC emission rate from thermal oxidizers Nos. 1 and 2 shall be determined by EPA Reference Methods 25 or 25A, or any other method approved by the Department. Can Coating Line No. 1 shall comply with the attached Lowest Achievable Emission Rate (LAER) determination. Reporting and recordkeeping requirements shall be as described in 40 CFR 60.495, NSPS for Beverage Can Surface Coating Industry, Subpart WW.

V.2 Air Quality Analysis

From a technical review of the application, the Department has determined that the modification and operation of these sources will not have an adverse/significant impact on Florida's ambient air quality standards.

V.3 Air Toxics Information

Currently, the Department is developing acceptable ambient concentrations for toxic substances. Specifically, sources classified as Category A (carcinogens and highly toxic) and Category B (moderately toxic substances).

In the event toxic emission limits are set during the term of this permit or any subsequent permit which are different than the permitted emissions, the Department may seek modification pursuant to FAC Rule 17-4.08.

VI. CONCLUSION

Based on the review of the data submitted by Anheuser-Busch Companies, Inc., the Florida Department of Environmental Regulation concludes that compliance with all applicable state air quality and federal NSPS for beverage can surface coating industry regulations will be achieved provided certain specific conditions are met. The impact of modifying and operating all can coating lines will not cause or contribute to a violation of any ambient air quality standard.

Note: The construction permits for Can Coating Lines Nos. 2, 3, and 4 (AC 16-50418, -57752, and -57753) will be modified to reflect the changes that have occurred at the Metal Container Corporation's existing facility as a result of the modernization project that began in 1985.

For the sake of consistency, some of the specific conditions for the above mentioned permits will be amended to reflect this purpose. See Specific Condition No. 14. in the attached proposed permit.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

PERMITTEE:
Metal Container Corporation
1100 North Ellis Road
Jacksonville, FL 32205-6257

Permit Number: AC 16-127873
Expiration Date: January 31, 1988
County: Duval County
Latitude/Longitude: 30° 20' 15" N
81° 44' 42" W
Project: Can Coating Line No. 1

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (FAC) Rules 17-2 and 17-4. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawings, plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the construction of Can Coating Line No. 1. This facility will be located at the Metal Container Corporation's existing complex in Jacksonville, Duval County, Florida. The UTM coordinates of the site are zone 17, 428.440 km East and 3356.377 km North.

Attachments:

1. Application to Construct Air Pollution Sources, DER Form 17-1.122(16), dated October 28, 1986.

2. Department's letter dated December 23, 1986.

3. Metal Container Corporation's letter dated January 20, 1987.

4. WAIVER OF 90 DAY TIME LIMIT dated May 21, 1987, with an expiration date of July 31, 1987.

Protecting Florida and Your Quality of Life

PERMITTEE:
Metal Container Corporation

Permit Number: AC 16-127873
Expiration Date: January 31, 1988

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth herein are "Permit Conditions" and as such are binding upon the permittee and enforceable pursuant to the authority of Sections 403.161, 403.727, or 403.859 through 403.861, Florida Statutes. The permittee is hereby placed on notice that the Department will review this permit periodically and may initiate enforceable action for any violation of the "Permit Conditions" by the permittee, its agents, employees, servants or representatives.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action by the Department.

3. As provided in Subsections 403.087(6) and 403.722(5), Florida Statutes, the issuance of this permit does not convey any vested rights or any exclusive privileges. Nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit does not constitute a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgement of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the state. Only the Trustees of the Internal Improvement Trust Fund may express state opinion as to title.

5. This permit does not relieve the permittee from liability for harm or injury to human health or welfare, animal, plant or aquatic life or property and penalties therefore caused by the construction or operation of this permitted source, nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

GENERAL CONDITIONS:

6. The permittee shall at all times properly operate and maintain the facility and system of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with the conditions of this permit, as required by the Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law, access to the premises, at reasonable times, where the permitted activity is located or conducted for the purpose of:

a. Having access to and copying any records that must be kept under the conditions of the permit;

b. Inspecting the facility, equipment, practices, or operations regulated or required under this permit; and,

c. Sampling or monitoring any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time may depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately notify and provide the Department with the following information:

a. a description of and cause of non-compliance; and,

b. the period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.

GENERAL CONDITIONS:

The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or revocation of this permit.

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source, which are submitted to the Department, may be used by the Department as evidence in any enforcement case arising under the Florida Statutes or Department rules, except where such use is proscribed by Sections 403.73 and 403.111, Florida Statutes.

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Florida Administrative Code Rules 17-4.12 and 17-30.30, as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit is required to be kept at the work site of the permitted activity during the entire period of construction or operation.

13. This permit also constitutes:

( ) Determination of Best Available Control Technology (BACT).
( ) Determination of Prevention of Significant Deterioration (PSD).
(x) Compliance with New Source Performance Standards.
(x) Determination of Lowest Achievable Emission Rate (LAER).

14. The Permittee shall comply with the following monitoring and record keeping requirements:

a. Upon request, the permittee shall furnish all records and plans required under Department rules. The retention period for all records will be extended automatically, unless otherwise stipulated by the Department, during the course of any unresolved enforcement action.

GENERAL CONDITIONS:

b. The permittee shall retain at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), copies of all reports required by this permit, and records of all data used to complete the application for this permit. The time period of retention shall be at least three years from the date of the sample, measurement, report or application unless otherwise specified by Department rule.

c. Records of monitoring information shall include:

- the date, exact place, and time of sampling or measurements;
- the person responsible for performing the sampling or measurements;
- the date(s) analyses were performed;
- the person responsible for performing the analyses;
- the analytical techniques or methods used; and,
- the results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be submitted or corrected promptly.

SPECIFIC CONDITIONS:

1. This permit supercedes permit No. AO 16-55208.

SPECIFIC CONDITIONS:

2. Maximum VOC emissions for Can Coating Line No. 1 shall not exceed 0.12 tons/day, 3.48 tons/month, and 41.8 tons per year (LAER Determination). Compliance with this emission rate shall be determined by EPA Reference Methods 25 or 25A, or any other method approved by the Department. Reporting and recordkeeping requirements shall be as described in 40 CFR 60.495, Subpart WW, NSPS for Beverage Can Surface Coating Industry.

3. Can Coating Line No. 1 shall comply with applicable requirements of 40 CFR 60, Subpart WW, NSPS for Beverage Can Surface Coating Industry.

4. The VOC emissions from the following sources (Lines Nos. 2, 3, and 4) shall not exceed the following RACT standards:

A) 2.8 pounds per gallon of coating (0.34 kilograms per liter), excluding water, delivered to the coating applicator of;

(a) Sheet basecoat (exterior and interior) and overvarnish, or

(b) Two-piece can exterior (basecoat and overvarnish) operation.

B) 4.2 pounds per gallon of coating (0.50 kilograms per liter), excluding water delivered to the coating applicator from two- and three-piece can interior body spray and two-piece can exterior end (spray or roll coat) operations.

5. The total permitted emissions for the facility shall not exceed 1.10 tons of VOC per day, 33 tons of VOC per month, and 400.3 tons of VOC per year.

6. Compliance with RACT regulations shall be determined by the procedures described in 45 FR 80824: For any 24-hour period, compliance shall be based on total actual emissions calculated from daily units of production records (number of each type of can, sheet etc), application rates of each coating (gallons/units of production), and solvents and solids content of each coating. This will then be compared to the total allowable emissions for that production mix to verify each coating complied with applicable emission limitations. The pounds of solvent per gallon of coating are be based on a certified analysis of the VOC content of each coating given to the user by the supplier. This analysis must be verifiable by laboratory analyses.

7. The permittee will be required to submit annual reports on the actual operation and emissions of the facility. Quarterly material

SPECIFIC CONDITIONS:

balance reports (24-hour) are required and shall be sent to the Duval County Bio-Environmental Services Division (BESD) office to assess emissions and maintain VOC emissions inventory. The quantity of cans processed during that quarter shall be included in the report. This report shall also include manufacturer's certifications, coating usage records, hours of operation, and test results. EPA Reference Methods 25 or 25A, or any other method approved by the Department, shall be used to verify compliance with the VOC emission rate.

8. This facility shall comply with all the requirements specified in the EPA policy memorandum 40 CFR Part 51, "Compliance with VOC Emission Limitations for Can Coating Operations", Federal Register/Vol 45, No. 237, December 8, 1980/Rules and Regulations (45 FR 80824).

9. According to FAC Rule 17-2.620(1)(a), no person shall store, pump, handle, process, load, unload, or use in any process or installation volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems deemed necessary and ordered by the Department. Currently, there are no control strategies associated with this operation other than crew efficiency to minimize pollutant emissions. The following procedures shall be utilized to minimize pollutant emissions, but shall not be limited to:

- o maintain tightly fitting covers, lids, etc., on all containers of VOC when they are not being handled, tapped, etc.;
- o where possible and practical, procure/fabricate a tightly fitting cover for any open trough, basin, bath, etc., of VOC so that it can be covered when not use;
- o all fittings, valve lines, etc., shall be properly maintained;
- o all VOC spills shall be attended to immediately and the waste properly disposed of, recycled, etc.

10. No objectionable odors are allowed from this facility.

11. The construction shall reasonably conform to the plans and schedule submitted in the application. If the permittee is unable to complete construction on schedule, he must notify the Department in writing 60 days prior to the expiration of the construction permit and submit a new schedule and request for an extension of the construction permit.

12. To obtain a permit to operate, the permittee must demonstrate compliance with the conditions of the construction permit and submit a complete application for an operating permit, including the application fee, along with compliance records, test results, and Certificate of

SPECIFIC CONDITIONS:

Completion, to the BESD 90 days prior to the expiration date of the construction permit. The permittee may continue to operate in compliance with all terms of the construction permit until its expiration date. Operation beyond the construction permit expiration date requires a valid permit to operate.

13. If the construction permit expires prior to the permittee requesting an extension or obtaining a permit to operate, then all activities at the project must cease and the permittee must apply for a new permit to construct which can take up to 90 days to process a complete application.

14. In conjunction with the review of the application to modify Can Coating Line No. 1 (AC 16-127873), the following requests have been approved:

A) Approval of a schedule for start-up and emissions testing of thermal oxidizers No. 1 and No. 2.

B) Approval to begin installation of the necessary ductwork to vent the three basecoater oven exhausts to the existing thermal oxidizers.

In addition, to be consistent with the new construction permit for Can Coating Line No. 1 and pursuant to FAC Rule 17-2.650(1)(f)1., the construction permits for Can Coating Lines Nos. 2, 3, and 4 will be amended as follows:

Permit Nos. AC 16-57752: Can Coating Line No. 3
AC 16-57753: Can Coating Line No. 4

<u>Specific Condition No. 2</u>

From:

The amounts and formulas of each coating and solvent shall be recorded on a daily basis. The formula should include pounds of VOC per gallon of coating, less water, and should be based on a certified analysis of each coating given by the supplier. These records and certifications shall be made available for Department inspection upon request.

SPECIFIC CONDITIONS:

To:

Compliance shall be determined by the procedure described in 45 FR 80824: For any 24-hour period, compliance shall be based on total actual emissions calculated from daily units of production records (number of each type of can, sheet, etc) application rates of each coating (gallons units of production), solvents and solids content of each coating. This would then be compared for that production mix to verify that each coating line complied with applicable emission limitations. The total allowable VOC emissions for the can manufacturing facility shall not exceed 1.1 tons per day, 33 tons per month, and 400.3 tons per year. The pounds of solvent per gallon of coating shall be based on a certified analysis of the VOC content of each coating given to the user by the supplier. This analysis must be verifiable by laboratory analysis. These records and certifications shall be made available upon the Department's request.

Permit No. AC 16-50418: Can Coating Line No. 2

Specific Condition No. 4

From:

Compliance with the emission limitations shall be determined by a material balance of VOC purchased and those reclaimed. The difference shall be presumed to be emitted to the atmosphere. An annual compliance report shall be submitted to the BESD. This report shall contain solvent usage, manufacturer's statement of VOC content, gallons of coating used, and hours of operation.

To:

A)

3. Compliance shall be determined by the procedures described in 45 FR 80824: For any 24-hour period, compliance shall be based on total actual emissions calculated from daily units of production records (number of each type of can, sheet, etc), application rates of each coating (gallons/units of production), solvents and solids content of each coating. This would then be compared to the total allowable emissions for that production mix to verify each coating complied with applicable emission limitations. The total allowable VOC emissions

for the can manufacturing facility shall not exceed 1.1 tons of VOC per day, 33 tons of VOC per month, and 400.3 tons of VOC per year. The pounds of solvent per gallon of coating shall be based on a certified analysis of the VOC content of each coating given to the user by the supplier. This analysis must be verifiable by laboratory analyses.

B)

The permittee will be required to submit annual reports on the actual operation and emission of the facility. Quarterly material balance reports (24-hour) shall be required and sent to the BESD office to assess emissions and maintain VOC inventory. The quantity of cans processed during that quarter shall be included in the report. This report shall also include manufacturer's certifications, coating usage records, hours of operation and test results. EPA Reference Methods 25 or 25A, or any other method approved by the Department, shall be used to verify compliance with the VOC emission rate.

The following conditions shall be added to all permits:

a) This facility shall comply with all the requirements specified in the EPA policy memorandum 40 CFR Part 51, "Compliance with VOC Emission Limitations for Can Coating Operations", Federal Register/Vol 45, No. 237, December 8, 1980/Rules and Regulations (45 FR 80824).

b) This facility shall comply with FAC Rule 17-2.650(1)(f)1., RACT regulations for Can Coating Operations.

c) According to FAC Rule 17-2.620(1)(a), no person shall store, pump, handle, process, load, unload, or use in any process or installation volatile organic compounds or organic solvents without applying known and existing vapor emission control devices or systems deemed necessary and ordered by the Department. The following procedures shall be utilized to minimize pollutant emissions, but shall not be limited to:

SPECIFIC CONDITIONS:

- o maintain tightly fitting covers, lids, etc., on all containers of VOC when they are not being handled, tapped, etc.;
- o where possible and practical, procure/fabricate a tightly fitting cover for any open trough, basin, bath, etc., of VOC so that it can be covered when not use;
- o all fittings, valve lines, etc., shall be properly maintained;
- o all VOC spills shall be attended to immediately and the waste properly disposed of, recycled, etc.

8. No objectionable odors are allowed for this facility.

Issued this_____day of_____, 19___

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL REGULATION

____
Dale Twachtmann, Secretary

____ **pages attached**

Lowest Achievable Emission Rate (LAER) Determination
Metal Container Corporation
Duval County

The applicant has submitted a request to reinstate can line No. 1 from a standby to a full-time basis, with the line speed being increased to 1,000 cans per minute. The can line, which will apply the coatings to beer and soft drink cans, is scheduled to operate continuously 8,760 hours per year.

The Metal Container Corporation is located in Duval County, which is currently designated nonattainment for the pollutant ozone, Rule 17-2.410(1), FAC. The proposed reinstatement of can line No. 1 will result in an increase of 42.5 tons of volatile organic compounds (VOCs) per year. VOCs are considered to be precursors to ozone, thus the modification of can line No. 1 is subject to a LAER determination as set forth in Rule 17-2.510, FAC, New Source Review (NSR) for nonattainment areas. In accordance with the provisions of the NSR rule for nonattainment areas, the overvarnish and bottom varnish operations from three existing lines will be ducted to thermal oxidizers to provide an offset of 45.7 tons of VOCs per year.

Date of Receipt of LAER Application:

January 21, 1987

Review Group Members

This determination was based upon comments received from the Stationary Source Control Section.

LAER Determination by DER:

Pollutant	Emission Limit
Ozone (VOC)	Emissions limited by using a combination of low solvent water-borne coatings* and catalytic oxidation of emitted VOC vapors.

*VOC content of solvents shall be limited to the following:

White Basecoat - 1.77 lbs VOC/gal - H_2O
Bottom Varnish - 1.92 lbs VOC/gal - H_2O
Over Varnish - 2.29 lbs VOC/gal - H_2O
Inside Spray - 3.62 lbs VOC/gal - H_2O

LAER Determination Rationale:

The procedure for determining LAER is set forth in Rule 17-2.640, FAC. In accordance with this procedure, the determination of LAER shall not allow the modified source to emit any affected pollutant in excess of the amount allowable under any applicable Environmental Protection Agency Standard of Performance for New Stationary Sources (NSPS) promulgated pursuant to 40 CFR Part 60.

The coating of beverage cans is regulated under Subpart WW of NSPS. In accordance with this regulation, VOC emissions are limited to 0.29 kilogram per liter of coating solids for exterior base coating operations, 0.46 kilogram per liter of coating solids for overvarnish coating operations, and 0.89 kilogram per liter of coating solids for inside spray coating operations. The applicant has indicated that the VOC emissions for the exterior base coating, overvarnish coating, and the inside spray coating operations are 0.28, 0.40, and 0.88 kilograms per liter of coating solids, respectively. These emission rates are less than the specified NSPS limitations and are thereby consistent with the LAER determination guidelines.

In addition to ensuring compliance with applicable NSPS, the Department, when preparing a LAER determination, shall give consideration to and make a determination that reflects: 1) information published by the USEPA including the BACT/LAER Clearinghouse, 2) the most stringent emission limitation which is contained in the implementation plan of any state, 3) the most stringent emission limitation which is achieved in practice, and 4) all scientific engineering, technical material, or other relevant information available to the Department.

The latest (May 1986) BACT/LAER Clearinghouse summary lists data for four facilities with can coating operations. Of the facilities listed, two of the listings had LAER determinations in which LAER was determined to be a 95% efficient thermal incinerator. One of these two facilities consisted of a 1,000 cans per minute line which is identical in throughput to the line proposed for this facility in Jacksonville. The LAER determination for the 1,000 cans per minute line listed in the BACT/LAER Clearinghouse had listed the VOC emissions as being 26.0 tons per year. The estimated emissions of the Jacksonville facility with the proposed LAER are 41.8 tons of VOCs per year, which would suggest that LAER is not being applied when compared to the facility with lower emission rate.

It is important to note, however, that the emission rate from the facility in Jacksonville has included the emissions for clean-up solvents, and the line will be coating 16 ounce cans instead of the smaller 12 ounce cans coated at the other facility. When these differences are taken into account, the LAER proposed for the Jacksonville facility is consistent with the LAER determinations for facilities permitted prior to this time.

The literature research indicates that the use of low solvent coatings in conjunction with thermal incineration of the VOC emissions represents LAER. The Department thereby agrees that the VOC emission limiting strategies for the No. 1 can coating line, as proposed by the applicant, is LAER.

Details of the Analysis may be Obtained by Contacting:

Barry Andrews, P.E., BACT Coordinator
Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended by:

C. H. Fancy, P.E., Deputy Chief, BAQM

Date:

Approved by:

Dale Twachtmann, Secretary

Date:

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STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

DER
MAY 22 1987
BAQM

WAIVER OF 90 DAY TIME LIMIT
UNDER SECTIONS 120.60(2) AND 403.0876, FLORIDA STATUTES

License (Permit, Certification) Application No. AC16-127873

Applicant's Name: Metal Container Corporation

The undersigned has read Sections 120.60(2) and 403.0876, Florida Statutes, and fully understands the applicant's rights under that section.

With regard to the above reference license (permit, certification) application, the applicant hereby with full knowledge and understanding of (his) (her) (its) rights under Sections 120.60(2) and 403.0876, Florida Statutes, waives the right under Sections 120.60(2) and 403.0876, Florida Statutes, to have the application approved or denied by the State of Florida Department of Environmental Regulation within the 90 day time period prescribed in Sections 120.60(2) and 403.0876, Florida Statutes. Said waiver is made freely and voluntarily by the applicant, is in (his) (her) (its) self-interest, and without any pressure or coercion by anyone employed by the State of Florida Department of Environmental Regulation.

This waiver shall expire on the 31 day of July 19 87.

The undersigned is authorized to make this waiver on behalf of the applicant.

Robert M. Lanham
Signature

Robert M. Lanham
Please Type Name of Signee

May 21, 1987
Date

Sworn to and subscribed
before me this _____ day
of _____________ 19___.

DER Form 17-1.201(8)
Effective November 30, 1982

5/21/87

Teresa Heron,

per your request.

Bob Yauhan

DER
MAY 22 1987
BAQM

Section 120.60, Florida Statutes

(2) When an application for a license is made as required by law, the agency shall conduct the proceedings required with reasonable dispatch and with due regard to the rights and privileges of all affected parties or aggrieved persons. Within 30 days after receipt of an application for a license, the agency shall examine the application, notify the applicant of any apparent errors or omissions, and request any additional information the agency is permitted by law to require. Failure to correct an error or omission or to supply additional information shall not be grounds for denial of the license unless the agency timely notified the applicant within this 30 day period. The agency shall notify the applicant if the activity for which he seeks a license is exempt from the licensing requirement and return any tendered application fee within 30 days after receipt of the original application or within 10 days after receipt of the timely requested additional information or correction of errors or omissions. Every application for license shall be approved or denied within 90 days after receipt of the original application or receipt of the timely requested additional information or correction of errors or omissions unless a shorter period of time for agency action is provided by law. The 90-day or shorter time period shall be tolled by the initiation of a proceeding under Section 120.57 and shall resume 10 days after the recommended order is submitted to the agency and the parties. Any application for a license not approved or denied within the 90-day period or shorter time period, within 15 days after conclusion of a public hearing held on the application, or within 45 days after the recommended order is submitted to the agency and the parties, whichever is latest, shall be deemed approved and, subject to the satisfactory completion of an examination, if required as prerequisite to licensure, the license shall be issued. The Public Service Commission, when issuing a license, and any other agency, if specifically exempted by law, shall be exempt from the time limitations within this subsection. Each agency, upon issuing or denying a license, shall state with particularity the grounds or basis for the issuance or denial of same, except where issuance is a ministerial act. On denial of a license application on which there has been no hearing, the denying agency shall inform the applicant of any right to a hearing pursuant to Section 120.57.

Section 403.0876, Florida Statutes

Permits; processing. ---Within 30 days after receipt of an application for a permit under this chapter, the department shall review the application and shall request submittal of all additional information the department is permitted by law to require. If the applicant believes any departmental request for additional information is not authorized by law or departmental rule, the applicant may request a hearing pursuant to s. 120.57. Within 30 days after receipt of such additional information, the department shall review it and may request only that information needed to clarify such additional information or to answer new questions raised by or directly related to such additional information. If the applicant believes the request of the department for such additional information is not authorized by law or departmental rule, the department, at the aplicant's request, shall proceed to process the permit application. Permits shall be approved or denied within 90 days after receipt of the original application, the last item of timely requested additional material, or the applicant's written request to begin processing the permit application.

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Tallahassee, FL

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ZIP CODE: 32301

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DEPARTMENT OF ENVIRONMENTAL REGULATION

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TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

DER
MAY 11 1987
BAQM

WAIVER OF 90 DAY TIME LIMIT
UNDER SECTIONS 120.60(2) AND 403.0876, FLORIDA STATUTES

License (Permit, Certification) Application No. AC16-127873

Applicant's Name: Metal Container Corporation

The undersigned has read Sections 120.60(2) and 403.0876, Florida Statutes, and fully understands the applicant's rights under that section.

With regard to the above reference license (permit, certification) application, the applicant hereby with full knowledge and understanding of (his) (her) (its) rights under Sections 120.60(2) and 403.0876, Florida Statutes, waives the right under Sections 120.60(2) and 403.0876, Florida Statutes, to have the application approved or denied by the State of Florida Department of Environmental Regulation within the 90 day time period prescribed in Sections 120.60(2) and 403.0876, Florida Statutes. Said waiver is made freely and voluntarily by the applicant, is in (his) (her) (its) self-interest, and without any pressure or coercion by anyone employed by the State of Florida Department of Environmental Regulation.

This waiver shall expire on the 30 day of June 1987.

The undersigned is authorized to make this waiver on behalf of the applicant.

Signature

John V. Stier
Please Type Name of Signee

May 6, 1987
Date

Sworn to and subscribed
before me this ____ day
of __________ 19___.

copied:
Teresa Heron
Clair/Bill } 5-11-87 Bom

5-11-87

Claire,

[redacted],

FYI.

Section 120.60, Florida Statutes

(2) When an application for a license is made as required by law, the agency shall conduct the proceedings required with reasonable dispatch and with due regard to the rights and privileges of all affected parties or aggrieved persons. Within 30 days after receipt of an application for a license, the agency shall examine the application, notify the applicant of any apparent errors or omissions, and request any additional information the agency is permitted by law to require. Failure to correct an error or omission or to supply additional information shall not be grounds for denial of the license unless the agency timely notified the applicant within this 30 day period. The agency shall notify the applicant if the activity for which he seeks a license is exempt from the licensing requirement and return any tendered application fee within 30 days after receipt of the original application or within 10 days after receipt of the timely requested additional information or correction of errors or omissions. Every application for license shall be approved or denied within 90 days after receipt of the original application or receipt of the timely requested additional information or correction of errors or omissions unless a shorter period of time for agency action is provided by law. The 90-day or shorter time period shall be tolled by the initiation of a proceeding under Section 120.57 and shall resume 10 days after the recommended order is submitted to the agency and the parties. Any application for a license not approved or denied within the 90-day period or shorter time period, within 15 days after conclusion of a public hearing held on the application, or within 45 days after the recommended order is submitted to the agency and the parties, whichever is latest, shall be deemed approved and, subject to the satisfactory completion of an examination, if required as prerequisite to licensure, the license shall be issued. The Public Service Commission, when issuing a license, and any other agency, if specifically exempted by law, shall be exempt from the time limitations within this subsection. Each agency, upon issuing or denying a license, shall state with particularity the grounds or basis for the issuance or denial of same, except where issuance is a ministerial act. On denial of a license application on which there has been no hearing, the denying agency shall inform the applicant of any right to a hearing pursuant to Section 120.57.

Section 403.0876, Florida Statutes

Permits; processing. ---Within 30 days after receipt of an application for a permit under this chapter, the department shall review the application and shall request submittal of all additional information the department is permitted by law to require. If the applicant believes any departmental request for additional information is not authorized by law or departmental rule, the applicant may request a hearing pursuant to s. 120.57. Within 30 days after receipt of such additional information, the department shall review it and may request only that information needed to clarify such additional information or to answer new questions raised by or directly related to such additional information. If the applicant believes the request of the department for such additional information is not authorized by law or departmental rule, the department, at the aplicant's request, shall proceed to process the permit application. Permits shall be approved or denied within 90 days after receipt of the original application, the last item of timely requested additional material, or the applicant's written request to begin processing the permit application.

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From the desk of J. V. Stier

5/6/87

Teresa –

As requested,

John Stier

DER
MAY 11 1987
BAQM

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4-24-87
Jax, FL

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CITY OF JACKSONVILLE, FLORIDA

DEPARTMENT OF HEALTH, WELFARE
& BIO-ENVIRONMENTAL SERVICES
Bio-Environmental Services Division
Air and Water Pollution Control

April 22, 1987

DER
APR 27 1987
BAQM

Mr. John V. Stier
Manager, Environmental Affairs
Anheuser-Busch Company
St. Louis, MO 63118-1852

Re: VOC Testing (EPA Reference Method 25)
Metal Container Corporation (Jacksonville, Florida)
Thermal Oxidizer No. 2
Production Line Nos. 2, 3, and 4
Test Dates: January 23 and 24, 1987

Dear Mr. Stier:

This is to acknowledge receipt of the above captioned test report, submitted on March 24, 1987.

In conjunction with associated audit gases procured through this agency and Research Triangle Institute, the data generated by this testing program appears to be accurate and representative. No technical deficiencies were noted during the field testing or the analytical portion as reported.

Although not mentioned in the report, it should be noted that the destruction efficiencies presented in Table 2-1 were attained while the thermal oxidizer was operating at a set point of 1250°F. It cannot be assumed that lower temperatures would yield similar results.

If there are any questions pertaining to this test review, please contact the undersigned at (904) 630-3210.

Very truly yours,

Alan J. Luther
Pollution Control Specialist

cc: Mr. Bill Stewart, P.E., DER
BESD File 1060 B
Mr. Clair H. Fancy, P.E., DER Tall.
Mr. Robert Lanham, Anh.-Busch (St. Louis)
Mr. Robert Lasky, Metal Container

AJL/bgm

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STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

DER
APR 13 1987
BAQM

WAIVER OF 90 DAY TIME LIMIT
UNDER SECTIONS 120.60(2) AND 403.0876, FLORIDA STATUTES

License (Permit, Certification) Application No. AC16-127873

Applicant's Name: Metal Container Corporation

The undersigned has read Sections 120.60(2) and 403.0876, Florida Statutes, and fully understands the applicant's rights under that section.

With regard to the above reference license (permit, certification) application, the applicant hereby with full knowledge and understanding of (his) (her) (its) rights under Sections 120.60(2) and 403.0876, Florida Statutes, waives the right under Sections 120.60(2) and 403.0876, Florida Statutes, to have the application approved or denied by the State of Florida Department of Environmental Regulation within the 90 day time period prescribed in Sections 120.60(2) and 403.0876, Florida Statutes. Said waiver is made freely and voluntarily by the applicant, is in (his) (her) (its) self-interest, and without any pressure or coercion by anyone employed by the State of Florida Department of Environmental Regulation.

This waiver shall expire on the 30 day of May 1987.

The undersigned is authorized to make this waiver on behalf of the applicant.

Signature

John V. Stier
Please Type Name of Signee

March 30, 1987
Date

Sworn to and subscribed
before me this ____ day
of ____________ 19___.

cc: J. Woosley, BESD 4-13-87

BUD LIGHT
BEER

From the desk of J.V. Stier

DER
APR 13 1987
BAQM

4/10/87

Teresa —

As requested,

John St

Bring out your best.

Section 120.60, Florida Statutes

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Section 403.0876, Florida Statutes

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Dept. of Envir. Regulation
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0251-6211

CA/AWB/9/85

Craig
Here it is.
Finally, and corrected.
Bruce

4-13-87

PS Form 3811, July 1983 447-845

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Mr. John Steir
Anheuser-Busch Companies, Inc.
202-4, One Busch Place
St. Louis, MO. 63118-1852

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6. Signature – Agent
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4/10/87
Metal Container Corporation-
Jacksonville
Modernization Program

PS Form 3800, Feb. 1982

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STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

April 10, 1987

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. John Stier
Manager, Environmental Affairs
Anheuser-Busch Companies, Inc.
202-4, One Busch Place
St. Louis, Missouri 63118-1852

Re: Metal Container Corporation - Jacksonville
Modernization Program

Dear Mr. Stier:

The department has received your March 24, 1987 letter which requested an extension of the approved April 1, 1987, schedule.

This request is acceptable. Additional test data for this source must be forwarded to the Bio-Environmental Services Division on or before October 1, 1987.

If you have any questions, please call me at (904)488-1344.

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/TH/s

cc: K. Mehta
J. Costas, Esq.

PM
4-1-87
St. Louis, MO

ANHEUSER-BUSCH COMPANIES

March 31, 1987

Mr. William Thomas
Department of Environmental Regulation
Bureau of Air Quality Management
2600 Blair Stone Road
Tallahassee, Florida 32301

WAIVER OF 90 DAY TIME LIMITS

Dear Bill:

Attached are the signed waivers of the 90 day time limit as requested. Please let me know if I can provide any additional information.

Sincerely,

ANHEUSER-BUSCH COMPANIES, INCORPORATED

John V. Stier
Manager, Environmental Affairs

JVS:pm
Attachments

JS331873

Re: AC 16-127873 [MCC] to 5/30/87
AC 16-119131 [A-B, Inc] to 4/30/87
-119132

cc: Khurshid Mehta (BESD) 4-6-87 AAm

DER
APR 6 1987
BAQM

Anheuser-Busch Companies, Inc
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

BEST AVAILABLE COPY

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

WAIVER OF 90 DAY TIME LIMIT
UNDER SECTIONS 120.60(2) AND 403.0876, FLORIDA STATUTES

License (Permit, Certification) Application No. AC16-12873 7

Applicant's Name: Metal Container Corporation

The undersigned has read Sections 120.60(2) and 403.0876, Florida Statutes, and fully understands the applicant's rights under that section.

With regard to the above reference license (permit, certification) application, the applicant hereby with full knowledge and understanding of (his) (her) (its) rights under Sections 120.60(2) and 403.0876, Florida Statutes, waives the right under Sections 120.60(2) and 403.0876, Florida Statutes, to have the application approved or denied by the State of Florida Department of Environmental Regulation within the 90 day time period prescribed in Sections 120.60(2) and 403.0876, Florida Statutes. Said waiver is made freely and voluntarily by the applicant, is in (his) (her) (its) self-interest, and without any pressure or coercion by anyone employed by the State of Florida Department of Environmental Regulation.

This waiver shall expire on the 30 day of May 19 87.

The undersigned is authorized to make this waiver on behalf of the applicant.

Signature

John V. Stier
Please Type Name of Signee

March 30, 1987
Date

Sworn to and subscribed
before me this ____ day
of ____________ 19___.

DER Form 17-1.201(8)
Effective November 30, 1982

Section 120.60, Florida Statutes

(2) When an application for a license is made as required by law, the agency shall conduct the proceedings required with reasonable dispatch and with due regard to the rights and privileges of all affected parties or aggrieved persons. Within 30 days after receipt of an application for a license, the agency shall examine the application, notify the applicant of any apparent errors or omissions, and request any additional information the agency is permitted by law to require. Failure to correct an error or omission or to supply additional information shall not be grounds for denial of the license unless the agency timely notified the applicant within this 30 day period. The agency shall notify the applicant if the activity for which he seeks a license is exempt from the licensing requirement and return any tendered application fee within 30 days after receipt of the original application or within 10 days after receipt of the timely requested additional information or correction of errors or omissions. Every application for license shall be approved or denied within 90 days after receipt of the original application or receipt of the timely requested additional information or correction of errors or omissions unless a shorter period of time for agency action is provided by law. The 90-day or shorter time period shall be tolled by the initiation of a proceeding under Section 120.57 and shall resume 10 days after the recommended order is submitted to the agency and the parties. Any application for a license not approved or denied within the 90-day period or shorter time period, within 15 days after conclusion of a public hearing held on the application, or within 45 days after the recommended order is submitted to the agency and the parties, whichever is latest, shall be deemed approved and, subject to the satisfactory completion of an examination, if required as prerequisite to licensure, the license shall be issued. The Public Service Commission, when issuing a license, and any other agency, if specifically exempted by law, shall be exempt from the time limitations within this subsection. Each agency, upon issuing or denying a license, shall state with particularity the grounds or basis for the issuance or denial of same, except where issuance is a ministerial act. On denial of a license application on which there has been no hearing, the denying agency shall inform the applicant of any right to a hearing pursuant to Section 120.57.

Section 403.0876, Florida Statutes

Permits; processing. ---Within 30 days after receipt of an application for a permit under this chapter, the department shall review the application and shall request submittal of all additional information the department is permitted by law to require. If the applicant believes any departmental request for additional information is not authorized by law or departmental rule, the applicant may request a hearing pursuant to s. 120.57. Within 30 days after receipt of such additional information, the department shall review it and may request only that information needed to clarify such additional information or to answer new questions raised by or directly related to such additional information. If the applicant believes the request of the department for such additional information is not authorized by law or departmental rule, the department, at the aplicant's request, shall proceed to process the permit application. Permits shall be approved or denied within 90 days after receipt of the original application, the last item of timely requested additional material, or the applicant's written request to begin processing the permit application.

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SHIPPER'S REFERENCE 164-1907-162

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ONE BUSCH PLACE
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Ms. Teresa [illegible]aron
Dept. of Envir. REgulation
2600 Blairstone Road
Tallahassee, Florida

DER
APR 6 1987
BAQM

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ANHEUSER-BUSCH COMPANIES

March 27, 1987

DER
MAR 30 1987
BAQM

Mr. William Thomas
Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

**METAL CONTAINER CORPORATION (MCC) - JACKSONVILLE
MODERNIZATION PROGRAM**

Dear Bill:

Based upon your verbal concurrence with the March 24, 1987 construction permit extension request and schedule, MCC will continue its efforts to design and install the ductwork necessary to vent the three basecoater oven exhausts to the existing thermal oxidizers. We will continue to work closely with the Jacksonville Bio-Environmental Services Division on the review of the existing test report and the additional test program planned for mid-August.

Sincerely,

ANHEUSER-BUSCH COMPANIES, INCORPORATED

John V. Stier
Manager, Environmental Affairs

JVS:pm

cc; Mr. Kurshid Mehta - BESD
Mr. Joe Cummings - MCC (Jacksonville)

JS32787

3-31-87
Bill T has
the draft preliminary
determination.
A waiver of 60
days was sent to
the Company.
(until MAY 31, 87)

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

PM
3-24-87
St. Louis, MO.

Worldwide Express
A 94415366

Original Copy

ANHEUSER-BUSCH COMPANIES

March 24, 1987

EXPRESS

Mr. William Thomas
Bureau of Air Quality Management
State of Florida
Dept. of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32301

DER
MAR 25 1987
BAQM

Dear Bill:

Metal Container Corporation - Jacksonville
Modernization Program

Attached is a draft copy of the VOC emission testing results for destruction and capture efficiencies at production lines 2, 3 and 4 at the Metal Container Corporation (MCC) facility in Jacksonville. The results indicate much higher capture efficiencies (91.8% average) than projected in the permit applications (50%). These tests were performed on January 23-24, 1987.

As discussed in my February 6, 1987, letter to Clair Fancy, in order to assure MCC can maintain compliance with the federal New Source Performance Standards (NSPS) for white basecoat, MCC requested the Department's approval to begin engineering and installation of the necessary ductwork to vent the three basecoater oven exhausts to the existing thermal oxidizers. This approval was obtained on March 4, 1987.

The engineering for the ductwork changes is dependent upon the capture efficiency estimates generated by the January 23-24 emissions tests. Based upon these results, decisions must be made as to which of the nine exhaust stacks must be ducted to the thermal oxidizers in order to meet the equivalent NSPS level. Unfortunately, the test report from Entropy was just received by MCC on March 18, 1987. Final engineering on the ductwork changes was initiated this week. Based upon these delays, I must once again request an extension of the April 1, 1987, deadline for submittal of additional test results on the basecoating process and the certificates for completion of construction of the modernization program.

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

Your approval of the following schedule is requested:

Date	Activity
April 15, 1987	Provide comments on draft test report to Entropy.
May 1, 1987	Final test report issuance.
May 15, 1987	Completion of final engineering design.
June 1, 1987	Final equipment fabrication and procurement.
June 15, 1987	Bid on installation of temperature recording devices for the thermal oxidizers.
July 1, 1987	Completion of ductwork installation for basecoaters No. 3 and 4.
July 15, 1987	Installation of temperature recording devices for the thermal oxidizers.
August 1, 1987	Completion of ductwork installation for basecoater No. 2.
August 15, 1987	Performance testing for capture and destruction efficiencies.
October 1, 1987	Submittal of performance tests and completion of construction certificates to Jacksonville BESD.

I again apologize for the additional extension request, but the delay in obtaining the draft Entropy report, mainly due to difficulties in obtaining "confidential" information from the coating and ink manufacturers, was unavoidable. MCC is encouraged by the high capture efficiencies suggested in the draft submittal and will be working with the Jacksonville BESD to finalize the report.

I will contact you on Wednesday, March 25, to get your verbal concurrence with the proposed schedule. Please let me know if I can provide any additional information.

Very truly yours,

J. V. Stier /smd

J. V. Stier
Manager - Environmental Affairs

JVS:cmh
enc.

cc Messrs. Kurshid Mehta - BESD
J. F. Cummings - MCC, Jacksonville

Rec'd 3/25/87

ENTROPY
ENVIRONMENTALISTS INC.

POST OFFICE BOX 12291
RESEARCH TRIANGLE PARK
NORTH CAROLINA 27709-2291
919-781-3550

STATIONARY SOURCE SAMPLING REPORT

EEI REF. NO. 5408B

METAL CONTAINER CORPORATION
JACKSONVILLE, FLORIDA

VOC EMISSIONS TESTING FOR DREs AND PROCESS CAPTURE EFFICIENCY

Thermal Oxidizer 2
Production Lines 2, 3, AND 4

Performed for: Anheuser-Busch Companies

JANUARY 23 AND 24, 1987

REPORT CERTIFICATION

The sampling and analysis performed for this report was carried out under my direction and supervision.

Date March 16, 1987 Signature

James N. Carroll

I have reviewed all testing details and results in this test report and hereby certify that the test report is authentic and accurate.

Date March 16, 1987 Signature

Walter S. Smith, P.E.

TABLE OF CONTENTS

INTRODUCTION

1.1 Background. Metal Container Corp. in Jacksonville, Florida operates a can coating process. A thermal oxidizer (incinerator) is used to control the volatile organic compounds (VOC) emissions from the process. For the test program, Metal Container Corp. was required to demonstrate the VOC destruction and removal efficiencies (DREs) of the thermal oxidizer and VOC capture efficiency for the printer over varnish bottom varnish (POBV) ovens.

1.2 Outline of Test Program. Stationary source sampling was performed on January 23 and 24, 1987 for VOC emissions. Testing was performed concurrently at the thermal oxidizer 2 stack and POBV ovens 2, 3, and 4 outlet (thermal oxidizer inlet). VOC emissions testing was also performed at the POBV stacks for engineering purposes. The VOC emissions are expressed as total gaseous nonmethane organics (TGNMO) as carbon.

The capture efficiency of the ovens was determined by measuring the TGNMO as carbon emission rates (lb/hr) at the ovens outlet and by quantifying the amount of carbon (lb/hr) in the solvents used. The coating/solvent usage rates were calculated by Entropy from data supplied by Metal Container Corp. and the coating manufacturers.

1.3 Test Participants. Table 1-2 lists the personnel present during the test program.

TABLE 1-2
TEST PARTICIPANTS

Metal Container Corporation	Robert J. Laskey, C.P.E Test Coordinator
Anheuser-Busch Companies	Robert M. Lanham Corporate Observer
Florida Department of Environmental Regulation	Alan J. Luther Test Observer
	Wm. A. Gaston III Test Observer
	Wayne L. Walker Test Observer
Entropy Inc.	James N. Carroll Project Supervisor
	Kent G. Daeke Sampling Team Leader
	Brent Hall Sampling Team Leader
	Stephen S. Helms Sampling Team Leader
	Willis S. Nesbit Sampling Team Leader

SUMMARY OF RESULTS

2.1 Presentation. Table 2-1 presents the TGNMO as carbon DREs for Thermal Oxidizer 2 and the capture efficiency for the POBV ovens. Table 2-2 presents a summary of the TGNMO as carbon emission results on a run-by-run basis for all test locations. Detailed test results are given in Appendix A, with field and analytical data given in Appendix B.

2.2 EPA Audit. Entropy was supplied with two EPA audit samples labeled BAL 1396 and BAL 1744. The analytical results for the two samples were 1,846 and 118 parts per million of carbon, respectively. The results were reported to the Florida Department of Environmental Regulation and were within specifications.

TABLE 2-1

DREs AND CAPTURE EFFICIENCIES

	- - - - - TEST SET	- - - - -	- - - - -	
	1	2	3	Average
Run Date	1/23/87	1/23/87	1/24/87	---
Thermal Oxidizer 2				
Emission Rate, Lbs/Hr as Carbon				
Inlet*	13.5	13.9	10.5	12.6
Stack	0.908	0.782	1.26	0.983
Destruction Efficiency, %	93.3	94.4	88.0	91.9
POBV 2, 3, 4 Ovens				
Solvent Rate, Lbs/Hr as Carbon				
Ovens Outlet*	13.5	13.9	10.5	12.6
POBVs usage**	14.48	12.16	14.53	13.72
Capture Efficiency, %	93.2	114.3	72.3	91.8

* Same test location and data
** Calculations in appendix C

TABLE 2-2

TGNMO AS CARBON TESTS SUMMARY OF RESULTS

	TEST SET		
	1	2	3
Run Date	1/23/87	1/23/87	1/24/87
Thermal Oxidizer 2 Stack			
Gas Flow Rate, Dry SCFM*	7,356	7,497	7,321
Concentration, ppmv Dry	66.0	55.8	92.1
Emission Rate, Lbs/Hr	0.908	0.782	1.26
Thermal Oxidizer 2 Inlet			
Gas Flow Rate, Dry SCFM*	6,301	7,014	6,053
Concentration, ppmv Dry	1,142	1,056	928
Emission Rate, Lbs/Hr	13.5	13.9	10.5
POBV 2 Stack			
Gas Flow Rate, Dry SCFM*	1,381	1,346	1,176
Concentration, ppmv Dry	87.8	128.0	69.7
Emission Rate, Lbs/Hr	0.227	0.322	0.153
POBV 3 Stack			
Gas Flow Rate, Dry SCFM*	1,036	956	1,025
Concentration, ppmv Dry	232	550	103
Emission Rate, Lbs/Hr	0.450	0.984	0.198
POBV 4 Stack			
Gas Flow Rate, Dry SCFM*	1,174	1,213	1,150
Concentration, ppmv Dry	110	99.0	163
Emission Rate, Lbs/Hr	0.243	0.224	0.351

* 68 degrees F., 29.92 in. Hg

PROCESS DESCRIPTION AND OPERATION

3.1 General. Metal Container Corp. uses three production lines to coat and ink cans. The cans are baked in ovens after being sprayed to cure the coatings. The volatiles driven off in the ovens are incinerated in a thermal oxidizer to control VOC emissions.

3.2 Source Air Flow. Figure 3-1 is a process schematic showing test locations for production lines 2, 3, and 4.

3.3 Operation During Testing. Table 3-1 presents the carbon content of the solvents used and the number of cans processed during the testing. Detailed coating/solvent calculations and data are presented in Appendix C.

TABLE 3-1
PROCESS DATA

	----- TEST SET	-----	-----
	1	2	3
Run Date	1/23/87	1/23/87	1/24/87
LINE 2			
Number of Cans	25,231	45,880	44,619
Carbon in Coatings, Lbs/Hr	2.711	3.671	3.544
LINE 3			
Number of Cans	34,028	39,113	63,163
Carbon in Coatings, Lbs/Hr	6.076	1.960	6.717
LINE 4			
Number of Cans	34,583	74,098	57,156
Carbon in Coatings, Lbs/Hr	5.697	6.524	4.265
Totals			
Number of Cans	93,842	159,091	164,938
Carbon in Coatings, Lbs/Hr	14.48	12.16	14.53

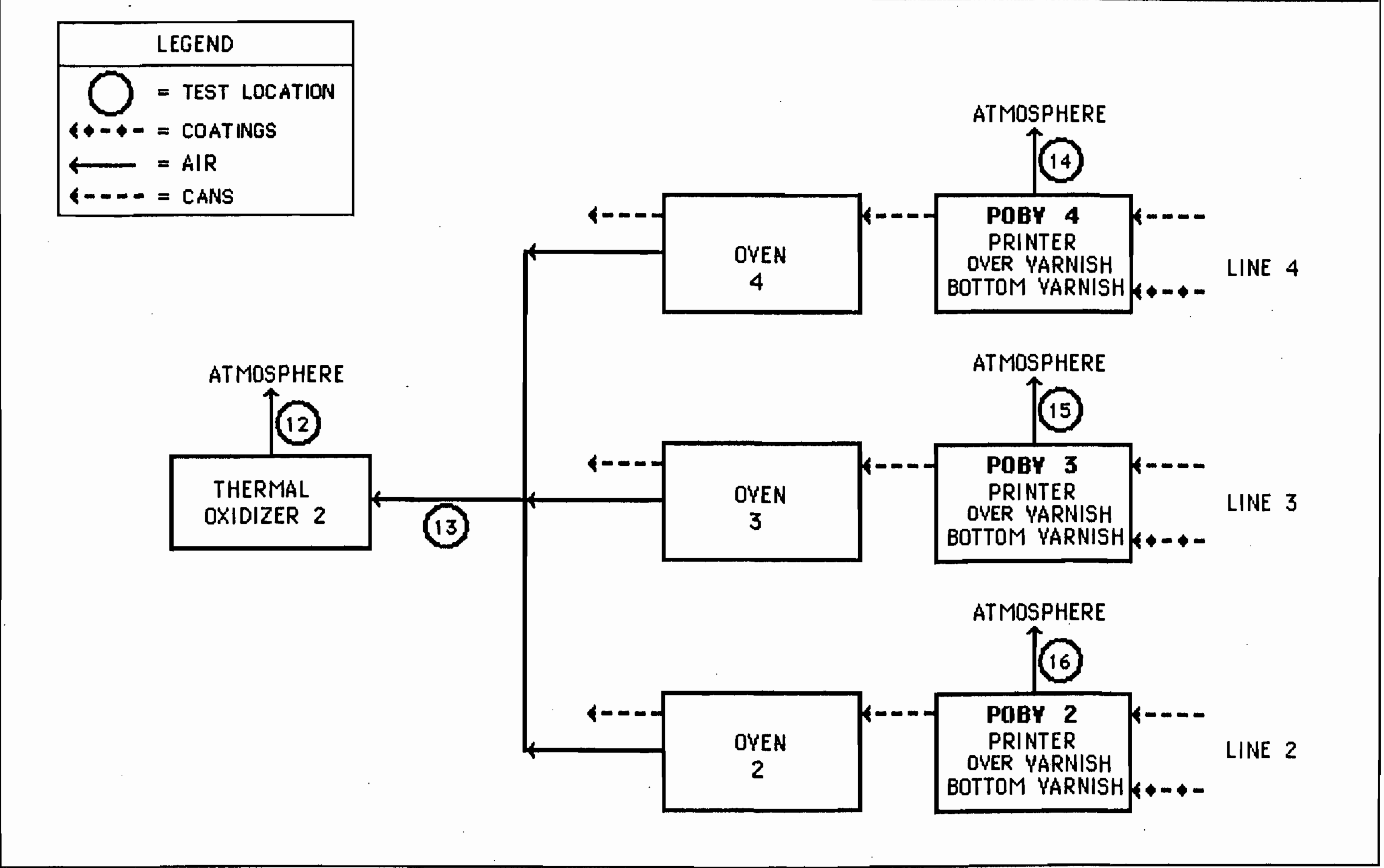


FIGURE 3-1. PRODUCTION LINES 2, 3, AND 4 SCHEMATIC SHOWING TEST LOCATIONS

SAMPLING AND ANALYTICAL PROCEDURES

4.1 General. All sampling and analytical procedures were those recommended by the United States Environmental Protection Agency and the Florida Department of Environmental Regulation. Descriptions of the sampling equipment and procedures (extracted from 40 CFR 60) are provided in Appendix E.

4.2 Traverse Points. The number and location of the traverse points were determined according to EPA Method 1. The stack and duct cross sections were divided into 16 equal areas with eight traverse points on each of two axes, as shown in Figures 4-1, 4-2, and 4-3.

4.3 Volumetric Air Flow Rates

4.3.1 Flue Gas Velocity. EPA Method 2 was used to take the velocity measurements during the traverses of the stack and duct cross sections.

4.3.2 Flue Gas Composition. Multipoint, integrated flue gas samples were collected and analyzed using EPA Method 3 to determine the flue gas composition and molecular weight at the thermal oxidizer stack. Ambient air values were assumed at the POBV stacks and thermal oxidizer inlet. A Fyrite analyzer was used to confirm the absence of carbon dioxide at the thermal oxidizer inlet.

4.3.3 Flue Gas Moisture. The moisture content of the flue gases at the thermal oxidizer stack was determined according to the procedures outlined in EPA Method 4. The moisture content at the thermal oxidizer inlet and POBV stacks was approximated using the wet bulb/dry bulb technique mentioned in EPA Method 4.

4.4 TGNMO as Carbon. EPA Method 25 was used to determine the TGNMO as carbon emissions; analysis was performed using a Byron 401 analyzer. The duration of each run was 60 minutes.

4.5 Sampling Equipment. All sampling equipment was manufactured by Byron Instruments, Nutech Corporation, or Entropy. Pertinent calibration data are provided in Appendix D.

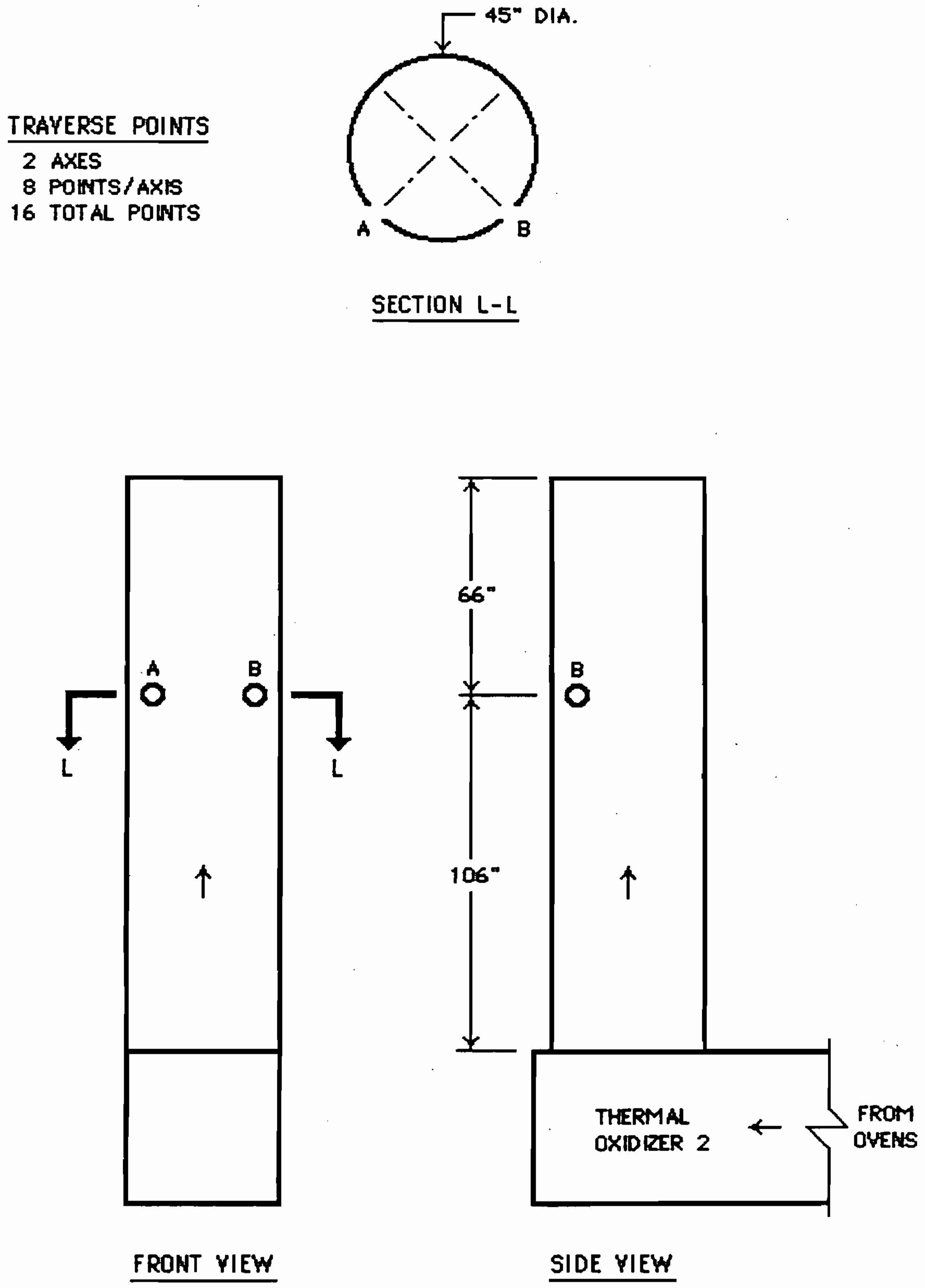


FIGURE 4-1. THERMAL OXIDIZER 2 STACK (TEST LOCATION 12)

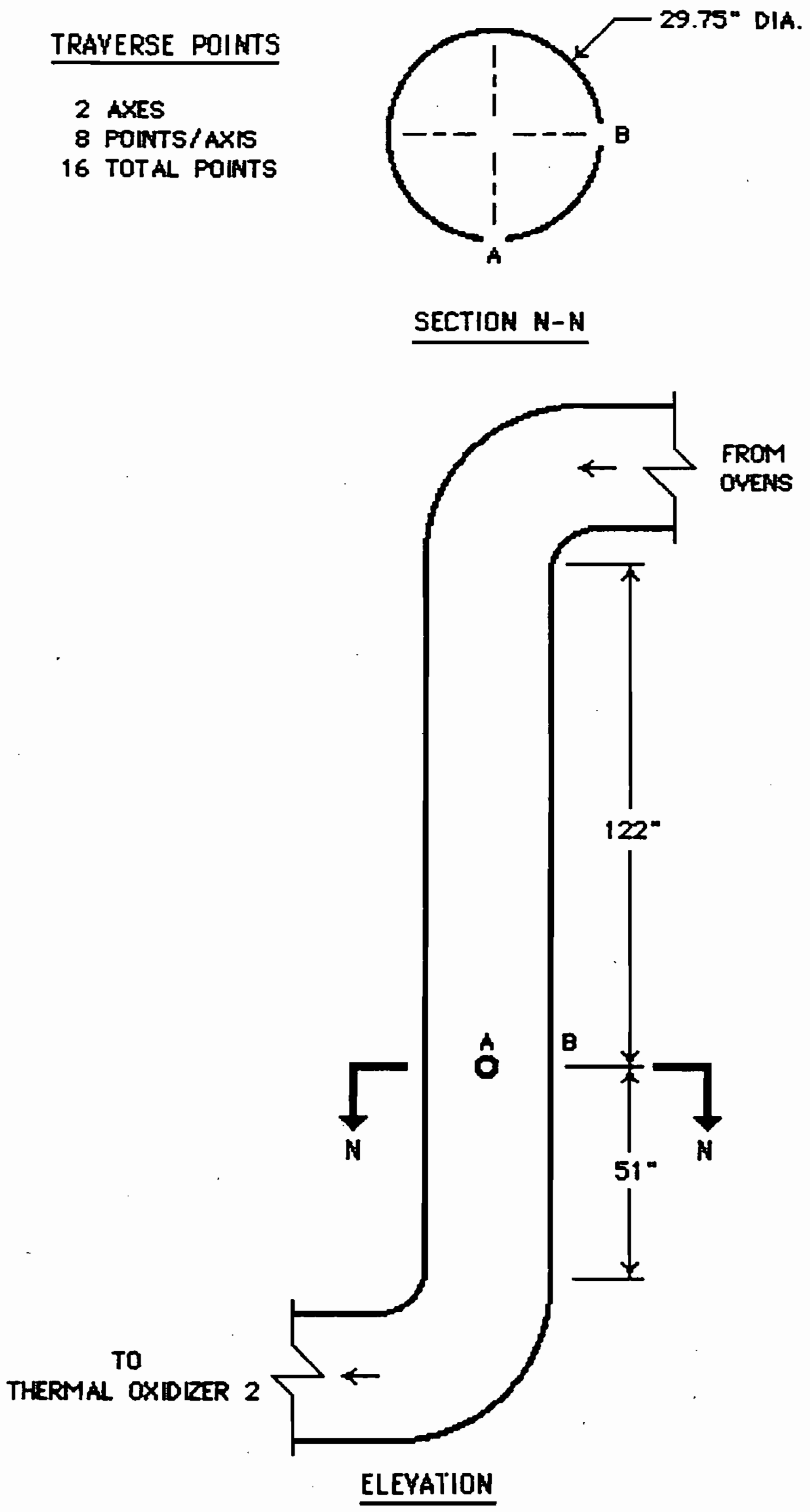


FIGURE 4-2. THERMAL OXIDIZER 2 INLET (TEST LOCATION 13)

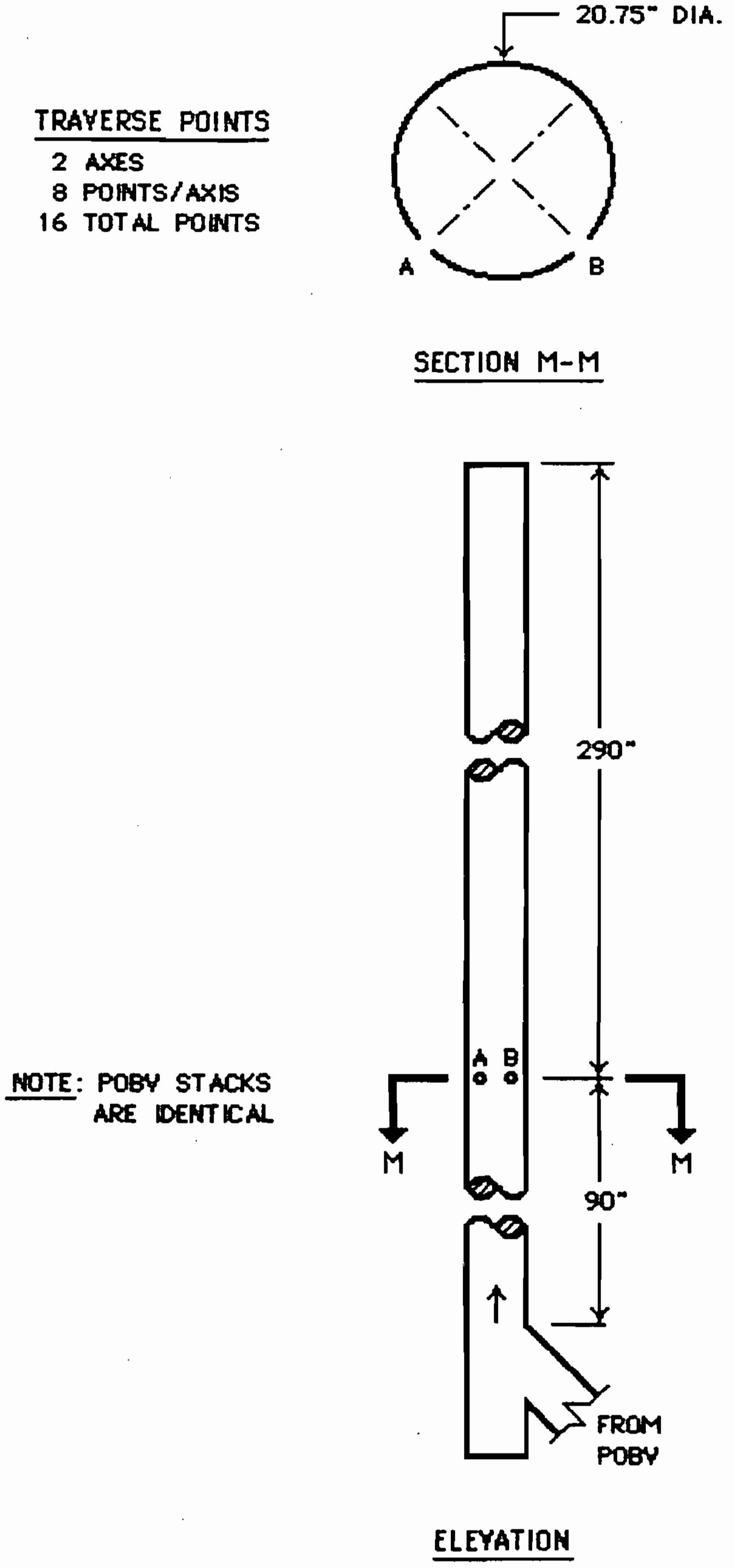


FIGURE 4-3. POBY STACK (TEST LOCATIONS 14, 15, AND 16)

APPENDIX A.1.a

A. TEST RESULTS

1. Air Flow Rates and Moisture Determinations

a. Thermal Oxidizer 2 (Locations 12 and 13)

- Stack
- Inlet

MOISTURE
FIELD DATA & RESULTS TABULATION

PLANT: Metal Container Corporation, Jacksonville, Florida

RUN #	DATE	SAMPLING LOCATION	OPERATOR
12-1	1/23/87	Thermal Oxidizer 2 Stack, Location 12	Willis S. Nesbit
12-2	1/23/87	Thermal Oxidizer 2 Stack, Location 12	Willis S. Nesbit
12-3	1/24/87	Thermal Oxidizer 2 Stack, Location 12	Willis S. Nesbit

		12-1	12-2	12-3
	Run Start Time	1515	1847	800
	Run Finish Time	1615	1947	900
	Net Sampling Points	16	16	16
Theta	Net Run Time, Minutes	60.00	60.00	60.00
Cp	Pitot Tube Coefficient	0.840	0.840	0.840
Y	Dry Gas Meter Calibration Factor	0.990	0.990	0.990
Pbar	Barometric Pressure, Inches Hg	30.30	30.30	30.30
Delta H	Avg. Pressure Differential of Orifice Meter, Inches H2O	1.730	1.730	1.730
Vm	Volume of Metered Gas Sample, Dry ACF	44.076	44.035	43.389
tm	Dry Gas Meter Temperature, Degrees F	78	71	66
Vm(std)	Volume of Metered Gas Sample, Dry SCF*	43.533	44.066	43.832
Vlc	Total Volume of Liquid Collected in Impingers & Silica Gel, mL	34.5	37.5	42.0
Vw(std)	Volume of Water Vapor, SCF*	1.624	1.765	1.977
%H2O	Moisture Content, Percent by Volume	3.6	3.9	4.3
Mfd	Dry Mole Fraction	0.964	0.961	0.957
%CO2	Carbon Dioxide, Percent by Volume, Dry	1.6	1.8	1.5
%O2	Oxygen, Percent by Volume, Dry	18.4	18.1	18.4
%CO+N2	CO + N2, Percent by Volume, Dry	80.0	80.1	80.1
Md	Dry Molecular Weight, Lb/Lb-Mole	28.99	29.01	28.98
Ms	Wet Molecular Weight, Lb/Lb-Mole	28.60	28.59	28.50
Pg	Flue Gas Static Pressure, Inches H2O	-0.20	-0.18	-0.14
Ps	Absolute Flue Gas Press., Inches HG	30.29	30.29	30.29
ts	Flue Gas Temperature, Degrees F	684	679	688

* 68 Degrees F -- 29.92 Inches of Mercury (Hg)

LABORATORY ANALYSIS OF MOISTURE CATCH

Plant Name ANHEUSER BUSCH **EEI Ref. #** 5408

Sampling Location THERMAL OXIDIZER 2 STACK LOCATION 12

Date Received 1/26 **Date Analyzed** 1/26 **Reagent Box(es)** 0236

Run Number	12-1	12-2	12-3
Run Date	1/23	1/23	1/24
Reagent (H_2O):			
Final Weight, g.	220.0	225.0	225.0
Tared Weight, g.	200.0	200.0	200.0
CONDENSED WATER, g.	20.0	25.0	25.0
Silica Gel:			
Final Weight, g.	214.5	212.5	217.0
Tared Weight, g.	200.0	200.0	200.0
ABSORBED WATER, g.	14.5	12.5	17.0
TOTAL WATER COLLECTED, g.	34.5	37.5	42.0

CUSTODY SHEET FOR REAGENT BOX # 0236

Date of Makeup 1/13/87 Initials MJD Locked? ✓

Individual Tare of Reagent: 200 mls. of H20

Individual Tare of Reagent: ______ mls. of ______

Individual Silica Gel Tare Weight 200 gms.

PLANT NAME Metal Cont. Corp.

SAMPLING LOCATION #12

Run Number	Date Used	Initials	Locked?	Date Cleanup	% S. Gel Spent	Initials	Locked?
12-1	1/23/87	WSN	✓	1/23/87	.30	WSN	✓
12.2	1/23/87	WSN	✓	1/23/87	-30	USN	✓
12.3	1/24/87	WSN	✓	1/24/87	-30	USN	—

Received in Lab Date 1/26 Initials J.F.J. Locked? ✓

Sampling Method: M.4

Remarks:

Zero & Span Balance Initials J.F.J.

Filter #	Tare Weight (mgms)	Used on Test

ENTROPY ENVIRONMENTALISTS, INC.

AIR FLOW RATE DETERMINATIONS

Metal Container Corporation

Jacksonville, Florida

Run	Sampling Location	Operator
12-1	Thermal Oxidizer 2 Stack	Willis S. Nesbit
12-2	Thermal Oxidizer 2 Stack	Willis S. Nesbit
12-3	Thermal Oxidizer 2 Stack	Willis S. Nesbit

		12-1	12-2	12-3
	Traverse Date	1/23/87	1/23/87	1/24/87
	Traverse Start Time	1435	1820	738
	Traverse Finish Time	1450	1828	749
	Number of Traverse Points	16	16	16
Cp	Pitot Tube Coefficient	0.84	0.84	0.84
Pbar	Barometric Pressure, Inches Hg	30.3	30.3	30.3
%H20	Moisture, Percent by Volume	3.6	3.9	4.3
Mfd	Dry Mole Fraction	0.964	0.961	0.957
%CO2	CO_2 Percent by Volume, Dry	1.6	1.8	1.5
%O2	Oxygen, Percent by Volume, Dry	18.4	18.1	18.4
%CO+N2	$CO+N_2$ Percent by Volume, Dry	80.0	80.1	80.1
Md	Dry Molecular Wt., Lb/Lb-Mole	28.99	29.01	28.98
Ms	Wet Molecular Wt., Lb/Lb-Mole	28.59	28.58	28.51
A	Duct Area, Square Inches	1,590	1,590	1,590
Pg	Static Pressure, Inches Water	-0.20	-0.18	-0.14
Ps	Absolute Pressure, Inches Hg	30.29	30.29	30.29
ts	Temperature, Degrees F	684	679	688
Delta P	Avg Velocity Head, Inches Water	0.0892	0.0928	0.0897
vs	Velocity, Feet/Second	24.7	25.1	24.8
Qsd	Air Flow Rate, Dry SCFM*	7,356	7,497	7,321
Qaw	Air Flow Rate, Wet ACFM	16,331	16,622	16,430

* 68 Degrees F - 29.92 Inches of Mercury (Hg)

AIR FLOW RATE DETERMINATIONS

Metal Container Corporation
Jacksonville, Florida

Run	Sampling Location	Operator
13-1	Thermal Oxidizer 2 Inlet	Brent W. Hall
13-2	Thermal Oxidizer 2 Inlet	Brent W. Hall
13-3	Thermal Oxidizer 2 Inlet	Brent W. Hall

		13-1	13-2	13-3
	Traverse Date	1/23/87	1/23/87	1/24/87
	Traverse Start Time	1410	1640	717
	Traverse Finish Time	1415	1644	722
	Number of Traverse Points	16	16	16
Cp	Pitot Tube Coefficient	0.84	0.84	0.84
Pbar	Barometric Pressure, Inches Hg	30.31	30.31	30.31
%H20	Moisture, Percent by Volume	2.5	3	3
Mfd	Dry Mole Fraction	0.975	0.970	0.970
%CO2	CO_2 Percent by Volume, Dry	0	0	0
%O2	Oxygen, Percent by Volume, Dry	20.9	20.9	20.9
%CO+N2	$CO+N_2$ Percent by Volume, Dry	79.1	79.1	79.1
Md	Dry Molecular Wt., Lb/Lb-Mole	28.84	28.84	28.84
Ms	Wet Molecular Wt., Lb/Lb-Mole	28.57	28.51	28.51
A	Duct Area, Square Inches	695.1	695.1	695.1
Pg	Static Pressure, Inches Water	-0.065	0.4	0.155
Ps	Absolute Pressure, Inches Hg	30.31	30.34	30.32
ts	Temperature, Degrees F	287	282	280
Delta P	Avg Velocity Head, Inches Water	0.2183	0.2706	0.2011
vs	Velocity, Feet/Second	31.2	34.6	29.8
Qsd	Air Flow Rate, Dry SCFM*	6,301	7,014	6,053
Qaw	Air Flow Rate, Wet ACFM	9,025	10,021	8,631

* 68 Degrees F - 29.92 Inches of Mercury (Hg)

APPENDIX A.1.b

A. TEST RESULTS

1. Air Flow Rates and Moisture Determinations

b. POBV Stacks (Locations 14, 15, 16)

AIR FLOW RATE DETERMINATIONS

Metal Container Corporation
Jacksonville, Florida

Run	Sampling Location	Operator
14-1	POBV 4 Stack	Stephen S. Helms
14-2	POBV 4 Stack	Stephen S. Helms
14-3	POBV 4 Stack	Stephen S. Helms

		14-1	14-2	14-3
	Traverse Date	1/23/87	1/23/87	1/24/87
	Traverse Start Time	1510	1631	747
	Traverse Finish Time	1513	1635	750
	Number of Traverse Points	16	16	16
Cp	Pitot Tube Coefficient	0.84	0.84	0.84
Pbar	Barometric Pressure, Inches Hg	30.3	30.3	30.3
%H20	Moisture, Percent by Volume	1.1	1.1	1
Mfd	Dry Mole Fraction	0.989	0.989	0.990
%CO2	CO_2 Percent by Volume, Dry	0	0	0
%02	Oxygen, Percent by Volume, Dry	20.9	20.9	20.9
%CO+N2	$CO+N_2$ Percent by Volume, Dry	79.1	79.1	79.1
Md	Dry Molecular Wt., Lb/Lb-Mole	28.84	28.84	28.84
Ms	Wet Molecular Wt., Lb/Lb-Mole	28.72	28.72	28.73
A	Duct Area, Square Inches	338.2	338.2	338.2
Pg	Static Pressure, Inches Water	-0.025	-0.025	-0.025
Ps	Absolute Pressure, Inches Hg	30.30	30.30	30.30
ts	Temperature, Degrees F	84	83	83
Delta P	Avg Velocity Head, Inches Water	0.0228	0.0243	0.0218
vs	Velocity, Feet/Second	8.57	8.84	8.37
Qsd	Air Flow Rate, Dry SCFM*	1,174	1,213	1,150
Qaw	Air Flow Rate, Wet ACFM	1,208	1,246	1,179

* 68 Degrees F - 29.92 Inches of Mercury (Hg)

AIR FLOW RATE DETERMINATIONS

Metal Container Corporation

Jacksonville, Florida

Run	Sampling Location	Operator
15-1	POBV 3 Stack	Stephen S. Helms
15-2	POBV 3 Stack	Stephen S. Helms
15-3	POBV 3 Stack	Stephen S. Helms

		15-1	15-2	15-3
	Traverse Date	1/23/87	1/23/87	1/24/87
	Traverse Start Time	1513	1636	751
	Traverse Finish Time	1515	1639	753
	Number of Traverse Points	16	16	16
Cp	Pitot Tube Coefficient	0.84	0.84	0.84
Pbar	Barometric Pressure, Inches Hg	30.3	30.3	30.3
%H20	Moisture, Percent by Volume	1.1	1.1	1
Mfd	Dry Mole Fraction	0.989	0.989	0.990
%CO2	CO_2 Percent by Volume, Dry	0	0	0
%02	Oxygen, Percent by Volume, Dry	20.9	20.9	20.9
%CO+N2	$CO+N_2$ Percent by Volume, Dry	79.1	79.1	79.1
Md	Dry Molecular Wt., Lb/Lb-Mole	28.84	28.84	28.84
Ms	Wet Molecular Wt., Lb/Lb-Mole	28.72	28.72	28.73
A	Duct Area, Square Inches	338.2	338.2	338.2
Pg	Static Pressure, Inches Water	-0.025	-0.025	-0.024
Ps	Absolute Pressure, Inches Hg	30.30	30.30	30.30
ts	Temperature, Degrees F	85	84	82
Delta P	Avg Velocity Head, Inches Water	0.0178	0.0151	0.0173
vs	Velocity, Feet/Second	7.58	6.98	7.45
Qsd	Air Flow Rate, Dry SCFM*	1,036	956	1,025
Qaw	Air Flow Rate, Wet ACFM	1,068	984	1,050

* 68 Degrees F - 29.92 Inches of Mercury (Hg)

AIR FLOW RATE DETERMINATIONS
Metal Container Corporation
Jacksonville, Florida

Run	Sampling Location	Operator
16-1	POBV 2 Stack	Kent G. Daeke
16-2	POBV 2 Stack	Stephen S. Helms
16-3	POBV 2 Stack	Stephen S. Helms

		16-1	16-2	16-3
	Traverse Date	1/23/87	1/23/87	1/24/87
	Traverse Start Time	1505	1640	754
	Traverse Finish Time	1510	1644	759
	Number of Traverse Points	16	16	16
Cp	Pitot Tube Coefficient	0.84	0.84	0.84
Pbar	Barometric Pressure, Inches Hg	30.3	30.31	30.3
%H20	Moisture, Percent by Volume	1.1	1.1	1
Mfd	Dry Mole Fraction	0.989	0.989	0.990
%CO2	CO_2 Percent by Volume, Dry	0	0	0
%02	Oxygen, Percent by Volume, Dry	20.9	20.9	20.9
%CO+N2	$CO+N_2$ Percent by Volume, Dry	79.1	79.1	79.1
Md	Dry Molecular Wt., Lb/Lb-Mole	28.84	28.84	28.84
Ms	Wet Molecular Wt., Lb/Lb-Mole	28.72	28.72	28.73
A	Duct Area, Square Inches	338.2	338.2	338.2
Pg	Static Pressure, Inches Water	-0.025	-0.025	-0.025
Ps	Absolute Pressure, Inches Hg	30.30	30.31	30.30
ts	Temperature, Degrees F	78	81	83
Delta P	Avg Velocity Head, Inches Water	0.0312	0.0298	0.0228
vs	Velocity, Feet/Second	9.97	9.77	8.56
Qsd	Air Flow Rate, Dry SCFM*	1,381	1,346	1,176
Qaw	Air Flow Rate, Wet ACFM	1,405	1,377	1,206

* 68 Degrees F - 29.92 Inches of Mercury (Hg)

APPENDIX A.2.a

A. TEST RESULTS

2. TGNMO

a. Thermal Oxidizer 2 (Locations 12 and 13)

- Stack
- Inlet

METHOD 25 DATA & RESULTS TABULATION

Metal Container Corporation

Jacksonville, Florida

Run	Sampling Location	Operator
12-1,-2,-3	Thermal Oxidizer 2 Stack	Kent G. Daeke

		12-1	12-2	12-3
	Run Date	1/23/87	1/23/87	1/24/87
	Run Start Time	1515	1847	0758
	Run Finish Time	1615	1947	0858
Qsd	Volumetric Air Flow Rate, SCFM	7,356	7,497	7,321
Vstd	Volume Sampled @ Std. Cond., dsl*	4.203	3.092	4.621
	TANK SAMPLING PARAMETERS			
V(tank)	Volume of Tank, liters	4.57	4.47	4.54
t(pre)	Pretest Temperature, deg. F	68	68	39
Pa(pre)	Pretest Absolute Pressure, mmHg	4.0	5.0	5.0
t(post)	Posttest Temperature, deg. F	65	68	41
Pa(post)	Posttest Absolute Pressure, mmHg	698	530	738
	NONCONDENSIBLE ORGANICS ANALYSIS			
Pb(pres)	Pressurization Baro. Pressure, inHg	30.3	29.9	30.3
t(pres)	Pressurization Temp., deg. F	82	98	78
Pg(pres)	Pressurization Gauge Press., mmHg	228	144	152
NCCanal	Concent. of Volume Analyzed, ppmvd	21.7	15.6	23.3
NCCppm	Concent. of Original Sample, ppmvd	30.2	25.4	27.3
	CONDENSIBLE ORGANICS ANALYSIS			
V(pCO2)	Volume of CO2 Purge, dsl	3.57	5.10	3.79
V(ox)	Volume of Oxidized Sample, dsl	7.32	4.42	6.40
CC(pCO2)	Concent. of Purged Sample, ppmvd	1.13	1.1	1.3
CC(ox)	Concent. of Oxidized Sample, ppmvd	20	20	46
CCppm	Concent. of Original Sample, ppmvd	35.8	30.4	64.8
	TGNMO AS CARBON : FORMULA WEIGHT	12.01	12.01	12.01
ppm-Tot	Total Concentration, ppmvd	66.0	55.8	92.1
Lb/Hr	Emissions Rate, Lb/Hr	0.908	0.782	1.26

* 68 Degrees F, 760 mm Hg - 29.92 Inches Hg

METHOD 25 DATA & RESULTS TABULATION
Metal Container Corporation
Jacksonville, Florida

Run	Sampling Location	Operator
13-1,-2,-3	Thermal Oxidizer 2 Inlet	Brent W. Hall

		13-1	13-2	13-3
	Run Date	1/23/87	1/23/87	1/24/87
	Run Start Time	1515	1848	0758
	Run Finish Time	1618	1948	0858
Qsd	Volumetric Air Flow Rate, SCFM	6,301	7,014	6,053
Vstd	Volume Sampled @ Std. Cond., dsl*	3.053	3.099	3.432
	TANK SAMPLING PARAMETERS			
V(tank)	Volume of Tank, liters	4.62	4.48	4.62
t(pre)	Pretest Temperature, deg. F	82	82	84
Pa(pre)	Pretest Absolute Pressure, mmHg	4.0	3.0	2.0
t(post)	Posttest Temperature, deg. F	82	82	84
Pa(post)	Posttest Absolute Pressure, mmHg	519	542	583
	NONCONDENSIBLE ORGANICS ANALYSIS			
Pb(pres)	Pressurization Baro. Pressure, inHg	30.3	30.3	30.31
t(pres)	Pressurization Temp., deg. F	82	82	85
Pg(pres)	Pressurization Gauge Press., mmHg	136	147	152
NCCanal	Concent. of Volume Analyzed, ppmvd	46.0	45.3	47.7
NCCppm	Concent. of Original Sample, ppmvd	80.9	77.1	75.6
	CONDENSIBLE ORGANICS ANALYSIS			
V(pCO2)	Volume of CO2 Purge, dsl	14.33	2.67	10.36
V(ox)	Volume of Oxidized Sample, dsl	6.97	6.87	6.11
CC(pCO2)	Concent. of Purged Sample, ppmvd	2.3	3.9	1.5
CC(ox)	Concent. of Oxidized Sample, ppmvd	460	440	476
CCppm	Concent. of Original Sample, ppmvd	1,061	979	852
	TGNMO AS CARBON : FORMULA WEIGHT	12.01	12.01	12.01
ppm-Tot	Total Concentration, ppmvd	1,142	1,056	928
Lb/Hr	Emissions Rate, Lb/Hr	13.5	13.9	10.5

* 68 Degrees F, 760 mm Hg - 29.92 Inches Hg

APPENDIX A.2.b

A. TEST RESULTS

2. TGNMO

b. POBV Stacks (Locations 14, 15, 16)

METHOD 25 DATA & RESULTS TABULATION

Metal Container Corporation
Jacksonville, Florida

Run	Sampling Location	Operator
14-1,-2,-3	POBV 4 Stack	Stephen S. Helms

		14-1	14-2	14-3
	Run Date	1/23/87	1/23/87	1/24/87
	Run Start Time	1515	1847	0758
	Run Finish Time	1615	1947	0858
Qsd	Volumetric Air Flow Rate, SCFM	1,174	1,213	1,150
Vstd	Volume Sampled @ Std. Cond., dsl*	3.582	3.609	4.052
	TANK SAMPLING PARAMETERS			
V(tank)	Volume of Tank, liters	4.62	4.57	4.61
t(pre)	Pretest Temperature, deg. F	68	65	39
Pa(pre)	Pretest Absolute Pressure, mmHg	4.0	4.0	3.0
t(post)	Posttest Temperature, deg. F	65	65	41
Pa(post)	Posttest Absolute Pressure, mmHg	589	600	636
	NONCONDENSIBLE ORGANICS ANALYSIS			
Pb(pres)	Pressurization Baro. Pressure, inHg	30.3	30.3	30.3
t(pres)	Pressurization Temp., deg. F	82	65	78
Pg(pres)	Pressurization Gauge Press., mmHg	227	151	172
NCCanal	Concent. of Volume Analyzed, ppmvd	3.7	2.4	2.06
NCCppm	Concent. of Original Sample, ppmvd	6.11	3.71	2.85
	CONDENSIBLE ORGANICS ANALYSIS			
V(pCO2)	Volume of CO2 Purge, dsl	5.51	7.80	3.08
V(ox)	Volume of Oxidized Sample, dsl	7.07	5.95	6.46
CC(pCO2)	Concent. of Purged Sample, ppmvd	1.1	1.16	1.23
CC(ox)	Concent. of Oxidized Sample, ppmvd	52	56	100
CCppm	Concent. of Original Sample, ppmvd	104	94.8	160
	TGNMO AS CARBON : FORMULA WEIGHT	12.01	12.01	12.01
ppm-Tot	Total Concentration, ppmvd	110	99	163
Lb/Hr	Emissions Rate, Lb/Hr	0.243	0.224	0.351

* 68 Degrees F, 760 mm Hg - 29.92 Inches Hg

METHOD 25 DATA & RESULTS TABULATION
Metal Container Corporation
Jacksonville, Florida

Run	Sampling Location	Operator
15-1,-2,-3	POBV 3 Stack	Stephen S. Helms

		15-1	15-2	15-3
	Run Date	1/23/87	1/23/87	1/24/87
	Run Start Time	1515	1847	0758
	Run Finish Time	1615	1947	0858
Qsd	Volumetric Air Flow Rate, SCFM	1,036	956	1,025
Vstd	Volume Sampled @ Std. Cond., dsl*	6.420	6.550	6.055
	TANK SAMPLING PARAMETERS			
V(tank)	Volume of Tank, liters	15.78	15.71	15.80
t(pre)	Pretest Temperature, deg. F	68	64	39
Pa(pre)	Pretest Absolute Pressure, mmHg	3.0	3.0	4.0
t(post)	Posttest Temperature, deg. F	65	82	41
Pa(post)	Posttest Absolute Pressure, mmHg	310	328	280
	NONCONDENSIBLE ORGANICS ANALYSIS			
Pb(pres)	Pressurization Baro. Pressure, inHg	30.3	30.3	30.3
t(pres)	Pressurization Temp., deg. F	82	82	41
Pg(pres)	Pressurization Gauge Press., mmHg	146	151	280
NCCanal	Concent. of Volume Analyzed, ppmvd	0	0	0
NCCppm	Concent. of Original Sample, ppmvd	0	0	0
	CONDENSIBLE ORGANICS ANALYSIS			
V(pC02)	Volume of C02 Purge, dsl	12.49	7.92	9.67
V(ox)	Volume of Oxidized Sample, dsl	10.52	9.56	6.10
CC(pC02)	Concent. of Purged Sample, ppmvd	1.4	1.1	1.53
CC(ox)	Concent. of Oxidized Sample, ppmvd	140	376	100
CCppm	Concent. of Original Sample, ppmvd	232	550	103
	TGNMO AS CARBON : FORMULA WEIGHT	12.01	12.01	12.01
ppm-Tot	Total Concentration, ppmvd	232	550	103
Lb/Hr	Emissions Rate, Lb/Hr	0.450	0.984	0.198

* 68 Degrees F, 760 mm Hg - 29.92 Inches Hg

METHOD 25 DATA & RESULTS TABULATION

Metal Container Corporation

Jacksonville, Florida

Run	Sampling Location	Operator
16-1,-2,-3	POBV 2 Stack	Kent G. Daeke

		16-1	16-2	16-3
	Run Date	1/23/87	1/23/87	1/24/87
	Run Start Time	1515	1847	0758
	Run Finish Time	1615	1947	0858
Qsd	Volumetric Air Flow Rate, SCFM	1,381	1,346	1,176
Vstd	Volume Sampled @ Std. Cond., dsl*	5.693	5.840	6.077
	TANK SAMPLING PARAMETERS			
V(tank)	Volume of Tank, liters	10.277	10.214	10.178
t(pre)	Pretest Temperature, deg. F	68	68	39
Pa(pre)	Pretest Absolute Pressure, mmHg	4.0	3.0	1.00
t(post)	Posttest Temperature, deg. F	65	80	41
Pa(post)	Posttest Absolute Pressure, mmHg	422	447	431
	NONCONDENSIBLE ORGANICS ANALYSIS			
Pb(pres)	Pressurization Baro. Pressure, inHg	30.31	30.3	30.3
t(pres)	Pressurization Temp., deg. F	82	80	78
Pg(pres)	Pressurization Gauge Press., mmHg	172	133	157
NCCanal	Concent. of Volume Analyzed, ppmvd	0.16	0	0
NCCppm	Concent. of Original Sample, ppmvd	0.350	0	0
	CONDENSIBLE ORGANICS ANALYSIS			
V(pCO2)	Volume of CO2 Purge, dsl	8.88	9.36	3.59
V(ox)	Volume of Oxidized Sample, dsl	5.58	7.32	6.99
CC(pCO2)	Concent. of Purged Sample, ppmvd	2.0	1.5	1.13
CC(ox)	Concent. of Oxidized Sample, ppmvd	86	100	60
CCppm	Concent. of Original Sample, ppmvd	87.4	128	69.7
	TGNMO AS CARBON : FORMULA WEIGHT	12.01	12.01	12.01
ppm-Tot	Total Concentration, ppmvd	87.8	128	69.7
Lb/Hr	Emissions Rate, Lb/Hr	0.227	0.322	0.153

* 68 Degrees F, 760 mm Hg - 29.92 Inches Hg

APPENDIX A.3

A. TEST RESULTS

3. Example Calculations

EXAMPLE CALCULATIONS NO. 12-1

Thermal Oxidizer 2 Stack

Volume Of Dry Gas Sampled At Standard Conditions

$$Vm(std) = 17.64 * Y * Vm * \frac{(Pbar + Delta\ H/13.6)}{(460 + tm)}$$

$$Vm(std) = 17.64 * 0.990 * 44.076 * \frac{(30.30 + 1.730/13.6)}{(460 + 78)} = 43.533\ DSCF$$

Volume Of Water Vapor At Standard Conditions

$$Vw(std) = 0.04707 * Vlc$$

$$Vw(std) = 0.04707 * 34.5 = 1.624\ SCF$$

Percent Moisture, By Volume, As Measured In Flue Gas

$$\%H20 = 100 * Vw(std) / (Vw(std) + Vm(std))$$

$$\%H20 = 100 * 1.624 / (1.624 + 43.533) = 3.6\ \%$$

Dry Mole Fraction Of Flue Gas

$$Mfd = 1 - (\%H_2O / 100)$$

$$Mfd = 1 - (3.6 / 100) = 0.964$$

Wet Molecular Weight Of Flue Gas

$$Ms = (Md * Mfd) + (0.18 * \%H_2O)$$

$$Ms = (28.99 * 0.964) + (0.18 * 3.6) = 28.59\ lb/lb\text{-}mole$$

Absolute Gas Pressure

$$Ps = Pbar + (Pg / 13.6)$$

$$Ps = 30.30 + (-0.20 / 13.6) = 30.29\ in.\ Hg$$

Average Flue Gas Velocity - Note: (Delta p) avg. is square of avg. sq. root

$$vs = 85.49 * Cp * \text{SQRT} \left[\frac{(\text{Delta } p)avg * (460 + ts))}{Ps * Ms}\right]$$

$$vs = 85.49 * 0.84 * \text{SQRT} \left[\frac{(0.0892 * (460 + 684))}{30.29 * 28.59}\right] = 24.7 \text{ ft/sec}$$

Dry Volumetric Flue Gas Flow Rate At Standard Conditions

$$Qsd = \frac{60}{144} * Mfd * vs * A * \frac{Tstd}{ts + 460} * \frac{Ps}{Pstd}$$

$$Qsd = \frac{60}{144} * 0.964 * 24.62 * 1{,}590 * \frac{528}{684 + 460} * \frac{30.29}{29.92} = 7{,}356 \text{ SCFM}$$

Wet Volumetric Flue Gas Flow Rate At Stack Conditions

$$Qaw = 60 / 144 * vs * A$$

$$Qaw = 60 / 144 * 24.7 * 1{,}590 = 16{,}331 \text{ ACFM}$$

Dry Molecular Weight Of Flue Gas

$$Md = (\%CO_2 * 0.44) + (\%O_2 * 0.32) + (\%CO + N_2 * 0.28)$$

$$Md = (1.6 * 0.44) + (18.4 * 0.32) + (80.0 * 0.28) = 28.99 \text{ Lb/Lb-Mole}$$

TGNMO as Carbon, Pounds Per Hour

$$Lb/Hr = \frac{60 * ppmd * Mol.\ Wt. * Qsd}{385.3 * 1{,}000{,}000}$$

$$Lb/Hr = \frac{60 * 66 * 12.01 * 7{,}356}{385.3 * 1{,}000{,}000} = 0.908 \text{ Lb/Hr}$$

```
Flex Quick List of Disk: D14  Model: 6  Program: 2  New M25 program
==================================================================================

8      'Ti' = ('tpre' - 32)/1.8 + 273
           MEMO: Convert initial tank temperature F to absolute degrees Kelvin

9      'Tf' = ('tpost' - 32)/1.8 + 273
           MEMO: Convert final tank temperature F to absolute degrees Kelvin

10     'Pp' = 25.401 * 'Pbpres' + 'Pgpres'
           MEMO: tank press. gauge pressure in. Hg. to absolute basis mm. Hg.

11     'Tp' = ('tpres' - 32)/1.8 + 273
           MEMO: Convert pressurization temperature F to absolute Kelvin

12     'P/T' = ('Papost'/'Tf') - ('Papre'/'Ti')
          MEMO: Pressure/Temperature correction factor

13     'Vstd' = 0.386 * 'Vtank' * 'P/T'
          MEMO: Sample volume in tank; 0.386 = 293/760

14     IF 'Vstran' = 0 THEN 'NCCppm' = 'NCCanal' * 'Pp'/'Tp' / 'P/T'
          MEMO: Adjust NCC concentration for pressurization

15     IF 'Vstran'<>0 THEN 'NCCppm'='NCCanal'*'Vdanal'/'Vstran' * 'Pp'/'Tp' / 'P
       /T'MEMO: Adjust NCC concentration for dilution & pressurization

16     IF 'V(pCO2)' + 'V(ox)' <= 0 THEN GO STEP 18
          MEMO: Skip CCppm calc (allows manual inputting of CCppm)

17     'CCppm' = ('CC(pCO2)' * 'V(pCO2)' / 'Vstd') + ('CC(ox)' * 'V(ox)' / 'Vstd
       ') MEMO: Adjust CC concentrations for the CO2 purge and oxidation volumes

18     'ppm-Tot' = 'NCCppm' + 'CCppm'
          MEMO: Add NonCondensible to Condensible for total nonmethane organics

19     'lb/hr' = 'ppm-Tot' / 1000000 * 'Qsd' * 60 / 385.3 * 'For. Wt.'
          MEMO: Convert ppm to lbs per hour using air flow rates
```

APPENDIX B.1.a

B. Field and Analytical Data

1. Air Flow Rates and Moisture Determinations

    a. Thermal Oxidizer 2 (Locations 12 and 13)

        - Stack
        - Inlet

Preliminary Field Data

PLANT NAME Anheuser Busch
LOCATION Jacksonville, FL
SAMPLING LOCATION #11 + 12

DUCT DEPTH
FROM INSIDE FAR WALL TO OUTSIDE OF PORT 45"
NIPPLE LENGTH 0
DEPTH OF DUCT 45"
WIDTH (RECTANGULAR DUCT) —

EQUIVALENT DIAMETER:

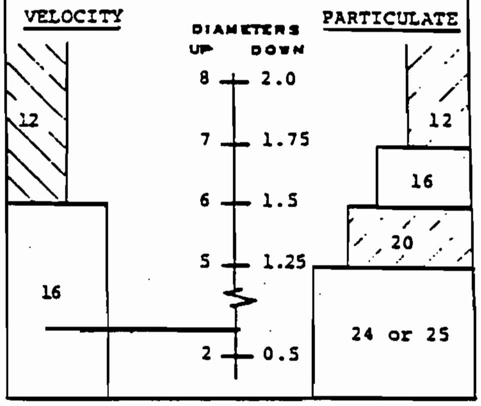
$$D_E = \frac{2 \times \text{DEPTH} \times \text{WIDTH}}{\text{DEPTH} + \text{WIDTH}} = \frac{2(\quad)(\quad)}{(\quad + \quad)} = \text{—}$$

DISTANCE FROM PORTS TO NEAREST FLOW DISTURBANCE	UPSTREAM	DOWNSTREAM
	106"	66"
DIAMETERS	2.4	1.5

STACK AREA $= \left(\frac{45}{2}\right)^2 \pi = 1590$ IN²

DRAW HORIZONTAL LINE THROUGH DIAMETERS

If more than 8 and 2 diameters and if duct dia. is less than 24", use 8 or 9 points.



Point	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL	DISTANCE FROM OUTSIDE OF PORT
1	3.2	1.44	1½"
2	10.5	4.73	4¾"
3	19.4	8.73	8¾"
4	32.3	14.54	14½"
5	67.7	30.47	30½"
6	80.6	36.27	36¼"
7	89.5	40.28	40¼"
8	96.8	43.56	43½"
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

LOCATION OF TRAVERSE POINTS IN RECTANGULAR STACKS

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

AIR FLOW RATE DETERMINATIONS

COMPANY NAME Metal Container Corp RUN # 12-1

ADDRESS Jacksonville, FL DATE 1/23/87

MEASUREMENT LOCATION #12 START-FINISH TIME 14:35 - 14:50

DUCT DIMENSIONS ______ DUCT AREA (A) ______ IN.^{2} PERSONNEL WSN

BARO. PRESSURE (P_{BAR}) 30.3 IN. H_G STATIC PRESSURE (P_G) -0.20 IN.H_2O

PITOT PROBE I.D. HH-6 PITOT TUBE COEFFICIENT (C_P) 0.84

Traverse Times

START	FINISH

POINT #	Δp IN H_2O	TEMP. ^oF
A 1	0.07	685
2	0.08	692
3	0.08	698
4	0.08	700
5	0.11	704
6	0.12	686
7	0.11	673
8	0.11	669
B 1	0.06	664
2	0.05	660
3	0.04	663
4	0.04	663
5	0.14	684
6	0.14	697
7	0.13	709
8	0.12	689

AVG. 0.08919 684
$(\sqrt{\Delta p})^2$ T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
From Method 3				
AVERAGE	1.6	AVERAGE	18.4	80.0
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
From Method 4					3.6

ABSOLUTE STACK GAS PRESSURE, in. Hg

$P_s = (\underset{P_{bar}}{\quad}) + \left[(\underset{P_g}{\quad}) / 13.6\right] = \underset{P_s}{\boxed{\quad}}$

DRY MOLE FRACTION OF STACK GAS

$M_{fd} = 1 - (\underset{\%H_2O}{\quad} / 100) = \underset{M_{fd}}{\boxed{\quad}}$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_d = \left[0.44\ (\underset{\%CO_2}{\quad})\right] + \left[0.32\ (\underset{\%O_2}{\quad})\right] + \left[0.28\ (\underset{\%N_2}{\quad} + \underset{\%CO}{\quad})\right] = \underset{M_d}{\boxed{\quad}}$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_s = (\underset{M_d}{\quad})(\underset{M_{fd}}{\quad}) + 0.18\ (\underset{\%H_2O}{\quad}) = \underset{M_s}{\boxed{\quad}}$

AVERAGE STACK GAS VELOCITY, ft/sec

$v_s = 85.49\ (\underset{C_p}{\quad})\ \sqrt{(\underset{\Delta p_{avg}}{\quad})(\underset{t_s}{\quad} + 460) / (\underset{P_s}{\quad})(\underset{M_s}{\quad})} = \underset{v_s}{\boxed{\quad}}$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

$Q_{sd} = 7.353\ (\underset{M_{fd}}{\quad})(\underset{v_s}{\quad})(\underset{A}{\quad})(\underset{P_s}{\quad}) / (\underset{t_s}{\quad} + 460) = \underset{Q_{sd}}{\boxed{\quad}}$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

$Q_{aw} = (60 / 144)(\underset{v_s}{\quad})(\underset{A}{\quad}) = \underset{Q_{aw}}{\boxed{\quad}}$

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8/86

ENTROPY

AIR FLOW RATE DETERMINATIONS

COMPANY NAME Metal Container Corp.
RUN # 12·2
ADDRESS Jacksonville, FL
DATE 1/23/87
MEASUREMENT LOCATION #12
START-FINISH TIME 1820 - 1828
DUCT DIMENSIONS ______ DUCT AREA (A) ______ IN.^{2}
PERSONNEL WSN
BARO. PRESSURE (P_{BAR}) 30.3 IN. H_G
STATIC PRESSURE (P_G) -0.18 IN.H_2O
PITOT PROBE I.D. HH·6
PITOT TUBE COEFFICIENT (C_P) 0.84

– Traverse Times –

START ______ FINISH ______

POINT #	Δp IN H_2O	TEMP. ^oF
A 1	0.13	669
2	0.14	699
3	0.15	702
4	0.14	699
5	0.08	668
6	0.07	666
7	0.06	660
8	0.06	669
B 1	0.09	662
2	0.11	673
3	0.12	685
4	0.12	699
5	0.08	689
6	0.07	683
7	0.06	675
8	0.05	667

AVG. 0.09279 $(\sqrt{\Delta p})^2$ 679 T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
From Method 3				
AVERAGE	1.8	AVERAGE	18.1	80.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
From Method 4					3.9

ABSOLUTE STACK GAS PRESSURE, in. Hg

$$P_s = (\underset{P_{bar}}{\quad\quad}) + \left[(\underset{P_g}{\quad\quad}) / 13.6\right] = \underset{P_s}{\boxed{\quad\quad}}$$

DRY MOLE FRACTION OF STACK GAS

$$M_{fd} = 1 - (\underset{\%H_2O}{\quad\quad} / 100) = \underset{M_{fd}}{\boxed{\quad\quad}}$$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$$M_d = \left[0.44\ (\underset{\%CO_2}{\quad\quad})\right] + \left[0.32\ (\underset{\%O_2}{\quad\quad})\right] + \left[0.28\ (\underset{\%N_2}{\quad\quad} + \underset{\%CO}{\quad\quad})\right] = \underset{M_d}{\boxed{\quad\quad}}$$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$$M_s = (\underset{M_d}{\quad\quad})(\underset{M_{fd}}{\quad\quad}) + 0.18\ (\underset{\%H_2O}{\quad\quad}) = \underset{M_s}{\boxed{\quad\quad}}$$

AVERAGE STACK GAS VELOCITY, ft/sec

$$v_s = 85.49\ (\underset{C_p}{\quad\quad}) \sqrt{(\underset{\Delta p_{avg}}{\quad\quad})(\underset{t_s}{\quad\quad} + 460) / (\underset{P_s}{\quad\quad})(\underset{M_s}{\quad\quad})} = \underset{v_s}{\boxed{\quad\quad}}$$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

$$Q_{sd} = 7.353\ (\underset{M_{fd}}{\quad\quad})(\underset{v_s}{\quad\quad})(\underset{A}{\quad\quad})(\underset{P_s}{\quad\quad}) / (\underset{t_s}{\quad\quad} + 460) = \underset{Q_{sd}}{\boxed{\quad\quad}}$$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

$$Q_{aw} = (60 / 144)(\underset{v_s}{\quad\quad})(\underset{A}{\quad\quad}) = \underset{Q_{aw}}{\boxed{\quad\quad}}$$

F-1023
8/86

ENTROPY

AIR FLOW RATE DETERMINATIONS

COMPANY NAME Metal Container Corp. RUN # 12-3
ADDRESS Jacksonville, FL DATE 1/24/87
MEASUREMENT LOCATION #12 START-FINISH TIME 07:38 - 07:49
DUCT DIMENSIONS ______ DUCT AREA (A) ______ IN.^{2} PERSONNEL WSN
BARO. PRESSURE (P_{BAR}) 30.3 IN. H_G STATIC PRESSURE (P_G) -0.14 IN. H_2O
PITOT PROBE I.D. HH-6 PITOT TUBE COEFFICIENT (C_p) 0.84

— Traverse Times —
START ______ FINISH ______

POINT #	Δp IN H_2O	TEMP. °F
A 1	0.12	677
2	0.14	682
3	0.16	690
4	0.13	690
5	0.06	694
6	0.06	692
7	0.04	684
8	0.05	682
B 1	0.05	675
2	0.06	686
3	0.07	700
4	0.07	706
5	0.12	690
6	0.13	688
7	0.13	685
8	0.11	679
AVG.	0.08968 $(\sqrt{\Delta p})^2$	688 T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
From Method 3				
AVERAGE	1.5	AVERAGE	18.4	80.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
From Method 4					43

ABSOLUTE STACK GAS PRESSURE, in. Hg

$P_s = (\quad_{P_{bar}}\quad) + [(\quad_{P_g}\quad) / 13.6] = \boxed{\quad}_{P_s}$

DRY MOLE FRACTION OF STACK GAS

$M_{fd} = 1 - (\quad_{\%H_2O}\quad / 100) = \boxed{\quad}_{M_{fd}}$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_d = [0.44\ (\quad_{\%CO_2}\quad)] + [0.32\ (\quad_{\%O_2}\quad)] + [0.28\ (\quad_{\%N_2}\quad + \quad_{\%CO}\quad)] = \boxed{\quad}_{M_d}$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_s = (\quad_{M_d}\quad)(\quad_{M_{fd}}\quad) + 0.18\ (\quad_{\%H_2O}\quad) = \boxed{\quad}_{M_s}$

AVERAGE STACK GAS VELOCITY, ft/sec

$v_s = 85.49\ (\quad_{C_p}\quad) \sqrt{(\quad_{\Delta p_{avg}}\quad)(\quad_{t_s}\quad + 460) / (\quad_{P_s}\quad)(\quad_{M_s}\quad)} = \boxed{\quad}_{v_s}$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

$Q_{sd} = 7.353\ (\quad_{M_{fd}}\quad)(\quad_{v_s}\quad)(\quad_{A}\quad)(\quad_{P_s}\quad) / (\quad_{t_s}\quad + 460) = \boxed{\quad}_{Q_{sd}}$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

$Q_{aw} = (60 / 144)(\quad_{v_s}\quad)(\quad_{A}\quad) = \boxed{\quad}_{Q_{aw}}$

ENTROPY

ORSAT FIELD DATA

Plant Name Metal Containers Corp

Sampling Location # 12 Fuel Type

Run and/or Sample No. 12-1 Leak Test? ✓ Date 1/23/87 Operator WSN

Time of Sample Collection	Time of Analysis	CO_2 Reading A	O_2 Reading B	CO Reading C	$\%O_2$ B-A	%CO C-B	$\%N_2$ 100-C
15:15	16:50	1.5	19.9	—	18.4	—	
—	—	1.6	20.0	—	18.4	—	
16:15	17:05	1.6	20.0	—	18.4	—	
	Avg.	1.6		Avg.	18.4	—	80.0

Run and/or Sample No. 12.2 Leak Test? ✓ Date 1/23/87 Operator WSN

Time of Sample Collection	Time of Analysis	CO_2 Reading A	O_2 Reading B	CO Reading C	$\%O_2$ B-A	%CO C-B	$\%N_2$ 100-C
18:47	20:45	1.7	19.9	—	18.2	—	
—	—	1.8	19.9	—	18.1	—	
19:47	21:00	1.8	19.9	—	18.1	—	
	Avg.	1.8		Avg.	18.1	—	80.1

Run and/or Sample No. 12.3 Leak Test? ✓ Date 1/24/87 Operator WSN

Time of Sample Collection	Time of Analysis	CO_2 Reading A	O_2 Reading B	CO Reading C	$\%O_2$ B-A	%CO C-B	$\%N_2$ 100-C
08:00	09:45	1.5	19.9	—	18.4	—	
—	—	1.5	19.9	—	18.4	—	
09:00	10:00	1.6	19.9	—	18.3	—	
	Avg.	1.5		Avg.	18.4	—	80.1

Entropy Environmentalists, Inc. Specialists in Source Sampling

PARTICULATE FIELD DATA

COMPANY NAME Metal Container Corp.
RUN NUMBER 12-1
ADDRESS Jacksonville, FL
TIME START 15:15
SAMPLING LOCATION #12
TIME FINISH 16:15
DATE 1/23/87
TEAM LEADER WSN
TECHNICIANS
BAROMETRIC PRESSURE, IN. HG 30.3
STATIC PRESSURE, IN. H_2O —
SAMPLING TRAIN LEAK TEST VACUUM, IN. HG 15 5
SAMPLING TRAIN LEAK RATE, CU. FT./MIN. 0.000 0.000

EQUIPMENT CHECKS

- ✓ PITOTS, PRE-TEST
- PITOTS, POST-TEST
- ✓ ORSAT SAMPLING SYSTEM
- ✓ TEDLAR BAG
- ✓ THERMOCOUPLE @ ______ °F

IDENTIFICATION NUMBERS

REAGENT BOX 236
NOZZLE NA
DIAMETER NA
METER BOX N.9
T/C READOUT —
UMBILICAL U.20
T/C PROBE —
SAMPLE BOX 12
ORSAT PUMP 7
PROBE M.4
TEDLAR BAG 10

FILTER #	TARE
NA	

NOMOGRAPH SET-UP

NOMOGRAPH #
ΔH@ 1.73
C FACTOR
METER TEMP
STACK TEMP
% MOISTURE
REF. ΔP

SAMPLE POINT	CLOCK TIME, MIN.	DRY GAS METER READING, CU. FT.	PITOT READING (ΔP), IN. H2O	ORIFICE SETTING (ΔH), IN. H2O IDEAL	ORIFICE SETTING (ΔH), IN. H2O ACTUAL	GAS METER TEMP. °F	PUMP VACUUM IN. HG GAUGE	FILTER BOX TEMP. °F	IMP. EXIT TEMP. °F	STACK TEMP. °F	LK. CHECK READINGS
	0/0	68.393	NA	1.73	1.73	70	2	240	49	NA	
	10	75.75	↓	↓	↓	76	2	243	50	↓	
	20	83.09				81	2	250	52		
	30	90.31				81	2	250	52		
	40	98.10				81	2	250	52		
	50	104.96				81	2	250	52		
	60/OFF	112.469									

V_M	$(\sqrt{\Delta P})^2$	ΔH	T_M	T_S
44.076	—	1.73	78	—

ENTROPY

PARTICULATE FIELD DATA

COMPANY NAME Metal Container Corp
RUN NUMBER 12.2
ADDRESS Jacksonville, FL
TIME START 18:47
SAMPLING LOCATION #12
TIME FINISH 19:47
DATE 1/23/88
TEAM LEADER WSN
TECHNICIANS
BAROMETRIC PRESSURE, IN. HG 30.3
STATIC PRESSURE, IN. H_2O
SAMPLING TRAIN LEAK TEST VACUUM, IN. HG 15 5
SAMPLING TRAIN LEAK RATE, CU. FT./MIN. 0.000 0.000

EQUIPMENT CHECKS

✓ PITOTS, PRE-TEST
✓ PITOTS, POST-TEST
✓ ORSAT SAMPLING SYSTEM
— TEDLAR BAG
— THERMOCOUPLE @ / °F

IDENTIFICATION NUMBERS

REAGENT BOX 236
NOZZLE NA
DIAMETER NA
METER BOX N.9
T/C READOUT —
UMBILICAL U.20
T/C PROBE —
SAMPLE BOX 12
ORSAT PUMP 7
PROBE M.4
TEDLAR BAG 2

FILTER #	**TARE**
NA	

NOMOGRAPH SET-UP

NOMOGRAPH #
ΔH@ 1.73
C FACTOR
METER TEMP
STACK TEMP
% MOISTURE
REF. ΔP

SAMPLE POINT	CLOCK TIME, MIN.	DRY GAS METER READING, CU. FT.	PITOT READING (ΔP), IN. H_2O	ORIFICE SETTING (ΔH), IN. H_2O		GAS METER TEMP. °F	PUMP VACUUM IN. HG GAUGE	FILTER BOX TEMP. °F	IMP. EXIT TEMP. °F	STACK TEMP. °F	LK. CHECK READINGS
				IDEAL	ACTUAL						
	0/0	112.518	NA	1.73	1.73	69	2	245	52	NA	
	10	119.88			1.73	71	2	250	50		
	20	127.22			1.73	72	2	252	50		
	30	134.52			1.73	71	2	252	50		
	40	141.72			1.73	71	2	252	50		
	50	149.31			1.73	72	2	252	50		
	60/OFF	156.553									

V_M	$(\sqrt{\Delta P})^2$	ΔH	T_M	T_S
44.035	—	1.73	71	—

ENTROPY

PARTICULATE FIELD DATA

COMPANY NAME Metal Container Corp. **RUN NUMBER** 12-3
ADDRESS Jacksonville, FL **TIME START** 08:00
SAMPLING LOCATION #12 **TIME FINISH** 09:00
DATE 1/24/87 **TEAM LEADER** WSN **TECHNICIANS** ______
BAROMETRIC PRESSURE, IN. HG 30.3 **STATIC PRESSURE, IN. H_2O** ______
SAMPLING TRAIN LEAK TEST VACUUM, IN. HG 15 5
SAMPLING TRAIN LEAK RATE, CU. FT./MIN. 0.000 0.000

EQUIPMENT CHECKS

- ✓ PITOTS, PRE-TEST
- ✓ PITOTS, POST-TEST
- ✓ ORSAT SAMPLING SYSTEM
- ✓ TEDLAR BAG
- ___ THERMOCOUPLE @ ______ °F

IDENTIFICATION NUMBERS

REAGENT BOX 236 **NOZZLE** NA **DIAMETER** NA
METER BOX N-9 **T/C READOUT** —
UMBILICAL U-20 **T/C PROBE** ______
SAMPLE BOX 12 **ORSAT PUMP** 7
PROBE M-4 **TEDLAR BAG** 9

FILTER #	TARE
NA	

NOMOGRAPH SET-UP **NOMOGRAPH #** /

ΔH@ 1.73 **C FACTOR** /
METER TEMP / **STACK TEMP** /
% MOISTURE / **REF. ΔP** ______

SAMPLE POINT	CLOCK TIME, MIN.	DRY GAS METER READING, CU. FT.	PITOT READING (ΔP), IN. H_2O	ORIFICE SETTING (ΔH), IN. H_2O		GAS METER TEMP. °F	PUMP VACUUM IN. HG GAUGE	FILTER BOX TEMP. °F	IMP. EXIT TEMP. °F	STACK TEMP. °F	LK. CHECK READINGS
				IDEAL	ACTUAL						
	0/0	167.064	NA	1.73	1.73	53	2	240	36	NA	
	10	174.29	↓	↓	1.73	59	2	250	38	↓	
	20	181.49			1.73	64	2	252	38		
	30	188.96			1.73	70	2	252	38		
	40	195.87			1.73	72	2	255	39		
	50	203.15			1.73	75	2	255	40		
	60/OFF	210.453									

43.389	—	1.73	66	—
V_M	$(\sqrt{\Delta P})^2$	ΔH	T_M	T_S

ENTROPY

Preliminary Field Data

PLANT NAME Metal Container Corp.
LOCATION Jacksonville, FL
SAMPLING LOCATION # 13

DUCT DEPTH
FROM INSIDE FAR WALL TO OUTSIDE OF PORT 29¾"
NIPPLE LENGTH —
DEPTH OF DUCT 29¾"
WIDTH (RECTANGULAR DUCT) —

EQUIVALENT DIAMETER:

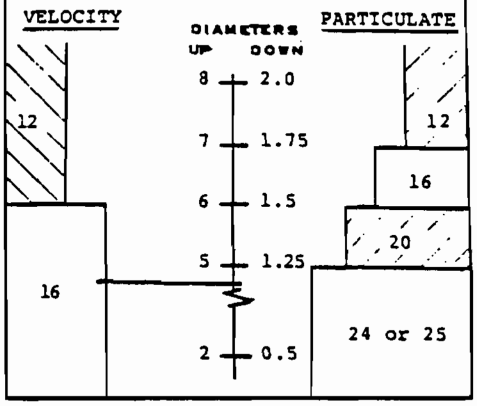
$$D_E = \frac{2 \times DEPTH \times WIDTH}{DEPTH + WIDTH} = \frac{2(\quad)(\quad)}{(\quad + \quad)} = —$$

DISTANCE FROM PORTS TO NEAREST FLOW DISTURBANCE	UPSTREAM	DOWNSTREAM
	122"	51"
DIAMETERS	4.1	1.7

$$\text{STACK AREA} = \left(\frac{29.75}{2}\right)^2 \pi = 695.1 \text{ IN}^2$$

DRAW HORIZONTAL LINE THROUGH DIAMETERS

If more than 8 and 2 diameters and if duct dia. is less than 24", use 8 or 9 points.



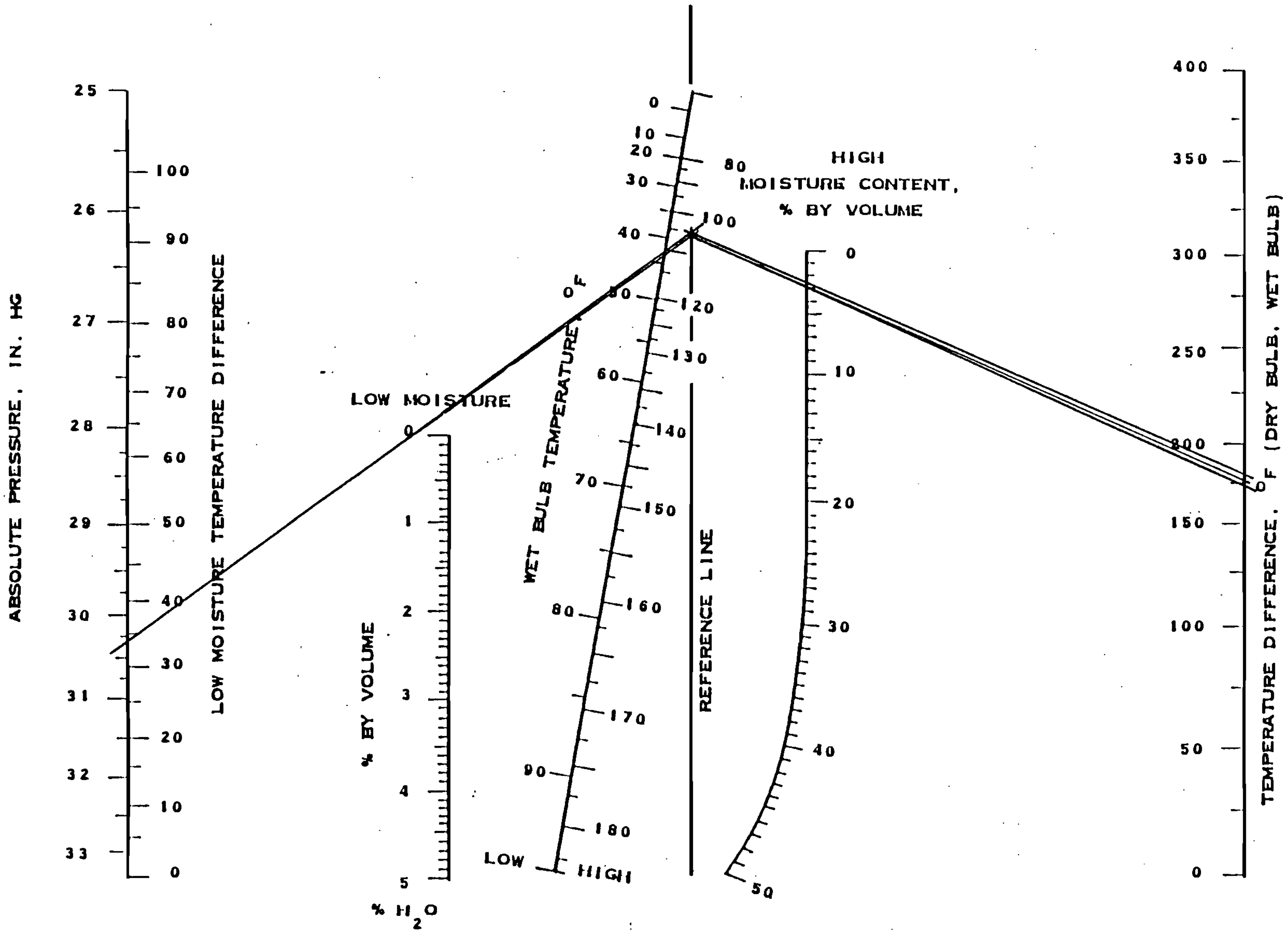
Point	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL	DISTANCE FROM OUTSIDE OF PORT
1	3.2	0.95	1"
2	10.5	3.12	3⅛"
3	19.4	5.77	5¾"
4	32.3	9.61	9⅝"
5	67.7	20.14	20⅛"
6	80.6	23.98	24"
7	89.5	26.63	26⅝"
8	96.8	28.79	28¾"
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

LOCATION OF TRAVERSE POINTS IN RECTANGULAR STACKS

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8



Run 13-1 = 2.5 % moisture
Run 13-2 = 3 % moisture
Run 13-3 = 3 % moisture

AIR FLOW RATE DETERMINATIONS

COMPANY NAME METAL CONTAINER CORP. **RUN #** B-1

ADDRESS JACKSONVILLE, FLA **DATE** 1/23/87

MEASUREMENT LOCATION LOC #13 **START-FINISH TIME** 14:10-14:15

DUCT DIMENSIONS ______ **DUCT AREA (A)** ______ **IN.^{2}** **PERSONNEL** BWH

BARO. PRESSURE (P_{BAR}) 30.31 **IN. H_G** **STATIC PRESSURE (P_G)** -.065 **IN.H_2O**

PITOT PROBE I.D. S-TYPE **PITOT TUBE COEFFICIENT (C_P)** 0.84

Traverse Times

START ______ **FINISH** ______

POINT #	Δp IN H_2O	TEMP. °F
A-1	.155	283
2	.18	283
3	.19	284
4	.165	285
5	.185	287
6	.22	288
7	.27	289
8	.27	289
B-1	.19	285
2	.22	285
3	.215	286
4	.22	287
5	.21	287
6	.245	288
7	.29	289
8	.30	289

AVG. 0.2183 ($(\sqrt{\Delta p})^2$) 287 (T_S)

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #
B/5	0%	14:25-14:27		
B/4	0%	15:32-15:37		

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
AVERAGE	-0-	**AVERAGE**	20.9	79.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
A	14:42	289	110	179	2.5
B	15:35	289	110	179	2.5
B	16:07	289	109	180	2.5

ABSOLUTE STACK GAS PRESSURE, in. Hg

$P_s = (30.31)_{P_{bar}} + [(-0.065)_{P_g} / 13.6] = \boxed{30.31}_{P_s}$

DRY MOLE FRACTION OF STACK GAS

$M_{fd} = 1 - (\quad_{\%H_2O} / 100) = \boxed{\quad}_{M_{fd}}$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_d = [0.44\ (\quad_{\%CO_2})] + [0.32\ (\quad_{\%O_2})] + [0.28\ (\quad_{\%N_2} + \quad_{\%CO})] = \boxed{\quad}_{M_d}$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_s = (\quad_{M_d})(\quad_{M_{fd}}) + 0.18\ (\quad_{\%H_2O}) = \boxed{\quad}_{M_s}$

AVERAGE STACK GAS VELOCITY, ft/sec

$v_s = 85.49\ (\quad_{C_p})\ \sqrt{(\quad_{\Delta p_{avg}})(\quad_{t_s} + 460) / (\quad_{P_s})(\quad_{M_s})} = \boxed{\quad}_{v_s}$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

$Q_{sd} = 7.353\ (\quad_{M_{fd}})(\quad_{v_s})(\quad_{A})(\quad_{P_s}) / (\quad_{t_s} + 460) = \boxed{\quad}_{Q_{sd}}$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

$Q_{aw} = (60 / 144)(\quad_{v_s})(\quad_{A}) = \boxed{\quad}_{Q_{aw}}$

F-1023
8/86

ENTROPY

AIR FLOW RATE DETERMINATIONS

COMPANY NAME METAL CONTAINER CORP. **RUN #** 13-2

ADDRESS JACKSONVILLE FLA **DATE** 4/23/87

MEASUREMENT LOCATION Lc. #13 **START-FINISH TIME** 16:40 - 16:44

DUCT DIMENSIONS ______ **DUCT AREA (A)** ______ **IN.^{2}** **PERSONNEL** BWH/TNC

BARO. PRESSURE (P_{BAR}) 3031 **IN. H_G** **STATIC PRESSURE (P_G)** +.4 **IN.H_2O**

PITOT PROBE I.D. S-TYPE **PITOT TUBE COEFFICIENT (C_P)** 0.84

— Traverse Times —

START	FINISH

POINT #	Δp IN H_2O	TEMP. °F
A-1	.21	284
2	.25	283
3	.245	286
4	.23	287
5	.26	288
6	.36	287
7	.33	286
8	.33	228
B-1	.22	284
2	.25	285
3	.26	286
4	.26	286
5	.26	285
6	.27	283
7	.32	285
8	.30	284

AVG. 0.27062 $(\sqrt{\Delta p})^2$ 282 T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #
A/4	0%	16:44-16:45		
B/4	0%	18:52-18:53		
B/4	0%	19:22-19:23		

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
AVERAGE	-0-	AVERAGE	20.9	79.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
A	16:45	288	111	177	3
B	18:55	286	110	176	3
B	19:25	286	110	176	3

ABSOLUTE STACK GAS PRESSURE, in. Hg

P_s = (30.31) + [(+0.4) / 13.6] = 30.34
P_{bar} P_g P_s

DRY MOLE FRACTION OF STACK GAS

M_{fd} = 1 - (______ / 100) = ______
% H_2O M_{fd}

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

M_d = [0.44 (______)] + [0.32 (______)] + [0.28 (______ + ______)] = ______
% CO_2 % O_2 % N_2 % CO M_d

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

M_s = (______)(______) + 0.18 (______) = ______
M_d M_{fd} % H_2O M_s

AVERAGE STACK GAS VELOCITY, ft/sec

v_s = 85.49 (______) $\sqrt{(\quad)(\quad + 460) / (\quad)(\quad)}$ = ______
C_p Δp_{avg} t_s P_s M_s v_s

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

Q_{sd} = 7.353 (______)(______)(______)(______) / (______ + 460) = ______
M_{fd} v_s A P_s t_s Q_{sd}

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

Q_{aw} = (60 / 144)(______)(______) = ______
v_s A Q_{aw}

ENTROPY

F-1023
8/86

AIR FLOW RATE DETERMINATIONS

COMPANY NAME METAL CONTAINER CORP. RUN # 13-3

ADDRESS JACKSONVILLE, FLA. DATE 1/24/87

MEASUREMENT LOCATION LOC # 13 START-FINISH TIME 7:17 - 7:22

DUCT DIMENSIONS ____ DUCT AREA (A) ____ IN.^{2} PERSONNEL BWH/JWC

BARO. PRESSURE (P_{BAR}) 30.31 IN. H_G STATIC PRESSURE (P_G) +0.155 IN.H_2O

PITOT PROBE I.D. S-TYPE PITOT TUBE COEFFICIENT (C_p) 0.84

Traverse Times START		FINISH

POINT #	Δp IN H_2O	TEMP. °F
A-1	.15	274
2	.17	274
3	.19	275
4	.175	276
5	.195	278
6	.23	281
7	.27	280
8	.25	278
B-1	.10	279
2	.15	280
3	.20	280
4	.19	283
5	.20	285
6	.23	284
7	.27	284
8	.30	284

AVG. 0.20112 ($\sqrt{\Delta p}$)^2 280 T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #
A/4	0 %	7:24-7:25		

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
AVERAGE	-0-	AVERAGE	20.9	79.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
A	7:28	285	111	174	3

ABSOLUTE STACK GAS PRESSURE, in. Hg

P_s = (30.31) + [(0.155) / 13.6] = $\boxed{30.32}$ (P_{bar}, P_g, P_s)

DRY MOLE FRACTION OF STACK GAS

M_{fd} = 1 - (___ / 100) = $\boxed{}$ (% H_2O, M_{fd})

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

M_d = [0.44 (___)] + [0.32 (___)] + [0.28 (___ + ___)] = $\boxed{}$ (% CO_2, % O_2, % N_2, % CO, M_d)

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

M_s = (___)(___) + 0.18 (___) = $\boxed{}$ (M_d, M_{fd}, % H_2O, M_s)

AVERAGE STACK GAS VELOCITY, ft/sec

v_s = 85.49 (___) $\sqrt{(___)(___ + 460) / (___)(___)}$ = $\boxed{}$ (C_p, Δp_{avg}, t_s, P_s, M_s, v_s)

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

Q_{sd} = 7.353 (___)(___)(___)(___) / (___ + 460) = $\boxed{}$ (M_{fd}, v_s, A, P_s, t_s, Q_{sd})

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

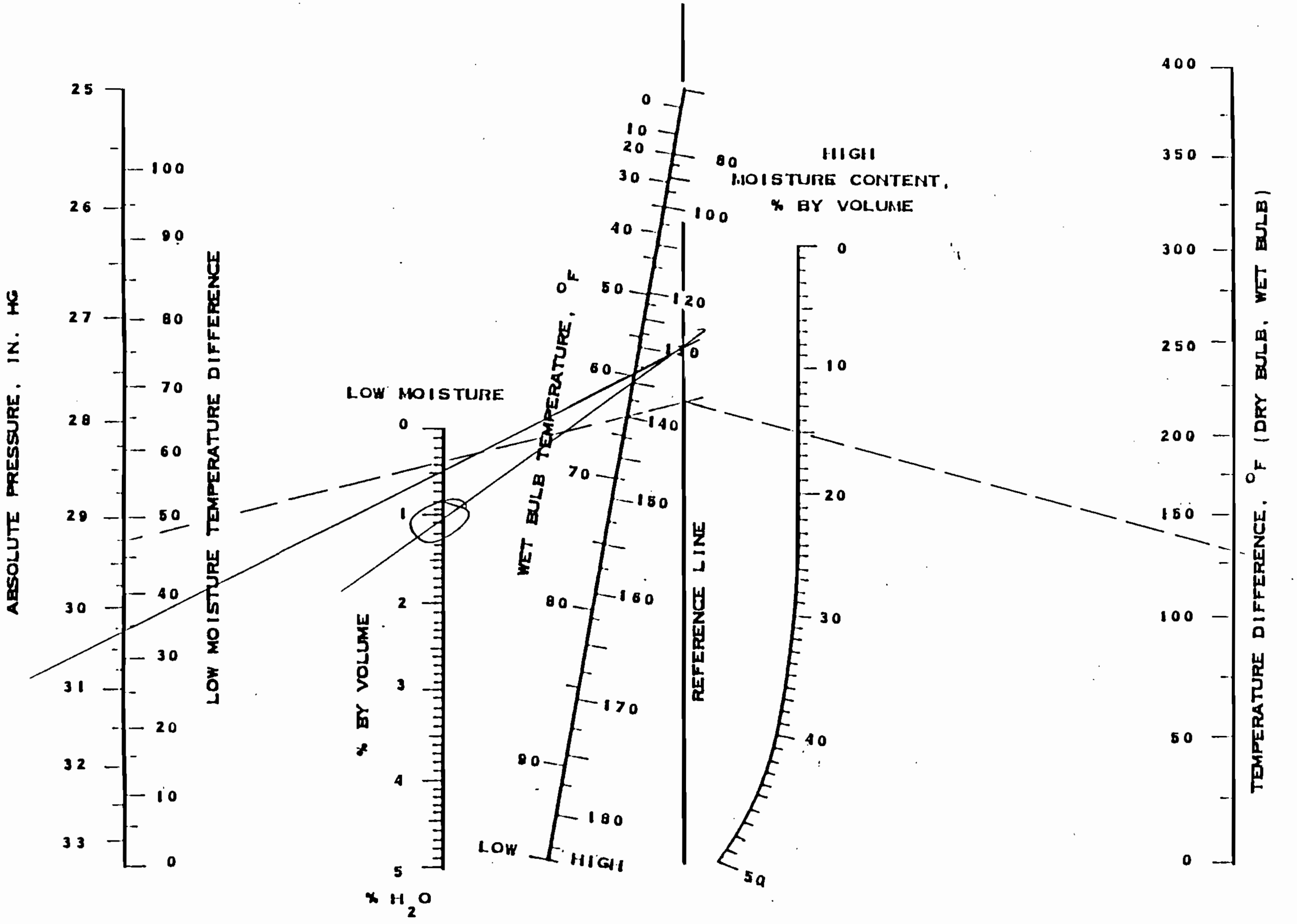
Q_{aw} = (60 / 144)(___)(___) = $\boxed{}$ (v_s, A, Q_{aw})

ENTROPY

F-1023
8/86

Ambient Cond'ns 1/23/87 CE8 + CE9

Metal Container Corp



WB = 60

DB = 76

BP = 30.3

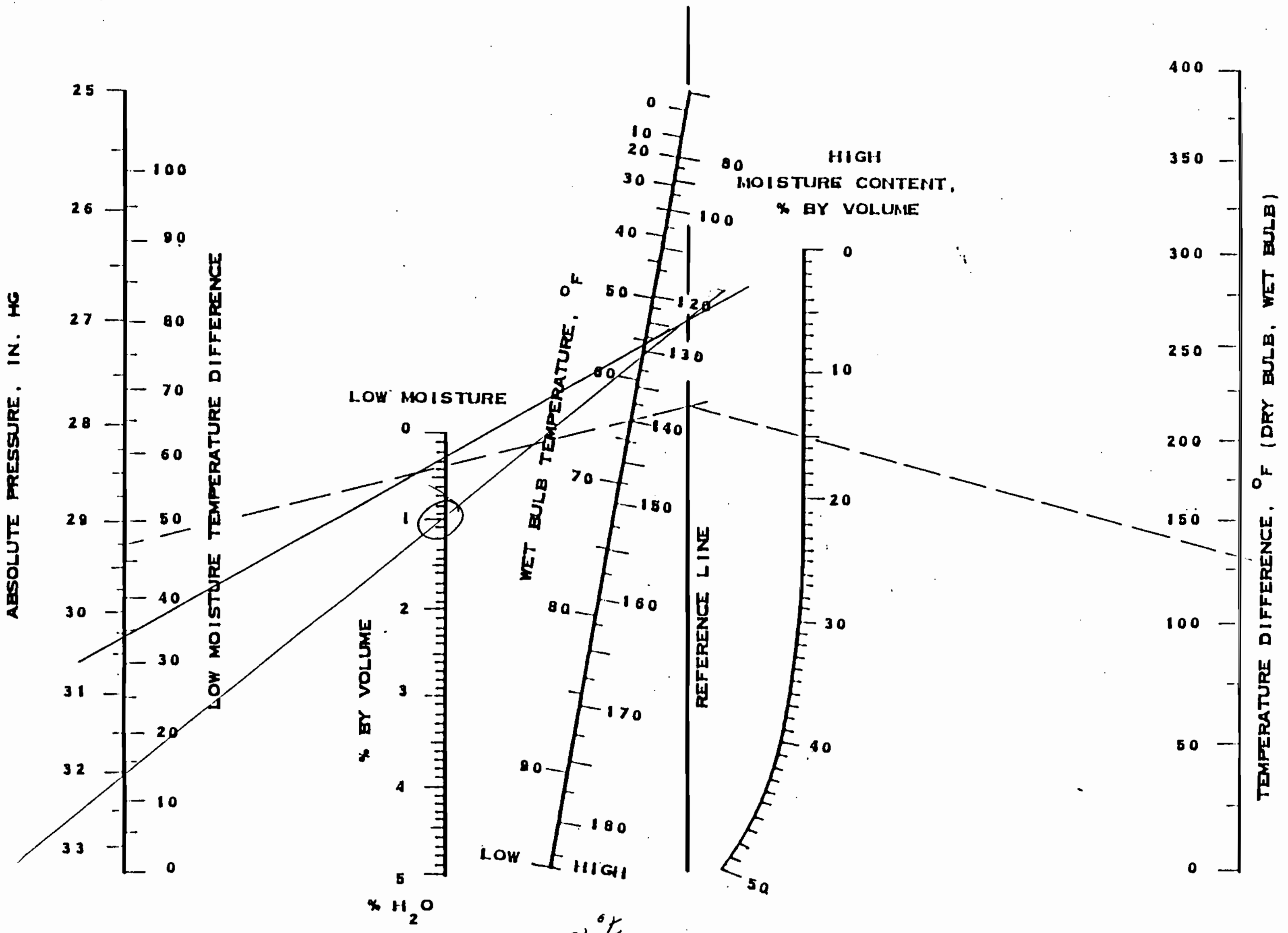
ΔT = 16

% H_2O = 1.1%

Ambient Conditions

1/23/87

Ambient Con ions 1/24/87 CE 1D



WB = 56°F
DB = 69°F
BP = 30.3"Hg
ΔT = 13°
% H_2O = 1.0%

Ambient Conditions
1/24/87

APPENDIX B.1.b

B. Field and Analytical Data

1. Air Flow Rates and Moisture Determinations

b. POBV Stacks (Locations 14, 15, 16)

Preliminary Field Data

PLANT NAME Anheuser Busch

LOCATION Jacksonville, FL

SAMPLING LOCATION #14, 15 + 16

DUCT DEPTH
FROM INSIDE FAR WALL TO OUTSIDE OF PORT 20¾"

NIPPLE LENGTH —

DEPTH OF DUCT 20¾"

WIDTH (RECTANGULAR DUCT) —

EQUIVALENT DIAMETER:

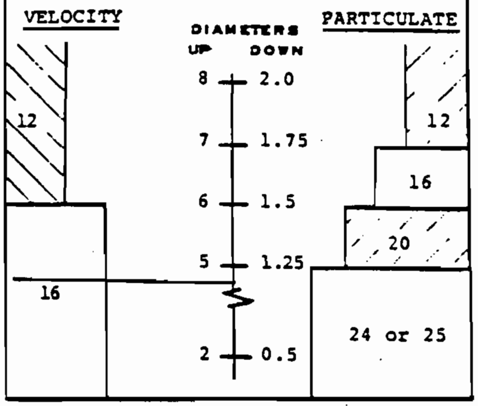
$D_E = \frac{2 \times \text{DEPTH} \times \text{WIDTH}}{\text{DEPTH} + \text{WIDTH}} = \frac{2(\quad)(\quad)}{(\quad + \quad)} = $ —

DISTANCE FROM PORTS TO NEAREST FLOW DISTURBANCE	UPSTREAM	DOWNSTREAM
	90"	290"
DIAMETERS	4.3	14

STACK AREA = $\left(\frac{20.75}{2}\right)^2 \pi$ = 338.2 IN²

DRAW HORIZONTAL LINE THROUGH DIAMETERS

If more than 8 and 2 diameters and if duct dia. is less than 24", use 8 or 9 points.



LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

LOCATION OF TRAVERSE POINTS IN RECTANGULAR STACKS

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.9

Point	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL	DISTANCE FROM OUTSIDE OF PORT
1	3.2	0.66	1"
2	10.5	2.18	2¼"
3	19.4	4.03	4"
4	32.3	6.70	6¾"
5	67.7	14.05	14"
6	80.6	16.72	16¾"
7	89.5	18.57	18⅝"
8	96.8	20.09	19¾"
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

ENTROPY ENVIRONMENTALISTS, INC.

BEST AVAILABLE COPY

COMPANY NAME Metal Container Corp. RUN # 14-1

ADDRESS Jacksonville, Fla. DATE 1-23-87

MEASUREMENT LOCATION #14 START-FINISH TIME ~~X~~1510-1513

DUCT DIMENSIONS ____ DUCT AREA (A) ____ IN.^{2} PERSONNEL SSH, VSN

BARO. PRESSURE (P_{BAR}) 30.3 IN. H_G STATIC PRESSURE (P_G) −.025 IN.H_2O

PITOT PROBE I.D. PT 12 S-Type PITOT TUBE COEFFICIENT (C_p) 0.84

— Traverse Times — START	FINISH

POINT #	Δp IN H_2O	TEMP. °F
A-1	.01	82
2	.01	83
3	.01	83
4	.02	85
5	.025	84
6	.03	84
7	.04	83
8	.04	82
B-1	.01	84
2	.02	84
3	.03	85
4	.035	84
5	.035	84
6	.03	83
7	.02	83
8	.02	83
AVG.	0.02283 $(\sqrt{\Delta p})^2$	84 T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
ambient				
AVERAGE	0 % CO_2	AVERAGE	20.9 % O_2	79.1 %CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
					1.1%

ABSOLUTE STACK GAS PRESSURE, in. Hg

$P_s = (\quad)_{P_{bar}} + \left[(\quad)_{P_g} / 13.6\right] = \boxed{\quad}_{P_s}$

DRY MOLE FRACTION OF STACK GAS

$M_{fd} = 1 - (\quad_{\%H_2O} / 100) = \boxed{\quad}_{M_{fd}}$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_d = \left[0.44\ (\quad)_{\%CO_2}\right] + \left[0.32\ (\quad)_{\%O_2}\right] + \left[0.28\ (\quad_{\%N_2} + \quad_{\%CO})\right] = \boxed{\quad}_{M_d}$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_s = (\quad)_{M_d}(\quad)_{M_{fd}} + 0.18\ (\quad)_{\%H_2O} = \boxed{\quad}_{M_s}$

AVERAGE STACK GAS VELOCITY, ft/sec

$v_s = 85.49\ (\quad)_{C_p} \sqrt{(\quad)_{\Delta p_{avg}}(\quad_{t_s} + 460) / (\quad)_{P_s}(\quad)_{M_s}} = \boxed{\quad}_{v_s}$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

$Q_{sd} = 7.353\ (\quad)_{M_{fd}}(\quad)_{v_s}(\quad)_{A}(\quad)_{P_s} / (\quad_{t_s} + 460) = \boxed{\quad}_{Q_{sd}}$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

$Q_{aw} = (60 / 144)(\quad)_{v_s}(\quad)_{A} = \boxed{\quad}_{Q_{aw}}$

ENTROPY

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AIR FLOW RATE DETERMINATIONS

COMPANY NAME Metal Container Corp. **RUN #** 14-2

ADDRESS Jacksonville, Fla. **DATE** 1-23-87

MEASUREMENT LOCATION # 14 **START-FINISH TIME** 1631 - 1635

DUCT DIMENSIONS ______ **DUCT AREA (A)** ______ **IN.²** **PERSONNEL** SSH

BARO. PRESSURE (P_{BAR}) 30.3 **IN. H_G** **STATIC PRESSURE (P_G)** -0.025 **IN. H_2O**

PITOT PROBE I.D. PT12 S-Type **PITOT TUBE COEFFICIENT (C_p)** 0.84

Traverse Times

START ______ **FINISH** ______

POINT #	Δp IN H_2O	TEMP. °F
A-1	0.014 0.011	82
2	0.015	83
3	0.015	82
4	0.019	82
5	0.029	83
6	0.035	83
7	0.034	82
8	0.032	82
B-1	0.020	83
2	0.026	83
3	0.028	84
4	0.034	84
5	0.029	84
6	0.025	84
7	0.023	83
8	0.023	83
AVG.	0.02431 $(\sqrt{\Delta p})^2$	83 T_s

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
ambient				
AVERAGE	0	AVERAGE	20.9	79.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
					1.1%

ABSOLUTE STACK GAS PRESSURE, in. Hg

$P_s = (\quad)_{P_{bar}} + [(\quad)_{P_g} / 13.6] = \boxed{\quad}_{P_s}$

DRY MOLE FRACTION OF STACK GAS

$M_{fd} = 1 - (\quad_{\%H_2O} / 100) = \boxed{\quad}_{M_{fd}}$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_d = [0.44\ (\quad)_{\%CO_2}] + [0.32\ (\quad)_{\%O_2}] + [0.28\ (\quad_{\%N_2} + \quad_{\%CO})] = \boxed{\quad}_{M_d}$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_s = (\quad)_{M_d}(\quad)_{M_{fd}} + 0.18\ (\quad)_{\%H_2O} = \boxed{\quad}_{M_s}$

AVERAGE STACK GAS VELOCITY, ft/sec

$v_s = 85.49\ (\quad)_{C_p} \sqrt{(\quad)_{\Delta p_{avg}}(\quad_{t_s} + 460) / (\quad)_{P_s}(\quad)_{M_s}} = \boxed{\quad}_{v_s}$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

$Q_{sd} = 7.353\ (\quad)_{M_{fd}}(\quad)_{v_s}(\quad)_{A}(\quad)_{P_s} / (\quad_{t_s} + 460) = \boxed{\quad}_{Q_{sd}}$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

$Q_{aw} = (60 / 144)(\quad)_{v_s}(\quad)_{A} = \boxed{\quad}_{Q_{aw}}$

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AIR FLOW RATE DETERMINATIONS

COMPANY NAME Metal Container Corp. RUN # 14-3

ADDRESS Jacksonville, Fla. DATE 1-24-87

MEASUREMENT LOCATION #14 START-FINISH TIME 747-750

DUCT DIMENSIONS ______ DUCT AREA (A) ______ IN.^{2} PERSONNEL SH

BARO. PRESSURE (P_{BAR}) 30.3 IN. H_G STATIC PRESSURE (P_G) -.025 IN.H_2O

PITOT PROBE I.D. PT 12 PITOT TUBE COEFFICIENT (C_P) 0.84

— Traverse Times —

START ______ FINISH ______

POINT #	Δp IN H_2O	TEMP. °F
A-1	0.01	81
2	0.01	82
3	0.01	84
4	0.01	84
5	0.02	84
6	0.03	83
7	0.04	83
8	0.03	84
B-1	0.01	82
2	0.03	84
3	0.03	84
4	0.03	83
5	0.04	84
6	0.03	84
7	0.02	83
8	0.02	83
AVG.	0.02182 $(\sqrt{\Delta p})^2$	83 T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
ambient				
AVERAGE	-0-	AVERAGE	20.9	79.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
					1%

ABSOLUTE STACK GAS PRESSURE, in. Hg

$P_s = (\quad)_{P_{bar}} + [(\quad)_{P_g} / 13.6] = \boxed{\quad}_{P_s}$

DRY MOLE FRACTION OF STACK GAS

$M_{fd} = 1 - (\quad_{\%H_2O} / 100) = \boxed{\quad}_{M_{fd}}$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_d = [0.44\ (\quad)_{\%CO_2}] + [0.32\ (\quad)_{\%O_2}] + [0.28\ (\quad_{\%N_2} + \quad_{\%CO})] = \boxed{\quad}_{M_d}$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_s = (\quad)_{M_d}(\quad)_{M_{fd}} + 0.18\ (\quad)_{\%H_2O} = \boxed{\quad}_{M_s}$

AVERAGE STACK GAS VELOCITY, ft/sec

$v_s = 85.49\ (\quad)_{C_p} \sqrt{(\quad)_{\Delta p_{avg}}(\quad_{t_s} + 460) / (\quad)_{P_s}(\quad)_{M_s}} = \boxed{\quad}_{v_s}$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

$Q_{sd} = 7.353\ (\quad)_{M_{fd}}(\quad)_{v_s}(\quad)_{A}(\quad)_{P_s} / (\quad_{t_s} + 460) = \boxed{\quad}_{Q_{sd}}$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

$Q_{aw} = (60 / 144)(\quad)_{v_s}(\quad)_{A} = \boxed{\quad}_{Q_{aw}}$

ENTROPY

Preliminary Field Data

PLANT NAME Anheuser Busch

LOCATION Jacksonville, FL

SAMPLING LOCATION #14, 15 + 16

DUCT DEPTH
FROM INSIDE FAR WALL TO OUTSIDE OF PORT 20¾"

NIPPLE LENGTH —

DEPTH OF DUCT 20¾"

WIDTH (RECTANGULAR DUCT) —

EQUIVALENT DIAMETER:

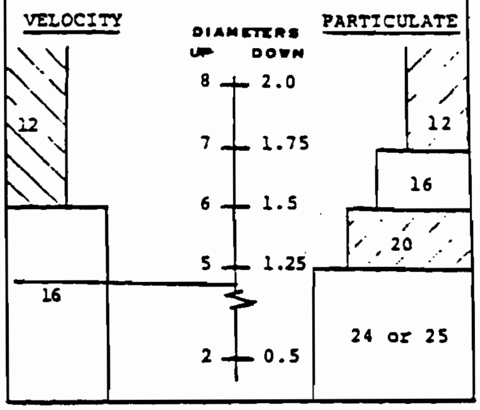
$$D_E = \frac{2 \times \text{DEPTH} \times \text{WIDTH}}{\text{DEPTH} + \text{WIDTH}} = \frac{2(\quad)(\quad)}{(\quad + \quad)} = \text{—}$$

DISTANCE FROM PORTS TO NEAREST FLOW DISTURBANCE	UPSTREAM	DOWNSTREAM
	90"	290"
DIAMETERS	4.3	14

STACK AREA = $\left(\frac{20.75}{2}\right)^2 \pi$ = 338.2 IN²

DRAW HORIZONTAL LINE THROUGH DIAMETERS

If more than 8 and 2 diameters and if duct dia. is less than 24", use 8 or 9 points.



Point	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL	DISTANCE FROM OUTSIDE OF PORT
1	3.2	0.66	1"
2	10.5	2.18	2¼"
3	19.4	4.03	4"
4	32.3	6.70	6¾"
5	67.7	14.05	14"
6	80.6	16.72	16¾"
7	89.5	18.57	18⅝"
8	96.8	20.09	19¾"
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

LOCATION OF TRAVERSE POINTS IN RECTANGULAR STACKS

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

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AIR FLOW RATE DETERMINATIONS

COMPANY NAME Metal Container Corp. RUN # 15-1

ADDRESS Jacksonville, Fla. DATE 1-23-89

MEASUREMENT LOCATION #15 START-FINISH TIME 1513-1515

DUCT DIMENSIONS ______ DUCT AREA (A) ______ IN.^{2} PERSONNEL SSH WSN

BARO. PRESSURE (P_{BAR}) 30.3 IN. H_G STATIC PRESSURE (P_G) -.025 IN.H_2O

PITOT PROBE I.D. PT12 PITOT TUBE COEFFICIENT (C_p) 0.84

— Traverse Times —
START ______ FINISH ______

POINT #	Δp IN H_2O	TEMP. °F
A-1	.005	84
2	.01	84
3	.02	85
4	.023	86
5	.023	86
6	.02	86
7	.02	85
8	.015	85
B-1	.01	84
2	.015	84
3	.02	85
4	.023	85
5	.025	85
6	.025	84
7	.025	84
8	.015	84

AVG. 0.01777 85
$(\sqrt{\Delta p})^2$ T_s

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
ambient				
AVERAGE	-0-	AVERAGE	20.9	79.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
					1.1%

ABSOLUTE STACK GAS PRESSURE, in. Hg

$P_s = (\quad)_{P_{bar}} + [(\quad)_{P_g} / 13.6] = \boxed{\quad}_{P_s}$

DRY MOLE FRACTION OF STACK GAS

$M_{fd} = 1 - (\quad_{\%H_2O} / 100) = \boxed{\quad}_{M_{fd}}$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_d = [0.44\ (\quad)_{\%CO_2}] + [0.32\ (\quad)_{\%O_2}] + [0.28\ (\quad_{\%N_2} + \quad_{\%CO})] = \boxed{\quad}_{M_d}$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_s = (\quad)_{M_d}(\quad)_{M_{fd}} + 0.18\ (\quad)_{\%H_2O} = \boxed{\quad}_{M_s}$

AVERAGE STACK GAS VELOCITY, ft/sec

$v_s = 85.49\ (\quad)_{C_p} \sqrt{(\quad)_{\Delta p_{avg}}(\quad_{t_s} + 460) / (\quad)_{P_s}(\quad)_{M_s}} = \boxed{\quad}_{v_s}$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

$Q_{sd} = 7.353\ (\quad)_{M_{fd}}(\quad)_{v_s}(\quad)_{A}(\quad)_{P_s} / (\quad_{t_s} + 460) = \boxed{\quad}_{Q_{sd}}$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

$Q_{aw} = (60 / 144)(\quad)_{v_s}(\quad)_{A} = \boxed{\quad}_{Q_{aw}}$

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AIR FLOW RATE DETERMINATIONS

COMPANY NAME Metal Container Corp. RUN # 15-2

ADDRESS Jacksonville, Fla. DATE 1-23-87

MEASUREMENT LOCATION #15 START-FINISH TIME 1636-1639

DUCT DIMENSIONS ______ DUCT AREA (A) ______ IN.^{2} PERSONNEL SSH

BARO. PRESSURE (P_{BAR}) 30.3 IN. H_G STATIC PRESSURE (P_G) −0.025 IN.H_2O

PITOT PROBE I.D. PT 12 S-Type PITOT TUBE COEFFICIENT (C_p) 0.84

— Traverse Times —

START ______ FINISH ______

POINT #	Δp IN H_2O	TEMP. °F
A-1	0.006	84
2	0.009	85
3	0.014	85
4	0.019	85
5	0.017	85
6	0.014	84
7	0.011	83
8	0.011	83
B-1	0.010	83
2	0.014	83
3	0.016	85
4	0.019	84
5	0.020	84
6	0.025	83
7	0.027	83
8	0.017	83

AVG. 0.01507 84

$(\sqrt{\Delta p})^2$ T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
ambient				
AVERAGE	−0−	AVERAGE	20.9	79.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
					1.1%

ABSOLUTE STACK GAS PRESSURE, in. Hg

P_s = (____) + [(____) / 13.6] = ☐
P_{bar} P_g P_s

DRY MOLE FRACTION OF STACK GAS

M_{fd} = 1 − (____ / 100) = ☐
%H_2O M_{fd}

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

M_d = [0.44 (____)] + [0.32 (____)] + [0.28 (____ + ____)] = ☐
%CO_2 %O_2 %N_2 %CO M_d

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

M_s = (____)(____) + 0.18 (____) = ☐
M_d M_{fd} %H_2O M_s

AVERAGE STACK GAS VELOCITY, ft/sec

v_s = 85.49 (____) $\sqrt{(\ \ )(\ \ + 460)\ /\ (\ \ )(\ \ )}$ = ☐
C_p Δp_{avg} t_s P_s M_s v_s

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

Q_{sd} = 7.353 (____)(____)(____)(____) / (____ + 460) = ☐
M_{fd} v_s A P_s t_s Q_{sd}

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

Q_{aw} = (60 / 144)(____)(____) = ☐
v_s A Q_{aw}

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AIR FLOW RATE DETERMINATIONS

COMPANY NAME Metal Container Corp RUN # 15-3

ADDRESS Jacksonville Fla. DATE 1-2#87

MEASUREMENT LOCATION #15 START-FINISH TIME 751-753

DUCT DIMENSIONS ______ DUCT AREA (A) ______ $IN.^2$ PERSONNEL SSH/KSD

BARO. PRESSURE (P_{BAR}) 30.3 IN. H_G STATIC PRESSURE (P_G) -.024 IN.H_2O

PITOT PROBE I.D. PT12 PITOT TUBE COEFFICIENT (C_P) 0.84

— Traverse Times —

START ______ FINISH ______

POINT #	Δp IN H_2O	TEMP. °F
A-1	0.005	81
2	0.010	82
3	0.015	82
4	0.020	84
5	0.025	84
6	0.020	81
7	0.020	81
8	0.020	81
B-1	0.005	81
2	0.010	83
3	0.010	82
4	0.020	84
5	0.020	84
6	0.025	82
7	0.030	81
8	0.025	81

AVG. 0.01725 82

$(\sqrt{\Delta p})^2$ T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
ambient				
	AVERAGE -0-	AVERAGE	20.9	79.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
					1%

ABSOLUTE STACK GAS PRESSURE, in. Hg

$P_s = (\underset{P_{bar}}{\quad}) + [(\underset{P_g}{\quad}) / 13.6] = \boxed{\quad}_{P_s}$

DRY MOLE FRACTION OF STACK GAS

$M_{fd} = 1 - (\underset{\%H_2O}{\quad} / 100) = \boxed{\quad}_{M_{fd}}$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_d = [0.44\ (\underset{\%CO_2}{\quad})] + [0.32\ (\underset{\%O_2}{\quad})] + [0.28\ (\underset{\%N_2}{\quad} + \underset{\%CO}{\quad})] = \boxed{\quad}_{M_d}$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_s = (\underset{M_d}{\quad})(\underset{M_{fd}}{\quad}) + 0.18\ (\underset{\%H_2O}{\quad}) = \boxed{\quad}_{M_s}$

AVERAGE STACK GAS VELOCITY, ft/sec

$v_s = 85.49\ (\underset{C_p}{\quad}) \sqrt{(\underset{\Delta p_{avg}}{\quad})(\underset{t_s}{\quad} + 460) / (\underset{P_s}{\quad})(\underset{M_s}{\quad})} = \boxed{\quad}_{v_s}$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

$Q_{sd} = 7.353\ (\underset{M_{fd}}{\quad})(\underset{v_s}{\quad})(\underset{A}{\quad})(\underset{P_s}{\quad}) / (\underset{t_s}{\quad} + 460) = \boxed{\quad}_{Q_{sd}}$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

$Q_{aw} = (60 / 144)(\underset{v_s}{\quad})(\underset{A}{\quad}) = \boxed{\quad}_{Q_{aw}}$

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Preliminary Field Data

PLANT NAME Anheuser Busch
LOCATION Jacksonville, FL
SAMPLING LOCATION #14, 15 + 16

DUCT DEPTH
FROM INSIDE FAR WALL TO OUTSIDE OF PORT 20¾"
NIPPLE LENGTH —
DEPTH OF DUCT 20¾"
WIDTH (RECTANGULAR DUCT) —

EQUIVALENT DIAMETER:

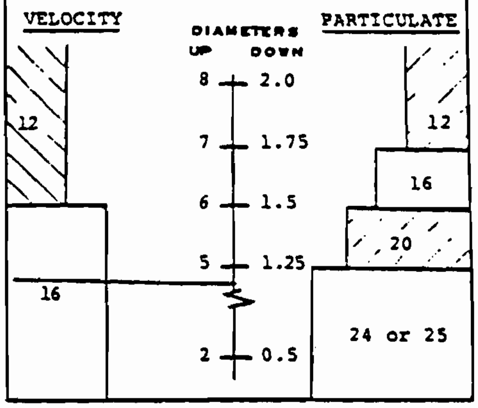
$$D_E = \frac{2 \times \text{DEPTH} \times \text{WIDTH}}{\text{DEPTH} + \text{WIDTH}} = \frac{2(\quad)(\quad)}{(\quad + \quad)} = \text{—}$$

DISTANCE FROM PORTS TO NEAREST FLOW DISTURBANCE	UPSTREAM	DOWNSTREAM
	90"	290"
DIAMETERS	4.3	14

STACK AREA= $\left(\frac{20.75}{2}\right)^2 \pi = 338.2$ IN²

DRAW HORIZONTAL LINE THROUGH DIAMETERS

If more than 8 and 2 diameters and if duct dia. is less than 24", use 8 or 9 points.



Point	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL	DISTANCE FROM OUTSIDE OF PORT
1	3.2	0.66	1"
2	10.5	2.18	2¼"
3	19.4	4.03	4"
4	32.3	6.70	6¾"
5	67.7	14.05	14"
6	80.6	16.72	16¾"
7	89.5	18.57	18⅝"
8	96.8	20.09	19¾"
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			

LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

LOCATION OF TRAVERSE POINTS IN RECTANGULAR STACKS

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
[illegible]											95.8

ENTROPY
ENVIRONMENTALISTS, INC

AIR FLOW RATE DETERMINATIONS

COMPANY NAME Metal Container Corp RUN # 16-1
ADDRESS Jacksonville Fla DATE 1-23-86
MEASUREMENT LOCATION Loc #16 START-FINISH TIME 1505-1510
DUCT DIMENSIONS ____ DUCT AREA (A) ____ IN.^{2} PERSONNEL [illegible]
BARO. PRESSURE (P_{BAR}) 30.3 IN. H_G STATIC PRESSURE (P_G) -.025 IN.H_2O
PITOT PROBE I.D. S-type PITOT TUBE COEFFICIENT (C_p) 0.84

— Traverse Times —
START ____ FINISH ____

POINT #	Δp IN H_2O	TEMP. °F
A-1	.02	77
2	.03	78
3	.035	78
4	.04	78
5	.04	77
6	.04	78
7	.03	78
8	.025	77
B-1	.02	77
2	.03	77
3	.035	78
4	.04	78
5	.04	75
6	.03	78
7	.025	77
8	.025	77

AVG. 0.03116 $(\sqrt{\Delta p})^2$ 78 T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
ambient				
AVERAGE	-0-	AVERAGE	20.9	79.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
					1.1%

ABSOLUTE STACK GAS PRESSURE, in. Hg

$$P_s = \underset{P_{bar}}{(\qquad)} + \left[\underset{P_g}{(\qquad)} / 13.6\right] = \underset{P_s}{\boxed{\qquad}}$$

DRY MOLE FRACTION OF STACK GAS

$$M_{fd} = 1 - (\underset{\%H_2O}{\qquad} / 100) = \underset{M_{fd}}{\boxed{\qquad}}$$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$$M_d = \left[0.44\ \underset{\%CO_2}{(\qquad)}\right] + \left[0.32\ \underset{\%O_2}{(\qquad)}\right] + \left[0.28\ (\underset{\%N_2}{\qquad} + \underset{\%CO}{\qquad})\right] = \underset{M_d}{\boxed{\qquad}}$$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$$M_s = \underset{M_d}{(\qquad)}\underset{M_{fd}}{(\qquad)} + 0.18\ \underset{\%H_2O}{(\qquad)} = \underset{M_s}{\boxed{\qquad}}$$

AVERAGE STACK GAS VELOCITY, ft/sec

$$v_s = 85.49\ \underset{C_p}{(\qquad)} \sqrt{\underset{\Delta p_{avg}}{(\qquad)}(\underset{t_s}{\qquad} + 460) / \underset{P_s}{(\qquad)}\underset{M_s}{(\qquad)}} = \underset{v_s}{\boxed{\qquad}}$$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

$$Q_{sd} = 7.353\ \underset{M_{fd}}{(\qquad)}\underset{v_s}{(\qquad)}\underset{A}{(\qquad)}\underset{P_s}{(\qquad)} / (\underset{t_s}{\qquad} + 460) = \underset{Q_{sd}}{\boxed{\qquad}}$$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

$$Q_{aw} = (60 / 144)\underset{v_s}{(\qquad)}\underset{A}{(\qquad)} = \underset{Q_{aw}}{\boxed{\qquad}}$$

ENTROPY

AIR FLOW RATE DETERMINATIONS

COMPANY NAME Metal Container Corp RUN # 16-2

ADDRESS Jacksonville, Fla. DATE 1-23-87

MEASUREMENT LOCATION loc. #16 START-FINISH TIME 1640-1644

DUCT DIMENSIONS ______ DUCT AREA (A) ______ IN.^{2} PERSONNEL SSH/KYD

BARO. PRESSURE (P_{BAR}) 30.31 IN. H_G STATIC PRESSURE (P_G) -0.025 IN.H_2O

PITOT PROBE I.D. S-type PITOT TUBE COEFFICIENT (C_p) 0.84

Traverse Times START		FINISH
POINT #	**Δp IN H_2O**	**TEMP. °F**
A-1	0.025	79
2	0.028	79
3	0.034	83
4	0.041	83
5	0.033	84
6	0.024	81
7	0.022	81
8	0.023	79
B-1	0.025	79
2	0.025	79
3	0.031	84
4	0.042	83
5	0.037	83
6	0.035	83
7	0.027	81
8	0.029	79
AVG.	0.02976 $(\sqrt{\Delta p})^2$	81 T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
ambient				
AVERAGE	-0-	AVERAGE	20.9	79.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
					1.1%

ABSOLUTE STACK GAS PRESSURE, in. Hg

$P_s = (\quad)_{P_{bar}} + [(\quad)_{P_g} / 13.6] = \boxed{\quad}_{P_s}$

DRY MOLE FRACTION OF STACK GAS

$M_{fd} = 1 - (\quad_{\%H_2O} / 100) = \boxed{\quad}_{M_{fd}}$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_d = [0.44\ (\quad)_{\%CO_2}] + [0.32\ (\quad)_{\%O_2}] + [0.28\ (\quad_{\%N_2} + \quad_{\%CO})] = \boxed{\quad}_{M_d}$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole

$M_s = (\quad)_{M_d}(\quad)_{M_{fd}} + 0.18\ (\quad)_{\%H_2O} = \boxed{\quad}_{M_s}$

AVERAGE STACK GAS VELOCITY, ft/sec

$v_s = 85.49\ (\quad)_{C_p} \sqrt{(\quad)_{\Delta p_{avg}}(\quad_{t_s} + 460) / (\quad)_{P_s}(\quad)_{M_s}} = \boxed{\quad}_{v_s}$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm

$Q_{sd} = 7.353\ (\quad)_{M_{fd}}(\quad)_{v_s}(\quad)_{A}(\quad)_{P_s} / (\quad_{t_s} + 460) = \boxed{\quad}_{Q_{sd}}$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm

$Q_{aw} = (60 / 144)(\quad)_{v_s}(\quad)_{A} = \boxed{\quad}_{Q_{aw}}$

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AIR FLOW RATE DETERMINATIONS

COMPANY NAME Metal Container Corp. RUN # 16-3
ADDRESS Jacksonville, Fla. DATE 1-2487
MEASUREMENT LOCATION #16 START-FINISH TIME 754-759
DUCT DIMENSIONS ______ DUCT AREA (A) ______ IN.^{2} PERSONNEL SSH
BARO. PRESSURE (P_{BAR}) 30.3 IN. H_G STATIC PRESSURE (P_G) -0.025 IN.H_2O
PITOT PROBE I.D. PT12 PITOT TUBE COEFFICIENT (C_p) 0.84

— Traverse Times —
START ______ FINISH ______

POINT #	Δp IN H_2O	TEMP. °F
A-1	.020	81
2	.025	83
3	.020	84
4	.035	85
5	.035	84
6	.020	84
7	.015	83
6	.015	82
B-1	.010	81
2	.015	83
3	.020	84
4	.030	84
5	.025	85
6	.030	84
7	.035	84
8	.025	81

AVG. 0.02278 83
$(\sqrt{\Delta p})^2$ T_S

Flue Gas Composition - Sampling & Analysis Data

Sampling Data

PORT/POINT	CO_2 FYRITE	START STOP TIME	BAG #	PUMP #

Analysis Data

TIME OF ANALYSIS	CO_2 READING A	O_2 READING B	% O_2 B-A	%CO+N_2 100-B
	ambient			
AVERAGE	-0-	AVERAGE	20.9	79.1
	% CO_2		% O_2	%CO+N_2

Moisture Data

PORT	TIME	DRY BULB TEMP. F	WET BULB TEMP. F	DIFF.	% H_2O
					1%

ABSOLUTE STACK GAS PRESSURE, in. Hg
$P_s = (\quad)_{P_{bar}} + [(\quad)_{P_g} / 13.6] = \boxed{\quad}_{P_s}$

DRY MOLE FRACTION OF STACK GAS
$M_{fd} = 1 - (\quad_{\%H_2O} / 100) = \boxed{\quad}_{M_{fd}}$

DRY MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole
$M_d = [0.44 (\quad)_{\%CO_2}] + [0.32 (\quad)_{\%O_2}] + [0.28 (\quad_{\%N_2} + \quad_{\%CO})] = \boxed{\quad}_{M_d}$

WET MOLECULAR WEIGHT OF STACK GAS, lb/lb-mole
$M_s = (\quad)_{M_d}(\quad)_{M_{fd}} + 0.18 (\quad)_{\%H_2O} = \boxed{\quad}_{M_s}$

AVERAGE STACK GAS VELOCITY, ft/sec
$v_s = 85.49 (\quad)_{C_p} \sqrt{(\quad)_{\Delta p_{avg}} (\quad_{t_s} + 460) / (\quad)_{P_s}(\quad)_{M_s}} = \boxed{\quad}_{v_s}$

DRY VOLUMETRIC STACK GAS FLOW RATE, scfm
$Q_{sd} = 7.353 (\quad)_{M_{fd}}(\quad)_{v_s}(\quad)_{A}(\quad)_{P_s} / (\quad_{t_s} + 460) = \boxed{\quad}_{Q_{sd}}$

WET VOLUMETRIC STACK GAS FLOW RATE, acfm
$Q_{aw} = (60 / 144)(\quad)_{v_s}(\quad)_{A} = \boxed{\quad}_{Q_{aw}}$

ENTROPY

APPENDIX B.2.a

B. Field and Analytical Data

2. TGNMO

a. Thermal Oxidizer 2 (Locations 12 and 13)

- Stack
- Inlet

METHOD 25 FIELD DATA

Company Name Metal Container Corp
Address Jacksonville, Fla
Sampling Location Ex # 12
Tank Number 175 Trap # QS Sample Train # T1
Tank Volume 4.57 liters

Run # 12-1
Date 1-23-87
Start 1515
Finish 1615
Operator BJD

TANK PARAMETERS

Parameter	Barometric Pressure,		Tank Temp.,		Tank Pressure (mm Hg)		Leak Check (cm Hg/10 min)	
	in.Hg	mmHg	F	C	Gauge	Absolute	Tank	System
Pretest	303	770	60		-766	4	0	0
Post Test	30.3	770	65		-72	698	0	0
Final Pressure	30.3	770	82		+228	998		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
1515 / 0	28.0	60	
5	27.0	60	
10	24.5	60	
15	22.1	60	
20	19.7	60	
25	18.0	60	
30	15.7	60	
35	13.1	60	
40	11.0	60	
45	8.9	60	
50	6.5	60	
55	4.5	60	
1615 / 60	3.0	—	

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METHOD 25 FIELD DATA

Company Name Mead Container Corp

Address Jacksonville, Fla

Sampling Location Loc #12

Tank Number 178 Trap # QQ Sample Train # T-1

Tank Volume 4.47 liters

Run # 12-2

Date 1-23-96

Start 1847

Finish 1947

Operator

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	Barometric Pressure, mmHg	Tank Temp., F	Tank Temp., C	Tank Pressure (mm Hg) Gauge	Tank Pressure (mm Hg) Absolute	Leak Check (cm Hg/10 min) Tank	Leak Check (cm Hg/10 min) System
Pretest	30.31	770	68		-765	5	0	0
Post Test	30.31	770	68		-240	530	0	0
Final Pressure	30.3	770	68		+144	914		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
0	29.1	60	
5	27.2	60	
10	25.5	60	
15	23.5	60	
20	21.9	60	
25	20.1	60	
30	17.8	60	
35	16.5	60	
40	14.6	60	
45	13.5	60	
50	12.2	60	
55	10.8	60	
1947/60	9.4	—	

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METHOD 25 FIELD DATA

Company Name Metal Container Corp
Address Jacksonville, Fla.
Sampling Location # 12
Tank Number 180 Trap # 923 Sample Train # T-3
Tank Volume 4.54 liters

Run # 12-3
Date ~~1-28-87~~ 1/24/87
Start 758
Finish 858
Operator KAD

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	Barometric Pressure, mmHg	Tank Temp., F	Tank Temp., C	Tank Pressure (mm Hg) Gauge	Tank Pressure (mm Hg) Absolute	Leak Check (cm Hg/10 min) Tank	Leak Check (cm Hg/10 min) System
Pretest	30.3	770	39°		-765	5	0	0
Post Test	30.3	770	41		-32	738	0	0
Final Pressure	30.3	770	78		+152	922		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
0/0 758	29.0	60	
5	27.0	60	
10	25.0	60	
15	22.1	60	
20	19.1	60	
25	17.2	60	
30	15.7	60	
35	13.0	60	
40	10.6	60	
45	8.3	60	
50	6.1	60	
55	3.8	60	
858 60/0858	2.0	—	

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ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp. RUN NUMBER 12-1

ADDRESS Jacksonville, Fla DATE OF ANALYSIS 1-29-87

MEASUREMENT LOCATION loc # 12 OPERATOR KOD.

NONCONDENSIBLE ORGANIC CARBON

TANK # 175 Vol:, 4.57 liters

Field Final Abs. Press: 998 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. ______

Calibration Coefficient, Y ______

SAMPLE BAG ______ PARAMETERS

Temperature ______ °F ______ °C

Barometric Pressure ______ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

	pass 1	pass 2	pass 3		AVERAGE	
NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	21.2	22.0	22.0	=	21.7	ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER QS BAG NUMBER 13

FLOW METER I.D. M 75

FLOW METER GAMMA 0.98

FLOW SETTING 200 mL/min

PURGE VOLUME = (Y)(V) = 0.98 × 3.64 = 3.57 STD LITER

	pass 1	pass 2	pass 3		AVERAGE	
CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	1.2	1.1	1.1	=	1.13	ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER QS BAG NUMBER 9

FLOW METER I.D. M 90

FLOW METER GAMMA 0.98

OVEN TEMPERATURE 600 °C

FLOW SETTING 200 mL/min

ACTUAL PURGE VOLUME 7.47 DSL

CORRECTED PURGE VOLUME = (Y)(V) = 7.32 DSL

	pass 1	pass 2	pass 3		AVERAGE	
CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	20	20	20	=	20	ppmvd C

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METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp. RUN NUMBER 12-2

ADDRESS Jacksonville, Fla. DATE OF ANALYSIS 1-29-87

MEASUREMENT LOCATION Loc #12 OPERATOR RJD

NONCONDENSIBLE ORGANIC CARBON

TANK # 178 Vol:, 4.47 liters

Field Final Abs. Press: 914 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. ____

Calibration Coefficient, Y ____

SAMPLE BAG ____ PARAMETERS

Temperature ____ °F ____ °C

Barometric Pressure ____ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 17 (pass 1) 15 (pass 2) 14.9 (pass 3) = 15.6 AVERAGE ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO$_2$ PURGE & ANALYSIS

TRAP NUMBER QQ BAG NUMBER 2

FLOW METER I.D. M 75

FLOW METER GAMMA 0.98

FLOW SETTING 200 mL/min

PURGE VOLUME = (Y)(V) = 5.20 × 0.98 = 5.10 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 1.1 (pass 1) 1.1 (pass 2) 1.1 (pass 3) = 1.1 AVERAGE ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER QQ BAG NUMBER 5

FLOW METER I.D. M 90

FLOW METER GAMMA 0.98

OVEN TEMPERATURE 600 °C

FLOW SETTING 200 mL/min

ACTUAL PURGE VOLUME 5.53 DSL CORRECTED PURGE VOLUME = (Y)(V) = 4.42 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 20 (pass 1) 20 (pass 2) 20 (pass 3) = 20 AVERAGE ppmvd C

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METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Containers Corp
RUN NUMBER 12-3
ADDRESS Jacksonville, Fla.
DATE OF ANALYSIS 1-29-87
MEASUREMENT LOCATION Loc #12
OPERATOR KJD

NONCONDENSIBLE ORGANIC CARBON

TANK # 180 Vol:, 4.54 liters
Field Final Abs. Press: 922 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. ______
Calibration Coefficient, Y ______

SAMPLE BAG ______ PARAMETERS
Temperature ______ °F ______ °C
Barometric Pressure ______ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	23.8	23.1	23.0	=	23.3	ppmvd C
	pass 1	pass 2	pass 3		AVERAGE	

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER Q23
BAG NUMBER 4
FLOW METER I.D. M75
FLOW METER GAMMA 0.98
FLOW SETTING 200 mL/min

PURGE VOLUME = (Y)(V) = 0.98 × 3.87 = 3.79 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	1.3	1.5	1.1	=	1.3	ppmvd C
	pass 1	pass 2	pass 3		AVERAGE	

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER Q23
BAG NUMBER 1
FLOW METER I.D. M90
FLOW METER GAMMA 0.98
OVEN TEMPERATURE 600 °C
FLOW SETTING 200 mL/min
ACTUAL PURGE VOLUME 6.53 DSL
CORRECTED PURGE VOLUME = (Y) (V) = 6.40 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	46	46	46	=	46	ppmvd C
	pass 1	pass 2	pass 3		AVERAGE	

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METHOD 25 FIELD DATA

Company Name METAL CONTAINER CORP.
Address JACKSONVILLE, FLA.
Sampling Location LOC. #13
Tank Number 177 Trap # 9B Sample Train # T4
Tank Volume 4.62 liters

Run # 13-1
Date 1/23/87
Start 15:15
Finish 16:18
Operator BWH

STOPPED WATCH FOR 3 MIN. BECAUSE OF LOW FLOW

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	mmHg	Tank Temp., F	C	Tank Pressure (mm Hg) Gauge	Absolute	Leak Check (cm Hg/10 min) Tank	System
Pretest	30.31	770	82		-766	4.0	0.0	0.0
Post Test	30.31	770	82		-251	519	0.0	0.0
Final Pressure	30.3	770	82		+136	906		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
1515	-29.2	60	
20	-28.0	60	
25	-27.5	60	
30	-26.0	60	
35	-24.0		
40	-22.3		
45	-21.0		
50	-18.5		
55	-17.0		
1600	-15.5		
05	-14.0		
10	-12.0		
1615/OFF	-10.8	—	

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ENTROPY

METHOD 25 FIELD DATA

Company Name METAL CONTAINER CORP.
Address JAX, FLA.
Sampling Location LOC. # 13
Tank Number 173 Trap # QI Sample Train # T4
Tank Volume 4.48 liters

Run # 13-2
Date 1/23/87
Start 18:48
Finish 19:48
Operator BW

~~TANK PARAMETERS~~

Parameter	Barometric Pressure, in.Hg	mmHg	Tank Temp., F	C	Tank Pressure (mm Hg) Gauge	Absolute	Leak Check (cm Hg/10 min) Tank	System
Pretest	30.31	770	82		-767	3.0	0.0	0.0
Post Test	30.31	770	82		-228	542	0.0	0.0
Final Pressure	30.3	770	82		+147	917		

SAMPLE DATA

124
108

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
1848	-29.0	60	
53	-28.0		
58	-26.8		
1903	-25.0		
08	-23.5		
13	-22.0		
18	-20.0		
23	-18.0		
28	-16.2		
33	-14.5		
38	-13.0		
43	-11.2	↓	
1948/OFF	-9.7	—	

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ENTROPY

METHOD 25 FIELD DATA

Company Name METAL CONTAINER CORP.
Address JACKSONVILLE, FLA.
Sampling Location LOC #13
Tank Number 179 Trap # QD Sample Train # T4
Tank Volume 4.62 liters

Run # 13-3
Date 1/24/87
Start 758
Finish 858
Operator BWK

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	Barometric Pressure, mmHg	Tank Temp., F	Tank Temp., C	Tank Pressure (mm Hg) Gauge	Tank Pressure (mm Hg) Absolute	Leak Check (cm Hg/10 min) Tank	Leak Check (cm Hg/10 min) System
Pretest	30.31	770	84		-768	2.0	0.0	0.0
Post Test	30.31	770	84		-187	583	0.0	0.0
Final Pressure	30.31	770	85		+152	922		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
758	-28.7	60	
803	-28.0		
08	-26.3		
13	-24.5		
18	-22.5		
23	-20.8		
28	-19.0		
33	-17.0		
38	-15.0		
43	-13.2		
48	-11.5		
53	-9.8		
858/off	-8.0		

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ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp. RUN NUMBER 13-1
ADDRESS Jacksonville, Fla DATE OF ANALYSIS 1-29-87
MEASUREMENT LOCATION loc #13 OPERATOR KAD

NONCONDENSIBLE ORGANIC CARBON

TANK # 177 Vol:, 4.62 liters
Field Final Abs. Press: 906 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. ______
Calibration Coefficient, Y ______

SAMPLE BAG ______ PARAMETERS
Temperature ______ °F ______ °C
Barometric Pressure ______ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg Gauge	Pressure, mmHg Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters: From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 43 (pass 1) 49 (pass 2) ~~[illegible]~~46 (pass 3) = 46 (AVERAGE) ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER Q8 BAG NUMBER 13
FLOW METER I.D. MODEL 75
FLOW METER GAMMA 0.98
FLOW SETTING 200 mL/min
PURGE VOLUME = (Y)(V) = 0.98 × 14.62 = 14.33 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 2.3 (pass 1) 2.8 (pass 2) 1.9 (pass 3) = 2.3 (AVERAGE) ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER Q8 BAG NUMBER 6
FLOW METER I.D. MODEL 75
FLOW METER GAMMA 0.98
OVEN TEMPERATURE 600 °C FLOW SETTING 200 mL/min
ACTUAL PURGE VOLUME 7.11 DSL CORRECTED PURGE VOLUME = (Y)(V) = 6.97 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 460 (pass 1) 460 (pass 2) 460 (pass 3) = 460 (AVERAGE) ppmvd C

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ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp.
RUN NUMBER 13-2
ADDRESS Jacksonville, Fla
DATE OF ANALYSIS 1-29-87
MEASUREMENT LOCATION Loc. #3
OPERATOR KYD

NONCONDENSIBLE ORGANIC CARBON

TANK # 173 Vol:, 4.48 liters
Field Final Abs. Press: 917 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D.
Calibration Coefficient, Y

SAMPLE BAG PARAMETERS
Temperature °F °C
Barometric Pressure in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air . Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	pass 1	pass 2	pass 3		AVERAGE	
	44	47	45	=	45.3	ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER QI
BAG NUMBER 4
FLOW METER I.D. MODEL 75
FLOW METER GAMMA 0.98
FLOW SETTING 200 mL/min
PURGE VOLUME = (Y)(V) = 0.98 × 2.72 = 2.67 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	pass 1	pass 2	pass 3		AVERAGE	
	4.3	3.0	4.5	=	3.9	ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER QI
BAG NUMBER 5
FLOW METER I.D. MODEL 75
FLOW METER GAMMA 0.98
OVEN TEMPERATURE 600 °C
FLOW SETTING 200 mL/min
ACTUAL PURGE VOLUME 7.01 DSL
CORRECTED PURGE VOLUME = (Y) (V) = 6.87 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	pass 1	pass 2	pass 3		AVERAGE	
	440	440	440	=	440	ppmvd C

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ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp. RUN NUMBER 13-3
ADDRESS Jacksonville, Fla. DATE OF ANALYSIS 1-29-87
MEASUREMENT LOCATION loc# 13 OPERATOR KSD

NONCONDENSIBLE ORGANIC CARBON

TANK # 179 Vol:, 4.62 liters
Field Final Abs. Press: 922 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. ______
Calibration Coefficient, Y ______

SAMPLE BAG ______ PARAMETERS
Temperature ______ °F ______ °C
Barometric Pressure ______ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air. Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 47.1 pass 1 48 pass 2 48 pass 3 = 47.7 AVERAGE ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER QD
BAG NUMBER 9
FLOW METER I.D. MODEL 75
FLOW METER GAMMA 0.98
FLOW SETTING 200 mL/min
PURGE VOLUME = (Y)(V) = 0.98 × 10.57 = 10.36 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 1.5 pass 1 1.5 pass 2 1.5 pass 3 = 1.5 AVERAGE ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER QD
BAG NUMBER 15
FLOW METER I.D. MODEL 75
FLOW METER GAMMA 0.98
OVEN TEMPERATURE 600 °C
FLOW SETTING 200 mL/min
ACTUAL PURGE VOLUME 6.23 DSL
CORRECTED PURGE VOLUME = (Y)(V) = 6.11 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 476 pass 1 476 pass 2 476 pass 3 = 476 AVERAGE ppmvd C

APPENDIX B.2.b

B. Field and Analytical Data

- 2. TGNMO
  - b. POBV Stacks (Locations 14, 15, 16)

METHOD 25 FIELD DATA

Company Name Metal Container Corp.
Address Jacksonville, Fla.
Sampling Location #14
Tank Number 169 Trap # Q0 Sample Train # T-2
Tank Volume 4.62 liters

Run # 14-1
Date 1-23-87
Start 1515
Finish 1615
Operator SSH

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	Barometric Pressure, mmHg	Tank Temp., F	Tank Temp., C	Tank Pressure (mm Hg) Gauge	Tank Pressure (mm Hg) Absolute	Leak Check (cm Hg/10 min) Tank	Leak Check (cm Hg/10 min) System
Pretest	30.3	770	68		-766	4	0	0
Post Test	30.3	770	65		-181	589	0	0
Final Pressure	30.3	770	82		+227	997		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
0/0	29.3	60	
5	27.0	60	
10	24.9	60	
15	23.1	60	
20	21.1	60	
25	19.2	60	
30	17.5	60	
35	15.5	60	
40	14.0	60	
45	12.1	60	
50	10.5	60	
55	8.6	60	
60/055	5.9	60	

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ENTROPY

METHOD 25 FIELD DATA

Company Name Metal Container Corp

Address Jacksonville, Fla.

Sampling Location #14

Tank Number 174 Trap # QP Sample Train # T2

Tank Volume 4.57 liters

Run # 14-2

Date 1-23-87

Start 1847

Finish 1947

Operator SSH

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	mmHg	Tank Temp., F	C	Tank Pressure (mm Hg) Gauge	Absolute	Leak Check (cm Hg/10 min) Tank	System
Pretest	30.3	770	65		-766	4	0	0
Post Test	30.3	770	65		-170	600	0	0
Final Pressure	30.3	770	65		+151	921		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
0/0	29.2	60	
5	27.0	60	
10	25.5	60	
15	23.5	60	
20	21.6	60	
25	19.8	60	
30	17.2	60	
35	16.0	60	
40	14.0	60	
45	12.3	60	
50	10.5	60	
55	8.7	60	
60/off	7.0	60	

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METHOD 25 FIELD DATA

Company Name Metal Container Corp.

Address Jacksonville, Fla.

Sampling Location # 14

Tank Number 176 Trap # QC Sample Train # T-5

Tank Volume 4.61 liters

Run # 14-3

Date 1-24-87

Start 0758

Finish 0858

Operator SSH

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	mmHg	Tank Temp., F	C	Tank Pressure (mm Hg) Gauge	Absolute	Leak Check (cm Hg/10 min) Tank	System
Pretest	30.3	770	39		-769	3	0	0
Post Test	30.3	770	41		-134	636	0	0
Final Pressure	30.3	770	78		+172	942		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
0/0	29.2	60	
5	26.8	60	
10	24.3	60	
15	22.5	60	
20	20.7	60	
25	18.0	60	
30	16.1	60	
35	14.4	60	
40	12.3	60	
45	10.7	60	
50	9.0	60	
55	7.5	60	
60/055	6.4	60	

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ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp. RUN NUMBER 14-1

ADDRESS Jacksonville, Fla. DATE OF ANALYSIS 1-29-87

MEASUREMENT LOCATION Loc #14 OPERATOR KYD

NONCONDENSIBLE ORGANIC CARBON

TANK # 169 Vol.: 4.62 liters

Field Final Abs. Press: 997 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. ______

Calibration Coefficient, Y ______

SAMPLE BAG ______ PARAMETERS

Temperature ______ °F ______ °C

Barometric Pressure ______ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	pass 1	pass 2	pass 3	= AVERAGE	
	5.4	2.6	3.1	3.7	ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER Q0

BAG NUMBER #4

FLOW METER I.D. M75

FLOW METER GAMMA 0.98

FLOW SETTING 200 mL/min

PURGE VOLUME = (Y)(V) = 0.98 × 5.63 = 5.51 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	pass 1	pass 2	pass 3	= AVERAGE	
	1.1	1.1	1.1	1.1	ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER Q0

BAG NUMBER 11

FLOW METER I.D. Model 90

FLOW METER GAMMA 0.98

OVEN TEMPERATURE 600 °C

FLOW SETTING 200 mL/min

ACTUAL PURGE VOLUME 7.21 DSL

CORRECTED PURGE VOLUME = (Y)(V) = 7.07 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	pass 1	pass 2	pass 3	= AVERAGE	
	52	52	52	52	ppmvd C

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ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp RUN NUMBER 14-2
ADDRESS Jacksonville, Fla. DATE OF ANALYSIS 1-29-87
MEASUREMENT LOCATION Ser #14 OPERATOR KWD

NONCONDENSIBLE ORGANIC CARBON

TANK # 174 Vol:, 4.57 liters
Field Final Abs. Press: 921 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. _____
Calibration Coefficient, Y _____

SAMPLE BAG PARAMETERS
Temperature _____ °F _____ °C
Barometric Pressure _____ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg Gauge	Pressure, mmHg Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters: From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C ~~[illegible]~~ 21 (pass 1) ~~[illegible]~~ 2.9 (pass 2) ~~2.2~~ 2.2 (pass 3) = 2.4 (AVERAGE) ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER Q7 BAG NUMBER #15 FLOW METER I.D. M75
FLOW METER GAMMA 0.98
FLOW SETTING 200 mL/min
PURGE VOLUME = (Y)(V) = 0.98 × 7.96 = 7.80 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 1.1 (pass 1) 1.3 (pass 2) 1.1 (pass 3) = 1.16 (AVERAGE) ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER Q7 BAG NUMBER 11 FLOW METER I.D. M90
FLOW METER GAMMA [illegible].98
OVEN TEMPERATURE 600 °C FLOW SETTING 200 mL/min
ACTUAL PURGE VOLUME 6.07 DSL CORRECTED PURGE VOLUME = (Y) (V) = 5.95 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 56 (pass 1) 56 (pass 2) 56 (pass 3) = 56 (AVERAGE) ppmvd C

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ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp
RUN NUMBER 14-3
ADDRESS Jacksonville, Fla.
DATE OF ANALYSIS 1-29-87
MEASUREMENT LOCATION loc #14
OPERATOR KGD.

NONCONDENSIBLE ORGANIC CARBON

TANK # 176 Vol.: 4.61 liters
Field Final Abs. Press: 942 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. ______
Calibration Coefficient, Y ______

SAMPLE BAG ______ PARAMETERS
Temperature ______ °F ______ °C
Barometric Pressure ______ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 2.1 pass 1 1.9 pass 2 2.2 pass 3 = 2.06 AVERAGE ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER QC
BAG NUMBER 13
FLOW METER I.D. M 75
FLOW METER GAMMA 0.98
FLOW SETTING 200 mL/min
PURGE VOLUME = (Y)(V) = 0.98 × 3.14 = 3.08 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 1.1 pass 1 1.5 pass 2 1.1 pass 3 = 1.23 AVERAGE ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER QC
BAG NUMBER 10
FLOW METER I.D. M 90
FLOW METER GAMMA 0.98
OVEN TEMPERATURE 600 °C
FLOW SETTING 200 mL/min
ACTUAL PURGE VOLUME 6.59 DSL
CORRECTED PURGE VOLUME = (Y)(V) = 6.46 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 100 pass 1 100 pass 2 100 pass 3 = 100 AVERAGE ppmvd C

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ENTROPY

METHOD 25 FIELD DATA

Company Name Metal Container Corp
Address Jacksonville, Fla.
Sampling Location # 15
Tank Number #3 Trap # Q59 Sample Train # T-5
Tank Volume 15.78 liters

Run # 15-1
Date 1-23-87
Start 1515
Finish 1615
Operator SSH

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	Barometric Pressure, mmHg	Tank Temp., F	Tank Temp., C	Tank Pressure (mm Hg) Gauge	Tank Pressure (mm Hg) Absolute	Leak Check (cm Hg/10 min) Tank	Leak Check (cm Hg/10 min) System
Pretest	30.3	770	68		-767	3	0	0
Post Test	30.3	770	65		-460	310	0	0
Final Pressure	30.3	770	82		+146	916		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
0/o	29.0	80	
5	27.9	80	
10	27.2	80	
15	26.7	86	
20	25.9	80	
25	25.0	80	
30	24.3	80	
35	23.2	80	
40	27.7	80	
45	21.8	80	
50	20.7	80	
55	19.8	80	
60/off	18.9	80	

ENTROPY

METHOD 25 FIELD DATA

Company Name Metal Container Corp.
Address Jacksonville Fla.
Sampling Location #15
Tank Number 4 Trap # QG Sample Train # T-5
Tank Volume 15.71 liters

Run # 15-2
Date 1-23-87
Start 1847
Finish 1947
Operator SSH

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	mmHg	Tank Temp., F	C	Tank Pressure (mm Hg) Gauge	Absolute	Leak Check (cm Hg/10 min) Tank	System
Pretest	30.3	770	64		-767	3	0	0
Post Test	30.3	770	82		-422	328	0	0
Final Pressure	30.3	770	82		+151	921		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
0/0	28.7	80	
5	27.4	80	
10	26.8	80	
15	26.0	80	
20	25.1	80	
25	24.2	80	
30	23.3	80	
35	22.3	80	
40	21.3	80	
45	20.5	80	
50	19.8	80	
55	18.7	80	
60/off	17.8	80	

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ENTROPY

METHOD #25 FIELD DATA

Company Name Metal Container Corp
Run # 15-3
Address Jacksonville, Fla.
Date 1-24 87
Sampling Location #15
Start 0758
Tank Number 1 Trap # QR Sample Train # T-6
Finish 0858
Tank Volume 15.80 liters
Operator SJH

TANK PARAMETERS

Parameter	Barometric Pressure,		Tank Temp.,		Tank Pressure (mm Hg)		Leak Check (cm Hg/10 min)	
	in.Hg	mmHg	F	C	Gauge	Absolute	Tank	System
Pretest	30.3	770	39		-766	4	0	0
Post Test	30.3	770	41		-490	280	0	0
Final Pressure	30.3	770	78		+160	930		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
0/0	29.0	80	
5	26.8	80	
10	26.1	80	
15	25.2	80	
20	24.7	80	
25	23.5	80	
30	22.7	80	
35	21.8	80	
40	21.0	80	
45	20.1	80	
50	19.5	80	
55	18.6	80	
60/~~655~~	17.5	80	

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ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp.
RUN NUMBER 15-1
ADDRESS Jacksonville, Fla.
DATE OF ANALYSIS 1-30-87
MEASUREMENT LOCATION Loc #15
OPERATOR KAD

NONCONDENSIBLE ORGANIC CARBON

TANK # 3 Vol:, 15.78 liters
Field Final Abs. Press: 916 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D.
Calibration Coefficient, Y

SAMPLE BAG PARAMETERS
Temperature °F °C
Barometric Pressure in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 0 pass 1 0 pass 2 0 pass 3 = $\boxed{0}$ AVERAGE ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER Q59
BAG NUMBER 8
FLOW METER I.D. M 75
FLOW METER GAMMA 0.98
FLOW SETTING 200 mL/min
PURGE VOLUME = (Y)(V) = 0.98 × 12.74 = 12.49 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 2.0 pass 1 1.1 pass 2 1.1 pass 3 = $\boxed{1.4}$ AVERAGE ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER Q59
BAG NUMBER 15
FLOW METER I.D. M 90
FLOW METER GAMMA 0.98
OVEN TEMPERATURE 600 °C
FLOW SETTING 200 mL/min
ACTUAL PURGE VOLUME 10.73 DSL
CORRECTED PURGE VOLUME = (Y) (V) = 10.52 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 140 pass 1 140 pass 2 140 pass 3 = $\boxed{140}$ AVERAGE ppmvd C

ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp. RUN NUMBER 15-2

ADDRESS Jacksonville, Fla. DATE OF ANALYSIS 1-30-87

MEASUREMENT LOCATION Line #15 OPERATOR AWM

NONCONDENSIBLE ORGANIC CARBON

TANK # 4 Vol:, 15.71 liters

Field Final Abs. Press: 921 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. ______

Calibration Coefficient, Y ______

SAMPLE BAG ______ PARAMETERS

Temperature ______ °F ______ °C

Barometric Pressure ______ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg Gauge	Pressure, mmHg Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 0 (pass 1) 0 (pass 2) 0 (pass 3) = 0 (AVERAGE) ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER QG BAG NUMBER 2

FLOW METER I.D. M 75

FLOW METER GAMMA 0.98

FLOW SETTING 200 mL/min

PURGE VOLUME = (Y)(V) = 0.98 × 8.08 = 7.92 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 1.1 (pass 1) 1.1 (pass 2) 1.1 (pass 3) = 1.1 (AVERAGE) ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER QG BAG NUMBER 15

FLOW METER I.D. M 90

FLOW METER GAMMA 0.98

OVEN TEMPERATURE 600 °C

FLOW SETTING 200 mL/min

ACTUAL PURGE VOLUME 9.76 DSL CORRECTED PURGE VOLUME = (Y) (V) = 9.56 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 376 (pass 1) 376 (pass 2) 376 (pass 3) = 376 (AVERAGE) ppmvd C

F-1027
8/86

ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Coating Corp.
RUN NUMBER 15-3

ADDRESS Jacksonville, Fla.
DATE OF ANALYSIS 1-30-87

MEASUREMENT LOCATION Jar #15
OPERATOR ______

NONCONDENSIBLE ORGANIC CARBON

TANK # 1 Vol.: 15.80 liters

Field Final Abs. Press: 930 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. ______

Calibration Coefficient, Y ______

SAMPLE BAG ______ PARAMETERS

Temperature ______ °F ______ °C

Barometric Pressure ______ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	pass 1	pass 2	pass 3	= AVERAGE	
	0	0	0	0	ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO$_2$ PURGE & ANALYSIS

TRAP NUMBER QR
BAG NUMBER 12
FLOW METER I.D. M 75
FLOW METER GAMMA 0.98
FLOW SETTING 200 mL/min

PURGE VOLUME = (Y)(V) = 0.98 × 9.87 = 9.67 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	pass 1	pass 2	pass 3	= AVERAGE	
	2.0	1.3	1.3	1.53	ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER QR
BAG NUMBER 11
FLOW METER I.D. M 90
FLOW METER GAMMA 0.98

OVEN TEMPERATURE 600 °C
FLOW SETTING 200 mL/min

ACTUAL PURGE VOLUME 6.23 DSL
CORRECTED PURGE VOLUME = (Y) (V) = 6.10 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	pass 1	pass 2	pass 3	= AVERAGE	
	100	100	100	100	ppmvd C

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ENTROPY

METHOD 25 FIELD DATA

Company Name Metal Container Corp
Address Jacksonville, Fla.
Sampling Location Oven #16
Tank Number V871 Trap # Q21 Sample Train # T-3
Tank Volume 10.277 liters

Run # 16-1
Date 1-23-87
Start 1515
Finish 1615
Operator WJD

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	Barometric Pressure, mmHg	Tank Temp., F	Tank Temp., C	Tank Pressure (mm Hg) Gauge	Tank Pressure (mm Hg) Absolute	Leak Check (cm Hg/10 min) Tank	Leak Check (cm Hg/10 min) System
Pretest	30.31	770	68		-766	4	0	0
Post Test	30.31	770	65		-348	422	0	0
Final Pressure	30.31	770	82		+172	942		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
1515 0	28.8	80	
5	28.0	80	
10	26.5	80	
15	25.4	80	
20	24.7	80	
25	22.6	80	
30	21.7	80	
35	20.0	80	
40	19.0	80	
45	18.0	80	
50	16.0	80	
55	14.8	80	
1615 60	13.7	[illegible]	

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ENTROPY

METHOD 25 FIELD DATA

Company Name Metal Container Corp
Address Jacksonville, Fla
Sampling Location Loc #16
Tank Number V8270 Trap # Q25 Sample Train # T-3
Tank Volume 10.214 liters

Run # 16-2
Date 1-23-88
Start 1847
Finish 1947
Operator [illegible]

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	Barometric Pressure, mmHg	Tank Temp., F	Tank Temp., C	Tank Pressure (mm Hg) Gauge	Tank Pressure (mm Hg) Absolute	Leak Check (cm Hg/10 min) Tank	Leak Check (cm Hg/10 min) System
Pretest	30.3	770	68		-764	3	0	0
Post Test	30.3	720	80		-323	447	0	0
Final Pressure	30.3	720	80		+133	903		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
0	29.0	80	
5	27.9	80	
10	26.5	80	
15	25.2	80	
20	24.1	80	
25	22.5	80	
30	20.7	80	
35	19.2	80	
40	18.1	80	
45	16.6	80	
50	15.8	80	
55	14.0	80	
1947 / Off	12.5		

ENTROPY

METHOD 25 FIELD DATA

Company Name Metal Container Corp.
Address Jacksonville, Fla.
Sampling Location # 16
Tank Number V8087 Trap # Q30 Sample Train # T-1
Tank Volume 10.178 liters

Run # 16-3
Date 1-24-87
Start 758
Finish 858
Operator KMD

TANK PARAMETERS

Parameter	Barometric Pressure, in.Hg	mmHg	Tank Temp., F	C	Tank Pressure (mm Hg) Gauge	Absolute	Leak Check (cm Hg/10 min) Tank	System
Pretest	30.3	770	39°		-769	1	0	0
Post Test	30.3	770	41		-339	431	0	0
Final Pressure	30.3	770	78		+157	927		

SAMPLE DATA

Clock Time	Gauge Pressure, Inches Hg	Flow Meter Setting, cc/min	
758/0	28.5	~~60~~ 80	
5	28.0	~~60~~ 80	
10	27.0	80	
15	26.0	80	
20	24.1	80	
25	23.0	80	
30	21.8	80	
35	19.9	80	
40	18.9	80	
45	17.4	80	
50	16.1	80	
55	14.8	80	
858 60/~~855~~	13.2	—	

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ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp. RUN NUMBER 16-1

ADDRESS Jacksonville, Fla. DATE OF ANALYSIS 1-29-87

MEASUREMENT LOCATION Loc #16 OPERATOR KAD.

NONCONDENSIBLE ORGANIC CARBON

TANK # V871 Vol:, 10.277 liters

Field Final Abs. Press: 942 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

FLOW METER I.D.

Calibration Coefficient, Y

SAMPLE BAG PARAMETERS

Temperature °F °C

Barometric Pressure in.Hg.

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C .5 (pass 1) 0 (pass 2) 0 (pass 3) = .16 AVERAGE ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER 021 BAG NUMBER 4

FLOW METER I.D. M75

FLOW METER GAMMA 0,98

FLOW SETTING 200 mL/min

PURGE VOLUME = (Y)(V) = 0,98 × 9.06 l = 8.88 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 2.5 (pass 1) 2.2 (pass 2) 1.3 (pass 3) = 2.0 AVERAGE ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER 021 BAG NUMBER 11

FLOW METER I.D. M90

FLOW METER GAMMA 0.98

OVEN TEMPERATURE 600 °C

FLOW SETTING 200 mL/min

ACTUAL PURGE VOLUME 5.69 DSL

CORRECTED PURGE VOLUME = (Y) (V) = 5.58 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 86 (pass 1) 86 (pass 2) 86 (pass 3) = 86 AVERAGE ppmvd C

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ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Container Corp.   RUN NUMBER 16-2

ADDRESS Jacksonville, Fla.   DATE OF ANALYSIS 1-29-87

MEASUREMENT LOCATION loc #16   OPERATOR KAD

NONCONDENSIBLE ORGANIC CARBON

TANK # V8270 Vol:, 10.214 liters

Field Final Abs. Press: 903 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. ____

Calibration Coefficient, Y ____

SAMPLE BAG ____ PARAMETERS

Temperature ____ °F ____ °C

Barometric Pressure ____ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 0 (pass 1) 0 (pass 2) 0 (pass 3) = 0 (AVERAGE) ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER 925   BAG NUMBER 12

FLOW METER I.D. M 75

FLOW METER GAMMA 0.98

FLOW SETTING 200 mL/min

PURGE VOLUME = (Y)(V) = 0.98 × 9.55 = 9.36 STD LITER

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 1.3 (pass 1) 2.1 (pass 2) 1.2 (pass 3) = 1.5 (AVERAGE) ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER 925   BAG NUMBER #1

FLOW METER I.D. M10

FLOW METER GAMMA 0.98

OVEN TEMPERATURE 600 °C

FLOW SETTING 200 mL/min

ACTUAL PURGE VOLUME 7.47 DSL   CORRECTED PURGE VOLUME = (Y) (V) = 7.32 DSL

CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C 100 (pass 1) 100 (pass 2) 100 (pass 3) = 100 (AVERAGE) ppmvd C

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ENTROPY

METHOD 25 ANALYSIS DATA

COMPANY NAME Metal Containers Corp RUN NUMBER 16-3

ADDRESS Jacksonville, Fla. DATE OF ANALYSIS 1-29-87

MEASUREMENT LOCATION Ov. #16 OPERATOR KJD

NONCONDENSIBLE ORGANIC CARBON

TANK # V8087 Vol: 10.178 liters

Field Final Abs. Press: 927 mmHg

	Field	Lab
Temperature °F		
Bar. Press., inHg		

FLOW METER I.D. _____

Calibration Coefficient, Y _____

SAMPLE BAG _____ PARAMETERS

Temperature _____ °F _____ °C

Barometric Pressure _____ in.Hg.

LAB TANK PRESSURIZATIONS

No.	Reading	Pressure, mmHg	
		Gauge	Absolute
1st	Beginning		
	Ending		
2nd	Beginning		
	Ending		

SAMPLE ALIQUOT / DILUTION TRANSFER VOLUMES

No.	Metered Volumes Transferred To Bag, Liters		
	From Tank/Source	Zero Air Dilution	Total
1st			
2nd			
3rd			
4th			

	pass 1	pass 2	pass 3		AVERAGE	
NONCONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	0	0	0	=	0	ppmvd C

CONDENSIBLE ORGANIC CARBON

TRAP CO_2 PURGE & ANALYSIS

TRAP NUMBER Q30 BAG NUMBER #8

FLOW METER I.D. M 75

FLOW METER GAMMA 0.98

FLOW SETTING 200 mL/min

PURGE VOLUME = (Y)(V) = 0.98 × 3.66 = 3.57 STD LITER

	pass 1	pass 2	pass 3		AVERAGE	
CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	1.3	1.1	1.0	=	1.13	ppmvd C

TRAP CONDENSIBLE ORGANIC CARBON ANALYSIS

TRAP NUMBER Q30 BAG NUMBER 9

FLOW METER I.D. M 90

FLOW METER GAMMA 0.98

OVEN TEMPERATURE 600 °C

FLOW SETTING 200 mL/min

ACTUAL PURGE VOLUME 7.13 DSL

CORRECTED PURGE VOLUME = (Y) (V) = 6.99 DSL

	pass 1	pass 2	pass 3		AVERAGE	
CONDENSIBLE ORGANIC CONCENTRATION, ppmvd C	60	60	60	=	60	ppmvd C

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ENTROPY

APPENDIX C

PROCESS AND COATING DATA

CARBON USAGE RATE

		Test Sets					
		1		2		3	
	% Carbon in Coating	Coating Used, lbs	Carbon Used, lbs	Coating Used, lbs	Carbon Used, lbs	Coating Used, lbs	Carbon Used, lbs
POBV 2							
Bottom Varnish	6.99	1.872	0.1309	0.936	0.06543	1.872	0.1309
Over Varnish	12.10	17.63	2.133	25.76	3.117	25.76	3.117
Red Ink	10.34	0.46	0.048	0.03	0.0031	0.02	0.0021
Blue Ink	10.34	0.69	0.071	0.0	0.0	0.28	0.029
White Ink	6.494	3.77	0.245	6.79	0.441	2.99	0.194
Gold Ink	12.93	0.64	0.083	0.34	0.044	0.55	0.071
Total Carbon Used, Lbs		2.711		3.671		3.544	
Run Time, Hrs		1.0		1.0		1.0	
Carbon Usage Rate, Lbs/Hr		2.711		3.671		3.544	
POBV 3							
Bottom Varnish	6.99	1.404	0.0981	0.936	0.06543	1.872	0.1309
Over Varnish	12.10	44.74	5.414	14.91	1.804	52.88	6.398
Red Ink	10.34	3.86	0.399	0.04	0.0041	1.08	0.112
Blue Ink	10.34	1.05	0.109	0.76	0.079	0.05	0.0052
White Ink	6.494	0.86	0.056	0.12	0.0078	1.09	0.071
Total Carbon Used, Lbs		6.076		1.960		6.717	
Run Time, Hrs		1.0		1.0		1.0	
Carbon Usage Rate, Lbs/Hr		6.076		1.960		6.717	
POBV 4							
Bottom Varnish	6.99	2.809	0.1936	1.872	0.1309	1.872	0.1309
Over Varnish	12.10	41.43	5.013	49.90	6.038	32.96	3.988
Red Ink	10.34	0.01	0.001	0.07	0.0072	0.03	0.0031
Blue Ink	10.34	1.63	0.169	2.03	0.21	1.10	0.114
White Ink	6.494	3.10	0.201	0.54	0.035	0.01	0.00065
Gold Ink	12.93	0.92	0.119	0.8	0.103	0.22	0.028
Total Carbon Used, Lbs		5.697		6.524		4.265	
Run Time, Hrs		1.0		1.0		1.0	
Carbon Usage Rate, Lbs/Hr		5.697		6.524		4.265	
POBVs 2, 3, 4							
Total Carbon Usage Rate		14.484		12.155		14.526	

CARBON CONTENT of SOLVENTS

	- Molecular Weight*-				
	Solvent	Carbon in Solvent	% Carbon in Solvent	% Solvent in Coating	% Carbon in Coating
POBVs					
Bottom Varnish (Inmont Z125-13)					
Solvent					
Butyl Cellosolve	118.17	72.06	60.98	4.70	2.866
n-Butyl Alcohol	74.12	48.04	64.81	2.50	1.620
n-Propyl Alcohol	60.11	36.03	59.96	1.20	0.720
Butyl Carbitol	60.11	36.03	59.96	1.20	0.720
Toluene	92.13	84.07	91.25	0.70	0.639
Isopropyl Alcohol	60.11	36.03	59.96	0.10	0.060
Exempt Mineral Spirits	N/A	N/A	85.00	0.50	0.425
				Total =	6.990
Over Varnish (PPG CE 3610C)					
Solvent (Percent carbon in coating submitted by PPG, breakdown of individual solvents is proprietary.)				Total =	12.10
Red Ink					
Solvent					
Aliphatic Amine	173.34	120.10	69.29	4.0	2.772
Hexyl Carbitol	190.32	120.10	63.10	12.0	7.572
				Total =	10.34
Blue Ink					
Solvent					
Aliphatic Amine	173.34	120.10	69.29	4.0	2.772
Hexyl Carbitol	190.32	120.10	63.10	12.0	7.572
				Total =	10.34
White Ink					
Solvent					
Aliphatic Amine	173.34	120.10	69.29	3.0	2.077
Hexyl Carbitol	190.32	120.10	63.10	7.0	4.417
				Total =	6.494
Gold Ink					
Solvent					
Aliphatic Amine	173.34	120.10	69.29	5.0	3.462
Hexyl Carbitol	190.32	120.10	63.10	15.0	9.465
				Total =	12.93

* Pound per pound mole

COATING USAGE DETERMINATIONS

	Test Sets		
	1	2	3
POBV 2			
Bottom Varnish (Inmont Z125-13)			
Coating Drop, inches	0.125	0.0625	0.125
Tank Area, square inches	400.0	400.0	400.0
Coating Volume, cubic inches	50.0	25.0	50.0
Coating Used, gallons	0.2165	0.1082	0.2165
Density of Coating, lbs/gal	8.65	8.65	8.65
Coating Used, lbs	1.872	0.936	1.873
Over Varnish (PPG CE 3610C)			
Coating Drop, inches	0.8125	1.1875	1.1875
Tank Area, square inches	576.0	576.0	576.0
Coating Volume, cubic inches	468.0	684.0	684.0
Coating Used, gallons	2.026	2.961	2.961
Density of Coating, lbs/gal	8.7	8.7	8.7
Coating Used, lbs	17.63	25.76	25.76
Red Ink Used, lbs	0.46	0.03	0.02
Blue Ink Used, lbs	0.69	0	0.28
White Ink Used, lbs	3.77	6.79	2.99
Gold Ink Used, lbs	0.64	0.34	0.55
POBV 3			
Bottom Varnish (Inmont Z125-13)			
Coating Drop, inches	0.09375	0.0625	0.125
Tank Area, square inches	400.0	400.0	400.0
Coating Volume, cubic inches	37.5	25.0	50.0
Coating Used, gallons	0.1623	0.1082	0.2165
Density of Coating, lbs/gal	8.65	8.65	8.65
Coating Used, lbs	1.404	0.936	1.873
Over Varnish (PPG CE 3610C)			
Coating Drop, inches	2.0625	0.6875	2.4375
Tank Area, square inches	576.0	576.0	576.0
Coating Volume, cubic inches	1,188.0	396.0	1,404.0
Coating Used, gallons	5.143	1.714	6.078
Density of Coating, lbs/gal	8.7	8.7	8.7
Coating Used, lbs	44.74	14.91	52.88
Red Ink Used, lbs	3.86	0.04	1.08
Blue Ink Used, lbs	1.05	0.76	0.05
White Ink Used, lbs	0.86	0.12	1.09

(continued next page)

COATING USAGE DETERMINATIONS
(Continued)

	Test Sets 1	Test Sets 2	Test Sets 3
POBV 4			
Bottom Varnish (Inmont Z125-13)			
Coating Drop, inches	0.1875	0.125	0.125
Tank Area, square inches	400.0	400.0	400.0
Coating Volume, cubic inches	75.0	50.0	50.0
Coating Used, gallons	0.3247	0.2165	0.2165
Density of Coating, lbs/gal	8.65	8.65	8.65
Coating Used, lbs	2.809	1.872	1.872
Over Varnish (PPG CE 3610C)			
Coating Drop, inches	2.75	3.3125	2.1875
Tank Area, square inches	400.0	400.0	400.0
Coating Volume, cubic inches	1,100.0	1,325.0	875.0
Coating Used, gallons	4.762	5.736	3.788
Density of Coating, lbs/gal	8.7	8.7	8.7
Coating Used, lbs	41.43	49.90	32.96
Red Ink Used, lbs	0.01	0.07	0.03
Blue Ink Used, lbs	1.63	2.03	1.10
White Ink Used, lbs	3.10	0.54	0.01
Gold Ink Used, lbs	0.92	0.80	0.22

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3200 CULLMAN AVENUE, CHARLOTTE, N.C. 28206

704/372-2080

February 9, 1987

Mr. James Carroll
Entropy
P. O. Box 12291
Research Triangle Park, NC 27709

Dear Jim:

This letter confirms the percentages of Amine and Carbitol in the inks at Metal Container in Jacksonville that I gave you by telephone. The percentages are as follows:

	% Aliphatic Amine	% Hexyl Carbitol
White Ink	3%	7%
Gold Ink	5%	15%
Red Ink	4%	12%
Blue Ink	4%	12%

Also, enclosed is a copy of the original letter sent to Metal Container and a MSDS to cover all inks.

If you need anymore information, please contact me immediately.

Sincerely,

Rick Clendenning

RC:kk

cc: George Williams

Enclosures

BASF Corporation
Inmont Division

BASF

Container Coatings

March 11, 1987

Mr. Robert Metz
ENTROPY ENVIRONMENTALISTS, INC.
Box 12291
Research Triangle Park, North Carolina 27709-2291

Reference: Z125-13 Aqueous Bottom Varnish

Dear Mr. Metz:

The organic solvent composition of Z125-13 is:

Butyl Celloslve	4.7
n-Butyl Alcohol	2.5
n-Propyl Alcohol	1.2
Butyl Carbitol	1.2
Exempt Mineral Spirits	0.5
Toluene	0.7
	10.8

This confirms the figures given you by phone on March 10 which you need for calculations being done at the request of Metal Container, Jacksonville. Do treat this data as confidential.

Thank you for your continued interest in Inmont products.

Very truly yours,

BASF INMONT CORPORATION

James R. Kesterson
Coordinator,
Product Compliance
Container Coatings Group

pr

cc: Mr. W. Martin, BASF Inmont, Cincinnati, Ohio
Mr. W. Feyler, BASF Inmont, Cincinnati, Ohio

1720-1754 Dana Avenue, Cincinnati, Ohio 45207 (513) 841-6100

BASF Corporation
Inmont Division

BASF

Container Coatings

February 11, 1987

Mr. James Carroll
Entropy Env. Inc.
P.O. Box 12291
Research Triangle Park, North Carolina 27709

Dear Mr. Carroll:

This is to confirm the information I gave you in a phone conversation on February 10th.

The carbon content of exempt mineral spirits can be estimated at 85%. This is a mix of saturated (alkanes) and unsaturated (alkenes) hydrocarbons with a molecular weight range of 112 to 140.

If you need more information, please call.

Very truly yours,

BASF CORPORATION
Inmont Division

William P. Feyler
Laboratory Manager
Container Coatings Group

1720-1754 Dana Avenue, Cincinnati, Ohio 45207 (513) 841-6100

Spin Neck Varnish

Container Coatings Product Data Sheet

PPG INDUSTRIES INC., COATINGS AND RESINS DIVISION, 760 PITTSBURGH DR., DELAWARE, OHIO 43015 (614) 363-9610

Code: CC3610C Over Varnish

Date: July 24, 1986

Product: Water Reducible Wet Ink Varnish

Suggested Use: ____ Int. ____ Process __x__ Past.
__x__ Ext. __x__ Non-Pro ____ Non-Past.

Submitted to: Metal Container Corp.

Submitted by: D. W. Kuhns

Location: St. Louis, MO

Attention: Mr. Norm Fitzgerald

PRODUCT DESCRIPTION

PHYSICAL PROPERTIES (as supplied)

Viscosity 60 ± 5 sec # 4F Cup @ 77F

Total Solids 38 ±2.00% by weight

Method 1 gram 5 min 375F

Total Solids 34.7 ±2.00% by volume

weight / gallon 8.7 ±0.20 lbs

pH 8.2 ± .4

DESCRIPTION

Resin Type(s) acrylic polyester

Cured film color clear

Contains internal lubricant __x__ Yes ____ No

SHIPPING AND HANDLING DATA

Flash Point 110 °F (PM Closed Cup)

Freeze Protection required __x__ Yes ____ No

Storage Life 3 months at 77 °F

Storage Life 3 months at 100 °F

VOC INFORMATION

Karl Fischer water 49.6 %

ASTM D2369-81 TS 38.7 %

VOC .35 Kg of organic solvent per liter of paint solids (NSPS)

VOC 2.1 lbs organic solvent per gallon of paint less water

Method 24

SUGGESTED APPLICATION DATA

Agitation Required before use ____ yes

Method dr roller or equi Time 15 min

Application Vis 55-65 sec # 4 For Cup @77F

Thinner water and/or butyl cellosolve

Amount as needed, (heaters preferred method

Substrate D&I aluminum or steel

Method direct rollcoat

Film Weight: 130±15 mgs/ 12 ounce

____ mgs/ ____

Clean up Solvent water and/or butyl cellosol

RECOMMENDED BAKES:

Conventional: 30 seconds dwell at 355 MT

____ dwell at ____ MT

HVHT: 2 seconds dwell at 375 PMT

____ dwell at ____ PMT

min IBO needed 60 seconds dwell at 360 MT

ADDITIONAL INFORMATION: (see reverse side)

MATERIAL SAFETY DATA SHEET
COATINGS AND RESINS GROUP

SECTION I - PRODUCT INFORMATION

MANUFACTURER'S NAME: PPG INDUSTRIES INC.
PRODUCT SAFETY LOC.: 260 KAPPA DRIVE
PITTSBURGH, PA 15238
MSDS CONTACT: MANAGER, INDUSTRIAL HYGIENE
AND PRODUCT SAFETY
(412) 963-5822
EMERGENCY TELEPHONE: (304) 843-1300

CODE/IDENTITY : CE3560 (081286T)
TRADE NAME: WATER REDUCIBLE WHITE ENAMEL
CHEMICAL FAMILY: POLYESTER
DOT CLS: PAINT, COMBUSTIBLE LIQUID
DATE OF PREPARATION: 12/11/86
CUSTOMER PART #:

SECTION II - INGREDIENTS

INGREDIENTS	APPROX. % WT.	CAS NO.	EXPOSURE LIMITS ACGIH TLV	OSHA PEL	PPG IPEL
TITANIUM DIOXIDE #	30	13463-67-7	10.00Mg/M3	15.00Mg/M3	10.00Mg/M3
BARIUM SULFATE	5	7727-43-7	10.00Mg/M3	NOT EST.	10.00Mg/M3
DEIONIZED WATER	30	7732-18-5	NOT EST.	NOT EST.	NOT EST.
N.N-DIMETHYL ETHANOLAMINE	1	108-01-0	NOT EST.	NOT EST.	NOT EST.
ETHYLENE GLYCOL MONOBUTYL ETHER	5	111-76-2	25.00PPM	50.00PPM	25.00PPM
FILM FORMERS. RESINS. AND ADDITIVES	25	PROPRIETARY	NOT EST.	NOT EST.	NOT EST.

CARCINOGENIC ACCORDING TO CRITERIA ESTABLISHED BY: * = NTP ** = IARC ● = OSHA # = OTHER

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE : 78 - 230 DEG.C
VAPOR PRESSURE: 16.7 mmHg
VAPOR DENSITY : HEAVIER THAN AIR
% VOL/VOLUME : 57.40
EVAP RATE(BuOAc=100): 32

SOLUBILITY IN WATER: 39.6 %
WT/GAL (LBS): 11.29
pH: U/I
% SOLID BY WEIGHT: 58.9

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

DOT CATEGORY: COMBUSTIBLE
FLASHPOINT: 130 DEG. F PMCC
FLAMMABLE LIMITS: LEL UI UEL U/I

EXTINGUISHING MEDIA:

USE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CLASS B EXTINGUISHERS (CARBON DIOXIDE. DRY CHEMICAL. OR UNIVERSAL AQUEOUS FILM FORMING FOAM) DESIGNED TO EXTINGUISH NFPA CLASS II COMBUSTIBLE LIQUID FIRES.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

CLOSED CONTAINERS MAY EXPLODE OR BURST (DUE TO THE BUILD-UP OF STEAM PRESSURE) WHEN EXPOSED TO EXTREME HEAT.

SPECIAL FIRE FIGHTING PROCEDURES:

WATER SPRAY MAY BE INEFFECTIVE. WATER SPRAY MAY BE USED TO COOL CLOSED CONTAINERS TO PREVENT PRESSURE BUILD-UP AND POSSIBLE AUTOIGNITION OR EXPLOSION WHEN EXPOSED TO EXTREME HEAT. IF WATER IS USED. FOG NOZZLES ARE PREFERABLE. FIRE-FIGHTERS SHOULD WEAR SELF CONTAINED BREATHING APPARATUS.

SECTION V - REACTIVITY DATA

STABILITY: STABLE **HAZARDOUS POLYMERIZATION:** NOT EXPECTED TO OCCUR

INCOMPATIBILITY (MATERIALS AND CONDITIONS TO AVOID):

AVOID CONTACT WITH STRONG ALKALIES. STRONG MINERAL ACIDS. OR STRONG OXIDIZING AGENTS.

HAZARDOUS DECOMPOSITION PRODUCTS:

MAY PRODUCE HAZARDOUS DECOMPOSITION PRODUCTS WHEN HEATED. WELDING. BRAZING. OR FLAME-CUTTING ON SURFACES COATED WITH THIS PRODUCT MAY PRODUCE FUMES INCLUDING: Carbon Monoxide. Oxides of Nitrogen. Formaldehyde

SECTION VI - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

Continued on Back of Page

Continuation of Manufacturer's Code - CE3560 DATE OF PREP: 12/11/86

SECTION IX - PROTECTION INFORMATION

PERSONAL PROTECTIVE EQUIPMENT FOR:

EYE PROTECTION:

WEAR CHEMICAL-TYPE SPLASH GOGGLES OR FULL FACE SHIELD.

SKIN PROTECTION:

WEAR PROTECTIVE CLOTHING, INCLUDING IMPERMEABLE APRON AND GLOVES CONSTRUCTED OF:
NITRILE, NEOPRENE OR LATEX RUBBER

RESPIRATORY PROTECTION:

OVEREXPOSURE TO VAPORS MAY BE PREVENTED BY ENSURING VENTILATION CONTROLS, VAPOR EXHAUST OR FRESH AIR ENTRY. NIOSH/MSHA-APPROVED (TC-23C-) PAINT SPRAY OR AIR SUPPLIED (TC-19C-) RESPIRATORS MAY ALSO REDUCE EXPOSURE. READ RESPIRATOR MANUFACTURER'S INSTRUCTIONS AND LITERATURE CAREFULLY TO DETERMINE THE TYPE OF AIRBORNE CONTAMINANTS AGAINST WHICH THE RESPIRATOR IS EFFECTIVE AND HOW IT IS TO BE PROPERLY FITTED.

OTHER EQUIPMENT:

CLEAN OR DISCARD CONTAMINATED CLOTHING AND SHOES.

VENTILATION REQUIREMENTS:

PROVIDE GENERAL DILUTION OR LOCAL EXHAUST VENTILATION IN VOLUME AND PATTERN TO KEEP THE CONCENTRATION OF INGREDIENTS LISTED IN SECTION II BELOW THE LOWEST SUGGESTED EXPOSURE LIMITS, THE LEL IN SECTION IV BELOW THE STATED LIMIT, AND TO REMOVE DECOMPOSITION PRODUCTS DURING WELDING OR FLAME CUTTING ON SURFACES COATED WITH THIS PRODUCT.

SECTION X - SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS:

DO NOT STORE ABOVE 120 DEGREES F. STORE LARGE QUANTITIES IN BUILDINGS DESIGNED AND PROTECTED FOR STORAGE OF NFPA CLASS II COMBUSTIBLE LIQUIDS.
PROTECT FROM FREEZING.

OTHER PRECAUTIONS:

IF THIS MATERIAL IS PART OF A MULTIPLE COMPONENT COATING SYSTEM, READ THE MATERIAL SAFETY DATA SHEET(S) FOR THE OTHER COMPONENT OR COMPONENTS BEFORE BLENDING AS THE RESULTING MIXTURE MAY HAVE THE HAZARDS OF ALL OF ITS PARTS.
ALL CHEMICAL SUBSTANCES IN THIS PRODUCT COMPLY WITH ALL APPLICABLE RULES OR ORDERS UNDER THE ENVIRONMENTAL PROTECTION AGENCY'S TOXIC SUBSTANCE CONTROL ACT.

THIS MATERIAL SAFETY DATA SHEET HAS BEEN PREPARED IN ACCORDANCE WITH THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200)
U/I = UNKNOWN INFORMATION N/A = NOT APPLICABLE NOT EST. = NOT ESTABLISHED

0587410043 (CUSTOMER NO.) LOCATION: 0808 88CE3560////1211

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CHECKLIST FOR INK/SOLVENT USAGE

Company Name Metal Container Corp.

Geographic Location JAX

Name of Observer(s) Jim Carroll

Amb. Temp., Deg. F 75

	Press 2					Press 3				
Run Number	CE 8					CE8				
Run Start Time	1515					1515				
Run Finish Time	1615					1615				
	Red	gold	blue	white		wh	bl	R		
Fountain	1	2	3	4		1	2	3	4	
Initial Weight of Virgin Ink Kit Recorded	✓	✓	✓	✓		✓	✓	✓		
Final Weight of Virgin Ink Kit Recorded										
Initial Fountain Level Noted ~~Varnish~~	✓	✓	✓			✓	✓	✓		
Final Fountain Level Same As Initial Level										
Initial Drop Wt./Reading of ~~IC Solvent~~ Varnish Drum Recorded	✓		13/16"			✓		2 1/16"		
Final Wt./Reading if ~~IC Solvent~~ Drum Recorded	✓					✓				
Initial Wt./Reading of ~~MU Solvent~~ Bottom Varnish Drum Recorded	✓		1/4"			✓		3/32"		
Final Wt./Reading of ~~MU Solvent~~ Drum Recorded	✓					✓				
Percent Solids of Virgin Ink Determined										
Percent Solids of Cut Ink Determined										
Inks Handled Properly - Much Spillage?										
Weighings Performed Properly										

Notes/Comments:

2
Red DDI Poly WBV Natural Lite Red CL 9902A B 19562
Gold " " " Natural Lite Gold CC9900A B22837
Blue " " " Blue CC9901A B199235
White " " " White CL 10670 B 22621

3
white " " " white CL 10670 B 22866
Blue " " " Bud Lt. Blue CL 10892 · B21887
Red " " " Bud Lt. Red CL 12108 - B 22277

CHECKLIST FOR INK/SOLVENT USAGE

Company Name Metal Container Corp.

Geographic Location JAX

Name of Observer(s) Jim Carroll   Amb. Temp., Deg. F 75

	Press 2					Press			
Run Number	CE 8								
Run Start Time	1515								
Run Finish Time	1615								
	gold	R	Bl	Wh					
Fountain	1	2	3	4		1	2	3	4
Initial Weight of Virgin Ink Kit Recorded	✓	✓	✓	✓		☐	☐	☐	☐
Final Weight of Virgin Ink Kit Recorded	☐	☐	☐	✓		☐	☐	☐	☐
Initial Fountain Level Noted	✓	✓	✓	✓		☐	☐	☐	☐
Final Fountain Level Same As Initial Level	☐	☐	☐	☐		☐	☐	☐	☐
Initial Drop ~~Wt.~~/Reading of Varnish ~~IC Solvent Drum~~ Recorded		✓	☐	2¾"			☐	☐	
Final Wt./Reading if ~~IC Solvent Drum~~ Recorded		✓	☐				☐	☐	
Initial Wt./Reading of MU Solvent Drum Recorded		✓	☐	3/16"			☐	☐	
Final Wt./Reading of MU Solvent Drum Recorded		✓	☐				☐	☐	
Percent Solids of Virgin Ink Determined		☐	☐				☐	☐	
Percent Solids of Cut Ink Determined		☐	☐				☐	☐	
Inks Handled Properly - Much Spillage?		☐	☐				☐	☐	
Weighings Performed Properly		☐	☐				☐	☐	

Notes/Comments: ACME Printing Ink Co

Gold = D+I Poly WBV Busch Gold CL-9881-B 22423

Red = D+I Poly, WBV Busch Red CL 33, B 20421

Blue = D+I Poly WBV Busch Blue CL 12088, B-22603

White = D+I Poly WBV White CL-10670, B-22621

CC3610C is the Over Varnish for presses 2, 3, 4,

Bottom varnish = 2125-13 Bar Air Rim Varnish

CHECKLIST FOR INK/SOLVENT USAGE

Company Name Metal Container Corp

Geographic Location JAX

Name of Observer(s) Jim Carroll

Amb. Temp., Deg. F 76

Press 2

Press 3

	Press 2	Press 3
Run Number	CE9	CE9
Run Start Time	1847	1847
Run Finish Time	1947	1947

Fountain	1	2	3	4 ✓	1	2	3 ✓	4
Initial Weight of Virgin Ink Kit Recorded	✓	✓	✓	✓	✓	✓	✓	
Final Weight of Virgin Ink Kit Recorded	✓	✓	✓	✓	✓	✓	✓	
Initial Fountain Level Noted	✓	✓	✓	✓	✓	✓	✓	
Final Fountain Level Same As Initial Level	✓	✓	✓	✓	✓	✓	✓	

Initial Wt./Reading of Over Varnish ~~IC Solvent~~ Drum Recorded	✓		1 3/16"	✓		11/16"
Final Wt./Reading if IC Solvent Drum Recorded	✓			✓		
Initial Wt./Reading of Bottom Varnish ~~MU Solvent~~ Drum Recorded	✓		1/16"	✓		1/16"
Final Wt./Reading of ~~MU Solvent~~ Drum Recorded	✓			✓		
Percent Solids of Virgin Ink Determined						
Percent Solids of Cut Ink Determined						
Inks Handled Properly - Much Spillage?	✓			✓		
Weighings Performed Properly	✓			✓		

Notes/Comments:

1735 WB/60 ~~B~~ B/76 RH= ~~N~~ 40%

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CHECKLIST FOR INK/SOLVENT USAGE

Company Name Metal Container Corp.

Geographic Location JAX

Name of Observer(s) Jim [illegible]

Amb. Temp., Deg. F 76

	Press 4				Press			
Run Number	CE9							
Run Start Time	1847							
Run Finish Time	1947							
Fountain	1	2	3	4	1	2	3	4
Initial Weight of Virgin Ink Kit Recorded	✓	✓	✓	✓				
Final Weight of Virgin Ink Kit Recorded	✓	✓	✓	✓				
Initial Fountain Level Noted	✓	✓	✓	✓				
Final Fountain Level Same As Initial Level	✓	✓	✓	✓				

Initial Wt./Reading of ~~IC Solvent~~ Overvarnish Drum Recorded	✓		3 5/16"		
Final Wt./Reading if ~~IC Solvent~~ Drum Recorded	✓				
Initial Wt./Reading of ~~MU Solvent~~ Bottom Varnish Drum Recorded	✓		1/8"		
Final Wt./Reading of ~~MU Solvent~~ Drum Recorded	✓				
Percent Solids of Virgin Ink Determined					
Percent Solids of Cut Ink Determined					
Inks Handled Properly - Much Spillage?	✓				
Weighings Performed Properly	✓				

Notes/Comments:

CHECKLIST FOR INK/SOLVENT USAGE

Company Name Metal Container Corp

Geographic Location JAX

Name of Observer(s) Jim Carroll

Amb. Temp., Deg. F 69

	Press 2	Press 3
Run Number	CE10	CE10
Run Start Time	757	757
Run Finish Time	857	857

Fountain	Press 2: 1	2	3	4	Press 3: 1	2	3	4
Initial Weight of Virgin Ink Kit Recorded	✓	✓	✓	✓	✓	✓	✓	
Final Weight of Virgin Ink Kit Recorded								
Initial Fountain Level Noted								
Final Fountain Level Same As Initial Level								

	Press 2		Press 3		
Initial Wt./Reading of ~~IC Solvent~~ Overvarnish Drum Recorded	✓		✓		9 7/16"
Final Wt./Reading if ~~IC Solvent~~ Drum Recorded	✓		✓		
Initial Wt./Reading of ~~MU Solvent~~ Bottom Varnish Drum Recorded	✓		✓		
Final Wt./Reading of ~~MU Solvent~~ Drum Recorded	✓		✓		
Percent Solids of Virgin Ink Determined	✓		✓		
Percent Solids of Cut Ink Determined	—		—		
Inks Handled Properly - Much Spillage?	✓		✓		
Weighings Performed Properly					

Notes/Comments:

@ 408 WB 56°F DB 69°F R.H. = 43%

The overvarnish drum was refilled during testing on Press 2

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CHECKLIST FOR INK/SOLVENT USAGE

Company Name Metal Container Corp

Geographic Location JAX

Name of Observer(s) Jim Carroll

Amb. Temp., Deg. F 69

	Press 4	Press
Run Number	CE10	
Run Start Time	757	
Run Finish Time	857	

Fountain	1	2	3	4	1	2	3	4
Initial Weight of Virgin Ink Kit Recorded	✓	✓	✓	✓				
Final Weight of Virgin Ink Kit Recorded								
Initial Fountain Level Noted	✓	✓	✓	✓				
Final Fountain Level Same As Initial Level								

Initial Wt./Reading of ~~IC Solvent~~ Overvarnish Drum Recorded	✓		9 5/16"		
Final Wt./Reading if ~~IC Solvent~~ Drum Recorded	✓				
Initial Wt./Reading of ~~MU Solvent~~ Bottom Varnish Drum Recorded	✓				
Final Wt./Reading of ~~MU Solvent~~ Drum Recorded					
Percent Solids of Virgin Ink Determined					
Percent Solids of Cut Ink Determined					
Inks Handled Properly - Much Spillage?					
Weighings Performed Properly					

Notes/Comments:

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~~CE~~-8

TANKS 1-23-87 RUN #1.

LINE #2 – NAT. LIGHT. 327627 * 352853 25

① RED – 16.65 – 16.19 0.46

② GOLD – 6.03 – 5.39 0.64

③ BLUE – 9.35 – 8.66 0.69

④ WHITE – 7.94 – 4.17 3.77

LINE #3 – BUD LIGHT. 456690* 490718 34

⑤ BLUE – 9.62 – 8.57 1.05

⑥ RED – 19.81 – 15.98 3.86

⑪ WHITE – 14.61 – 13.75 0.86

LINE #4 – BUSCH. 510833 * 545416 3458

⑦ GOLD – 4.51 – 3.59 .92

⑧ RED – 12.70 – 12.69 .01

⑨ BLUE – 17.43 – 15.80 1.63

⑩ WHITE – 10.99 – 7.89 3.1

* – STARTED 13½ MINUTES AFTER ACTUAL START.

CE #9

INKS , RUN #2 , 1-23-82

LINE #2 - NAT. LIGHT. 22,217 - 68,097 45880

① RED - 15.90 - 15.87 0.03

② GOLD - 3.27 - 2.93 0.34

③ BLUE - 7.93 - 7.93 0

④ WHITE - 27.56 - 20.77 6.79

LINE #3 - BUD LIGHT. 13915 - 53,028 39113

⑤ BLUE - 7.18 - 6.42 0.76

⑥ RED - 15.02 - 14.98 0.04

⑪ WHITE - 11.11 - 10.99 0.12

LINE #4 - BUSCH. 16,570 - 90,668 74098

⑦ GOLD - 18.84 - 18.04 0.80

⑧ RED - 11.07 - 11.00 0.07

⑨ BLUE - 13.62 - 11.59 2.03

⑩ WHITE - 24.63 - 24.09 0.54

CE #10

INKS, RUN #3, 1-24-87

LINE #2 - NAT. LIGHT. — 49,268 — 93,887 44619

① RED — 10,86 — 10,84 0.02

② GOLD — 14.05 — 13.50 0.55

③ BLUE — 3,27 — 2.99 0.28

④ WHITE — 17.62 — 14.63 2.99

LINE #3 — BUD LIGHT. — 89,475 — 152,638 63163

⑤ WHITE — 3,29 — 2,20 1.09

⑥ BLUE — 18,80 — 18,75 0.05

⑦ RED — 7,26 — 6.18 1.08

LINE #4 - BUSCH — 114693 — 171,849 57156

⑧ GOLD - 14,30 — 14,08 0.22

⑨ RED - 7,83 — 7.80 0.03

⑩ BLUE - 2.88 — 1.78 1.10

⑪ WHITE — 23.48 — 23.47 0.01

LINES 2, 3, 4
BOTTOM VARNISH
1/23/87

ALL RESERVOIRS ARE 20" x 20"

INMONT Z125-13

RUN 1	1/8"	3/32"	3/16"	
RUN 2	1/4"	1/16"	1/8"	
RUN 3	1/8"	1/8"	1/8"	← 1/24/87
	↑	↑	↑	
	LINE 2	LINE 3	LINE 4	

APPENDIX D

CALIBRATION DATA

QUALITY ASSURANCE PROCEDURES

General. Each item of field test equipment purchased or constructed by Entropy is assigned a unique, permanent identification number. New items for which calibration is required are calibrated before initial field use. Equipment whose calibration status may change with use or with time is inspected in the field before testing begins, and again upon return from each field use. When an item of equipment is found to be out of calibration, it is adjusted and recalibrated or retired from service. All equipment is periodically recalibrated in full, regardless of the outcome of these regular inspections.

Calibrations are conducted in a manner and at a frequency which meet or exceed U. S. EPA specifications. Entropy follows the calibration procedures outlined in EPA Reference Methods, and those recommended within the Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III (EPA-600/4-77-027b, August, 1977). When the Reference Methods are inapplicable, Entropy uses methods such as those prescribed by the American Society for Testing and Materials (ASTM).

Data obtained during calibrations are recorded on standardized forms, which are checked for completeness and accuracy by the Quality Assurance Manager or the Quality Assurance Director. Data reduction and subsequent calculations are performed using Entropy's in-house computer facilities. Calculations are generally performed at least twice as a check for accuracy. Copies of calibration data are included in the test or project reports.

Inspection and Maintenance. An effective preventive maintenance program is necessary to ensure data quality. Each item of equipment returning from the field is inspected before it is returned to storage. During the course of these inspections, items are cleaned, repaired, reconditioned, and recalibrated where necessary.

Each item of equipment transported to the field for this test program was inspected again before being packed. Entropy performs these quality assurance activities prior to departure for the job site to detect equipment problems which may originate during periods of storage. This minimizes lost time on site due to equipment failure.

Occasional equipment failure in the field is unavoidable despite the most rigorous inspection and maintenance procedures. For this reason, Entropy routinely transports sufficient backup equipment to the job site to have complete redundancy of all critical sampling train components.

Calibration. Emissions sampling equipment that requires calibration includes the pitot tube, pressure gauges, thermometers, and barometers. The following sections elaborate on the calibration procedures followed by Entropy for these items of equipment. Calibration data for the specific items of equipment used for this test program follow the text.

Pitot Tubes. All Type S pitot tubes used by Entropy, whether separate or attached to a sampling probe, are constructed in-house or by Nutech Corporation. Each pitot is calibrated when new in accordance with the geometry standards contained in EPA Reference Method 2. A Type S pitot tube, constructed and positioned according to these standards, will have a coefficient of 0.84 ± 0.02. This coefficient should not change as long as the pitot tube is not damaged.

Each pitot tube is inspected visually before it is transported to the field. If this inspection indicates damage or raises doubt that the pitot remains in accordance with the EPA geometry standards, the pitot tube is not used until it has been refurbished and recalibrated.

Differential Pressure Gauges. Each set of magnehelic differential pressure gauges is calibrated initially over its full range, 0-10 inches W.C. After each field use, the calibration of the gauge set is checked against an inclined manometer at the average delta p encountered during the test. If the agreement is within ± 5 percent, the calibration is acceptable.

Temperature Sensor. All thermocouples employed by Entropy for the measurement of flue gas temperatures are calibrated upon receipt. Initial calibrations are performed at three points (ice bath, boiling water, and hot oil). An ASTM mercury-in-glass thermometer is used as a reference. The thermocouple is acceptable if the agreement is within 1.5 percent (absolute) at each of the three calibration points.

On site, prior to the start of testing, the reading from the stack gas thermocouple-potentiometer combination is compared with a mercury-in-glass reference thermometer. If the two agree within 1.5 percent (absolute), the thermocouple and potentiometer are considered to be in proper working order for the test series.

After each field use, the thermocouple-potentiometer system is compared with an ASTM mercury-in-glass reference thermometer at a temperature within 10 percent of the average absolute stack gas temperature. If the absolute temperatures agree within 1.5 percent, the temperature data are considered valid.

Barometer. Each field barometer is adjusted before each test series to agree within ± 0.1 inches of a reference aneroid barometer. The reference barometer is checked weekly against the station pressure value (corrected for elevation difference) reported by the National Weather Service station at the Raleigh-Durham airport, approximately 2.5 miles from Entropy's location.

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Dry Gas Meter Identification: 1017057

Calibration by:

Date: 4-1-86

Barometric Pressure (P_b): 29.86 in. Hg

ENTROPY ENVIRONMENTALISTS, INC. PAGE 1 of 2

*Date: ______

*Barometric Pressure (P_b): ______ in. Hg

Approx. Flow Rate (Q) cfm	Spirometer		Dry Gas Meter		Pressure (Δp) in. H_2O	Time (θ) min.	Flow Rate (Q) cfm	Meter Meter Coeff. (Y_{ds})	Avg. Meter Coeff. ($\bar{Y}_{ds}$)
	Gas Volume (V_s) ft³	Temp. (t_s) °F	Gas Volume (V_{ds}) ft³	Temp. (t_{ds}) °F					
0.40	4.062	78.8	4.062	80	0.85	10.0	0.3971	1.0001	
	4.117	79.3	4.061	80	0.85	10.0	0.4021	1.0130	
	4.159	79.7	4.065	80	0.85	10.0	0.4088	1.0289	
0.60	6.084	79.7	6.035	80	1.3	10.0	0.5938	1.0055	
	6.166	79.7	6.016	80	1.275	10.0	0.6018	1.0223	
	6.102	79.7	6.015	80	1.25	10.0	0.5955	1.0119	
0.80	8.097	79.7	7.996	80	2.35	10.0	0.7902	1.0074	
	8.132	79.7	8.003	80	2.40	10.0	0.7937	1.0107	
	8.114	79.3	7.916	80	2.45	10.0	0.7925	1.0100	
1.0	10.129	78.8	10.141	80	3.875	10.0	0.9901	0.9936	
	10.164	78.8	10.081	80	3.80	10.0	0.9936	1.0011	
	10.173	78.8	10.092	80	3.80	10.0	0.9945	1.0009	
1.2	12.359	78.8	12.305	80	5.5	10.0	1.2092	0.9932	
	12.368	78.8	12.316	80	5.3	10.0	1.2091	0.9935	
	12.313	78.8	12.274	80	5.3	10.0	1.2031	0.9925	

$$Y_{ds} = \frac{(V_s)\ (t_{ds} + 460)\ (P_b)}{(V_{ds})\ (t_s + 460)\ (P_b + (\ p\ /\ 13.6))}$$

$$Q = (17.64)\ \frac{(P_b)\ (V_s)}{(t_s + 460)\ (\theta)}$$

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Dry Gas Meter Identification: 1017057   Calibration by: ______

Date: 4-1-86   Barometric Pressure (P_b): 29.86 In. Hg

ENTROPY ENVIRONMENTALISTS, INC.   PAGE 2 of 2

*Date: ______   *Barometric Pressure (P_b): ______ In. Hg

Approx. Flow Rate (Q) cfm	Spirometer Gas Volume (V_s) ft³	Spirometer Temp. (t_s) °F	Dry Gas Meter Gas Volume (V_{ds}) ft³	Dry Gas Meter Temp. (t_{ds}) °F	Pressure (Δp) in. H_2O	Time (θ) min.	Flow Rate (Q) cfm	Meter Meter Coeff. (Y_{ds})	Avg. Meter Coeff. ($\bar{Y}_{ds}$)
1.4	14.454	79.7	14.462	81	7.625	10.0	1.4107	0.9834	
	14.444	78.8	14.446	80.5	7.55	10.0	1.4120	0.9847	
	14.399	78.8	14.406	80	7.575	10.0	1.4076	0.9834	

$\bar{Y}_{ds} = 1.002$

$$Y_{ds} = \frac{(V_s)\ (t_{ds} + 460)\ (P_b)}{(V_{ds})\ (t_s + 460)\ (P_b + (\ p\ /\ 13.6))}$$

$$Q = (17.64)\ \frac{(P_b)\ (V_s)}{(t_s + 460)\ (\theta)}$$

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Dry Gas Meter Identification: 6838323 Calibration by:

Date: 3-26-86 Barometric Pressure (P_b): 30.12 in. Hg

*Date: 3-27-86 *Barometric Pressure (P_b): 29.85 in. Hg

ENTROPY ENVIRONMENTALISTS, INC.

Approx. Flow Rate (Q) cfm	Spirometer Gas Volume (V_s) ft³	Spirometer Temp. (t_s) °F	Dry Gas Meter Gas Volume (V_{ds}) ft³	Dry Gas Meter Temp. (t_{ds}) °F	Pressure (Δp) in. H_2O	Time (θ) min.	Flow Rate (Q) cfm	Meter Meter Coeff. (Y_{ds})	Avg. Meter Coeff. ($\bar{Y}_{ds}$)
0.30	2.924	82.4	2.906	81	0.40	10.00	0.2864	1.0026	
	2.969	82.8	2.869	81	.40	10.00	.2906	1.0304	
	3.652	83.3	3.501	81	.40	12.00	.3571	1.0377	
* 0.40	4.235	80.6	4.330	77	0.85	10.00	.4125	.9700	
	4.545	80.6	4.370	78	.85	10.00	.4427	1.0328	
	4.417	80.6	4.345	79	.85	10.00	.4302	1.0114	
0.50	5.328	78.8	5.206	75	1.10	10.00	.5271	1.0135	
	5.383	79.7	5.212	77	1.15	10.00	.5317	1.025	
	5.301	79.7	5.166	78	1.15	10.00	.5219	1.020	
* 0.80	8.288	81	8.216	79	2.65	10.00	.8067	.9985	
	8.397	82	8.214	80	2.65	10.00	.8158	1.0119	
	8.352	82.4	8.199	80	2.65	10.00	.8108	1.0075	
1.00	10.638	83.3	10.472	81	4.15	10.00	1.040	1.0014	
	10.656	83.3	10.534	81.5	4.15	10.00	1.042	.9981	
	10.528	83.3	10.450	81.5	4.15	10.00	1.0296	.9941	

$$Y_{ds} = \frac{(V_s)\ (t_{ds} + 460)\ (P_b)}{(V\ \ )\ (t\ \ + 460)\ (P\ \ + (\ p\ /\ 13.6))}$$

$$Q = (17.64)\ \frac{(P_b)\ (V_s)}{(t_s + 460)\ (\theta)}$$

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ENTROPY ENVIRONMENTALISTS, INC.

Dry Gas Meter Identification: 6838323 Calibration by: MH

Date: 3-26-86 Barometric Pressure (P_b): 30.12 in. Hg

*Date: 3-27-86 *Barometric Pressure (P_b): 29.85 in. Hg

Approx. Flow Rate (Q) cfm	Spirometer		Dry Gas Meter		Pressure (Δp) in. H_2O	Time (Θ) min.	Flow Rate (Q) cfm	Meter Meter Coeff. (Y_{ds})	Avg. Meter Coeff. ($\bar{Y}_{ds}$)
	Gas Volume (V_s) ft^3	Temp. (t_s) °F	Gas Volume (V_{ds}) ft^3	Temp. (t_{ds}) °F					
* 1.20	12.304	82.4	12.168	80	5.50	10.00	1.1945	0.9932	
	12.177	82.4	12.065	80	5.50	10.00	1.1821	.9914	
	12.186	82.4	12.100	80	5.50	10.00	1.1830	.9892	
1.35	13.698	82.4	13.494	79.5	6.85	10.00	1.3418	.9931	
	13.552	82.4	13.505	80	6.85	10.00	1.33	.9826	
	13.752	81.5	13.712	80	7.00	10.00	1.35	.9833	

$\bar{Y}_{ds} = 1.0042$

$$Y_{ds} = \frac{(V_s)(t_{ds} + 460)(P_b)}{(V_{ds})(t_s + 460)(P_b + (\Delta p / 13.6))}$$

$$Q = (17.64)\frac{(P_b)(V_s)}{(t_s + 460)(\Theta)}$$

Meter Box Number: N9

Calibration by: T. Taylor

Standard Meter Number: 1017057

Standard Meter Gamma: 1.002

Date: 9-10-86

Barometric Pressure (P_b): 29.85 in. Hg

*Date: ______

*Barometric Pressure (P_b): ______ in. Hg

PRETEST CALIBRATION

Standard Meter			Meter Box Metering System				
Gas Volume (V_{ds}) ft^3	Temp. (t_{ds}) °F	Time (θ) min.	Orifice Setting (ΔH) in. H_2O	Gas Volume (V_d) ft^3	Temp. (t_d) °F	Coeff. (Y_d)	$\Delta H_@$ in. H_2O
3.965	72	10.0	0.50	4.082	78	.9830	1.770
3.961	72	10.0	0.50	4.088	80	.9843	1.767
8.236	72	10.0	2.1	8.473	83	.9890	1.707
8.178	72	10.0	2.1	8.447	85.5	.9896	1.723
12.351	72	10.0	4.8	12.667	88	.9946	1.719
12.335	72	10.0	4.8	12.696	91	.9965	1.714
					Average	.9895	1.73

0.990

$$Y_d = \frac{Y_{ds} * V_{ds} * (t_d + 460) * P_b}{V_d * (t_{ds} + 460) * (P_b + H/13.6)}$$

$$\Delta H_@ = \frac{0.0317 * \Delta H}{P_b * (t_d + 460)} * \left[\frac{(t_{ds} + 460) * \theta}{Y_{ds} * V_{ds}} \right]^2$$

Meter Box Number: N9

Calibration by: T. McDonald

Meter Box Vacuum: 2 in. Hg

Standard Meter Number: 6838323

Standard Meter Gamma: 1.0042

Date: 2-4-87

Barometric Pressure (P_b): 29.78 in. Hg

POSTTEST CALIBRATION

Standard Meter			Meter Box Metering System				
Gas Volume (V_{ds}) ft^3	Temp. (t_{ds}) °F	Time (θ) min.	Orifice Setting (ΔH) in. H_2O	Gas Volume (V_d) ft^3	Temp. (t_d) °F	Coeff. (Y_d)	$\Delta H_@$ in. H_2O
7.225	66	10.0	1.73	7.491	79	0.9883	1.80
7.240	66	10.0	1.73	7.510	79	0.9878	1.79
7.232	66	10.0	1.73	7.511	81	0.9902	1.79
					Average	0.9888	1.79

$$Y_d = \frac{Y_{ds} * V_{ds} * (t_d + 460) * P_b}{V_d * (t_{ds} + 460) * (P_b + \Delta H/13.6)}$$

$$\Delta H_@ = \frac{0.0317 * \Delta H}{P_b * (t_d + 460)} * \left[\frac{(t_{ds} + 460) * \theta}{Y_{ds} * V_{ds}}\right]^2$$

Dickey Scales, Inc.

CERTIFICATE OF INSPECTION

THIS CERTIFIES THAT THE WEIGHING INSTRUMENTS LISTED AT

Metal Container Corporation, North Ellis Rd., Jacksonville, FL

Model 4100
Ser. No. 1232

HAVE BEEN TESTED ON THIS DATE 1/22/87 AND ARE

Correct

(TEST BASED ON U.S. GOVERNMENT STANDARDS)

AS PER LIST OF INSTRUMENTS RECORDED AT ABOVE ADDRESS AND AT

(SEAL)

Dickey Scales, Inc.
P.O. Box 3216
436 West 41st Street
Jacksonville, Florida 32206

SUPERVISOR SERVICE DEPARTMENT

355-8365

(X)

APPENDIX E

SAMPLING AND ANALYTICAL PROCEDURES

METHOD 1—SAMPLE AND VELOCITY TRAVERSES FOR STATIONARY SOURCES

1. *Principle and Applicability*

1.1 Principle. To aid in the representative measurement of pollutant emissions and/or total volumetric flow rate from a stationary source, a measurement site where the effluent stream is flowing in a known direction is selected, and the cross-section of the stack is divided into a number of equal areas. A traverse point is then located within each of these equal areas.

1.2 Applicability. This method is applicable to flowing gas streams in ducts, stacks, and flues. The method cannot be used when: (1) flow is cyclonic or swirling (see Section 2.4), (2) a stack is smaller than about 0.30 meter (12 in.) in diameter, or 0.071 m^2 (113 $in.^2$) cross-sectional area, or (3) the measurement site is less than two stack or duct diameters downstream or less than a half diameter upstream from a flow disturbance.

The requirements of this method must be considered before construction of a new facility from which emissions will be measured; failure to do so may require subsequent alterations to the stack or deviation from the standard procedure. Cases involving variants are subject to approval by the Administrator, U.S. Environmental Protection Agency.

2. *Procedure*

2.1 Selection of Measurement Site. Sampling or velocity measurement is performed at a site located at least eight stack or duct diameters downstream and two diameters upstream from any flow disturbance such as a bend, expansion, or contraction in the stack, or from a visible flame. If necessary, an alternative location may be selected, at a position at least two stack or duct diameters downstream and a half diameter upstream from any flow disturbance. For a rectangular cross section, an equivalent diameter (D_e) shall be calculated from the following equation, to determine the upstream and downstream distances:

$$D_e = \frac{2\,LW}{(L+W)}$$

where L=length and W=width.

2.2 Determining the Number of Traverse Points.

2.2.1 Particulate Traverses. When the eight- and two-diameter criterion can be met, the minimum number of traverse points shall be: (1) twelve, for circular or rectangular stacks with diameters (or equivalent diameters) greater than 0.61 meter (24 in.); (2) eight, for circular stacks with diameters between 0.30 and 0.61 meter (12-24 in.); (3) nine, for rectangular stacks with equivalent diameters between 0.30 and 0.61 meter (12-24 in.).

When the eight- and two-diameter criterion cannot be met, the minimum number of traverse points is determined from Figure 1-1. Before referring to the figure, however, determine the distances from the chosen measurement site to the nearest upstream and downstream disturbances, and divide each distance by the stack diameter or equivalent diameter, to determine the distance in terms of the number of duct diameters. Then, determine from Figure 1-1 the minimum number of traverse points that corresponds: (1) to the number of duct diameters upstream; and (2) to the number of diameters downstream. Select the higher of the two minimum numbers of traverse points, or a greater value, so that for circular stacks the number is a multiple of 4, and for rectangular stacks, the number is one of those shown in Table 1-1.

TABLE 1-1 CROSS-SECTION LAYOUT FOR RECTANGULAR STACKS

Number of traverse points	Matrix layout
9	3x3
12	4x3
16	4x4
20	5x4
25	5x5
30	6x5
36	6x6
42	7x6
49	7x7

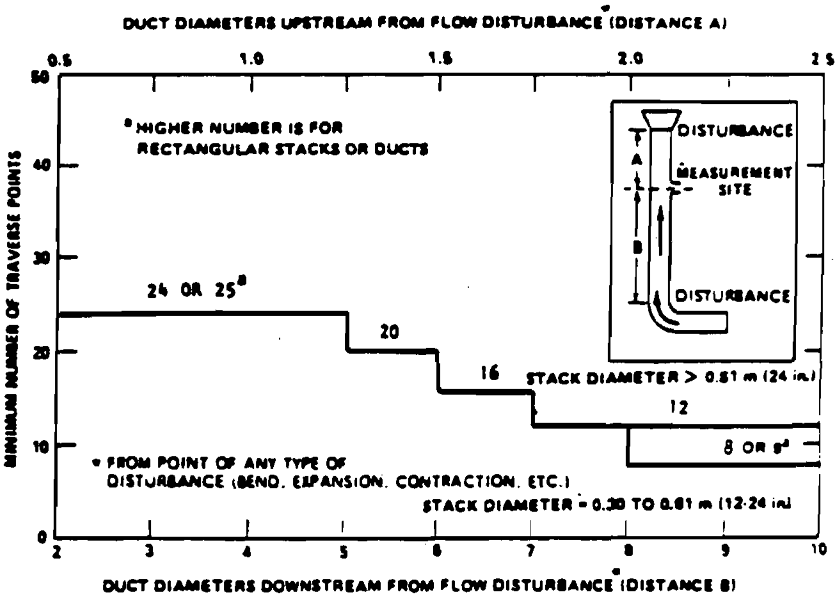

Figure 1-1. Minimum number of traverse points for particulate traverses.

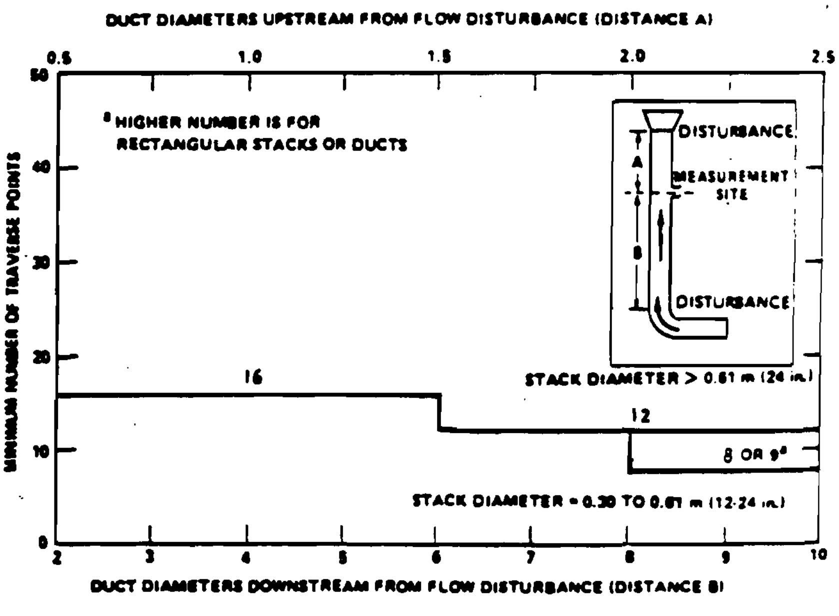

Figure 1-2. Minimum number of traverse points for velocity (nonparticulate) traverses.

2.2.2 Velocity (Non-Particulate) Traverses. When velocity or volumetric flow rate is to be determined (but not particulate matter), the same procedure as that for particulate traverses (Section 2.2.1) is followed, except that Figure 1-2 may be used instead of Figure 1-1.

2.3 Cross-sectional Layout and Location of Traverse Points.

2.3.1 Circular Stacks. Locate the traverse points on two perpendicular diameters according to Table 1-2 and the example shown in Figure 1-3. Any equation (for examples, see Citations 2 and 3 in the Bibliography) that gives the same values as those in Table 1-2 may be used in lieu of Table 1-2.

For particulate traverses, one of the diameters must be in a plane containing the greatest expected concentration variation, e.g., after bends, one diameter shall be in the plane of the bend. This requirement becomes less critical as the distance from the disturbance increases; therefore, other diameter locations may be used, subject to approval of the Administrator.

In addition for stacks having diameters greater than 0.61 m (24 in.) no traverse points shall be located within 2.5 centimeters (1.00 in.) of the stack walls; and for stack diameters equal to or less than 0.61 m (24 in.), no traverse points shall be located within 1.3 cm (0.50 in.) of the stack walls. To meet these criteria, observe the procedures given below.

2.3.1.1 Stacks With Diameters Greater Than 0.61 m (24 in.). When any of the traverse points as located in Section 2.3.1 fall within 2.5 cm (1.00 in.) of the stack walls, relocate them away from the stack walls to: (1) a distance of 2.5 cm (1.00 in.); or (2) a distance equal to the nozzle inside diameter, whichever is larger. These relocated traverse points (on each end of a diameter) shall be the "adjusted" traverse points.

Whenever two successive traverse points are combined to form a single adjusted traverse point, treat the adjusted point as two separate traverse points, both in the sampling (or velocity measurement) procedure, and in recording the data.

TRAVERSE POINT	DISTANCE, % of diameter
1	4 4
2	14 7
3	29 5
4	70 5
5	85 3
6	95 6

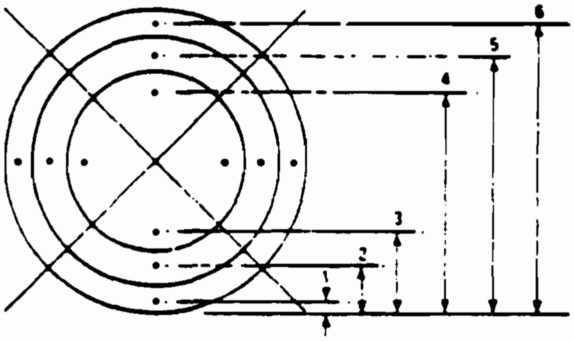

Figure 1 3. Example showing circular stack cross section divided into 12 equal areas, with location of traverse points indicated.

TABLE 1-2. LOCATION OF TRAVERSE POINTS IN CIRCULAR STACKS

[Percent of stack diameter from inside wall to traverse point]

Traverse point number on a diameter	Number of traverse points on a diameter—											
	2	4	6	8	10	12	14	16	18	20	22	24
1	14.6	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	85.4	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3		75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4		93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5			85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6			95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7				89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8				96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9					91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10					97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11						93.3	85.4	78.0	70.4	61.2	39.3	32.3
12						97.9	90.1	83.1	76.4	69.4	60.7	39.8
13							94.3	87.5	81.2	75.0	68.5	60.2
14							98.2	91.5	85.4	79.6	73.8	67.7
15								95.1	89.1	83.5	78.2	72.8
16								98.4	92.5	87.1	82.0	77.0
17									95.6	90.3	85.4	80.6
18									98.6	93.3	88.4	83.9
19										96.1	91.3	86.8
20										98.7	94.0	89.5
21											96.5	92.1
22											98.9	94.5
23												96.8
24												98.9

2.3.1.2 Stacks With Diameters Equal to or Less Than 0.61 m (24 in.). Follow the procedure in Section 2.3.1.1, noting only that any "adjusted" points should be relocated away from the stack walls to: (1) a distance of 1.3 cm (0.50 in.); or (2) a distance equal to the nozzle inside diameter, whichever is larger.

2.3.2 Rectangular Stacks. Determine the number of traverse points as explained in Sections 2.1 and 2.2 of this method. From Table 1-1, determine the grid configuration. Divide the stack cross-section into as many equal rectangular elemental areas as traverse points, and then locate a traverse point at the centroid of each equal area according to the example in Figure 1-4.

If the tester desires to use more than the minimum number of traverse points, expand the "minimum number of traverse points" matrix (see Table 1-1) by adding the extra traverse points along one or the other or both legs of the matrix; the final matrix need not be balanced. For example, if a 4x3 "minimum number of points: matrix were expanded to 36 points, the final matrix could be 9x4 or 12x3, and would not necessarily have to be 6x6. After constructing the final matrix, divide the stack cross-section into as many equal rectangular, elemental areas as traverse points, and locate a traverse point at the centroid of each equal area.

The situation of traverse points being too close to the stack walls is not expected to arise with rectangular stacks. If this problem should ever arise, the Administrator must be contacted for resolution of the matter.

2.4 Verification of Absence of Cyclonic Flow. In most stationary sources, the direction of stack gas flow is essentially parallel to the stack walls. However, cyclonic flow may exist (1) after such devices as cyclones and inertial demisters following venturi scrubbers, or (2) in stacks having tangential inlets or other duct configurations which tend to induce swirling; in these instances, the presence or absence of cyclonic flow at the sampling location must be determined. The following techniques are acceptable for this determination.

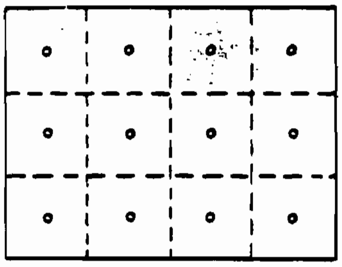

Figure 1-4. Example showing rectangular stack cross section divided into 12 equal areas, with a traverse point at centroid of each area.

Level and zero the manometer. Connect a Type S pitot tube to the manometer. Position the Type S pitot tube at each traverse point, in succession, so that the planes of the face openings of the pitot tube are perpendicular to the stack cross-sectional plane; when the Type S pitot tube is in this position, it is at "0° reference." Note the differential pressure (Δp) reading at each traverse point. If a null (zero) pitot reading is obtained at 0° reference at a given traverse point, an acceptable flow condition exists at that point. If the pitot reading is not zero at 0° reference, rotate the pitot tube (up to ±90° yaw angle), until a null reading is obtained. Carefully determine and record the value of the rotation angle (α) to the nearest degree. After the null technique has been applied at each traverse point, calculate the average of the absolute values of α; assign α values of 0° to those points for which no rotation was required, and include these in the overall average. If the average value of α is greater than 10°, the overall flow condition in the stack is unacceptable and alternative methodology, subject to the approval of the Administrator, must be used to perform accurate sample and velocity traverses.

3. *Bibliography*

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● SEE PROPOSED AMENDMENT NEXT PAGE

PART 60—[AMENDED]

It is proposed to amend Appendix A, Method 1 of 40 CFR Part 60 as follows:

1. The Authority citation for 40 CFR Part 60 continues to read as follows:

Sections 111, 114, and 301(a) of the Clean Air Act, as amended (42 U.S.C. 7411, 7414, and 7601(a)).

2. By amending Section 2.1 by adding a second paragraph as follows:

* * * * *

2. *Procedure.*

2.1 * * *

A second alternative procedure is available for determining the acceptability of a measurement location not meeting the criteria above. This procedure, determination of gas flow angles at the sampling points and comparing the results with acceptability criteria, is described in Section 2.5.

* * * * *

3. By amending Section 2.4 by changing in the last sentence of the second paragraph the value "10°" to "20°," and by adding a third paragraph as follows:

* * * * *

2.4 * * *

The alternative procedure described in Section 2.5 may be used to determine the rotation angles in lieu of the procedure described above. The limit of acceptability for the average value of σ would remain 20°.

* * * * *

4. By adding a new Section 2.5 to Section 2 as follows:

* * * * *

2.5 Alternative Measurement Site Selection Procedure. This alternative applies to sources where measurement locations are less than two equivalent stack or duct diameters downstream or less than a half duct diameter upstream from a flow disturbance. The alternative should be limited to ducts larger than 24 inches in diameter where blockage and wall effects are minimal. A directional flow-sensing probe is used to measure pitch and yaw angles of the gas flow at 40 or more traverse points, the resultant angle is calculated and compared with acceptable criteria for mean and standard deviation.

Note—Both the pitch and yaw angles are measured from a line passing through the traverse point and parallel to the stack axis. The pitch angle is the angle of the gas flow component in the plane that INCLUDES the traverse line and is parallel to the stack axis. The yaw angle is the angle of the gas flow component in the plane PERPENDICULAR to the traverse line at the traverse point and is measured from the line passing through the traverse point and parallel to the stack axis.

2.5.1 Apparatus.

2.5.1.1 Directional Probe. Any directional probe, such as United Sensor Type DA Three-Dimensional Directional Probe (NOTE: Mention of trade name or specific products does not constitute endorsement by the U.S. Environmental Protection Agency) capable of measuring both the pitch and yaw angles of gas flows is acceptable. Assign an identification number to the directional probe, and permanently mark or engrave the number on the body of the probe. The pressure holes of directional probes are susceptible to plugging when used in particulate-laden gas streams. Therefore, a system for cleaning the pressure holes by "back-purging" with pressurized air is required.

2.5.1.2 Differential Pressure Gauges. Inclined manometers, U-tube manometers, or other differential pressure gauges (e.g., magnehelic gauges) that meet the specifications described in Method 2, Section 2.2.

Note.—If the differential pressure gauge produces both negative and positive readings, then both negative and positive pressure readings shall be calibrated at a minimum of three points as specified in Method 2, Section 2.2.

2.5.2 Traverse Points. Use a minimum of 40 traverse points for circular ducts and 42 points for rectangular ducts for the gas flow angle determinations. Follow Section 2.3 and Table 1-1 or 1-2 for the location and layout of the traverse points. If the measurement location is determined to be acceptable according to the criteria in this alternative procedure, use the same traverse point number and location for sampling and velocity measurements.

2.5.3 Measurement Procedure.

2.5.3.1 Prepare the directional probe and differential pressure gauges as recommended by the manufacturer. Capillary tubing or surge tanks may be used to dampen pressure fluctuations. It is recommended, but not required, that a pretest leak check be conducted. To perform a leak check, pressurize or use suction on the impact opening until a reading of at least 7.6 cm (3 in.) H_2O registers on the differential pressure gauge, then close off the impact opening. The pressure of a leak-free system will remain stable for at least 15 seconds.

2.5.3.2 Level and zero the manometers. Since the manometer level and zero may drift because of vibrations and temperature changes, periodically check the level and zero during the traverse.

2.5.3.3 Position the probe at the appropriate locations in the gas stream and rotate until zero deflection is indicated for the yaw angle pressure gauge. Determine and record the yaw angle. Record the pressure gauge readings for the pitch angle and determine the pitch angle from the calibration curve. Repeat this procedure for each traverse point. Complete a "back-purge" of the pressure lines and the impact openings prior to measurements at each traverse point.

2.5.4 Calculate the resultant angle at each traverse point, the average resultant angle, and the standard deviation using the following equations. Complete the calculations retaining at least one extra significant figure beyond that of the acquired data. Round the values after the final calculations.

2.5.4.1 Calculate the resultant angle at each traverse point:

R_i = arc cosine [(cosine Y_i) (cosine P_i)]
Eq. 1-2

Where:

R_i = Resultant angle at traverse point i, degree.

Y_i = Yaw angle at traverse point i, degree.

P_i = Pitch angle at traverse point i, degree.

2.5.4.2 Calculate the average resultant for the measurements:

$$R = \frac{R_i}{n} \qquad \text{Eq. 1-3}$$

Where

R = Average resultant angle, degree.

n = Total number of traverse points.

2.5.4.3. Calculate the standard deviations:

$$S_d = \frac{\overset{n}{\underset{i}{}} (R_i - R)^2}{(n-1)} \qquad \text{Eq. 1-4}$$

Where:

S_d = Standard deviation, degree.

2.5.5 The measurement location is acceptable if R<20° and S_d<10°.

2.5.6 Calibration. Use a flow system as described in Sections 4.1.2.1 and 4.1.2.2 of Method 2. In addition, the flow system shall have the capacity to generate two test-section velocities: one between 365 and 730 m/min (1200 and 2400 ft/min) and one between 730 and 1100 m/min (2400 and 3600 ft/min).

2.5.6.1 Cut two entry ports in the test-section. The axes through the entry ports shall be perpendicular to each other and intersect in the centroid of the test-section. The ports should be elongated slots parallel to the axis of the test section and of sufficient length to allow measurement of pitch angles while maintaining the pitot head position at the test-section centroid. To facilitate alignment of the directional probe during calibration, the test-section should be constructed of plexiglass or some other transparent material. All calibration measurements should be made at the same point in the test-section, preferably at the centroid of the test-section.

2.5.6.2 To ensure that the gas flow is parallel to the central axis of the test-section, follow the procedure in Section 2.4 for cyclonic flow determination to measure the gas flow angles at the centroid of the test section from two test ports located 90° apart. The gas flow angle measured in each port must be ±2° of 0°. Straightening vanes should be installed if necessary to meet this criterion.

2.5.6.3 Pitch Angle Calibration. Perform a calibration traverse according to the manufacturer's recommended protocol in 5° increments for angles from −60° to +60° at one velocity in each of the two ranges specified above. Average the pressure ratio values obtained for each angle in the two flow ranges, and plot a calibration curve with the average values of the pressure ratio (or other suitable measurement factor as recommended by the manufacturers) versus the pitch angle. Draw a smooth line through the data points. Plot also the data values for each traverse point. Determine the differences between the measured data values and the angle from the calibration curve at the same pressure ratio. The difference at each comparison must be within ±2° for angles between 0° and 40° and with ±3° for angles between 40° and 60°.

2.5.8.4. Yaw Angle Calibration. Mark the three-dimensional probe to allow the determination of the yaw position of the probe. This is usually a line extending the length of the probe and aligned with the impact opening. To determine the accuracy of measurements of the yaw angle, only the zero or null position need be calibrated as follows. Place the directional probe in the test section and rotate the probe until the zero position is found. With a protractor or other angle measuring device, measure the angle indicated by the yaw angle indicator on the three-dimensional probe. This should be within ±2° of 0°. Report this measurement for any other points along the length of the pitot where yaw angle measurements could be read in order to account for variations in the pitot markings used to indicate pitot head positions.

5. By adding Citations 13 and 14 to Section 3, as follows:

3. Bibliography

* * * * *

13. Smith, W.S. and D.J. Grove. A Proposed Extension of EPA Method 1 Criteria. "Pollution Engineering". XV(8):36–37. August 1983.

14. Gerhart, P.M. and M.J. Dorsey. Investigation of Field Test Procedures for Large Fans. University of Akron, Akron, Ohio. (EPRI Contract CS-1651). Final Report (RP-1649-5) December 1980.

METHOD 2—DETERMINATION OF STACK GAS VELOCITY AND VOLUMETRIC FLOW RATE (TYPE S PITOT TUBE)

1. *Principle and Applicability*

1.1 Principle. The average gas velocity in a stack is determined from the gas density and from measurement of the average velocity head with a Type S (Stausscheibe or reverse type) pitot tube.

1.2 Applicability. This method is applicable for measurement of the average velocity of a gas stream and for quantifying gas flow.

This procedure is not applicable at measurement sites which fail to meet the criteria of Method 1. Section 2.1. Also. the method cannot be used for direct measurement in cyclonic or swirling gas streams: Section 2.4 of Method 1 shows how to determine cyclonic or swirling flow conditions. When unacceptable conditions exist. alternative procedures. subject to the approval of the Administrator. U.S. Environmental Protection Agency. must be employed to make accurate flow rate determinations; examples of such alternative procedures are: (1) to install straightening vanes; (2) to calculate the total volumetric flow rate stoichiometrically, or (3) to move to another measurement site at which the flow is acceptable.

2. *Apparatus*

Specifications for the apparatus are given below. Any other apparatus that has been demonstrated (subject to approval of the Administrator) to be capable of meeting the specifications will be considered acceptable.

2.1 Type S Pitot Tube. The Type S pitot tube (Figure 2-1) shall be made of metal tubing (e.g. stainless steel). It is recommended that the external tubing diameter (dimension D_t Figure 2-2b) be between 0.48 and 0.95 centimeters (3/16 and 3/8 inch). There shall be an equal distance from the base of each leg of the pitot tube to its face-opening plane (dimensions P_A and P_B Figure 2-2b): it is recommended that this distance be between 1.05 and 1.50 times the external tubing diameter. The face openings of the pitot tube shall, preferably, be aligned as shown in Figure 2-2: however, slight misalignments of the openings are permissible (see Figure 2-3).

The Type S pitot tube shall have a known coefficient, determined as outlined in Section 4. an identification number shall be assigned to the pitot tube: this number shall be permanently marked or engraved on the body of the tube.

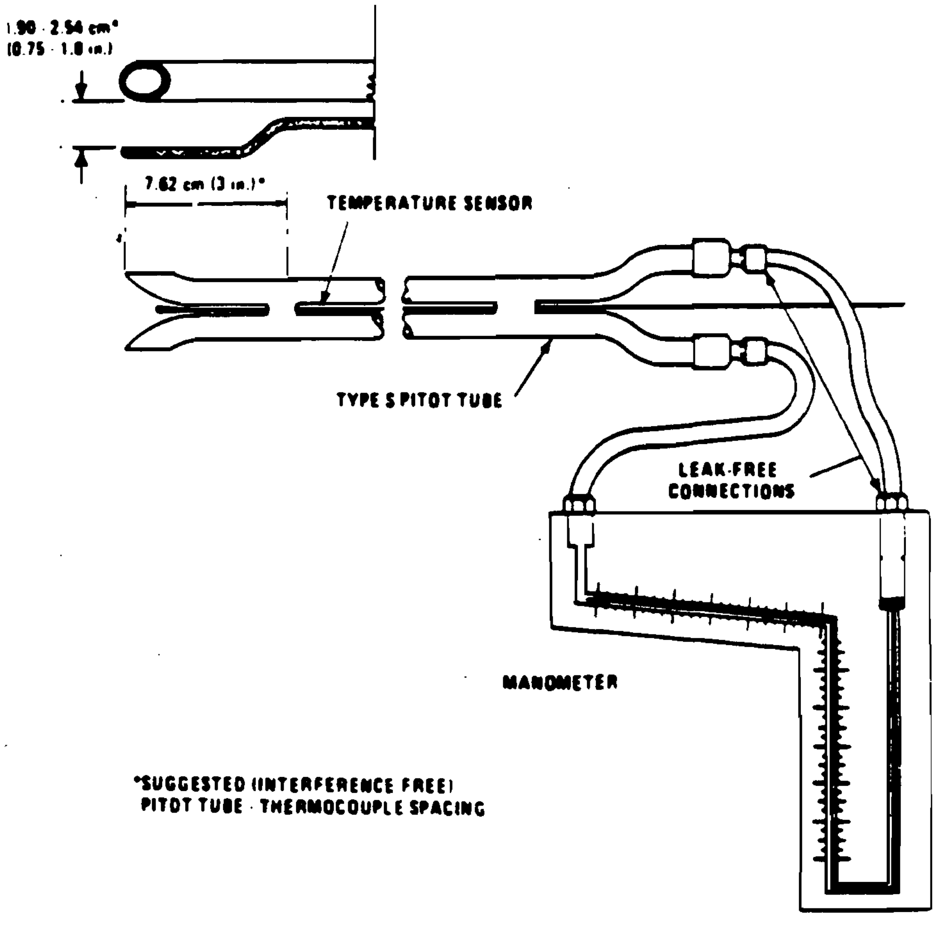


Figure 2-1. Type S pitot tube manometer assembly.

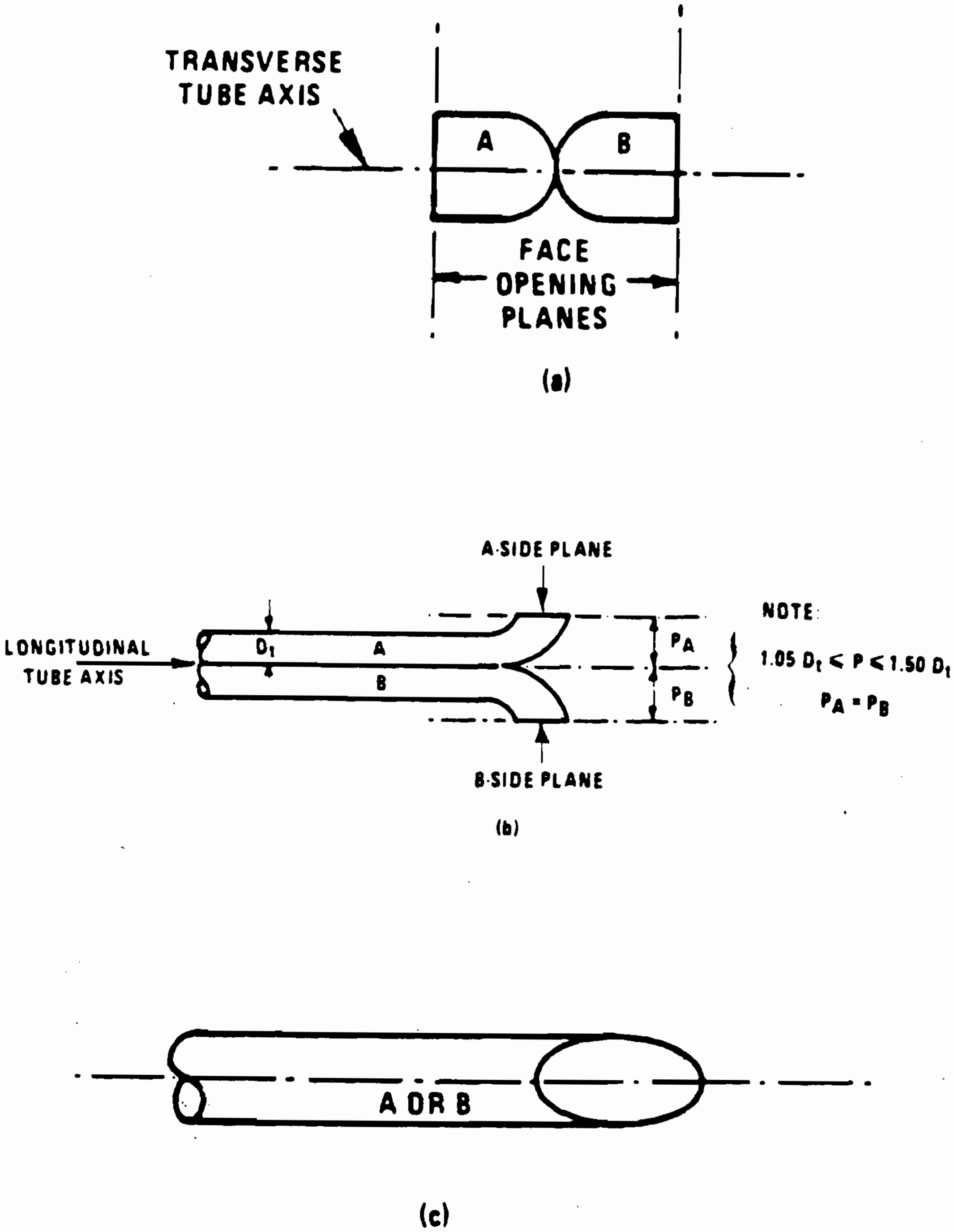


Figure 2-2. Properly constructed Type S pitot tube, shown in: (a) end view; face opening planes perpendicular to transverse axis; (b) top view; face opening planes parallel to longitudinal axis; (c) side view; both legs of equal length and centerlines coincident, when viewed from both sides. Baseline coefficient values of 0.84 may be assigned to pitot tubes constructed this way.

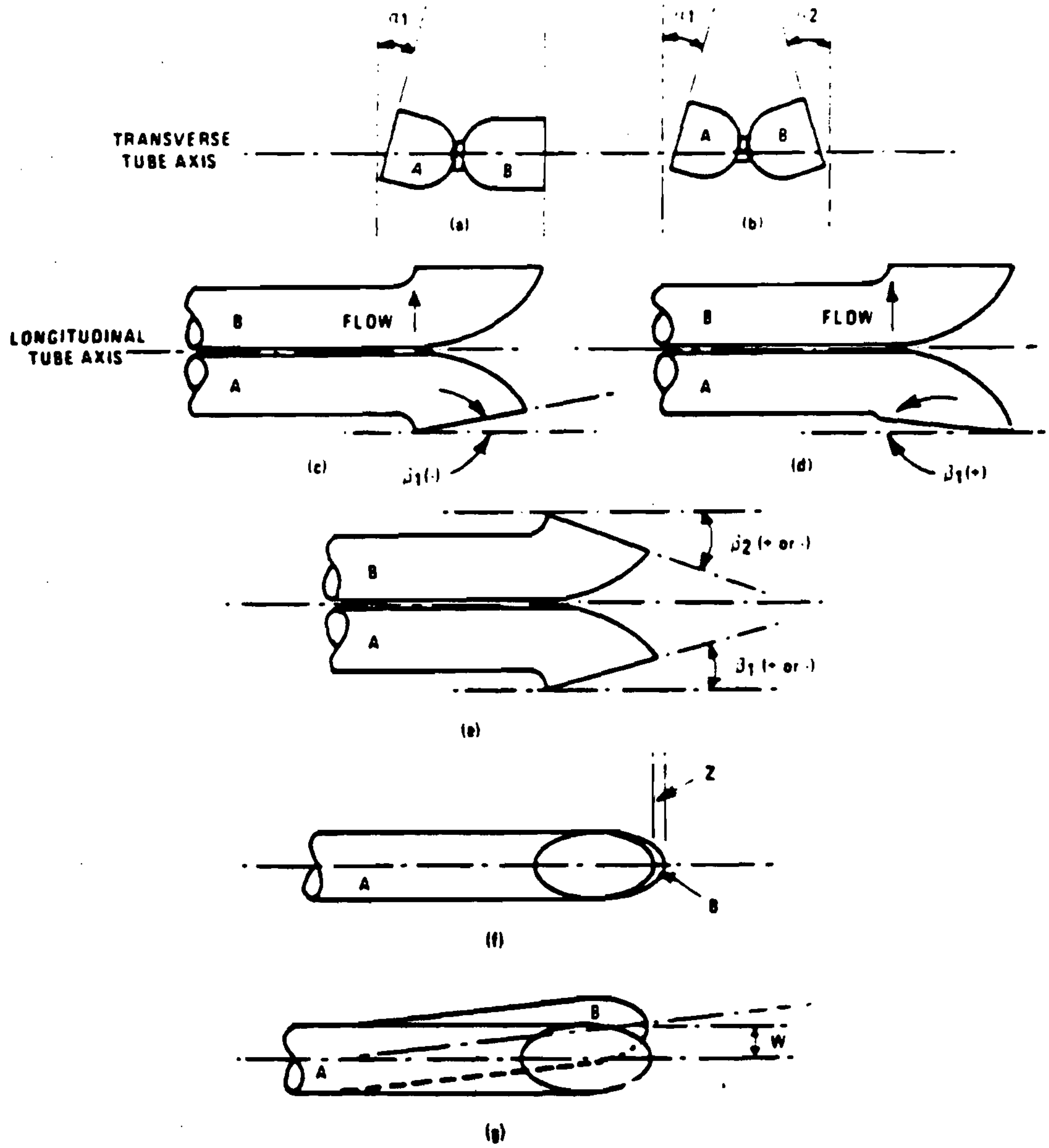


Figure 2-3. Types of face-opening misalignment that can result from field use or improper construction of Type S pitot tubes. These will not affect the baseline value of Cp(s) so long as $\alpha 1$ and $\alpha 2$ 10°, $\beta 1$ and $\beta 2$ 5°, z 0.32 cm (1/8 in.) and w 0.08 cm (1/32 in.) (citation 11 in Section 6).

A standard pitot tube may be used instead of a Type S, provided that it meets the specifications of Sections 2.7 and 4.2; note, however, that the static and impact pressure holes of standard pitot tubes are susceptible to plugging in particulate-laden gas streams. Therefore, whenever a standard pitot tube is used to perform a traverse, adequate proof must be furnished that the openings of the pitot tube have not plugged up during the traverse period; this can be done by taking a velocity head (Δp) reading at the final traverse point, cleaning out the impact and static holes of the standard pitot tube by "back-purging" with pressurized air, and then taking another Δp reading. If the Δp readings made before and after the air purge are the same (± 5 percent), the traverse is acceptable. Otherwise, reject the run. Note that if Δp at the final traverse point is unsuitably low, another point may be selected. If "back-purging" at regular intervals is part of the procedure, then comparative Δp readings shall be taken, as above, for the last two back purges at which suitably high Δp readings are observed.

2.2 Differential Pressure Gauge. An inclined manometer or equivalent device is used. Most sampling trains are equipped with a 10-in. (water column) inclined-vertical manometer, having 0.01-in. H_2O divisions on the 0-to 1-in. inclined scale, and 0.1-in. H_2O divisions on the 1- to 10-in. vertical scale. This type of manometer (or other gauge of equivalent sensitivity) is satisfactory for the measurement of Δp values as low as 1.3 mm (0.05 in.) H_2O. However, a differential pressure gauge of greater sensitivity shall be used (subject to the approval of the Administrator), if any of the following is found to be true: (1) the arithmetic average of all Δp readings at the traverse points in the stack is less than 1.3 mm (0.05 in.) H_2O; (2) for traverses of 12 or more points, more than 10 percent of the individual Δp readings are below 1.3 mm (0.05 in.) H_2O; (3) for traverses of fewer than 12 points, more than one Δp reading is below 1.3 mm (0.05 in.) H_2O. Citation 18 in Section 6 describes commercially available instrumentation for the measurement of low-range gas velocities.

As an alternative to criteria (1) through (3) above, the following calculation may be performed to determine the necessity of using a more sensitive differential pressure gauge:

$$T=\frac{\sum_{i=1}^{n}\sqrt{\Delta p_i+K}}{\sum_{i=1}^{n}\sqrt{\Delta p_i}}$$

where:

Δp_i = Individual velocity head reading at a traverse point, mm H_2O (in. H_2O).

n = Total number of traverse points.

K = 0.13 mm H_2O when metric units are used and 0.005 in H_2O when English units are used.

If T is greater than 1.05, the velocity head data are unacceptable and a more sensitive differential pressure gauge must be used.

NOTE: If differential pressure gauges other than inclined manometers are used (e.g., magnehelic gauges), their calibration must be checked after each test series. To check the calibration of a differential pressure gauge, compare Δp readings of the gauge with those of a gauge-oil manometer at a minimum of three points, approximately representing the range of Δp values in the stack. If, at each point, the values of Δp as read by the differential pressure gauge and gauge-oil manometer agree to within 5 percent, the differential pressure gauge shall be considered to be in proper calibration. Otherwise, the test series shall either be voided, or procedures to adjust the measured Δp values and final results shall be used subject to the approval of the Administrator.

2.3 Temperature Gauge. A thermocouple, liquid-filled bulb thermometer, bimetallic thermometer, mercury-in-glass thermometer, or other gauge, capable of measuring temperature to within 1.5 percent of the minimum absolute stack temperature shall be used. The temperature gauge shall be attached to the pitot tube such that the sensor tip does not touch any metal; the gauge shall be in an interference-free arrangement with respect to the pitot tube face openings (see Figure 2-1 and also Figure 2-7 in Section 4). Alternate positions may be used if the pitot tube-temperature gauge system is calibrated according to the procedure of Section 4. Provided that a difference of not more than 1 percent in the average velocity measurement is introduced, the temperature gauge need not be attached to the pitot tube; this alternative is subject to the approval of the Administrator.

2.4 Pressure Probe and Gauge. A piezometer tube and mercury- or water-filled U-tube manometer capable of measuring stack pressure to within 2.5 mm (0.1 in.) Hg is used. The static tap of a standard type pitot tube or one leg of a Type S pitot tube with the face opening planes positioned parallel to the gas flow may also be used as the pressure probe.

2.5 Barometer. A mercury, aneroid, or other barometer capable of measuring atmospheric pressure to within 2.5 mm Hg (0.1 in. Hg) may be used. In many cases, the barometric reading may be obtained from a nearby national weather service station, in which case the station value (which is the absolute barometric pressure) shall be requested and an adjustment for elevation differences between the weather station and the sampling point shall be applied at a rate of minus 2.5 mm (0.1 in.) Hg per 30-meter (100 foot) elevation increase or vice-versa for elevation decrease.

2.6 Gas Density Determination Equipment. Method 3 equipment, if needed (see Section 3.6), to determine the stack gas dry molecular weight, and Reference Method 4 or Method 5 equipment for moisture content determination; other methods may be used subject to approval of the Administrator.

2.7 Calibration Pitot Tube. When calibration of the Type S pitot tube is necessary (see Section 4), a standard pitot tube is used as a reference. The standard pitot tube shall, preferably, have a known coefficient, obtained either (1) directly from the National Bureau of Standards, Route 270, Quince Orchard Road, Gaithersburg, Maryland, or (2) by calibration against another standard pitot tube with an NBS-traceable coefficient. Alternatively, a standard pitot tube designed according to the criteria given in 2.7.1 through 2.7.5 below and illustrated in Figure 2-4 (see also Citations 7, 8, and 17 in Section 6) may be used. Pitot tubes designed according to these specifications will have baseline coefficients of about 0.99±0.01.

2.7.1 Hemispherical (shown in Figure 2-4), ellipsoidal, or conical tip.

2.7.2 A minimum of six diameters straight run (based upon D, the external diameter of the tube) between the tip and the static pressure holes.

2.7.3 A minimum of eight diameters straight run between the static pressure holes and the centerline of the external tube, following the 90 degree bend.

2.7.4 Static pressure holes of equal size (approximately 0.1 D), equally spaced in a piezometer ring configuration.

2.7.5 Ninety degree bend, with curved or mitered junction.

2.8 Differential Pressure Gauge for Type S Pitot Tube Calibration. An inclined manometer or equivalent is used. If the single-velocity calibration technique is employed (see Section 4.1.2.3), the calibration differential pressure gauge shall be readable to the nearest 0.13 mm H_2O (0.005 in. H_2O). For multivelocity calibrations, the gauge shall be readable to the nearest 0.13 mm H_2O (0.005 in H_2O) for Δp values between 1.3 and 25 mm H_2O (0.05 and 1.0 in. H_2O), and to the nearest 1.3 mm H_2O (0.05 in. H_2O) for Δp values above 25 mm H_2O (1.0 in. H_2O). A special, more sensitive gauge will be required to read Δp values below 1.3 mm H_2O [0.05 in. H_2O] (see Citation 18 in Section 6).

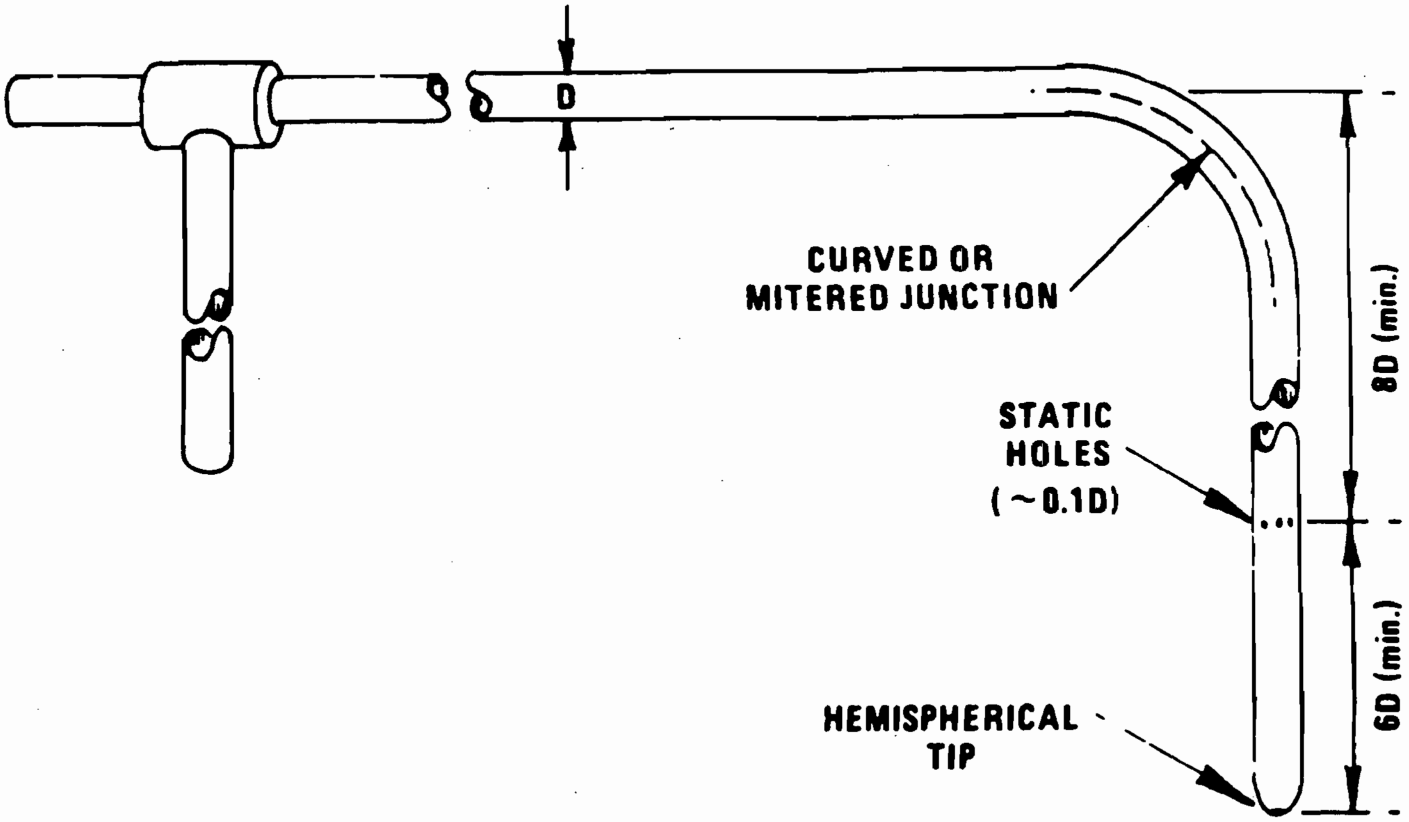


Figure 2-4. Standard pitot tube design specifications.

3. *Procedure*

3.1 Set up the apparatus as shown in Figure 2-1. Capillary tubing or surge tanks installed between the manometer and pitot tube may be used to dampen Δp fluctuations. It is recommended, but not required, that a pretest leak-check be conducted, as follows: (1) blow through the pitot impact opening until at least 7.6 cm (3 in.) H_2O velocity pressure registers on the manometer; then, close off the impact opening. The pressure shall remain stable for at least 15 seconds; (2) do the same for the static pressure side, except using suction to obtain the minimum of 7.6 cm (3 in.) H_2O. Other leak-check procedures, subject to the approval of the Administrator may be used.

3.2 Level and zero the manometer. Because the manometer level and zero may drift due to vibrations and temperature changes, make periodic checks during the traverse. Record all necessary data as shown in the example data sheet (Figure 2-5).

3.3 Measure the velocity head and temperature at the traverse points specified by Method 1. Ensure that the proper differential pressure gauge is being used for the range of Δp values encountered (see Section 2.2). If it is necessary to change to a more sensitive gauge, do so, and remeasure the Δp and temperature readings at each traverse point. Conduct a post-test leak-check (mandatory), as described in Section 3.1 above, to validate the traverse run.

3.4 Measure the static pressure in the stack. One reading is usually adequate.

3.5 Determine the atmospheric pressure.

PLANT ____________________
DATE ____________ RUN NO. ____________
STACK DIAMETER OR DIMENSIONS, m(in.) ____________
BAROMETRIC PRESSURE, mm Hg (in. Hg) ____________
CROSS SECTIONAL AREA, m^2(ft^2) ____________
OPERATORS ____________
PITOT TUBE I.D. NO. ____________
AVG. COEFFICIENT, Cp = ____________
LAST DATE CALIBRATED ____________

SCHEMATIC OF STACK
CROSS SECTION

Traverse Pt. No.	Vel. Hd., Δp mm (in.) H_2O	Stack Temperature		P_g mm Hg (in.Hg)	$\sqrt{\Delta p}$
		t_s, °C (°F)	T_s, °K (°R)		
Average					

Figure 2-5. Velocity traverse data.

3.6 Determine the stack gas dry molecular weight. For combustion processes or processes that emit essentially CO_2, O_2, CO, and N_2, use Method 3. For processes emitting essentially air, an analysis need not be conducted; use a dry molecular weight of 29.0. For other processes, other methods, subject to the approval of the Administrator, must be used.

3.7 Obtain the moisture content from Reference Method 4 (or equivalent) or from Method 5.

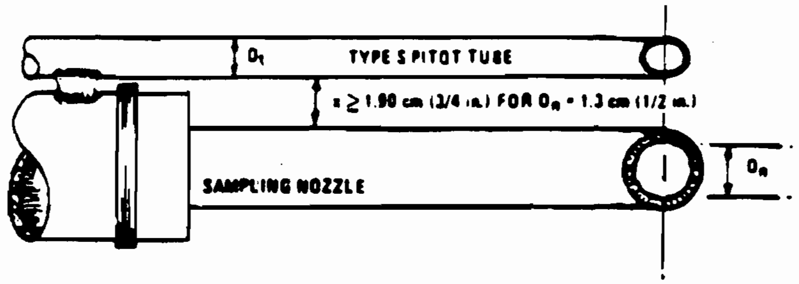
3.8 Determine the cross-sectional area of the stack or duct at the sampling location. Whenever possible, physically measure the stack dimensions rather than using blueprints.

4. *Calibration*

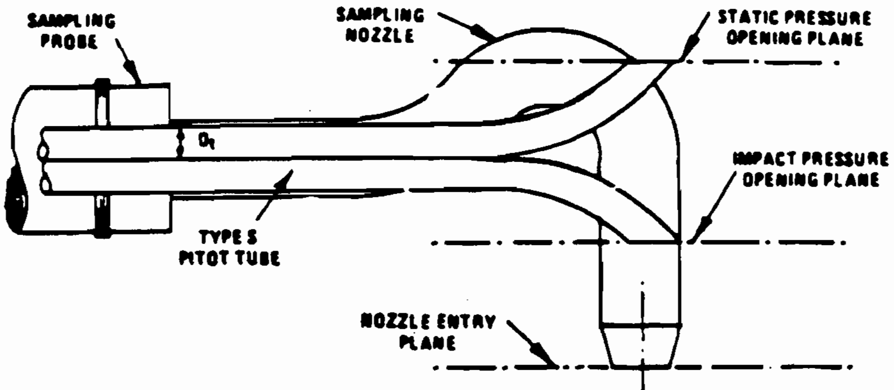
4.1 Type S Pitot Tube. Before its initial use, carefully examine the Type S pitot tube in top, side, and end views to verify that the face openings of the tube are aligned within the specifications illustrated in Figure 2-2 or 2-3. The pitot tube shall not be used if it fails to meet these alignment specifications.

After verifying the face opening alignment, measure and record the following dimensions of the pitot tube: (a) the external tubing diameter (dimension D_t, Figure 2-2b); and (b) the base-to-opening plane distances (dimensions P_A and P_B, Figure 2-2b). If D_t is between 0.48 and 0.95 cm (3/16 and 3/8 in.) and if P_A and P_B are equal and between 1.05 and 1.50 D_t, there are two possible options: (1) the pitot tube may be calibrated according to the procedure outlined in Sections 4.1.2 through 4.1.5 below, or (2) a baseline (isolated tube) coefficient value of 0.84 may be assigned to the pitot tube. Note, however, that if the pitot tube is part of an assembly, calibration may still be required, despite knowledge of the baseline coefficient value (see Section 4.1.1).

If D_t, P_A, and P_B are outside the speci limits, the pitot tube must be calibrated outlined in 4.1.2 through 4.1.5 below.



A. BOTTOM VIEW: SHOWING MINIMUM PITOT-NOZZLE SEPARATION.



B. SIDE VIEW: TO PREVENT PITOT TUBE FROM INTERFERING WITH GAS FLOW STREAMLINES APPROACHING THE NOZZLE. THE IMPACT PRESSURE OPENING PLANE OF THE PITOT TUBE SHALL BE EVEN WITH OR ABOVE THE NOZZLE ENTRY PLANE.

4.1.1 Type S Pitot Tube Assemblies. During sample and velocity traverses, the isolated Type S pitot tube is not always used; in many instances, the pitot tube is used in combination with other source-sampling components (thermocouple, sampling probe, nozzle) as part of an "assembly." The presence of other sampling components can sometimes affect the baseline value of the Type S pitot tube coefficient (Citation 9 in Section 6); therefore an assigned (or otherwise known) baseline coefficient value may or may not be valid for a given assembly. The baseline and assembly coefficient values will be identical only when the relative placement of the components in the assembly is such that aerodynamic interference effects are eliminated. Figures 2-6 through 2-8 illustrate interference-free component arrangements for Type S pitot tubes having external tubing diameters between 0.48 and 0.95 cm (3/16 and 3/8 in.). Type S pitot tube assemblies that fail to meet any or all of the specifications of Figures 2-6 through 2-8 shall be calibrated according to the procedure outlined in Sections 4.1.2 through 4.1.5 below, and prior to calibration, the values of the intercomponent spacings (pitot-nozzle, pitot-thermocouple, pitot-probe sheath) shall be measured and recorded.

Note: Do not use any Type S pitot tube assembly which is constructed such that the impact pressure opening plane of the pitot tube is below the entry plane of the nozzle (see Figure 2-6b).

4.1.2 Calibration Setup. If the Type S pitot tube is to be calibrated, one leg of the tube shall be permanently marked A, and the other, B. Calibration shall be done in a flow system having the following essential design features:

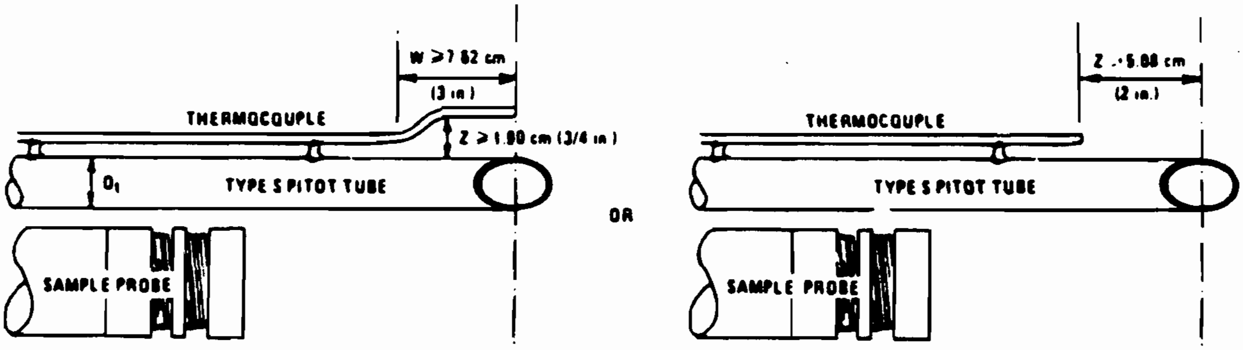


Figure 2-7. Proper thermocouple placement to prevent interference; Dt between 0.48 and 0.95 cm (3/16 and 3/8 in.).

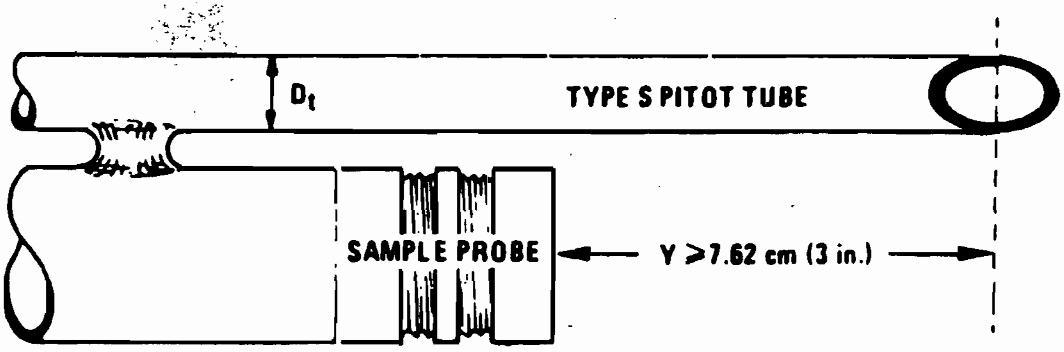


Figure 2-8. Minimum pitot-sample probe separation needed to prevent interference; Dt between 0.48 and 0.95 cm (3/16 and 3/8 in.).

4.1.2.1 The flowing gas stream must be confined to a duct of definite cross-sectional area, either circular or rectangular. For circular cross-sections, the minimum duct diameter shall be 30.5 cm (12 in.); for rectangular cross-sections, the width (shorter side) shall be at least 25.4 cm (10 in.).

4.1.2.2 The cross-sectional area of the calibration duct must be constant over a distance of 10 or more duct diameters. For a rectangular cross-section, use an equivalent diameter, calculated from the following equation, to determine the number of duct diameters:

$$D = \frac{2LW}{(L+W)}$$

Equation 2-1

where:
D_e = Equivalent diameter
L = Length
W = Width

To ensure the presence of stable, fully developed flow patterns at the calibration site, or "test section," the site must be located at least eight diameters downstream and two diameters upstream from the nearest disturbances.

NOTE: The eight- and two-diameter criteria are not absolute; other test section locations may be used (subject to approval of the Administrator), provided that the flow at the test site is stable and demonstrably parallel to the duct axis.

4.1.2.3 The flow system shall have the capacity to generate a test-section velocity around 915 m/min (3,000 ft/min). This velocity must be constant with time to guarantee steady flow during calibration. Note that Type S pitot tube coefficients obtained by single-velocity calibration at 915 m/min (3,000 ft/min) will generally be valid to within ±3 percent for the measurement of velocities above 305 m/min (1,000 ft/min) and to within ±5 to 6 percent for the measurement of velocities between 180 and 305 m/min (600 and 1,000 ft/min). If a more precise correlation between C_p and velocity is desired, the flow system shall have the capacity to generate at least four distinct, time-invariant test-section velocities covering the velocity range from 180 to 1,525 m/min (600 to 5,000 ft/min), and calibration data shall be taken at regular velocity intervals over this range (see Citations 9 and 14 in Section 6 for details).

4.1.2.4 Two entry ports, one each for the standard and Type S pitot tubes, shall be cut in the test section; the standard pitot entry port shall be located slightly downstream of the Type S port, so that the standard and Type S impact openings will lie in the same cross-sectional plane during calibration. To facilitate alignment of the pitot tubes during calibration, it is advisable that the test section be constructed of plexiglas or some other transparent material.

4.1.3 Calibration Procedure. Note that this procedure is a general one and must not be used without first referring to the special considerations presented in Section 4.1.5. Note also that this procedure applies only to single-velocity calibration. To obtain calibration data for the A and B sides of the Type S pitot tube, proceed as follows:

4.1.3.1 Make sure that the manometer is properly filled and that the oil is free from contamination and is of the proper density. Inspect and leak-check all pitot lines; repair or replace if necessary.

PITOT TUBE IDENTIFICATION NUMBER: ____________ DATE ________

CALIBRATED BY ______________________________

"A" SIDE CALIBRATION

RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(s)}$	DEVIATION $C_{p(s)} - \bar{C}_p(A)$
1				
2				
3				
		$\bar{C}_p$ (SIDE A)		

"B" SIDE CALIBRATION

RUN NO.	Δp_{std} cm H_2O (in. H_2O)	$\Delta p_{(s)}$ cm H_2O (in. H_2O)	$C_{p(s)}$	DEVIATION $C_{p(s)} - \bar{C}_p(B)$
1				
2				
3				
		$\bar{C}_p$ (SIDE B)		

$$\text{AVERAGE DEVIATION} = \sigma\,(\text{A OR B}) = \frac{\sum_{1}^{3} \left| C_{p(s)} - \bar{C}_p(\text{A OR B}) \right|}{3} \longleftarrow \text{MUST BE} \le 0.01$$

$$\left| \bar{C}_p\,(\text{SIDE A}) - \bar{C}_p\,(\text{SIDE B}) \right| \longleftarrow \text{MUST BE} \le 0.01$$

Figure 2-9. Pitot tube calibration data.

4.1.3.2 Level and zero the manometer. Turn on the fan and allow the flow to stabilize. Seal the Type S entry port.

4.1.3.3 Ensure that the manometer is level and zeroed. Position the standard pitot tube at the calibration point (determined as outlined in Section 4.1.5.1), and align the tube so that its tip is pointed directly into the flow. Particular car should be taken in aligning the tube to avoid yaw and pitch angles. Make sure that the entry port surrounding the tube is properly sealed.

4.1.3.4 Read Δp_{std} and record its value in a data table similar to the one shown in Figure 2-9. Remove the standard pitot tube from the duct and disconnect it from the manometer. Seal the standard entry port.

4.1.3.5 Connect the Type S pitot tube to the manometer. Open the Type S entry port. Check the manometer level and zero. Insert and align the Type S pitot tube so that its A side impact opening is at the same point as was the standard pitot tube and is pointed directly into the flow. Make sure that the entry port surrounding the tube is properly sealed.

4.1.3.6 Read Δp_s and enter its value in the data table. Remove the Type S pitot tube from the duct and disconnect it from the manometer.

4.1.3.7 Repeat steps 4.1.3.3 through 4.1.3.6 above until three pairs of Δp readings have been obtained.

4.1.3.8 Repeat steps 4.1.3.3 through 4.1.3.7 above for the B side of the Type S pitot tube.

4.1.3.9 Perform calculations, as described in Section 4.1.4 below.

4.1.4 Calculations.

4.1.4.1 For each of the six pairs of Δp readings (i.e., three from side A and thre from side B) obtained in Section 4.1.3 abov calculate the value of the Type S pitot tub coeffficient as follows:

$$C_{p(s)} = C_{p(std)} \sqrt{\frac{\Delta p_{std}}{\Delta p_s}}$$

Equation 2-2

where:

$C_{p(s)}$ = Type S pitot tube coefficient

$C_{p(std)}$ = Standard pitot tube coefficient; use 0.99 if the coefficient is unknown and the tube is designed according to the criteria of Sections 2.7.1 to 2.7.5 of this method.

Δp_{std} = Velocity head measured by the standard pitot tube, cm H_2O (in. H_2O)

Δp_s = Velocity head measured by the Type S pitot tube, cm H_2O (in H_2O)

4.1.4.2 Calculate C_p (side A), the mean A-side coefficient, and C_p (side B), the mean B-side coefficient; calculate the difference between these two average values.

4.1.4.3 Calculate the deviation of each of the three A-side values of $C_{p(s)}$ from C_p (side A), and the deviation of each B-side value of $C_{p(s)}$ from C_p C_p (side B). Use the following equation:

$$\text{Deviation} = C_{p(s)} - \overline{C}_p(\text{A or B})$$

Equation 2-3

4.1.4.4 Calculate δ, the average deviation from the mean, for both the A and B sides of the pitot tube. Use the following equation:

$$\sigma\,(\text{side A or B}) = \frac{\sum_{1}^{3} |C_{p(s)} - \overline{C}_p(A \text{ or } B)|}{3}$$

Equation 2-4

4.1.4.5 Use the Type S pitot tube only if the values of δ (side A) and δ (side B) are less than or equal to 0.01 and if the absolute value of the difference between C_p (A) and C_p (B) is 0.01 or less.

4.1.5 Special considerations.

4.1.5.1 Selection of calibration point.

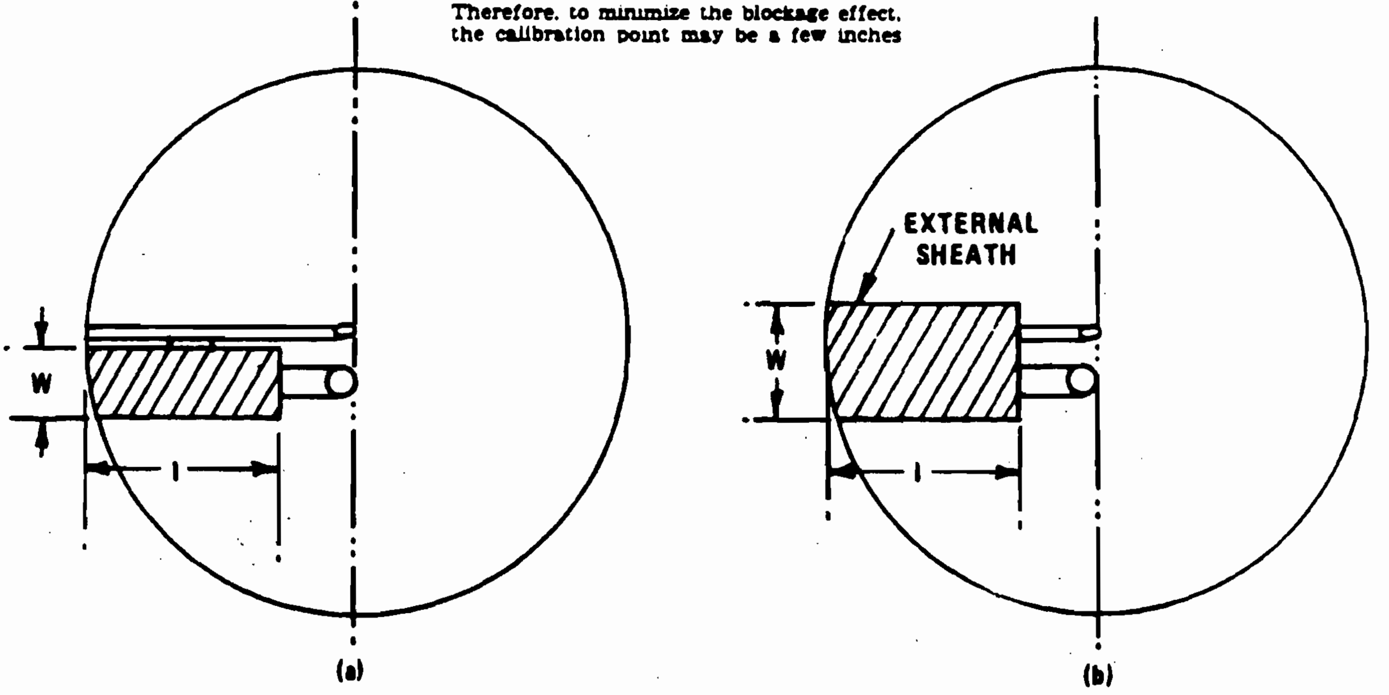
4.1.5.1.1 When an isolated Type S pitot tube is calibrated, select a calibration point at or near the center of the duct, and follow the procedures outlined in Sections 4.1.3 and 4.1.4 above. The Type S pitot coefficients so obtained, i.e., C_p (side A) and C_p (side B), will be valid, so long as either: (1) the isolated pitot tube is used; or (2) the pitot tube is used with other components (nozzle, thermocouple, sample probe) in an arrangement that is free from aerodynamic interference effects (see Figures 2-6 through 2-8).

4.1.5.1.2 For Type S pitot tube-thermocouple combinations (without sample probe), select a calibration point at or near the center of the duct, and follow the procedures outlined in Sections 4.1.3 and 4.1.4 above. The coefficients so obtained will be valid so long as the pitot tube-thermocouple combination is used by itself or with other components in an interference-free arrangement (Figures 2-6, and 2-8).

4.1.5.1.3 For assemblies with sample probes, the calibration point should be located at or near the center of the duct; however, insertion of a probe sheath into a small duct may cause significant cross-sectional area blockage and yield incorrect coefficient values (Citation 9 in Section 6). Therefore, to minimize the blockage effect, the calibration point may be a few inches off-center if necessary. The actual blockage effect will be negligible when the theoretical blockage, as determined by a projected-area model of the probe sheath, is 2 percent or less of the duct cross-sectional area for assemblies without external sheaths (Figure 2-10a), and 3 percent or less for assemblies with external sheaths (Figure 2-10b).

4.1.5.2 For those probe assemblies in which pitot tube-nozzle interference is a factor (i.e., those in which the pitot-nozzle separation distance fails to meet the specification illustrated in Figure 2-6a), the value of $C_{p(s)}$ depends upon the amount of free-space between the tube and nozzle, and therefore is a function of nozzle size. In these instances, separate calibrations shall be performed with each of the commonly used nozzle sizes in place. Note that the single-velocity calibration technique is acceptable for this purpose, even though the larger nozzle sizes (>0.635 cm or ¼ in.) are not ordinarily used for isokinetic sampling at velocities around 915 m/min (3,000 ft/min), which is the calibration velocity; note also that it is not necessary to draw an isokinetic sample during calibration (see Citation 19 in Section 6).

4.1.5.3 For a probe assembly constructed such that its pitot tube is always used in the same orientation, only one side of the pitot tube need be calibrated (the side which will face the flow). The pitot tube must still meet the alignment specifications of Figure 2-2 or 2-3, however, and must have an average deviation (δ) value of 0.01 or less (see Section 4.1.4.4).



ESTIMATED SHEATH BLOCKAGE (%) = $\left[\frac{l \times W}{\text{DUCT AREA}}\right] \times 100$

Figure 2-10. Projected-area models for typical pitot tube assemblies.

Figure 2-10. Projected-area models for typical pitot tube assemblies.

4.1.6 Field Use and Recalibration.

4.1.6.1 Field Use.

4.1.6.1.1 When a Type S pitot tube (isolated tube or assembly) is used in the field, the appropriate coefficient value (whether assigned or obtained by calibration) shall be used to perform velocity calculations. For calibrated Type S pitot tubes, the A side coefficient shall be used when the A side of the tube faces the flow, and the B side coefficient shall be used when the B side faces the flow; alternatively, the arithmetic average of the A and B side coefficient values may be used, irrespective of which side faces the flow.

4.1.6.1.2 When a probe assembly is used to sample a small duct (12 to 36 in. in diameter), the probe sheath sometimes blocks a significant part of the duct cross-section, causing a reduction in the effective value of $C_{p(s)}$. Consult Citation 9 in Section 6 for details. Conventional pitot-sampling probe assemblies are not recommended for use in ducts having inside diameters smaller than 12 inches (Citation 16 in Section 6).

4.1.6.2 Recalibration.

4.1.6.2.1 Isolated Pitot Tubes. After each field use, the pitot tube shall be carefully reexamined in top, side, and end views. If the pitot face openings are still aligned within the specifications illustrated in Figure 2-2 or 2-3, it can be assumed that the baseline coefficient of the pitot tube has not changed. If, however, the tube has been damanged to the extent that it no longer meets the specifications of Figure 2-2 or 2-3, the damage shall either be repaired to restore proper alignment of the face openings or the tube shall be discarded.

4.1.6.2.2 Pitot Tube Assemblies. After each field use, check the face opening alignment of the pitot tube, as in Section 4.1.6.2.1; also, remeasure the intercomponent spacings of the assembly. If the intercomponent spacings have not changed and the face opening alignment is acceptable, it can be assumed that the coefficient of the assembly has not changed. If the face opening alignment is no longer within the specifications of Figures 2-2 or 2-3, either repair the damage or replace the pitot tube (calibrating the new assembly, if necessary). If the intercomponent spacings have changed, restore the original spacings or recalibrate the assembly.

4.2 Standard pitot tube (if applicable). If a standard pitot tube is used for the velocity traverse, the tube shall be constructed according to the criteria of Section 2.7 and shall be assigned a baseline coefficient value of 0.99. If the standard pitot tube is used as part of an assembly, the tube shall be in an interference-free arrangement (subject to the approval of the Administrator).

4.3 Temperature Gauges. After each field use, calibrate dial thermometers, liquid-filled bulb thermometers, thermocouple-potentiometer systems, and other gauges at a temperature within 10 percent of the average absolute stack temperature. For temperatures up to 405° C (761° F), use an ASTM mercury-in-glass reference thermometer, or equivalent, as a reference; alternatively, either a reference thermocouple and potentiometer (calibrated by NBS) or thermometric fixed points, e.g., ice bath and boiling water (corrected for barometric pressure) may be used. For temperatures above 405° C (761° F), use an NBS-calibrated reference thermocouple-potentiometer system or an alternate reference, subject to the approval of the Administrator.

If, during calibration, the absolute temperatures measured with the gauge being calibrated and the reference gauge agree within 1.5 percent, the temperature data taken in the field shall be considered valid. Otherwise, the pollutant emission test shall either be considered invalid or adjustments (if appropriate) of the test results shall be made, subject to the approval of the Administrator.

4.4 Barometer. Calibrate the barometer used against a mercury barometer.

5. *Calculations*

Carry out calculations, retaining at least one extra decimal figure beyond that of the acquired data. Round off figures after final calculation.

5.1 Nomenclature.

A = Cross-sectional area of stack, m² (ft²).

B_{ws} = Water vapor in the gas stream (from Method 5 or Reference Method 4), proportion by volume.

C_p = Pitot tube coefficient, dimensionless.

K_p = Pitot tube constant.

$$34.97 \frac{\text{m}}{\text{sec}} \left[\frac{(\text{g/g-mole})(\text{mm Hg})}{(^\circ\text{K})(\text{mm H}_2\text{O})}\right]^{1/2}$$

for the metric system and

$$85.49 \frac{\text{ft}}{\text{sec}} \left[\frac{(\text{lb/lb-mole})(\text{in. Hg})}{(^\circ\text{R})(\text{in. H}_2\text{O})}\right]^{1/2}$$

for the English system.

M_d = Molecular weight of stack gas, dry basis (see Section 3.6) g/g-mole (lb/lb-mole).

M_s = Molecular weight of stack gas, wet basis, g/g-mole (lb/lb-mole).

$= M_d (1 - B_{ws}) + 18.0 B_{ws}$

Equation 2-5

P_{bar} = Barometric pressure at measurement site, mm Hg (in. Hg).

P_g = Stack static pressure, mm Hg (in. Hg).

P_s = Absolute stack gas pressure, mm Hg (in. Hg).

$= P_{bar} + P_g$

Equation 2-6

P_{std} = Standard absolute pressure, 760 mm Hg (29.92 in. Hg).

Q_{sd} = Dry volumetric stack gas flow rate corrected to standard conditions, dscm/hr (dscf/hr).

t_s = Stack temperature, °C (°F).

T_s = Absolute stack temperature, °K, (°R).

$= 273 + t_s$ for metric

Equation 2-7

$= 460 + t_s$ for English

Equation 2-8

T_{std} = Standard absolute temperature, 293 °K (528° R)

v_s = Average stack gas velocity, m/sec (ft/sec).

Δp = Velocity head of stack gas, mm H₂O (in. H₂O).

3,600 = Conversion factor, sec/hr.

18.0 = Molecular weight of water, g/g-mole (lb/lb-mole).

5.2 Average stack gas velocity.

$$v_s = K_p C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{T_{s(avg)}}{P_s M_s}}$$

Equation 2-9

5.3 Average stack gas dry volumetric flow rate.

$$Q_{sd} = 3{,}600 (1 - B_{ws}) v_s A \left(\frac{T_{std}}{T_{s(avg)}}\right) \left(\frac{P_s}{P_{std}}\right)$$

Equation 2-10

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METHOD 3—GAS ANALYSIS FOR CARBON DIOXIDE, OXYGEN, EXCESS AIR, AND DRY MOLECULAR WEIGHT

1. *Principle and Applicability*

1.1 Principle. A gas sample is extracted from a stack, by one of the following methods: (1) single-point, grab sampling; (2) single-point, integrated sampling; or (3) multi-point, integrated sampling. The gas sample is analyzed for percent carbon dioxide (CO_2), percent oxygen (O_2), and, if necessary, percent carbon monoxide (CO). If a dry molecular weight determination is to be made, either an Orsat or a Fyrite [1] analyzer may be used for the analysis; for excess air or emission rate correction factor determination, an Orsat analyzer must be used.

1.2 Applicability. This method is applicable for determining CO_2 and O_2 concentrations, excess air, and dry molecular weight of a sample from a gas stream of a fossil-fuel combustion process. The method may also be applicable to other processes where it has been determined that compounds other than CO_2, O_2, CO, and nitrogen (N_2) are not present in concentrations sufficient to affect the results.

Other methods, as well as modifications to the procedure described herein, are also applicable for some or all of the above determinations. Examples of specific methods and modifications include: (1) a multi-point sampling method using an Orsat analyzer to analyze individual grab samples obtained at each point; (2) a method using CO_2 or O_2 and stoichiometric calculations to determine dry molecular weight and excess air; (3) assigning a value of 30.0 for dry molecular weight, in lieu of actual measurements, for processes burning natural gas, coal, or oil. These methods and modifications may be used, but are subject to the approval of the Administrator, U.S. Environmental Protection Agency.

2. *Apparatus*

As an alternative to the sampling apparatus and systems described herein, other sampling systems (e.g., liquid displacement) may be used provided such systems are capable of obtaining a representative sample and maintaining a constant sampling rate, and are otherwise capable of yielding acceptable results. Use of such systems is subject to the approval of the Administrator.

2.1 Grab Sampling (Figure 3-1).

2.1.1 Probe. The probe should be made of stainless steel or borosilicate glass tubing and should be equipped with an in-stack or out-stack filter to remove particulate matter (a plug of glass wool is satisfactory for this purpose). Any other materials inert to O_2, CO_2, CO, and N_2 and resistant to temperature at sampling conditions may be used for the probe; examples of such material are aluminum, copper, quartz glass and Teflon.

2.1.2 Pump. A one-way squeeze bulb, or equivalent, is used to transport the gas sample to the analyzer.

2.2 Integrated Sampling (Figure 3-2).

2.2.1 Probe. A probe such as that described in Section 2.1.1 is suitable.

2.2.2 Condenser. An air-cooled or water-cooled condenser, or other condenser that will not remove O_2, CO_2, CO, and N_2, may be used to remove excess moisture which would interfere with the operation of the pump and flow meter.

2.2.3 Valve. A needle valve is used to adjust sample gas flow rate.

2.2.4 Pump. A leak-free, diaphragm-type pump, or equivalent, is used to transport sample gas to the flexible bag. Install a small surge tank between the pump and rate meter to eliminate the pulsation effect of the diaphragm pump on the rotameter.

2.2.5 Rate Meter. The rotameter, or equivalent rate meter, used should be capable of measuring flow rate to within ±2 percent of the selected flow rate. A flow rate range of 500 to 1000 cm^3/min is suggested.

2.2.6 Flexible Bag. Any leak-free plastic (e.g., Tedlar, Mylar, Teflon) or plastic-coated aluminum (e.g., aluminized Mylar) bag, or equivalent, having a capacity consistent with the selected flow rate and time length of the test run, may be used. A capacity in the range of 55 to 90 liters is suggested.

To leak-check the bag, connect it to a water manometer and pressurize the bag to 5 to 10 cm H_2O (2 to 4 in. H_2O). Allow to stand for 10 minutes. Any displacement in the water manometer indicates a leak. An alternative leak-check method is to pressurize the bag to 5 to 10 cm H_2O (2 to 4 in. H_2O) and allow to stand overnight. A deflated bag indicates a leak.

2.2.7 Pressure Gauge. A water-filled U-tube manometer, or equivalent, of about 28 cm (12 in.) is used for the flexible bag leak-check.

2.2.8 Vacuum Gauge. A mercury manometer, or equivalent, of at least 760 mm Hg (30 in. Hg) is used for the sampling train leak-check.

2.3 Analysis. For Orsat and Fyrite analyzer maintenance and operation procedures, follow the instructions recommended by the manufacturer, unless otherwise specified herein.

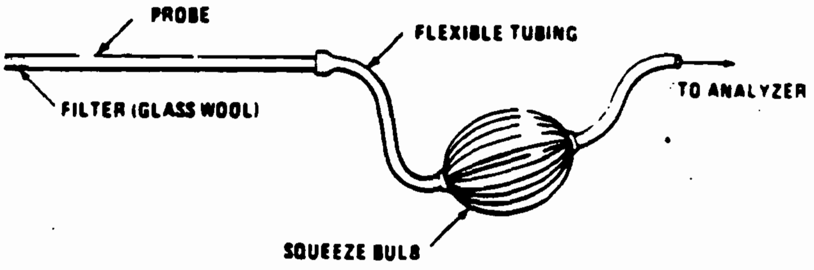

Figure 3-1 Grab sampling train

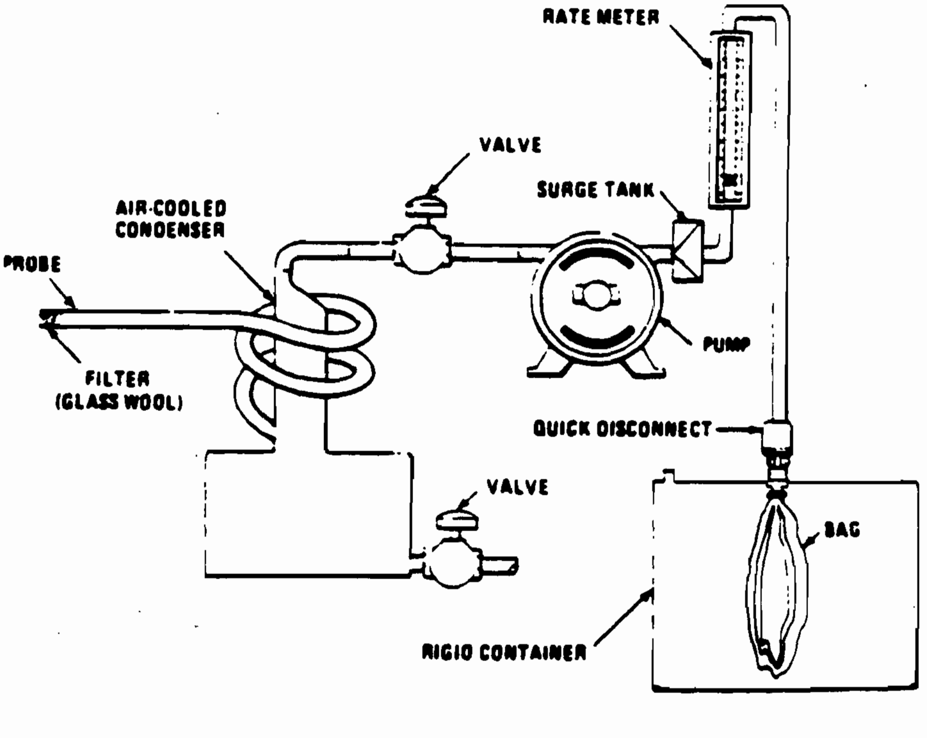

Figure 3-2. Integrated gas-sampling train.

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[1] Mention of trade names or specific products does not constitute endorsement by the Environmental Protection Agency.

2.3.1 Dry Molecular Weight Determination. An Orsat analyzer or Fyrite type combustion gas analyzer may be used.

2.3.2 Emission Rate Correction Factor or Excess Air Determination. An Orsat analyzer must be used. For low CO_2 (less than 4.0 percent) or high O_2 (greater that 15.0 percent) concentrations, the measuring burette of the Orsat must have at least 0.1 percent subdivisions.

3. *Dry Molecular Weight Determination*

Any of the three sampling and analytical procedures described below may be used for determining the dry molecular weight.

3.1 Single-Point, *Grab* Sampling and Analytical Procedure.

3.1.1 The sampling point in the duct shall either be at the centroid of the cross section or at a point no closer to the walls than 1.00 m (3.3 ft), unless otherwise specified by the Administrator.

3.1.2 Set up the equipment as shown in Figure 3-1, making sure all connections ahead of the analyzer are tight and leak-free. If and Orsat analyzer is used, it is recommended that the analyzer be leaked-checked by following the procedure in Section 5; however, the leak-check is optional.

3.1.3 Place the probe in the stack, with the tip of the probe positioned at the sampling point; purge the sampling line. Draw a sample into the analyzer and immediately analyze it for percent CO_2 and percent O_2. Determine the percentage of the gas that is N_2 and CO by subtracting the sum of the percent CO_2 and percent O_2 from 100 percent. Calculate the dry molecular weight as indicated in Section 6.3.

3.1.4 Repeat the sampling, analysis, and calculation procedures, until the dry molecular weights of any three grab samples differ from their mean by no more than 0.3 g/g-mole (0.3 lb/lb-mole). Average these three molecular weights, and report the results to the nearest 0.1 g/g-mole (lb/lb-mole).

3.2 Single-Point, Integrated Sampling and Analytical Procedure.

3.2.1 The sampling point in the duct shall be located as specified in Section 3.1.1.

3.2.2 Leak-check (optional) the flexible bag as in Section 2.2.6. Set up the equipment as shown in Figure 3-2. Just prior to sampling, leak-check (optional) the train by placing a vacuum gauge at the condenser inlet, pulling a vacuum of at least 250 mm Hg (10 in. Hg), plugging the outlet at the quick disconnect, and then turning off the pump. The vacuum should remain stable for at least 0.5 minute. Evacuate the flexible bag. Connect the probe and place it in the stack, with the tip of the probe positioned at the sampling point; purge the sampling line. Next, connect the bag and make sure that all connections are tight and leak free.

3.2.3 Sample at a constant rate. The sampling run should be simultaneous with, and for the same total length of time as, the pollutant emission rate determination. Collection of at least 30 liters (1.00 ft^3) of sample gas is recommended; however, smaller volumes may be collected, if desired.

3.2.4 Obtain one integrated flue gas sample during each pollutant emission rate determination. Within 8 hours after the sample is taken, analyze it for percent CO_2 and percent O_2 using either an Orsat analyzer or a Fyrite-type combustion gas analyzer. If an Orsat analyzer is used, it is recommended that the Orsat leak-check described in Section 5 be performed before this determination; however, the check is optional. Determine the percentage of the gas that is N_2 and CO by subtracting the sum of the percent CO_2 and percent O_2 from 100 percent. Calculate the dry molecular weight as indicated in Section 6.3.

3.2.5 Repeat the analysis and calculation procedures until the individual dry molecular weights for any three analyses differ from their mean by no more than 0.3 g/g-mole (0.3 lb/lb-mole). Average these three molecular weights, and report the results to the nearest 0.1 g/g-mole (0.1 lb/lb-mole).

3.3 Multi-Point, Integrated Sampling and Analytical Procedure.

3.3.1 Unless otherwise specified by the Administrator, a minimum of eight traverse points shall be used for circular stacks having diameters less than 0.61 m (24 in.), a minimum of nine shall be used for rectangular stacks having equivalent diameters less than 0.61 m (24 in.), and a minimum of twelve traverse points shall be used for all other cases. The traverse points shall be located according to Method 1. The use of fewer points is subject to approval of the Administrator.

3.3.2 Follow the procedures outlined in sections 3.2.2 throught 3.2.5, except for the following: traverse all sampling points and sample at each point for an equal length of time. Record sampling data as shown in Figure 3-3.

FIGURE 3-3—SAMPLING RATE DATA

Time	Traverse pt.	Q lpm	% dev *
Average			

*% Dev. = $(Q-Q_{avg})/Q_{avg} \times 100$ (Must be <10%)

4. *Emission Rate Correction Factor or Excess Air Determination*

NOTE: A Fyrite-type combustion gas analyzer is not acceptable for excess air or emission rate correction factor determination, unless approved by the Administrator. If both percent CO_2 and percent O_2 are measured, the analytical results of any of the three procedures given below may also be used for calculating the dry molecular weight.

Each of the three procedures below shall be used only when specified in an applicable subpart of the standards. The use of these procedures for other purposes must have specific prior approval of the Administrator.

4.1 Single-Point, Grab Sampling and Analytical Procedure.

4.1.1 The sampling point in the duct shall either be at the centroid of the cross-section or at a point no closer to the walls than 1.00 m (3.3 ft), unless otherwise specified by the Administrator.

4.1.2 Set up the equipment as shown in Figure 3-1, making sure all connections ahead of the analyzer are tight and leak-free. Leak-check the Orsat analyzer according to the procedure described in Section 5. This leak-check is mandatory.

4.1.3 Place the probe in the stack, with the tip of the probe positioned at the sampling point; purge the sampling line. Draw a sample into the analyzer. For emission rate correction factor determination, immediately analyze the sample, as outlined in Sections 4.1.4 and 4.1.5, for percent CO_2 or percent O_2. If excess air is desired, proceed as follows: (1) immediately analyze the sample, as in Sections 4.1.4 and 4.1.5, for percent CO_2, O_2, and CO; (2) determine the percentage of the gas that is N_2 by subtracting the sum of the percent CO_2, percent O_2, and percent CO from 100 percent; and (3) calculate percent excess air as outlined in Section 6.2.

4.1.4 To insure complete absorption of the CO_2, O_2, or if applicable, CO, make repeated passes through each absorbing solution until two consecutive readings are the same. Several passes (three or four) should be made between readings. (If constant readings cannot be obtained after three consecutive readings, replace the absorbing solution.)

4.1.5 After the analysis is completed, leak-check (mandatory) the Orsat analyzer once again, as described in Section 5. For the results of the analysis to be valid, the Orsat analyzer must pass this leak test before and after the analysis.

NOTE: Since this single-point, grab sampling and analytical procedure in normally conducted in conjunction with a single-point, grab sampling and analytical procedure for a pollutant, only one analysis is ordinarily conducted. Therefore, great care must be taken to obtain a valid sample and analysis. Although in most cases only CO_2 or O_2 is required, it is recommended that both CO_2 and O_2 be measured, and that Section 4.4 be used to validate the analytical data.

4.2 Single-Point, Integrated Sampling and Analytical Procedure.

4.2.1 The sampling point in the duct shall be located as specified in Section 4.1.1.

4.2.2 Leak-check (mandatory) the flexible bag as in Section 2.2.6. Set up the equipment as shown in Figure 3-2. Just prior to sampling, leak-check (mandatory) the train by placing a vacuum gauge at the condenser inlet, pulling a vacuum of a least 250 mm Hg (10 in. Hg), plugging the outlet at the quick disconnect, and then turning off the pump. The vacuum shall remain stable for at least 0.5 minute. Evacuate the flexible bag. Connect the probe and place it in the stack, with the tip of the probe positioned at the sampling point; purge the sampling line. Next, connect the bag and make sure that all connections are tight and leak free.

4.2.3 Sample at a constant rate, or as specified by the Administrator. The sampling run must be simultaneous with, and for the same total lengh of time as, the pollutant emission rate determination. Collect at least 30 liters (1.00 ft^3) of sample gas. Smaller volumes may be collected, subject to approval of the Administrator.

4.2.4 Obtain one integrated flue gas sample during each pollutant emission rate determination. For emission rate correction factor determination, analyze the sample within 4 hours after it is taken for percent CO_2 or percent O_2 (as outlined in Sections 4.2.5 through 4.2.7). The Orsat analyzer must be leak-check (see Section 5) before the analysis. If excess air is desired, proceed as follows: (1) within 4 hours after the sample is taken, analyze it (as in Sections 4.2.5 through 4.2.7) for percent CO_2, O_2, and CO; (2) determine the percentage of the gas that is N_2 by subtracting the sum of the percent CO_2, percent O_2, and percent CO from 100 percent; (3) calculate percent excess air, as outlined in Section 6.2.

4.2.5 To insure complete absorption of the CO_2, O_2, or if applicable, CO, make repeated passes through each absorbing solution until two consecutive readings are the same. Several passes (three of four) should be make between readings. (If constant readings cannot be obtained after three consecutive readings, replace the absorbing solution.)

4.2.6 Repeat the analysis until the following criteria are met:

4.2.6.1 For percent CO_2, repeat the analytical procedure until the results of any three analyses differ by no more that (a) 0.3 percent by volume when CO_2 is greater than 4.0 percent or (b) 0.2 percent by volume when CO_2 is less than or equal to 4.0 percent. Average the three acceptable values of percent CO_2 and report the results to the nearest 0.1 percent.

4.2.6.2 For percent O_2, repeat the analytical procedure until the results of any three analyses differ by no more than (a) 0.3 percent by volume when O_2 is less than 15.0 percent or (b) 0.2 percent by volume when O_2 is greater than or equal to 15.0 percent. Average the three acceptable values of percent O_2 and report the results to the nearest 0.1 percent.

4.2.6.3 For percent CO, repeat the analytical procedure until the results of any three analyses differ by no more than 0.3 percent. Average the three acceptable values of percent CO and report the results to the nearest 0.1 percent.

4.2.7 After the analysis is completed, leak-check (mandatory) the Orsat analyzer once again, as described in Section 5. For the results of the analysis to be valid, the Orsat analyzer must pass this leak test before an after the analysis.

Note: Although in most instances only CO_2 or O_2 is required, it is recommended that both CO_2 and O_2 be measured, and that Citation 5 in the Bibliography be used to validate the analytical data.

4.3 Multi-Point, Integrated Sampling and Analytical Procedure.

4.3.1 Both the minimum number of sampling points and the sampling point location shall be as specified in Section 3.3.1 of this method. The use of fewer points than specified is subject to the approval of the Administrator.

4.3.2 Follow the procedures outlined in Sections 4.2.2 through 4.2.7, except for the following: Traverse all sampling points and sample at each point for an equal length of time. Record sampling data as shown in Figure 3-3.

4.4 Quality Control Procedures.

4.4.1 Data Validation When Both CO_2 and O_2 Are Measured. Although in most instances, only CO_2 or O_2 measurement is required, it is recommended that both CO_2 and O_2 be measured to provide a check on the quality of the data. The following quality control procedure is suggested.

Note: Since the method for validating the CO_2 and O_2 analyses is based on combustion of organic and fossil fuels and dilution of the gas stream with air, this method does not apply to sources that (1) remove CO_2 or O_2 through processes other than combustion, (2) add O_2 (e.g., oxygen enrichment) and N_2 in proportions different from that of air, (3) add CO_2 (e.g., cement or lime kilns), or (4) have no fuel factor, F_o, values obtainable (e.g., extremely variable waste mixtures). This method validates the measured proportions of CO_2 and O_2 for the fuel type, but the method does not detect sample dilution resulting from leaks during or after sample collection. The method is applicable for samples collected downstream of most lime or limestone flue-gas desulfurization units as the CO_2 added or removed from the gas stream is not significant in relation to the total CO_2 concentration. The CO_2 concentrations from other types of scrubbers using only water or basic slurry can be significantly affected and would render the F_o check minimally useful.

4.4.1.1 Calculate a fuel factor, F_o, using the following equation:

$$F_o = \frac{20.9 - \%O_2}{\%CO_2}$$

Eq. 3-3

Where:

$\%O_2$ = Percent O_2 by volume (dry basis).

$\%CO_2$ = Percent CO_2 by volume (dry basis).

20.9 = Percent O_2 by volume in ambient air.

If CO is present in quantities measurable by this method, adjust the O_2 and CO_2 values before performing the calculation for F_o as follows:

$$\%CO_2(adj) = \%CO_2 + \%CO$$

$$\%O_2(adj) = \%O_2 - 0.5\ \%CO$$

Where: $\%CO$ = Percent CO by volume (dry basis).

4.4.1.2 Compare the calculated F_o factor with the expected F_o values. The following table may be used in establishing acceptable ranges for the expected F_o if the fuel being burned is known. When fuels are burned in combination, calculate the combined fuel F_d and F_c factors (as defined in Method 19) according to the procedure in Method 19 Section 5.2.3. Then calculate the F_o factor as follows:

$$F_o = \frac{0.209\ F_d}{F_c}$$

Eq. 3-4

Fuel type	F_o range
Coal:	
Anthracite and lignite	1.016–1.130
Bituminous	1.083–1.230
Oil:	
Distillate	1.260–1.413
Residual	1.210–1.370
Gas:	
Natural	1.600–1.836
Propane	1.434–1.586
Butane	1.405–1.553
Wood	1.000–1.120
Wood bark	1.003–1.130

Calculated F_o values beyond the acceptable ranges shown in this table should be investigated before accepting the test results. For example, the strength of the solutions in the gas analyzer and the analyzing technique should be checked by sampling and analyzing a known concentration, such as air; the fuel factor should be reviewed and verified. An acceptability range of ±12 percent is appropriate for the F_o factor of mixed fuels with variable fuel ratios. The level of the emission rate relative to the compliance level should be considered in determining if a retest is appropriate, i.e., if the measured emissions are much lower or much greater than the compliance limit, repetition of the test would not significantly change the compliance status of the source and would be unnecessarily time-consuming and costly.

5. Leak-Check Procedure for Orsat Analyzers

Moving an Orsat analyzer frequently causes it to leak. Therefore, an Orsat analyzer should be throughly leak-checked on site before the flue gas sample is introduced into it. The procedure for leak-checking an Orsat analyzer is:

5.1.1 Bring the liquid level in each pipette up to the reference mark on the capillary tubing and then close the pipette stopcock.

5.1.2 Raise the leveling bulb sufficiently to bring the confining liquid meniscus onto the graduated portion of the burette and then close the manifold stopcock.

5.1.3 Record the meniscus position.

5.1.4 Observe the menicus in the burette and the liquid level in the pipette for movement over the next 4 minutes.

5.1.5 For the Orsat analyzer to pass the leak-check, two conditions must be met.

5.1.5.1 The liquid level in each pipette must not fall below the bottom of the capillary tubing during this 4-minute interval.

5.1.5.2 The meniscus in the burette must not change by more than 0.2 ml during this 4-minute interval.

5.1.6 If the analyzer fails the leak-check procedure, all rubber connections and stopcocks should be checked until the cause of the leak is identified. Leaking stopcocks must be disassembled, cleaned, and regreased. Leaking rubber connections must be replaced. After the analyzer is reassembled, the leak-check procedure must be repeated.

6. Calculations

6.1 Nomenclature.

M_d = Dry molecular weight, g/g-mole (lb/lb-mole).

%EA = Percent excess air.

$\%CO_2$ = Percent CO_2 by volume (dry basis).

$\%O_2$ = Percent O_2 by volume (dry basis).

%CO = Percent CO by volume (dry basis).

$\%N_2$ = Percent N_2 by volume (dry basis).

0.264 = Ratio of O_2 to N_2 in air, v/v.

0.280 = Molecular weight of N_2 or CO, divided by 100.

0.320 = Molecular weight of O_2 divided by 100.

0.440 = Molecular weight of CO_2 divided by 100.

6.2 Percent Excess Air. Calculate the percent excess air (if applicable), by substituting the appropriate values of percent O_2, CO, and N_2 (obtained from Section 4.1.3 or 4.2.4) into Equation 3-1.

$$\%\ EA = \frac{\%O_2 - 0.5\%\ CO}{0.264\%\ N_2 - (\%O_2 - 0.5\ \%\ CO)} \times 100$$

Equation 3-1

Note: The equation above assumes that ambient air is used as the source of O_2 and that the fuel does not contain appreciable amounts of N_2 (as do coke oven or blast furnace gases). For those cases when appreciable amounts of N_2 are present (coal, oil, and natural gas do not contain appreciable amounts of N_2) or when oxygen enrichment is used, alternate methods, subject to approval of the Administrator, are required.

6.3 Dry Molecular Weight. Use Equation 3-2 to calculate the dry molecular weight of the stack gas

$$M_d = 0.440(\%CO_2) + 0.320(\%O_2) + 0.280(\%N_2 - \%CO)$$

Equation 3-2

NOTE: The above equation does not consider argon in air (about 0.9 percent, molecular weight of 37.7). A negative error of about 0.4 percent is introduced. The tester may opt to include argon in the analysis using procedures subject to approval of the Administrator.

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METHOD 4—DETERMINATION OF MOISTURE CONTENT IN STACK GASES

1. *Principle and Applicability*

1.1 Principle. A gas sample is extracted at a constant rate from the source: moisture is removed from the sample stream and determined either volumetrically or gravimetrically.

1.2 Applicability. This method is applicable for determining the moisture content of stack gas.

Two procedures are given. The first is a reference method, for accurate determinations of moisture content (such as are needed to calculate emission data). The second is an approximation method, which provides estimates of percent moisture to aid in setting isokinetic sampling rates prior to a pollutant emission measurement run. The approximation method described herein is only a suggested approach; alternative means for approximating the moisture content, e.g., drying tubes, wet bulb-dry bulb techniques, condensation techniques, stoichiometric calculations, previous experience, etc., are also acceptable.

The reference method is often conducted simultaneously with a pollutant emission measurement run; when it is, calculation of percent isokinetic, pollutant emission rate, etc., for the run shall be based upon the results of the reference method or its equivalent; these calculations shall not be based upon the results of the approximation method, unless the approximation method is shown, to the satisfaction of the Administrator, U.S. Environmental Protection Agency, to be capable of yielding results within 1 percent H_2O of the reference method.

NOTE: The reference method may yield questionable results when applied to saturated gas streams or to streams that contain water droplets. Therefore, when these conditions exist or are suspected, a second determination of the moisture content shall be made simultaneously with the reference method, as follows: Assume that the gas stream is saturated. Attach a temperature sensor [capable of measuring to ±1° C (2° F)] to the reference method probe. Measure the stack gas temperature at each traverse point (see Section 2.2.1) during the reference method traverse; calculate the average stack gas temperature. Next, determine the moisture percentage, either by: (1) using a psychrometric chart and making appropriate corrections if stack pressure is different from that of the chart, or (2) using saturation vapor pressure tables. In cases where the pyschrometric chart or the saturation vapor pressure tables are not applicable (based on evaluation of the process), alternate methods, subject to the approval of the Administrator, shall be used.

2. *Reference Method*

The procedure described in Method 5 for determining moisture content is acceptable as a reference method.

2.1 Apparatus. A schematic of the sampling train used in this reference method is shown in Figure 4-1. All components shall be maintained and calibrated according to the procedure outlined in Method 5.

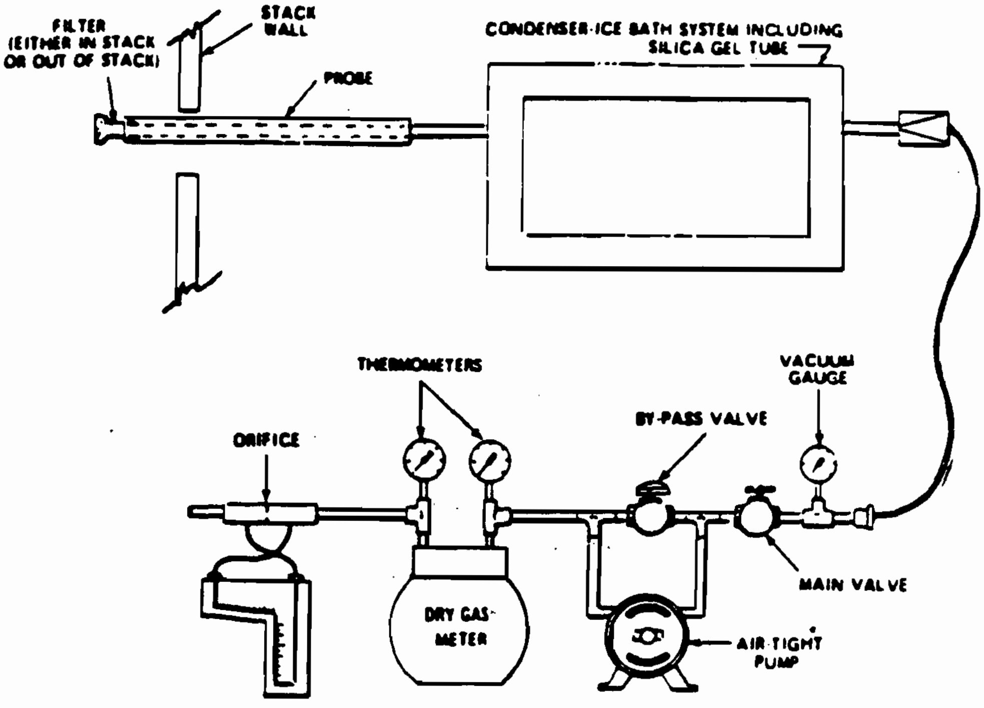

Figure 4-1. Moisture sampling train-reference method

2.1.1 Probe. The probe is constructed of stainless steel or glass tubing, sufficiently heated to prevent water condensation, and is equipped with a filter, either in-stack (e.g., a plug of glass wool inserted into the end of the probe) or heated out-stack (e.g., as described in Method 5), to remove particular matter.

When stack conditions permit, other metals or plastic tubing may be used for the probe, subject to the approval of the Administrator.

2.1.2 Condenser. The condenser consists of four impingers connected in series with ground glass, leak-free fittings or any similarly leak-free non-contaminating fittings. The first, third, and fourth impingers shall be of the Greenburg-Smith design, modified by replacing the tip with a 1.3 centimeter (½ inch) ID glass tube extending to about 1.3 cm (½ in.) from the bottom of the flask. The second impinger shall be of the Greenburg-Smith design with the standard tip. Modifications (e.g., using flexible connections between the impingers, using materials other than glass, or using flexible vacuum lines to connect the filter holder to the condenser) may be used, subject to the approval of the Administrator.

The first two impingers shall contain known volumes of water, the third shall be empty, and the fourth shall contain a known weight of 6- to 16-mesh indicating type silica gel, or equivalent desiccant. If the silica gel has been previously used, dry at 175° C (350° F) for 2 hours. New silica gel may be used as received. A thermometer, capable of measuring temperature to within 1° C (2° F), shall be placed at the outlet of the fourth impinger, for monitoring purposes.

Alternatively, any system may be used (subject to the approval of the Administrator) that cools the sample gas stream and allows measurement of both the water that has been condensed and the moisture leaving the condenser, each to within 1 ml or 1 g. Acceptable means are to measure the condensed water, either gravimetrically or volumetrically, and to measure the moisture leaving the condenser by: (1) monitoring the temperature and pressure at the exit of the condenser and using Dalton's law of partial pressures, or (2) passing the sample gas stream through a tared silica gel (or equivalent desiccant) trap, with exit gases kept below 20° C (68° F), and determining the weight gain.

If means other than silica gel are used to determine the amount of moisture leaving the condenser, it is recommended that silica gel (or equivalent) still be used between the condenser system and pump, to prevent moisture condensation in the pump and metering devices and to avoid the need to make corrections for moisture in the metered volume.

2.1.3 Cooling System. An ice bath container and crushed ice (or equivalent) are used to aid in condensing moisture.

2.1.4 Metering System. This system includes a vacuum gauge; leak-free pump, thermometers capable of measuring temperature to within 3° C (5.4° F), dry gas meter capable of measuring volume to within 2 percent, and related equipment as shown in Figure 4-1. Other metering systems, capable of maintaining a constant sampling rate and determining sample gas volume, may be used, subject to the approval of the Administrator.

2.1.5 Barometer. Mercury, aneroid, or other barometer capable of measuring atmospheric pressure to within 2.5 mm Hg (0.1 in. Hg) may be used. In many cases, the barometric reading may be obtained from a nearby national weather service station, in which case the station value (which is the absolute barometric pressure) shall be requested and an adjustment for elevation differences between the weather station and the sampling point shall be applied at a rate of minus 2.5 mm Hg (0.1 in. Hg) per 30 m (100 ft) elevation increase or vice versa for elevation decrease.

2.1.6 Graduated Cylinder and/or Balance. These items are used to measure condensed water and moisture caught in the silica gel to within 1 ml or 0.5 g. Graduated cylinders shall have subdivisions no greater than 2 ml. Most laboratory balances are capable of weighing to the nearest 0.5 g or less. These balances are suitable for use here.

2.2 Procedure. The following procedure is written for a condenser system (such as the impinger system described in Section 2.1.2) incorporating volumetric analysis to measure the condensed moisture, and silica gel and gravimetric analysis to measure the moisture leaving the condenser.

2.2.1 Unless otherwise specified by the Administrator, a minimum of eight traverse points shall be used for circular stacks having diameters less than 0.61 m (24 in.), a minimum of nine points shall be used for rectangular stacks having equivalent diameters less than 0.61 m (24 in.), and a minimum of twelve traverse points shall be used in all other cases. The traverse points shall be located according to Method 1. The use of fewer points is subject to the approval of the Administrator. Select a suitable probe and probe length such that all traverse points can be sampled. Consider sampling from opposite sides of the stack (four total sampling ports) for large stacks, to permit use of shorter probe lengths. Mark the probe with heat resistant tape or by some other method to denote the proper distance into the stack or duct for each sampling point. Place known volumes of water in the first two impingers. Weigh and record the weight of the silica gel to the nearest 0.5 g, and transfer the silica gel to the fourth impinger; alternatively, the silica gel may first be transferred to the impinger, and the weight of the silica gel plus impinger recorded.

2.2.2 Select a total sampling time such that a minimum total gas volume of 0.60 scm (21 scf) will be collected, at a rate no greater than 0.021 m^3/min (0.75 cfm). When both moisture content and pollutant emission rate are to be determined, the moisture determination shall be simultaneous with, and for the same total length of time as, the pollutant emission rate run, unless otherwise specified in an applicable subpart of the standards.

2.2.3 Set up the sampling train as shown in Figure 4-1. Turn on the probe heater and (if applicable) the filter heating system to temperatures of about 120° C (248° F), to prevent water condensation ahead of the condenser; allow time for the temperatures to stabilize. Place crushed ice in the ice bath container. It is recommended, but not required, that a leak check be done, as follows: Disconnect the probe from the first impinger or (if applicable) from the filter holder. Plug the inlet to the first impinger (or filter holder) and pull a 380 mm (15 in.) Hg vacuum; a lower vacuum may be used, provided that it is not exceeded during the test. A leakage rate in excess of 4 percent of the average sampling rate or 0.00057 m^3/min (0.02 cfm), whichever is less, is unacceptable. Following the leak check, reconnect the probe to the sampling train.

2.2.4 During the sampling run, maintain a sampling rate within 10 percent of constant rate, or as specified by the Administrator. For each run, record the data re-

FIGURE 4-2—FIELD MOISTURE DETERMINATION REFERENCE METHOD

Plant ....
Location ....
Operator ....
Date ....
Run No ....
Ambient temperature ....
Barometric pressure ....
Probe length m (ft) ....

SCHEMATIC OF STACK CROSS SECTION

Traverse point number	Sampling time	Stack temperature	Presure differential across orifice meter ΔH	Meter reading gas sample volume	ΔV_m	Gas Sample temperature at dry gas meter		Temperaturem of gas leaving condenser or last impinger
						Inlet	Outlet	
	(θ), min	°C (°F)	mm (in.) H_2O	m^3 (ft^3)	m^3 (ft^3)	(Tm_{in}), °C (°F)	(Tm_{out}), °C (°F)	°C (°F)
Total .... Average					Avg	Avg.	Avg	

quired on the example data sheet shown in Figure 4-2. Be sure to record the dry gas meter reading at the beginning and end of each sampling time increment and whenever sampling is halted. Take other appropriate readings at each sample point, at least once during each time increment.

2.2.5 To begin sampling, position the probe tip at the first traverse point. Immediately start the pump and adjust the flow to the desired rate. Traverse the cross section, sampling at each traverse point for an equal length of time. Add more ice and, if necessary, salt to maintain a temperature of less 20° C (68° F) at the silica gel outlet.

2.2.6 After collecting the sample, disconnect the probe from the filter holder (or from the first impinger) and conduct a leak check (mandatory) as described in Section 2.2.3. Record the leak rate. If the leakage rate exceeds the allowable rate, the tester shall either reject the test results or shall correct the sample volume as in Section 6.3 of Method 5. Next, measure the volume of the moisture condensed to the nearest ml. Determine the increase in weight of the silica gel (or silica gel plus impinger) to the nearest 0.5 g. Record this information (see example data sheet, Figure 4-3) and calculate the moisture percentage, as described in 2.3 below.

2.2.7 A quality control check of the volume metering system at the field site is suggested before collecting the sample following the procedure in Method 5, Section 4.4

2.3 Calculations. Carry out the following calculations, retaining at least one extra decimal figure beyond that of the acquired data. Round off figures after final calculation.

FIGURE 4-3—ANALYTICAL DATA—REFERENCE METHOD

	Impinger volume, ml	Silica gel weight, g
Final		
Initial		
Difference		

2.3.1 Nomenclature.

B_{ws} = Proportion of water vapor, by volume, in the gas stream.

M_w = Molecular weight of water, 18.0 g/g-mole (18.0 lb/lb-mole).

P_m = Absolute pressure (for this method, same as barometric pressure) at the dry gas meter, mm Hg (in. Hg).

P_{std} = Standard absolute pressure, 760 mm Hg (29.92 in. Hg).

R = Ideal gas constant, 0.06236 (mm Hg) (m³)/(g-mole) (°K) for metric units and 21.85 (in. Hg) (ft³)/(lb-mole) (°R) for English units.

T_m = Absolute temperature at meter, (°R).

T_{std} = Standard absolute temperature, 293 K (528°R).

V_m = Dry gas volume measured by dry gas meter, dcm (dcf).

ΔV_m = Incremental dry gas volume measured by dry gas meter at each traverse point, dcm (dcf).

$V_{m(std)}$ = Dry gas volume measured by the dry gas meter, corrected to standard conditions, dscm (dscf).

$V_{wc(std)}$ = Volume of water vapor condensed corrected to standard conditions, scm (scf).

$V_{wsg(std)}$ = Volume of water vapor collected in silica gel corrected to standard conditions, scm (scf).

V_f = Final volume of condenser water, ml.

V_i = Initial volume, if any, of condenser water, ml.

W_f = Final weight of silica gel or silica gel plus impinger, g.

W_i = Initial weight of silica gel or silica gel plus impinger, g.

Y = Dry gas meter calibration factor.

ρ_w = Density of water, 0.9982 g/ml (0.002201 lb/ml).

2.3.2 Volume of water vapor condensed.

$$V_{wc(std)} = \frac{(V_f - V_i)\rho_w R T_{std}}{P_{std} M_w}$$

$$= K_1(V_f - V_i)$$

Equation 4-1

where:

K_1 = 0.001333 m³/ml for metric units

= 0.04707 ft³/ml for English units

2.3.3 Volume of water vapor collected in silica gel.

$$V_{wsg(std)} = \frac{(W_f - W_i) R T_{std}}{P_{std} M_w}$$

$$= K_2(W_f - W_i)$$

Equation 4-2

where:

K_2 = 0.001335 m³/g for metric units

= 0.04715 ft³/g for English units

2.3.4 Sample gas volume.

$$V_{m(std)} = V_m Y \frac{(P_m)(T_{std})}{(P_{std})(T_m)}$$

$$= K_3 Y \frac{V_m P_m}{T_m}$$

Equation 4-3

where:

K_3 = 0.3858 °K/mm Hg for metric units

= 17.64 °R/in. Hg for English units

NOTE: If the post-test lead rate (Section 2.2.6) exceeds the allowable rate, correct the value of V_m in Equation 4-3, as described in Section 6.3 of Method 5.

2.3.5 Moisture Content.

$$B_{ws} = \frac{V_{wc(std)} + V_{wsg(std)}}{V_{wc(std)} + V_{wsg(std)} + V_{m(std)}}$$

Equation 4-4

NOTE: In saturated or moisture droplet-laden gas streams, two calculations of the moisture content of the stack gas shall be made, one using a value based upon the saturated conditions (see Section 1.2), and another based upon the results of the impinger analysis. The lower of these two values of B_{ws} shall be considered correct.

2.3.6 Verification of constant sampling rate. For each time increment, determine the ΔV_m. Calculate the average. If the value for any time increment differs from the average by more than 10 percent, reject the results and repeat the run.

3. *Approximation Method*

The approximation method described below is presented only as a suggested method (see Section 1.2).

3.1 Apparatus.

3.1.1 Probe. Stainless steel glass tubing, sufficiently heated to prevent water condensation and equipped with a filter (either in-stack or heated out-stack) to remove particulate matter. A plug of glass wool, inserted into the end of the probe, is a satisfactory filter.

3.1.2 Impingers. Two midget impingers, each with 30 ml capacity, or equivalent.

3.1.3 Ice Bath. Container and ice, to aid in condensing moisture in impingers.

3.1.4 Drying Tube. Tube packed with new or regenerated 6- to 16-mesh indicating-type silica gel (or equivalent desiccant), to dry the sample gas and to protect the meter and pump.

3.1.5 Valve. Needle valve, to regulate the sample gas flow rate.

3.1.6 Pump. Leak-free, diaphragm type, or equivalent, to pull the gas sample through the train.

3.1.7 Volume Meter. Dry gas meter, sufficiently accurate to measure the sample volume within 2%, and calibrated over the range of flow rates and conditions actually encountered during sampling.

3.1.8 Rate Meter. Rotameter, to measure the flow range from 0 to 3 lpm (0 to 0.11 cfm).

3.1.9 Graduated Cylinder. 25 ml.

3.1.10 Barometer. Mercury, aneroid, or other barometer, as described in Section 2.1.5 above.

3.1.11 Vacuum Gauge. At least 760 mm Hg (30 in. Hg) gauge, to be used for the sampling leak check.

3.2 Procedure.

3.2.1 Place exactly 5 ml distilled water in each impinger.

Leak check the sampling train as follows: Temporarily insert a vacuum gauge at or near the probe inlet; then, plug the probe inlet and pull a vacuum of at least 250 mm Hg (10 in. Hg). Note, the time rate of change of the dry gas meter dial; alternatively, a rotameter (0–40 cc/min) may be temporarily attached to the dry gas meter outlet to determine the leakage rate. A leak rate not in excess of 2 percent of the average sampling rate is acceptable.

NOTE: Carefully release the probe inlet plug before turning off the pump.

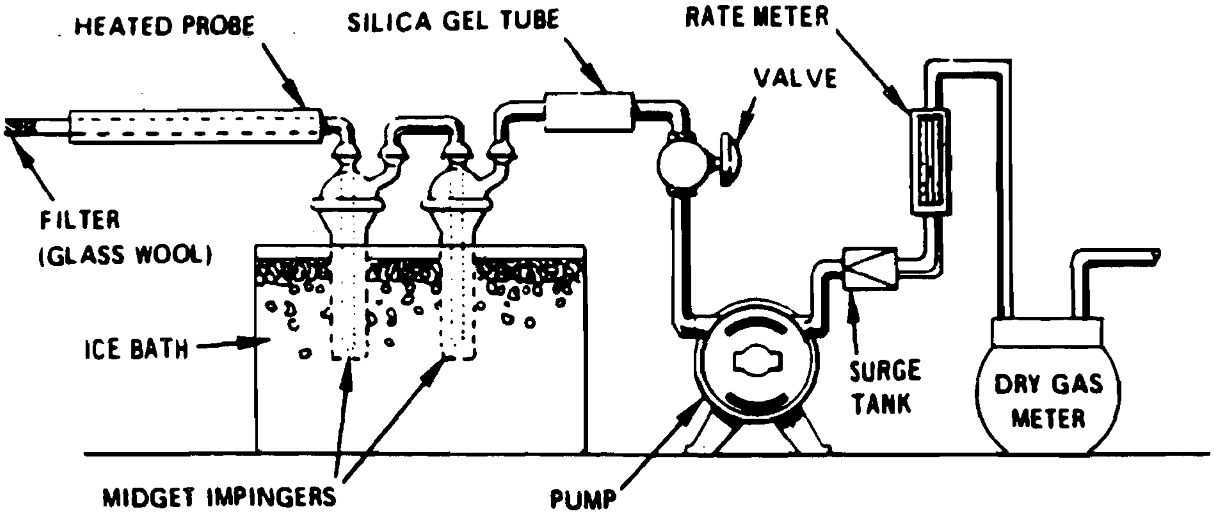

Figure 4-4. Moisture-sampling train - approximation method.

FIGURE 4-5—FIELD MOISTURE DETERMINATION—APPROXIMATION METHOD

Location.................................... Comments:
Test..
Date..
Operator....................................
Barometric pressure..........

Clock time	Gas volume through meter, (Vm), m³ (ft³)	Rate meter setting m³/min, (ft³/min)	Meter temperature, °C (°F)

3.2.2 Connect the probe, insert it into the stack, and sample at a constant rate of 2 lpm (0.071 cfm). Continue sampling until the dry gas meter registers about 30 liters (1.1 ft³) or until visible liquid droplets are carried over from the first impinger to the second. Record temperature, pressure, and dry gas meter readings as required by Figure 4-5.

3.2.3 After collecting the sample, combine the contents of the two impingers and measure the volume to the nearest 0.5 ml.

3.3 Calculations. The calculation method presented is designed to estimate the moisture in the stack gas; therefore, other data, which are only necessary for accurate moisture determinations, are not collected. The following equations adequately estimate the moisture content, for the purpose of determining isokinetic sampling rate settings.

3.3.1 Nomenclature.

B_{wm} = Approximate proportion, by volume, of water vapor in the gas stream leaving the second impinger, 0.025.

B_{ws} = Water vapor in the gas stream, proportion by volume.

M_w = Molecular weight of water, 18.0 g/g-mole (18.0 lb/lb-mole).

P_m = Absolute pressure (for this method, same as barometric pressure) at the dry gas meter.

P_{std} = Standard absolute pressure, 760 mm Hg (29.92 in. Hg).

R = Ideal gas constant, 0.06236 (mm Hg) (m³)/(g-mole) (°K) for metric units and 21.85 (in. Hg) (ft³)/lb-mole) (°R) for English units.

T_m = Absolute temperature at meter, °K (°R).

T_{std} = Standard absolute temperature, 293° K (528° R).

V_f = Final volume of impinger contents, ml.

V_i = Initial volume of impinger contents, ml.

V_m = Dry gas volume measured by dry gas meter, dcm (dcf).

$V_{m(std)}$ = Dry gas volume measured by dry gas meter, corrected to standard conditions, dscm (dscf).

$V_{wc(std)}$ = Volume of water vapor condensed, corrected to standard conditions, scm (scf).

ρ_w = Density of water, 0.9982 g/ml (0.002201 lb/ml).

Y = Dry gas meter calibration factor.

3.3.2 Volume of water vapor collected.

where:

$$V_{wc} = \frac{(V_f - V_i)\rho_w R T_{std}}{P_{std} M_w}$$

$$= K_1 (V_f - V_i)$$

Equation 4-5

K_1 = 0.001333 m³/ml for metric units
= 0.04707 ft³/ml for English units.

3.3.3 Gas volume.

$$V_{m(std)} = V_m \left(\frac{P_m}{P_{std}}\right)\left(\frac{T_{std}}{T_m}\right)$$

$$= K_2 \frac{V_m P_m}{T_m}$$

Equation 4-6

where:

K_2 = 0.3858 °K/mm Hg for metric units
= 17.64 °R/in. Hg for English units

3.3.4 Approximate moisture content.

$$B_{ws} = \frac{V_{wc}}{V_{wc} + V_{m(std)}} + B_{wm}$$

$$= \frac{V_{wc}}{V_{wc} + V_{m(std)}} + (0.025)$$

Equation 4-7

4. *Calibration*

4.1 For the reference method, calibrate equipment as specified in the following sections of Method 5: Section 5.3 (metering system); Section 5.5 (temperature gauges); and Section 5.7 (barometer). The recommended leak check of the metering system (Section 5.6 of Method 5) also applies to the reference method. For the approximation method, use the procedures outlined in Section 5.1.1 of Method 6 to calibrate the metering system, and the procedure of Method 5, Section 5.7 to calibrate the barometer.

5. *Bibliography*

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Method 25—Determination of Total Gaseous Nonmethane Organic Emissions as Carbon[117]

1. Applicability and Principle

1.1 Applicability. This method applies to the measurement of volatile organic compounds (VOC) as total gaseous nonmethane organics (TGNMO) as carbon in source emissions. Organic particulate matter will interfere with the analysis and therefore, in some cases, an in-stack particulate filter is required. This method is not the only method that applies to the measurement of TGNMO. Costs, logistics, and other practicalities of source testing may make other test methods more desirable for measuring VOC of certain effluent streams. Proper judgment is required in determining the most applicable VOC test method. For example, depending upon the molecular weight of the organics in the effluent stream, a totally automated semi-continuous nonmethane organic (NMO) analyzer interfaced directly to the source may yield accurate results. This approach has the advantage of providing emission data semi-continuously over an extended time period.

Direct measurement of an effluent with a flame ionization detector (FID) analyzer may be appropriate with prior characterization of the gas stream and knowledge that the detector responds predictably to the organic compounds in the stream. If present, methane will, of course, also be measured. In practice, the FID can be applied to the determination of the mass concentration of the total molecular structure of the organic emissions under the following limited conditions: (1) Where only one compound is known to exist; (2) when the organic compounds consist of only hydrogen and carbon; (3) where the relative percentage of the compounds is known or can be determined, and the FID response to the compounds is known; (4) where a consistent mixture of compounds exists before and after emission control and *only* the relative concentrations are to be assessed; or (5) where the FID can be calibrated against mass standards of the compounds emitted (solvent emissions, for example).

Another example of the use of a direct FID is as a screening method. If there is enough information available to provide a rough estimate of the analyzer accuracy, the FID analyzer can be used to determine the VOC content of an uncharacterized gas stream. With a sufficient buffer to account for possible inaccuracies, the direct FID can be a useful tool to obtain the desired results without costly exact determination.

In situations where a qualitative/quantitative analysis of an effluent stream is desired or required, a gas chromatographic FID system may apply. However, for sources emitting numerous organics, the time and expense of this approach will be formidable.

1.2 Principle. An emission sample is withdrawn from the stack at a constant rate through a chilled condensate trap by means of an evacuated sample tank. TGNMO are determined by combining the analytical results obtained from independent analyses of the condensate trap and sample tank fractions. After sampling is completed, the organic contents of the condensate trap are oxidized to carbon dioxide (CO_2) which is quantitatively collected in an evacuated vessel; then a portion of the CO_2 is reduced to methane (CH_4) and measured by a FID. The organic content of the sample fraction collected in the sampling tank is measured by injecting a portion into a gas chromatographic (GC) column to achieve separation of the nonmethane organics from carbon monoxide (CO), CO_2 and CH_4; the nonmethane organics (NMO) are oxidized to CO_2, reduced to CH_4, and measured by a FID. In this manner, the variable response of the FID associated with different types of organics is eliminated.

2. Apparatus

The sampling system consists of a condensate trap, flow control system, and sample tank (Figure 1). The analytical system consists of two major sub-systems: an oxidation system for the recovery and conditioning of the condensate trap contents and a NMO analyzer. The NMO analyzer is a GC with backflush capability for NMO analysis and is equipped with an oxidation catalyst, reduction catalyst, and FID. (Figures 2 and 3 are schematics of a typical NMO analyzer.) The system for the recovery and conditioning of the organics captured in the condensate trap consists of a heat source, oxidation catalyst, nondispersive infrared (NDIR) analyzer and an intermediate collection vessel (Figure 4 is a schematic of a typical system.) TGNMO sampling equipment can be constructed from commercially available components and components fabricated in a machine shop. NMO analyzers are available commercially or can be constructed from available components by a qualified instrument laboratory.

2.1 Sampling. The following equipment is required:

2.1.1 Probe. 3.2-mm OD (⅛-in.) stainless steel tubing.

2.1.2 Condensate Trap. Constructed of 316 stainless steel; construction details of a suitable trap are shown in Figure 5.

2.1.3 Flow Shut-off Valve. Stainless steel control valve for starting and stopping sample flow.

2.1.4 Flow Control System. Any system capable of maintaining the sampling rate to within ±10 percent of the selected flow rate (50 to 100 cc/min range).

2.1.5 Vacuum Gauge. Gauge for monitoring the vacuum of the sample tank during leak checks and sampling.

2.1.6 Sample Tank. Stainless steel or aluminum tank with a volume of 4 to 8 liters, equipped with a stainless steel female quick connect for assembly to the sample train and analytical system.

2.1.7 Mercury Manometer. U-tube mercury manometer capable of measuring pressure to within 1 mm Hg in the 0–900 mm range.

2.1.8 Vacuum Pump. Capable of evacuating to an absolute pressure of 10 mm Hg.

2.2 Analysis. The following equipment is required:

2.2.1 Condensate Recovery and Conditioning Apparatus. An apparatus for recovering and catalytically oxidizing the condensate trap contents is required. Figure 4 is a schematic of such a system. The analyst must demonstrate prior to initial use that the analytical system is capable of proper oxidation and recovery, as specified in section 5.1. The condensate recovery and conditioning apparatus consists of the following major components.

2.2.1.1 Heat Source. A heat source sufficient to heat the condensate trap (including probe) to a temperature where the trap turns a "dull red" color. A system using both a propane torch and an electric muffle-type furnace is recommended.

2.2.1.2 Oxidation Catalyst. A catalyst system capable of meeting the catalyst efficiency criteria of this method (section 5.1.2). Addendum I of this method lists a catalyst system found to be acceptable.

2.2.1.3 Water Trap. Any leak-proof moisture trap capable of removing moisture from the gas stream.

2.2.1.4 NDIR Detector. A detector capable of indicating CO_2 concentration in the zero to 1 percent range. This detector is required for monitoring the progress of combustion of the organic compounds from the condensate trap.

2.2.1.5 Pressure Regulator. Stainless steel needle valve required to maintain the trap conditioning system at a near constant pressure.

2.2.1.6 Intermediate Collection Vessel. Stainless steel or aluminum collection vessel equipped with a female quick connect. Tanks with nominal volumes in the 1 to 4 liter range are recommended.

2.2.1.7 Mercury Manometer. U-tube mercury manometer capable of measuring pressure to within 1 mm Hg in the 0–900 mm range.

2.2.1.8 Gas Purifiers. Gas purification systems sufficient to maintain CO_2 and organic impurities in the carrier gas and auxiliary oxygen at a level of less than 10 ppm (may not be required depending on quality of cylinder gases used).

2.2.2 NMO Analyzer. Semi-continuous GC/FID analyzer capable of: (1) separating CO, CO_2, and CH_4 from nonmethane organic compounds, (2) reducing the CO_2 to CH_4 and quantifying as CH_4 and (3) oxidizing the nonmethane organic compounds to CO_2, reducing the CO_2 to CH_4 and quantifying as CH_4. The analyst must demonstrate prior to initial use that the analyzer is capable of proper separation, oxidation, reduction, and measurement (section 5.2). The analyzer consists of the following major components:

2.2.2.1 Oxidation Catalyst. A catalyst system capable of meeting the catalyst efficiency criteria of this method (section 5.2.1). Addendum I of this method lists a catalyst system found to be acceptable.

2.2.2.2 Reduction Catalyst. A catalyst system capable of meeting the catalyst efficiency criteria of this method (section 5.2.3). Addendum I of this method lists a catalyst system found to be acceptable.

2.2.2.3 Separation Column(s). Gas chromatographic column(s) capable of separating CO, CO_2, and CH_4 from NMO compounds as demonstrated according to the procedures established in this method (section 5.2.5). Addendum I of this method lists a column found to be acceptable.

2.2.2.4 Sample Injection System. A GC sample injection valve fitted with a sample loop properly sized to interface with the NMO analyzer (1 cc loop recommended).

2.2.2.5 FID. A FID meeting the following specifications is required.

2.2.2.5.1 Linearity. A linear response (± 5%) over the operating range as demonstrated by the procedures established in section 5.2.2.

2.2.2.5.2 Range. Signal attenuators shall be available to produce a minimum signal response of 10 percent of full scale for a full scale range of 10 to 50000 ppm CH_4.

2.2.2.6 Data Recording System. Analog strip chart recorder or digital intergration system compatible with the FID for permanently recording the analytical results.

2.2.3 Barometer. Mercury, aneroid, or other barometer capable of measuring atmospheric pressure to within 1 mm Hg.

2.2.4 Thermometer. Capable of measuring the laboratory temperature within 1°C.

2.2.5 Vacuum Pump. Capable of evacuating to an absolute pressure of 10 mm Hg.

2.2.6 Syringe (2). 10 µl and 100 µl liquid injection syringes.

2.2.7 Liquid Sample Injection Unit. 316 SS U-tube fitted with a Teflon injection septum, see Figure 6.

3. Reagents

3.1 Sampling: Crushed dry ice is required during sampling.

3.2 Analysis.

3.2.1 NMO Analyzer. The following gases are needed:

3.2.1.1 Carrier Gas. Zero grade gas containing less than 1 ppm C. Addendum I of this method lists a carrier gas found to be acceptable.

3.2.1.2 Fuel Gas. Pure hydrogen, containing less than 1 ppm C.

3.2.1.3 Combustion Gas. Zero grade air or oxygen as required by the detector.

3.2.2 Condensate Recovery and Conditioning Apparatus.

3.2.2.1 Carrier Gas. Five percent O_2 in N_2, containing less than 1 ppm C.

3.2.2.2 Auxiliary Oxygen. Zero grade oxygen containing less than 1 ppm C.

3.2.2.3 Hexane. ACS grade, for liquid injection.

3.2.2.4 Toluene. ACS grade, for liquid injection.

3.3 Calibration. For all calibration gases, the manufacturer must recommend a maximum shelf life for each cylinder (i.e., the length of time the gas concentration is not expected to change more than ± 5 percent from its certified value). The date of gas cylinder preparation, certified organic concentration and recommended maximum shelf life must be affixed to each cylinder before shipment from the gas manufacturer to the buyer. The following calibration gases are required.

3.3.1 Oxidation Catalyst Efficiency Check Calibration Gas. Gas mixture standard with nominal concentration of 1 percent methane in air.

3.3.2 Flame Ionization Detector Linearity and Nonmethane Organic Calibration Gases (3). Gas mixture standards with nominal propane concentrations of 20 ppm, 200 ppm, and 3000 ppm, in air.

3.3.3 Carbon Dioxide Calibration Gases (3). Gas mixture standards with nominal CO_2 concentrations of 50 ppm, 500 ppm, and 1 percent, in air. Note: total NMO less than 1 ppm required for 1 percent mixture.

3.3.4 NMO Analyzer System Check Calibration Gases (4).

3.3.4.1 Propane Mixture. Gas mixture standard containing (nominal) 50 ppm CO, 50 ppm CH_4, 2 percent CO_2, and 20 ppm C_3H_8 prepared in air.

3.3.4.2 Hexane. Gas mixture standard containing (nominal) 50 ppm hexane in air.

3.3.4.3 Toluene. Gas mixture standard containing (nominal) 20 ppm toluene in air.

3.3.4.4 Methanol. Gas mixture standard containing (nominal) 100 ppm methanol in air.

4. Procedure

4.1 Sampling.

4.1.1 Sample Tank Evacuation and Leak Check. Either in the laboratory or in the field, evacuate the sample tank to 10 mm Hg absolute pressure or less (measured by a mercury U-tube manometer) then leak check the sample tank by isolating the tank from the vacuum pump and allowing the tank to sit for 10 minutes. The tank is acceptable if no change in tank vacuum is noted.

4.1.2 Sample Train Assembly. Just prior to assembly, measure the tank vaccum using a mercury U-tube manometer. Record this vaccum (P_{ti}), the ambient temperature (T_{ti}), and the barometric pressure (P_{bi}) at this time. Assuring that the flow shut-off valve is in the closed position, assemble the sampling system as shown in Figure 1. Immerse the condensate trap body in dry ice to within 2.5 or 5 cm of the point where the inlet tube joins the trap body.

4.1.3. Pretest Leak Check. A pretest leak check is required. After the sampling train is assembled, record the tank vacuum as indicated by the vaccum gauge. Wait a minimum period of 10 minutes and recheck the indicated vacuum. If the vacuum has not changed, the portion of the sampling train behind the shut-off valve does not leak and is considered acceptable. To check the front portion of the sampling train, assure that the probe tip is tightly plugged and then open the sample train flow shut-off valve. Allow the sample train to sit for a minimum period of 10 minutes. The leak check is acceptable if no visible change in the tank vacuum gauge occurs. Record the pretest leak rate (cm/Hg per 10 minutes). At the completion of the leak check period, close the sample flow shut-off valve.

4.1.4. Sample Train Operation. Place the probe into the stack such that the probe is perpendicular to the direction of stack gas flow; locate the probe tip at a single preselected point. If a probe extension which will not be analyzed as part of the condensate trap is being used, assure that at least a 15 cm section of the probe which will be analyzed with the trap is in the stack effluent. For stacks having a negative static pressure, assure that the sample port is sufficiently sealed to prevent air in-leakage around the probe. Check the dry ice level and add ice if necessary. Record the clock time and sample tank gauge vacuum. To begin sampling, open the flow shut-off valve and adjust (if applicable) the control valve of the flow control system used in the sample train; maintain a constant flow rate (±10 percent) throughout the duration of the sampling period. Record the gauge vacuum and flowmeter setting (if applicable) at 5-minute intervals. Select a total sample time greater than or equal to the minimum sampling time specified in the applicable subpart of the regulation; end the sampling when this time period is reached or when a constant flow rate can no longer be maintained due to reduced sample tank vacuum. When the sampling is completed, close the flow shut-off valve and record the final sample time and guage vacuum readings. Note: If the sampling had to be stopped before obtaining the minimum sampling time (specified in the applicable subpart) because a constant flow rate could not be maintained, proceed as follows: After removing the probe from the stack, remove the used sample tank from the sampling train (without disconnecting other portions of the sampling train) and connect another sample tank to the sampling train. Prior to attaching the new tank to the sampling train, assure that the tank vacuum (measured on-site by the U-tube manometer) has been recorded on the data form and that the tank has been leak-checked (on-site). After the new tank is attached to the sample train, proceed with the sampling until the required minimum sampling time has been exceeded.

4.1.5 Post Test Leak Check. A leak check is mandatory at the conclusion of each test run. After sampling is completed, remove the probe from the stack and plug the probe tip. Open the sample train flow shut-off valve and monitor the sample tank vacuum gauge for a period of 10 minutes. The leak check is acceptable if no visible change in the tank vacuum gauge occurs. Record the post test leak rate (cm Hg per 10 minutes). If the sampling train does not pass the post leak check, invalidate the run or use a procedure acceptable to the Administrator to adjust the data.

4.2 Sample Recovery. After the post test leak check is completed, disconnect the condensate trap at the flow metering system and tightly seal both ends of the condensate trap. Keep the trap packed in dry ice until the samples are returned to the laboratory for analysis. Remove the flow metering system from the sample tank. Attach the U-tube manometer to the tank (keep length of connecting line to a minimum) and record the final tank vacuum (P_t); record the tank temperature (T_t) and barometric pressure at this time. Disconnect the manometer from the tank. Assure that the test run number is properly identified on the condensate trap and the sample tank(s).

4.3 Condensate Recovery and Conditioning. Prepare the condensate recovery and conditioning apparatus by setting the carrier gas flow rate and heating the catalyst to its operating temperature. Prior to initial use of the condensate recovery and conditioning apparatus, a system performance test must be conducted according to the procedures established in section 5.1 of this method. After successful completion of the initial performance test, the system is routinely used for sample conditioning according to the following procedures:

4.3.1 System Blank and Catalyst Efficiency Check. Prior to and immediately following the conditioning of each set of sample traps, or on a daily basis (whichever occurs first) conduct the carrier gas blank test and catalyst efficiency test as specified in sections 5.1.1 and 5.1.2 of this method. Record the carrier gas initial and final blank values, B_{ti} and B_{tf}, respectively. If the criteria of the tests cannot be met, make the necessary repairs to the system before proceeding.

4.3.2 Condensate Trap Carbon Dioxide Purge and Sample Tank Pressurization. The first step in analysis is to purge the condensate trap of any CO_2 which it may contain and to simultaneously pressurize the sample tank. This is accomplished as follows: Obtain both the sample tank and condensate trap from the test run to be analyzed. Set up the condensate recovery and conditioning apparatus so that the carrier flow bypasses the condensate trap hook-up terminals, bypasses the oxidation catalyst, and is vented to the atmosphere. Next, attach the condensate trap to the apparatus and pack the trap in dry ice. Assure that the valves isolating the collection vessel connection from the atmospheric vent and the vacuum pump are closed and then attach the sample tank to the system as if it were the intermediate collection vessel. Record the tank vacuum on the laboratory data form. Assure that the NDIR analyzer indicates a zero output level and then switch the carrier flow through the condensate trap; immediately switch the carrier flow from vent to collect. The condensate trap recovery and conditioning apparatus should now be set up as indicated in Figure 8. Monitor the NDIR: when CO_2 is no longer being passed through the system, switch the carrier flow so that it once again bypasses the condensate trap. Continue in this manner until the gas sample tank is pressurized to a nominal gauge pressure of 800 mm Hg. At this time, isolate the tank, vent the carrier flow, and record the sample tank pressure (P_{tf}), barometric pressure (P_{bf}), and ambient temperature (T_{tf}). Remove the sample tank from the system.

4.3.3 Recovery of Condensate Trap Sample. Oxidation and collection of the sample in the condensate trap is now ready to begin. From the step just completed in section 4.3.1.2 above, the system should be set up so that the carrier flow bypasses the condensate trap, bypasses the oxidation catalyst, and is vented to the atmosphere. Attach an evacuated intermediate collection vessel to the system and then switch the carrier so that it flows through the oxidation catalyst. Switch the carrier from vent to collect and open the valve to the collection vessel; remove the dry ice from the trap and then switch the carrier flow through the trap. The system should now be set up to operate as indicated in Figure 9. During oxidation of the condensate trap sample, monitor the NDIR to determine when all the sample has been removed and oxidized (indicated by return to baseline of NDIR analyzer output). Begin heating the condensate trap and probe with a propane torch. The trap should be heated to a temperature at which the trap glows a "dull red" (approximately 500°C). During the early part of the trap "burn out," adjust the carrier and auxiliary oxygen flow rates so that an excess of oxygen is being fed to the catalyst system. Gradually increase the flow of carrier gas through the trap. After the NDIR indicates that most of the organic matter has been purged, place the trap in a muffle furnance (500°C). Continue to heat the probe with a torch or some other procedure (e.g., electrical resistance heater). Continue this procedure for at least 5 minutes after the NDIR has returned to baseline. Remove the heat from the trap but continue the carrier flow until the intermediate collection vessel is pressurized to a gauge pressure of 800 mm Hg (nominal). When the vessel is pressurized, vent the carrier; measure and record the final intermediate collection vessel pressure (P_f) as well as the barometric pressure (P_{bf}), ambient temperature (T_f), and collection vessel volume (V_v).

4.4 Analysis. Prior to putting the NMO analyzer into routine operation, an initial performance test must be conducted. Start the analyzer and perform all the necessary functions in order to put the analyzer in proper working order, then conduct the performance test according to the procedures established in section 5.2. Once the performance test has been successfully completed and the CO_2 and NMO calibration response factors determined, proceed with sample analysis as follows:

4.4.1 Daily operations and calibration checks. Prior to and immediately following the analysis of each set of samples or on a daily basis (whichever occurs first) conduct a calibration test according to the procedures established in section 5.3. If the criteria of the daily calibration test cannot be met, repeat the NMO analyzer performance test (section 5.2) before proceeding.

4.4.2 Analysis of Recovered Condensate Sample. Purge the sample loop with sample and then inject a preliminary sample in order to determine the appropriate FID attenuation. Inject triplicate samples from the intermediate collection vessel and record the values obtained for the condensible organics as CO_2 (C_{cm}).

4.4.3 Analysis of Sample Tank. Purge the sample loop with sample and inject a preliminary sample in order to determine the appropriate FID attenuation for monitoring the backflushed non-methane organics. Inject triplicate samples from the sample tank and record the values obtained for the nonmethane organics (C_{tm}).

5. Calibration and Operational Checks

Maintain a record of performance of each item.

5.1 Initial Performance Check of Condensate Recovery and Conditioning Apparatus.

5.1.1 Carrier Gas and Auxiliary Oxygen Blank. Set equal flow rates for both the carrier gas and auxiliary oxygen. With the trap switching valves in the bypass position and the catalyst in-line, fill an evacuated intermediate collection vessel with carrier gas. Analyze the collection vessel for CO_2; the carrier blank is acceptable if the CO_2 concentration is less than 10 ppm.

5.1.2 Catalyst Efficiency Check. Set up the condensate trap recovery system so that the carrier flow bypasses the trap inlet and is vented to the atmosphere at the system outlet. Assure that the valves isolating the collection system from the atmospheric vent and vacuum pump are closed and then attach an evacuated intermediate collection vessel to the system. Connect the methane standard gas cyclinder (section 3.3.1) to the system's condensate trap connector (probe end, Figure 4). Adjust the system valving so that the standard gas cylinder acts as the carrier gas and adjust the flow rate to the rate normally used during trap sample recovery. Switch off the auxiliary oxygen flow and then switch from vent to collect in order to begin collecting a sample. Continue collecting a sample in a normal manner until the intermediate vessel is filled to a nominal gauge pressure of 300 mm Hg. Remove the intermediate vessel from the system and vent the carrier flow to the atmosphere. Switch the valving to return the system to its normal carrier gas and normal operating conditions. Analyze the collection vessel for CO_2; the catalyst efficiency is acceptable if the CO_2 concentration is within ±5 percent of the expected value.

5.1.3 System Performance Check. Construct a liquid sample injection unit similar in design to the unit shown in Figure 6. Insert this unit into the condensate recovery and conditioning system in place of a condensate trap and set the carrier gas and auxiliary oxygen flow rates to normal operating levels. Attach an evacuated intermediate collection vessel to the system and switch from system vent to collect. With the carrier gas routed through the injection unit and the oxidation catalyst, inject a liquid sample (see. 5.1.3.1 to 5.1.3.4) via the injection septum. Heat the injection unit with a torch while monitoring the oxidation reaction on the NDIR. Continue the purge until the reaction is complete. Measure the final collection vessel pressure and then analyze the vessel to determine the CO_2 concentration. For each injection, calculate the percent recovery using the equation in section 6.6.

The performance test is acceptable if the average percent recovery is 100 ± 10 percent with a relative standard deviation (section 6.7) of less than 5 percent for each set of triplicate injections as follows:

5.1.3.1 100 μl hexane.
5.1.3.2 10 μl hexane.
5.1.3.3 100 μl toluene.
5.1.3.4 10 μl toluene.

5.2 Initial NMO Analyzer Performance Test.

5.2.1 Oxidation Catalyst Efficiency Check. Turn off or bypass the NMO analyzer reduction catalyst. Make triplicate injections of the high level methane standard (section 3.3.1). The oxidation catalyst operation is acceptable if no FID response is noted.

5.2.2 Analyzer Linearity Check and NMO Calibration. Operating both the oxidation and reduction catalysts, conduct a linearity check of the analyzer using the propane standards specified in section 3.3. make triplicate injections of each calibration gas and then calculate the average response factor (area/ppm C) for each gas, as well as the overall mean of the response factor values. The instrument linearity is acceptable if the average response factor of each calibration gas is within ± 5 percent of the overall mean value and if the relative standard deviation (section 6.7) for each set of triplicate injections is less than ±5 percent. Record the overall mean of the propane response factor values as the NMO calibration response factor (RF_{NMO}).

5.2.3 Reduction Catalyst Efficiency Check and CO_2 Calibration. An exact determination of the reduction catalyst efficiency is not required. Instead, proper catalyst operation is indirectly checked and continuously monitored by establishing a CO_2 response factor and comparing it to the NMO response factor. Operating both the oxidation and reduction catalysts make triplicate injections of each of the CO_2 calibration gases (section 3.3.3). Calculate the average response factor (area/ppm) for each calibration gas, as well as the overall mean of the response factor values. The reduction catalyst operation is acceptable if the average response factor of each calibration gas is within ±5 percent of the overall mean value and if the relative standard deviation (section 6.7) for each set of triplicate injections is less than ±5 percent. Additionally, the CO_2 overall mean response factor must be within ±10 percent of the NMO calibration response factor (RF_{NMO}) calculated in section 5.2.2. Record the overall mean of the response factor values as the CO_2 calibration response factor (RF_{CO2}).

5.2.4 NMO System Blank. For the high level CO_2 calibration gas (section 3.3.3) record the NMO value measured during the CO_2 calibration conducted in section 5.2.3. This value is the NMO blank value for the analyzer (B_a) and should be less than 10 ppm.

5.2.5 System Performance Check. Check the column separation and overall performance of the analyzer by making triplicate injections of the calibration gases listed in section 3.3.4. The analyzer performance is acceptable if the measured NMO value for each gas (average of triplicate injections) is within ±12 percent of the expected value.

5.3 NMO Analyzer Daily Calibration.

5.3.1 NMO Blank and CO_2. Inject triplicate samples of the high level CO_2 calibration gas (section 3.3.3) and calculate the average response factor. The system operation is adequate if the calculated response factor is within ±10 percent of the RF_{CO2} calculated during the initial performance test (section 5.2.2). Use the daily response factor (DRF_{CO2}) for analyzer calibration and the calculation of measured CO_2 concentrations in the collection vessel samples. In addition, record the NMO blank value (B_a); this value should be less than 10 ppm.

5.3.2 NMO Calibration. Inject triplicate samples of the mixed propane calibration cylinder (section 3.3.4.1) and calculate the average NMO response factor. The system operation is adequate if the calculated response factor is within ±10 percent of the RF_{NMO} calculated during the initial performance test (section 5.2.1). Use the daily response factor (DRF_{NMO}) for analyzer calibration and calculation of NMO concentrations in the sample tanks.

5.4 Sample Tank. The volume of the gas sampling tanks used must be determined. Prior to putting each tank in service, determine the tank volume by weighing the tanks empty and then filled with deionized distilled water; weigh to the nearest 5 gm and record the results. Alternatively, measure the volume of water used to fill the tanks to the nearest 5 ml.

5.5 Intermediate Collection Vessel. The volume of the intermediate collection vessels used to collect CO_2 during the analysis of the condensate traps must be determined. Prior to putting each vessel into service, determine the volume by weighing the vessel empty and then filled with deionized distilled water; weigh to the nearest 5 gm and record the results. Alternatively, measure the volume of water used to fill the tanks to the nearest 5 ml.

6. Calculations

Note: All equations are written using absolute pressure; absolute pressures are determined by adding the measured barometric pressure to the measured gauge pressure.

6.1 Sample Volume. For each test run, calculate the gas volume sampled:

$$V_s = 0.386\ V \left(\frac{P_t}{T_t} - \frac{P_{ti}}{T_{ti}} \right)$$

6.2 Noncondensible Organics. For each sample tank, determine the concentration of nonmethane organics (ppm C):

$$C_t = \left[\frac{\frac{P_{tf}}{T_{tf}}}{\frac{P_t}{T_t} \quad \frac{P_{ti}}{T_{ti}}} \right] \left[\frac{1}{r} \sum_{j=1}^{r} C_{tm_j} - B_a \right]$$

6.3 Condensible Organics. For each condensate trap determine the concentration of organics (ppm C):

$$C_c = 0.386\ \frac{V_v\ P_f}{V_s\ T_f} \left[\frac{1}{q} \sum_{k=1}^{q} C_{cm_k} - B_t \right]$$

6.4 Total Gaseous Nonmethane Organics (TGNMO). To determine the TGNMO concentration for each test run, use the following equation:

$$C = C_t + C_c$$

6.5 Total Gaseous Nonmethane Organics (TGNMO) Mass Concentration. To determine the TGNMO mass concentration as carbon for each test run, use the following equation:

$$M_c = 0.498\ C$$

6.6 Percent Recovery. To calculate the percent recovery for the liquid injections to the condensate recovery and conditioning system use the following equation:

$$\text{percent recovery} = 1.6\ \frac{M}{L}\ \frac{V_v}{\rho}\ \frac{P_f}{T_f}\ \frac{C_{cm}}{N}$$

6.7 Relative Standard Deviation.

$$RSD = \frac{100}{\overline{X}} \sqrt{\frac{\Sigma\ (x_i - \overline{x})^2}{n - 1}}$$

Where:

B_a = Measured NMO blank value for NMO analyzer, ppm C.

B_t = Measured CO_2 blank value for condensate recovery and conditioning system carrier gas, ppm CO_2.

C = total gaseous nonmethane organic (TGNMO) concentration of the effluent, ppm C equivalent.

C_c = Calculated condensible organic (condensate trap) concentration of the effluent, ppm C equivalent.

C_{cm} = Measured concentration (NMO analyzer) for the condensate trap (intermediate collection vessel), ppm CO_2.

C_t = Calculated noncondensible organic concentration (sample tank) of the effluent, ppm C equivalent.

C_{tm} = Measured concentration (NMO analyzer) for the sample tank, ppm NMO.

L = Volume of liquid injected, microliters.

M = Molecular weight of the liquid injected, g/g-mole.

M_c = total gaseous non-methane organic (TGNMO) mass concentration of the effluent, mg C/dscm.

N = Carbon number of the liquid compound injected (N = 7 for toluene, N = 6 for hexane).

P_f = Final pressure of the intermediate collection vessel, mm Hg absolute.

P_{ti} = Gas sample tank pressure prior to sampling, mm Hg absolute.

P_t = Gas sample tank pressure after sampling, but prior to pressurizing, mm Hg absolute.

P_{tf} = Final gas sample tank pressure after pressurizing, mm Hg absolute.

T_f = Final temperature of intermediate collection vessel, °K.

T_{ti} = Sample tank temperature prior to sampling, °K.

T_t = Sample tank temperature at completion of sampling, °K.

T_{tf} = Sample tank temperature after pressurizing °K.

V = Sample tank volume, cm.

V_v = Intermediate collection vessel volume, cm

V_s = Gas volume sampled, dscm.

n = Number of data points.

q = Total number of analyzer injections of intermediate collection vessel during analysis (where k = injection number, 1 . . . q).

r = Total number of analyzer injections of sample tank during analysis (where j = injection number, 1 . . . r).

x_i = Individual measurements.

X = Mean value.

ρ = Density of liquid injected, g/cc.

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7.2 Salo, Albert E., William L. Oaks, and Robert D. MacPhee. Measuring the Organic Carbon Content of Source Emissions for Air Pollution Control. Paper No. 74-190. (Presented at the 67th Annual Meeting of the Air Pollution Control Association, Denver, CO. June 9-13, 1974.) 25 p.

Method 25

Addendum I. System Components

In test Method 25 several important system components are not specified; instead minimum performance specifications are provided. The method is written in this manner to permit individual preference in choosing components, as well as to encourage development and use of improved components. This addendum is added to the method in order to provide users with some specific information regarding components which have been found satisfactory for use with the method. This listing is given only for the purpose of providing information and does not constitute an endorsement of any product by the Environmental Protection Agency. This list is not meant to imply that other components not listed are not acceptable.

1. Condensate Recovery and Conditioning System Oxidation Catalyst. ⅜" OD×14" inconel tubing packed with 8 inches of hopcalite* oxidizing catalyst and operated at 800°C in a tube furnace. Note: At this temperature, this catalyst must be purged with carrier gas at all times to prevent catalyst damage.

2. NMO Analyzer Oxidation Catalyst. ¼" OD×14" inconel tubing packed with 6 inches of hopcalite oxidizing catalyst and operated at 800°C in a tube furnace. (See note above.).

3. NMO Analyzer Reduction Catalyst. Reduction Catalyst Module: Byron Instruments, Raleigh, N.C.

4. Gas Chromatographic Separation Column. ⅛ inch OD stainless steel packed with 3 feet of 10 percent methyl silicone. Sp 2100 (or equivalent) on Supelcoport (or equivalent), 80/100 mesh, followed by 1.5 feet Porapak Q (or equivalent) 60/80 mesh. The inlet side is to the silicone. Condition the column for 24 hours at 200°C with 20 cc/min N_2 purge.

During analysis for the nonmethane organics the separation column is operated as follows: First, operate the column at −78°C (dry ice bath) to elute CO and CH_4. After the CH_4 peak operate the column at 0°C to elute CO_2. When the CO_2 is completely eluted, switch the carrier flow to backflush the column and simultaneously raise the column temperature to 100°C in order to elute all nonmethane organics (exact timings for column operation are determined from the calibration standard).

Note.—The dry ice operating condition may be deleted if separation of CO and CH_4 is unimportant.

Note.—Ethane and ethylene may or may not be measured using this column; whether or not ethane and ethylene are quantified will depend on the CO_2 concentration in the gas sample. When high levels of CO_2 are present, ethane and ethylene will elute under the tail of the CO_2 peak.

5. Carrier Gas. Zero grade nitrogen or helium or zero air.

---

*MSA registered trademark.

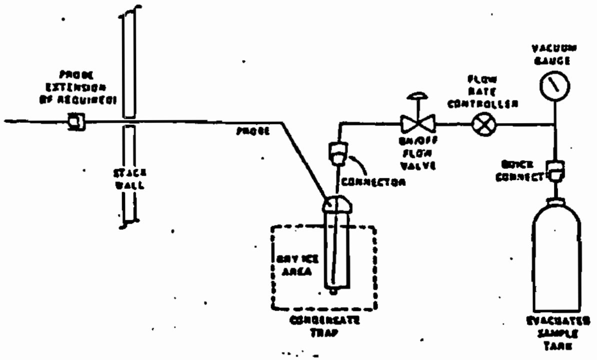


Figure 1. Sampling apparatus.

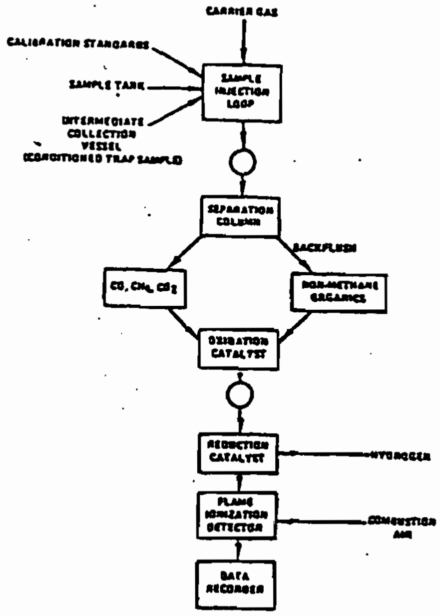


Figure 2. Simplified schematic of non-methane organic (NMO) analyzer.

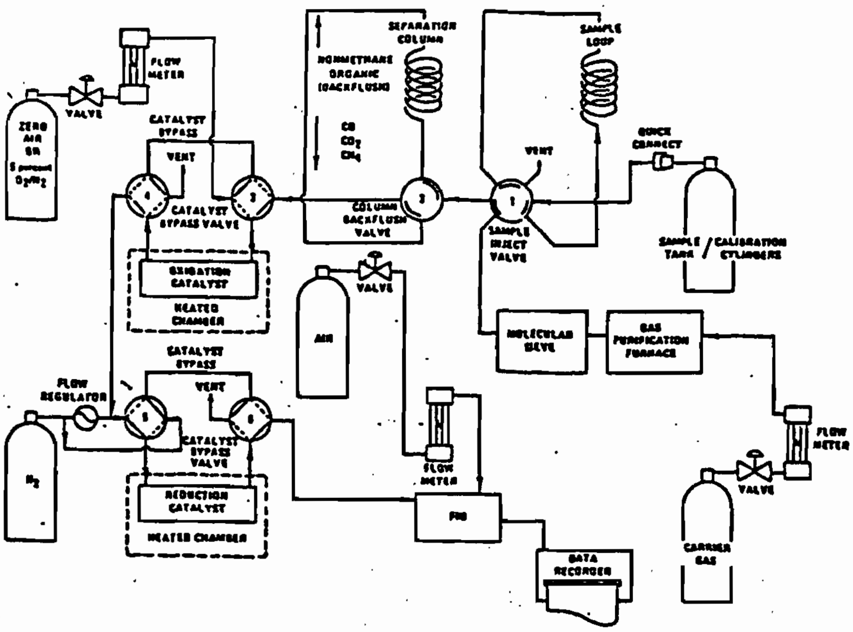


Figure 3. Nonmethane organic (NMO) analyzer.

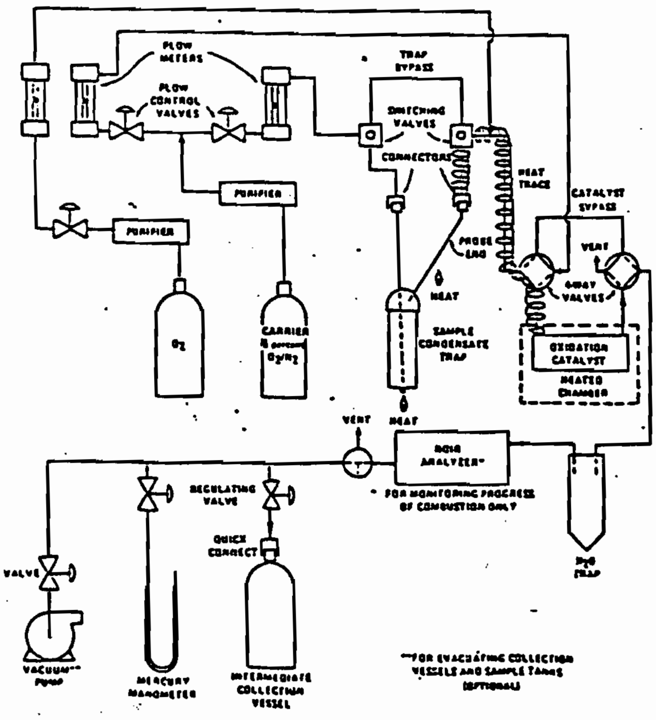


Figure 4. Condensate recovery and conditioning apparatus.

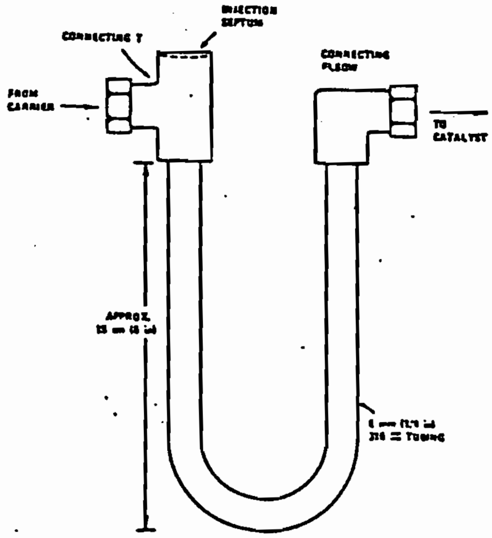
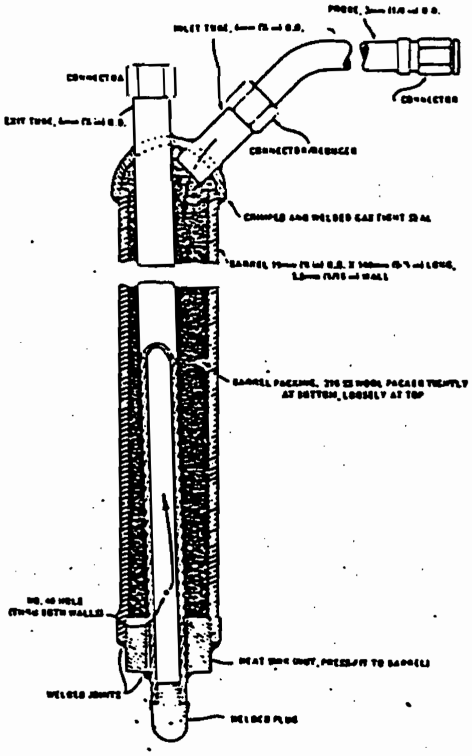


Figure 6. Liquid sample injection unit.



MATERIAL: TYPE 316 STAINLESS STEEL

Figure 5. Condensate trap.

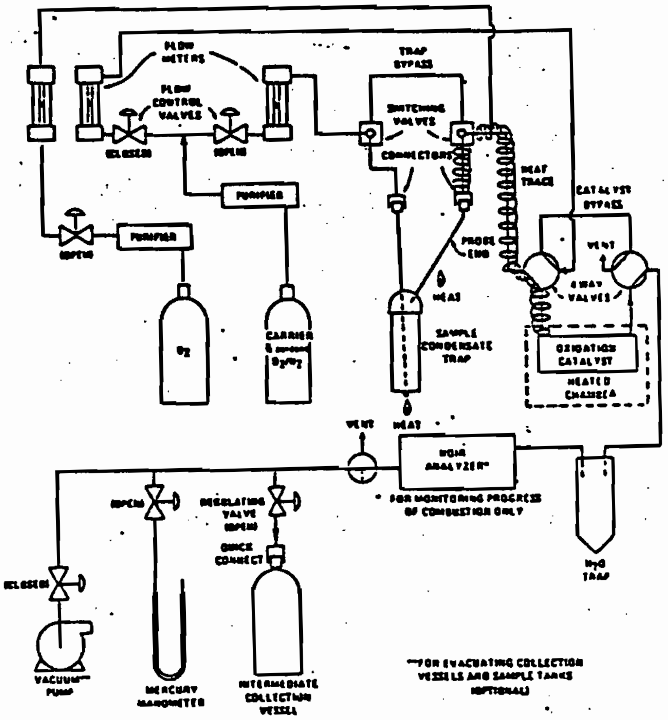
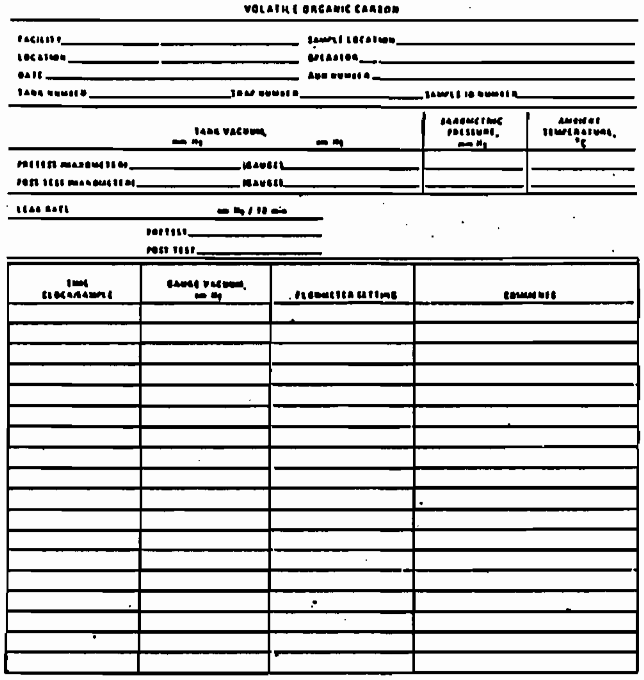


Figure 9. Condensate recovery and conditioning apparatus, collection of trap organics.



VOLATILE ORGANIC CARBON

FACILITY______________________ SAMPLE LOCATION______________________
LOCATION______________________ OPERATOR______________________
DATE______________________ RUN NUMBER______________________
TANK NUMBER______________ TRAP NUMBER______________ SAMPLE ID NUMBER______________

	TANK VACUUM, mm Hg	mm Hg	BAROMETRIC PRESSURE, mm Hg	AMBIENT TEMPERATURE, °C
PRETEST (MANOMETER)		(GAUGE)		
POST TEST (MANOMETER)		(GAUGE)		

LEAK RATE mm Hg / 10 min
PRETEST______________________
POST TEST______________________

TIME CLOCK/SAMPLE	GAUGE VACUUM, mm Hg	FLOWMETER SETTING	COMMENTS

Figure 7. Example Field Data Form.

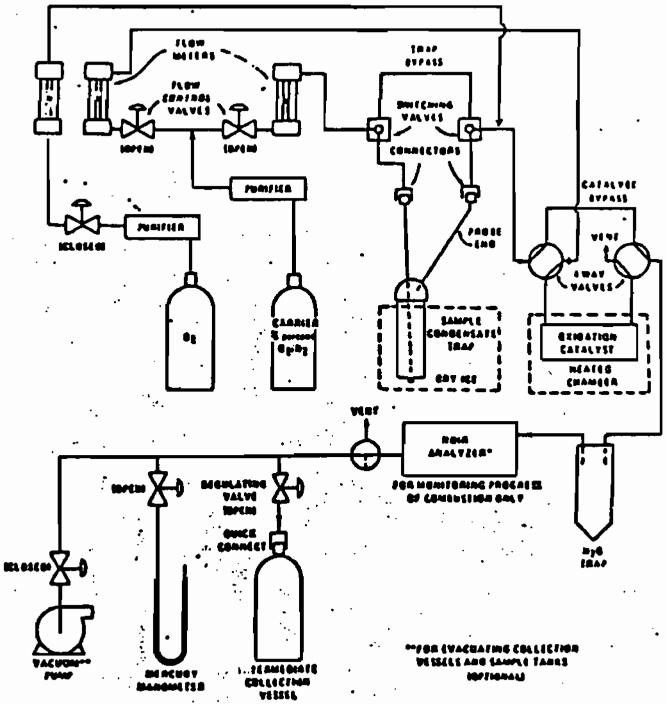


Figure 8. Condensate recovery and conditioning apparatus, carbon dioxide purge.

BEST AVAILABLE COPY

march 20, 87

EMISSIONS TRADING POLICY STATEMENT

I. Introduction: Basic Elements of Emissions Trading

This statement details EPA policy on emissions trading. It sets out conditions EPA considers necessary for emissions trades to satisfy the Clean Air Act. It also clarifies and otherwise makes final the Interim Policy proposed on April 7, 1982 (47 FR 15076). It is accompanied by a Technical Issues Document which elaborates and provides greater detail on principles set forth below. Finally, it addresses new issues, and incorporates certain additional safeguards as a result of past trading experience, to better assure the environmental integrity of future trades.

A. What is Emissions Trading?

Emissions trading consists of bubbles, netting, emission offsets, and emission reduction banking. These steps involve creation of surplus emission reductions at certain stacks, vents or similar sources of emissions and use of these emission reductions to meet or redefine pollution control requirements applicable to other emission sources. Such emissions trades can provide more flexibility to meet environmental requirements, and may therefore be used to reduce control costs and encourage faster compliance. Moreover, by developing "generic" trading rules (see Section III below) states[1] may be able to expedite bubble approvals by eliminating the need for case-by-case SIP revisions[2] and by providing more predictable approval criteria.

B. The Bubble

EPA's bubble lets *existing* plants (or groups of plants) increase emissions at one or more emission sources in exchange for compensating extra decreases in emissions at other emission sources. Approved bubbles give plant managers the ability to implement less costly ways of meeting air quality requirements. To be approvable, each bubble must produce results which are equivalent to or better than the baseline emission levels in terms of ambient impact and enforceability. Thus, bubbles should jeopardize neither ambient standards nor applicable PSD increments and visibility requirements. Under EPA's bubble, emission reductions from existing sources can not be used to meet technology-based requirements applicable to new or modified stationary sources.

This Policy Statement replaces EPA's original bubble policy (December 11, 1979; 44 FR 71779) and Interim Emissions Trading Policy (47 FR 15076). It tightens general bubble principles as well as requirements for bubbles in primary nonattainment areas which require but lack demonstrations of attainment, and requires bubbles in these areas to produce progress towards attainment, beyond equivalence to stringent emission limits. By specifying EPA's requirements for bubbles in all areas, this Policy Statement should make the development, review and approval of environmentally-sound bubbles more rapid and predictable.

C. Netting

Netting may exempt "modifications" of existing major sources from certain preconstruction permit requirements under New Source Review (NSR), so long as there is no net emissions increase within the major source or any such increase falls below significance levels.[3] By "netting out," the modification is not considered "major" and is therefore not subject to associated preconstruction permit requirements for major modifications under 40 CFR 51.18, 51.24, 52.21, 52.24, 52.27, or 52.28. The modification must nevertheless meet applicable new source performance standards (NSPS), national emissions standards for hazardous air pollutants (NESHAPs), preconstruction applicability review requirements under 40 CFR 51.18(a)-(h) and (l), and SIP requirements.

Netting's scope is determined by the definition of "source" for review of major modifications. In general, PSD areas use a single, plantwide definition, allowing actual emission reductions anywhere in a contiguous plant to compensate for potential emission increases at individual emitting units within the plant. Nonattainment areas can choose either this single, plantwide definition or a dual definition, so long as the definition selected does not interfere with attainment and maintenance of NAAQS and is consistent with progress towards attainment. Under the plantwide definition, significant net actual increases at the plant as a whole will trigger new source review. Under the dual definition, significant increases at either the plant as a whole or individual emitting units will trigger new source review.

In addition to these federal definitions for major new sources and modifications, state preconstruction permits for major or minor new sources and modifications may be required under 40 CFR 51.18(a), and some states preclude netting.

D. Emission Offsets

In *nonattainment* areas, major new stationary sources and major modifications are subject to a preconstruction permit requirement that they secure sufficient surplus emission reductions to more than "offset" their emissions. This requirement is designed to allow industrial growth in nonattainment areas without interfering with attainment and maintenance of ambient air quality standards. It is currently implemented through SIP regulations adopted by states to meet the requirements of 40 CFR 51.18(j).

In *attainment* areas, some new sources and modifications might not otherwise be able to be constructed because their emissions would result in

---

[1] "States" includes any entity properly delegated authority to administer relevant parts of a State Implementation Plan (SIP) under the Clean Air Act.

[2] "Case-by-case SIP revision" means case-by-case approval by EPA as a SIP revision. This is the traditional mechanism by which bubbles and other SIP changes have been approved by EPA.

[3] See, e.g., 40 CFR 51.18(j)(1)(x), 51.24(b)(23), 52.21(b)(23). See also today's Technical Issues Document, n. 47 and accompanying text.

On November 7, 1986, EPA restructured CFR Part 51 and renumbered many of that Part's sections (51 FR 40656). Because most readers will be more familiar with prior designations, today's notice contains citations based on the organization of Part 51 as it existed before this restructuring. Interested parties may use Appendix F of today's Technical Issues Document to convert today's Part 51 citations to the corresponding new ones.

3/21 Although 17-2.510 would not require the full nonattainment new source review since the application of thermal oxiders to lines 2, 3 & 4 will provide an overall net reduction of emissions for the facility. Federal rules (~~[illegible]~~*) do not presently provide for netting across the facility without application of LAER. Thus the ~~application~~ proposed application of thermal oxidizers in conjunction with low solvent technology will reduce emissions below RACT limits to provide offsets. Application of the same controls to line 1 as LAER will assure full compliance with both state & federal rules.

3/25 ~~Bill [illegible], [illegible] required.~~

*(FR 43830/Vol 51, No 233)

See Netting & Emission Trading Policy

5/7 Bill, Wallace and I determined, LAER will be required. Teresa

PS Form 3811, July 1983 447-845

● **SENDER: Complete items 1, 2, 3 and 4.**

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☐ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery.

3. Article Addressed to:

Mr. John Stier
Anheuser-Busch Companies, Inc.
202-4, One Busch Place
St. Louis, Missouri 63118-1852

4. Type of Service:

☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number
P 408 531 170

Always obtain signature of addressee or agent and **DATE DELIVERED.**

5. Signature – Addressee
X

6. Signature – Agent
X m E

7. Date of Delivery

8. Addressee's Address *(ONLY if requested and fee paid)*

ST LOUIS MO
9
1987
USPS
STA

DOMESTIC RETURN RECEIPT

P 408 531 170

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. John Stier	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 3/5/87	

PS Form 3800, Feb. 1982

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

March 4, 1987

Mr. John Stier
Manager, Environmental Affairs
Anheuser-Busch Companies, Inc.
202-4, One Busch Place
St. Louis, Missouri 63118-1852

Dear Mr. Stier:

Re: AC 16-57752 and AC 16-57753

The department has received your February 6, 1987 letter which requested permission to install the ducts needed to vent the three basecoated oven exhausts to the existing thermal oxidizers.

This request is acceptable. Test data for this source must be forwarded to the Bio-Environmental Services Division on or before April 1, 1987, as required in the previously approved schedule.

By definition, this request does not constitute a modification, therefore, the amendment of your construction permits Nos. AC 16-57752 and AC 16-57753 will be incorporated into the new construction permit for Can Coating Line No. 1, AC 16-12873 as offset credit.

If you have any questions, please call me at (904)488-1344.

Sincerely,

DH Thomas P.E.

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/TH/s

cc: J. Cole
J. Woosley

ANHEUSER-BUSCH COMPANIES

February 20, 1987

Ms. Teresa Heron
Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
2600 Blairstone Road
Tallahassee, Florida 32301

METAL CONTAINER CORPORATION - JACKSONVILLE
CAN LINE NUMBER ONE

Dear Ms. Heron:

As we discussed by phone yesterday, attached is a chronological history of the permit activities at the Jacksonville plant after the baseline date in 1981. The technical evaluation for overvarnish units on lines 3 and 4 stated that if the actual emissions levels stayed below 403.5 tons per year, a significant net emissions increase would not occur. The facility emissions after the reactivation of can line number one will remain below the 403.5 ton per year level.

Please let me know if I can provide any further information.

Sincerely,

ANHEUSER-BUSCH COMPANIES, INCORPORATED

John V. Stier
Manager, Environmental Affairs

JVS:pm
Attachment

JS22087

DER
FEB 23 1987
BAQM

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

METAL CONTAINER CORPORATION
JACKSONVILLE AIR PERMIT LISTING

Date	Activity
6/22/81	Application for operating permit renewal submitted. Changed to water-based coatings. Considered to be baseline date for contemporaneous emissions increases or decreases. 1981 actual emissions of 315.5 tpy plus RACT credit of 48.0 tpy forms baseline of 363.5 tpy.
10/29/81	Permit to operate issued (A016-44656,57,58,59). Expire 9/30/86.
11/18/81	Applications to construct overvarnish units on Lines 1 and 2 submitted.
2/19/82	Permits to construct (overvarnish) on Lines 1 and 2 issued (AC16-50417,18). Emissions level increase of 45.1 tpy subject to limited new source review requirements.
4/23/82	Certificates of Completion of Construction submitted for AC16-50417,18.
6/22/82	Permits to operate overvarnish units on Lines 1 and 2 issued (A016-55208,10). Expire 5/31/87.
7/1/82	Applications to construct overvarnish units on Lines 3 and 4 submitted.
10/5/82	Permits to construct (overvarnish) on Lines 3 and 4 issued (AC16-57752,53). Total plant emission level limited to 403.5 tpy to avoid significant net emissions increase.
10/21/82	Certificates of Completion of Construction submitted for AC16-57752,53.
12/1/82	Permits to operate Lines 1, 2, 3 and 4, including overvarnish units on all lines, issued (A016-55208,10,62285,62287). Expire 5/31/87.
10/10/85	Application to modernize line speeds from 950 to 1,400 cpm submitted for Lines 2, 3 and 4. Actual emissions projected at less than 403.5 tpy so no significant emissions increase occurs.
1/6/86	Specific Conditions 2 and 4 of construction permit No's AC16-57752 and 53 modified to reflect modernized lines.
10/28/86	Application to re-instate Line No. 1 from standby to full time basis submitted.

4

ANHEUSER-BUSCH COMPANIES

February 6, 1987

DER

FEB 9 1987

BAQM

Mr. Clair Fancy
Central Air Permitting Section
Department of Environmental Regulation
2600 Blairstone Road
Tallahassee, Florida 32301-8241

METAL CONTAINER CORPORATION - JACKSONVILLE
MODERNIZATION PROGRAM

Dear Clair:

As you are well aware, Metal Container Corporation (MCC) is in the start-up phase of the modernization program to increase can line speeds on lines 2, 3 and 4 at its Jacksonville facility.

In order to assure that MCC can maintain compliance with the Federal New Source Performance Standards (NSPS), while simultaneously maintaining the flexibility to run basecoat materials that are not NSPS "compliance" coatings, MCC requests approval to begin immediate installation of the necessary ductwork to vent the three basecoater oven exhausts to the existing thermal oxidizers. Upon completion of this program (estimated to be within four weeks of your approval), a performance test meeting the requirements outlined in the NSPS will be conducted on the basecoaters. The test data will be forwarded to the local Bio-Environmental Services Division before the recently extended deadline of April, 1987.

In order to meet the April 1 date, your timely approval for the further amendment of our construction permit No. AC16-57752 & 53 is requested. MCC is prepared to begin installation of the ductwork immediately upon your notification.

Your continued assistance and help during the modernization program is greatly appreciated. Please let me know if I can provide any further information.

Sincerely,

John V. Stier/dmd

John V. Stier
Manager, Environmental Affairs

JVS:pm

cc: Mr. Kurshid Mehta, BESD
Mr. Joe Cummings, MCC

JS2587

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32399-2400

BOB MARTINEZ
GOVERNOR

DALE TWACHTMANN
SECRETARY

January 22, 1987

Mr. John V. Stier
Manager, Environmental Affairs
Anheuser-Busch Company
St. Louis, Missouri 63118-1852

Dear Mr. Stier:

The department received your letter, dated January 9, 1987, which requested an extension of a schedule for start-up and emissions testing of thermal oxidizers Nos. 1 and 2 at the Jacksonville Can Plant.

This request is acceptable. The schedule for completing and submitting an emissions testing program and operating permit applications will be changed as follows:

From: February 1, 1987
To: April 1, 1987

Sincerely,

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/TH/s

copy BES
& district
done PA

ANHEUSER-BUSCH COMPANIES

January 20, 1987

Ms. Teresa Heron
Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
2600 Blairstone Road
Tallahassee, Florida 32301

METAL CONTAINER CORPORATION - JACKSONVILLE
CAN LINE NUMBER ONE

Dear Ms. Heron:

As requested in your December 23, 1986 letter on this subject, attached is some additional information to help in your review of this application. Specifically:

1. The use of water-borne coatings and incineration of the VOC emitted from three ovens is presented as LAER.

2. Continuous emission reductions will occur by capturing and incinerating a percentage of the VOC emitted from the ovens and process applicators.

3. The actual facility emissions for each year have been included as part of the original application. The Department has relied on the difference in a facility actual versus allowable emissions to issue construction permits for four overvarnish units and also the elimination of solvent based necker/flanger lubricant to issue construction permits for modernized Lines 2, 3 and 4.

4. The maximum production for can coating Line No. 1 is 1,000 cans per minute.

5. Thermal oxidizer No. 1 will control can coating Line No. 1. Thermal oxidizer No. 2 will control the emissions from the printer pin ovens on Lines 2, 3 and 4. The VOC emissions from the overvarnish and bottom varnish operations exhaust through these pin ovens. Process flow diagrams are attached showing this configuration.

6. Material safety data sheets are attached for each of the compounds proposed for use.

DER
JAN 21 1987
BAQM

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

7. There will be no emissions of non-criteria pollutants from this operation. All organic compounds are classified as VOC. If the chemical abstract number is still necessary, it can be found based upon the attached data sheets.

8. Attached are emissions for Line No. 1 calculated on a daily basis. The format suggested in your letter has been utilized.

9. Actual VOC emissions since 1981 are included with the original applications.

Please call me in St. Louis at (314) 577-4170 if you need any additional information.

Sincerely,

ANHEUSER-BUSCH COMPANIES, INCORPORATED

John V. Stier

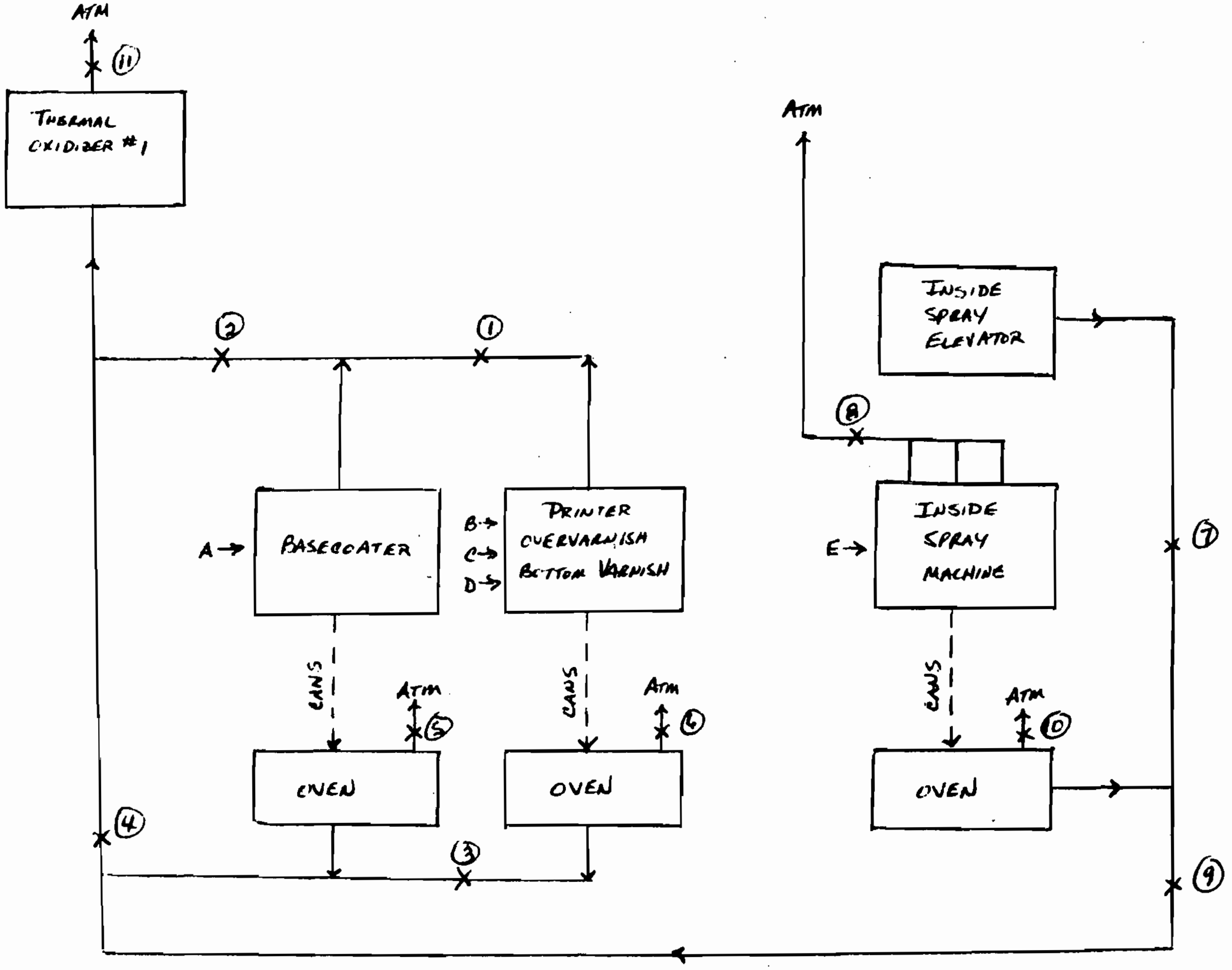
John V. Stier
Manager, Environmental Affairs

JVS:pm
Attachment

cc: Mr. Pat Nolan (w/att)

JS19872

LINE 1



COATINGS

A – BASECOAT

B – INKS

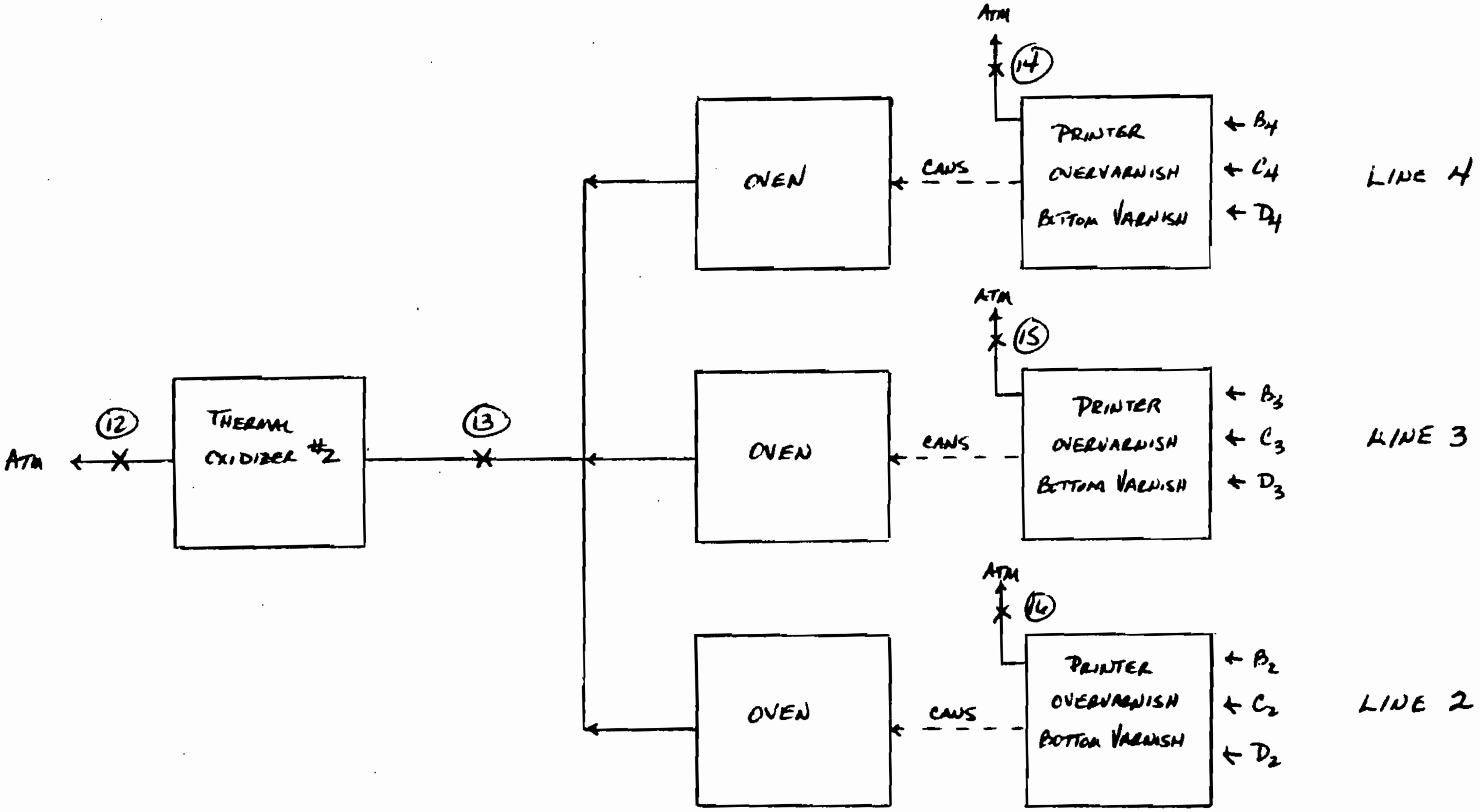
C – OVERVARNISH

D – BOTTOM VARNISH

E – INSIDE SPRAY

RAL
11/86

LINES 2, 3, & 4



COATINGS

B - INKS
C - OVERVARNISH
D - BOTTOM VARNISH

RML 11/86

METAL CONTAINER CORPORATION
JACKSONVILLE, FLORIDA
CAN LINE NO. 1 AIR PERMITS APPLICATION
JANUARY 16, 1987

CAN LINE NO. 1 MAXIMUM DAILY EMISSIONS

MATERIAL	LBS VOC/GAL LESS WATER	% SOLIDS (W/W)	% SOLVENT (W/W)	% WATER (W/W)	POUNDS VOC/GAL SOLIDS	GALLONS PER M CANS	CANS PER DAY	GALLONS COATING APPLIED	SOLIDS APPLIED	OVERALL CONTROL EFFICIENCY	LBS VOC/DAY
LINE NO. 1 WORST CASE DAY - ALL SOFT DRINK CANS											
INSIDE SPRAY - CELANESE 3500-C	3.62	20.00	15.03	65.00	7.34	0.266	1080000.00	287.28	57.46	0.720	118.08
BOTTOM VARNISH - INMONT Z125	1.92	42.00	11.45	58.00	2.63	0.010	1080000.00	10.80	4.54	0.450	6.56
OVERVARNISH - INMONT S145-121A	2.29	46.30	15.98	37.70	3.34	0.146	1080000.00	126.14	58.40	0.450	107.29
CLEAN-UP SOLVENTS - MEK	6.71	0.00	100.00	0.00	6.71	0.005	1080000.00	5.40	0.00	0.223	28.15
SUBTOTALS											260.09

Container Coatings Product Data Sheet

PPG INDUSTRIES INC., COATINGS AND RESINS DIVISION, 760 PITTSBURGH DR., DELAWARE, OHIO 43015 (614) 363-9610

Code: [redacted] *

Date: June 18, 1985

Product: Water Reducible White Enamel

Suggested Use: ___ Int. ___ Process x Past.

x Ext. x Non-Pro ___ Non-Past.

Submitted to: Metal Container Corp.

Submitted by: D. W. Kuhns

Location: St. Louis, MO

Attention: Mr. Norm Fitzgerald

PRODUCT DESCRIPTION

PHYSICAL PROPERTIES (as supplied)

Viscosity 160 ± 40 sec # 4F Cup @ 77F

Total Solids 58.0 ±2.00% by weight

Method ASTM2369-81

Total Solids 42.5 ±2.00% by volume

weight / gallon 11.1 ±0.20 lbs

pH 8.4 ± .4

DESCRIPTION

Resin Type(s) polyester

Cured film color white

Contains internal lubricant x Yes ___ No

SHIPPING AND HANDLING DATA

Flash Point 130 °F (PM Closed Cup)

Freeze Protection required x Yes ___ No

Storage Life 3 months at 77 °F

Storage Life 3 months at 100 °F

VOC INFORMATION

Karl Fischer water 33.1 %

ASTM D2369-81 TS 58.0 %

VOC .28 Kg of organic solvent per liter of paint solids (NSPS)

VOC 1.8 lbs organic solvent per gallon of paint – H_2O less water

Method 24

SUGGESTED APPLICATION DATA

Agitation Required before use yes

Method dr. roller or equiv. Time 30 min

Application Vis. 160±40 sec # 4 Ford Cup @77F

Thinner water and/or butyl cellosolve

Amount ___

Substrate D&I beer and beverage cans

Method rollcoat

Film Weight: 8-10 mgs/ sq. in.

___ mgs/ ___

Clean up Solvent water and/or butyl cellosolve

RECOMMENDED BAKES:

Conventional:	30 sec	dwell at	350F	MT
		dwell at		MT
HVHT:	2 sec	dwell at	380F	PMT
		dwell at		PMT
min IBO needed	60 sec	dwell at	380F	MT

ADDITIONAL INFORMATION: (see reverse side)

NOTE: STATEMENTS AND METHODS DESCRIBED HEREIN ARE BASED UPON THE BEST INFORMATION AND PRACTICES KNOWN TO PPG INDUSTRIES, INC. HOWEVER, PROCEDURES FOR APPLICATIONS MENTIONED ARE SUGGESTIONS ONLY AND ARE NOT TO BE CONSTRUED AS REPRESENTATION OR WARRANTIES AS TO PERFORMANCE OR RESULTS. NOR DOES PPG INDUSTRIES, INC. WARRANT FREEDOM FROM PATENT INFRINGEMENT IN THE USE OF ANY FORMULA OR PROCESS SET FORTH HEREIN. WHEN SUGGESTED USE INCLUDES PROCESS AND/OR PASTEURIZATION PPG DOES NOT CLAIM ACCEPTABLE PERFORMANCE AT ALL POSSIBLE TIMES AND TEMPERATURES. THE USER MUST TEST PERFORMANCE FOR ACCEPTABILITY USING HIS CONDITIONS.

FORM 4707 REV. 3-84

MATERIAL SAFETY DATA SHEET
COATINGS AND RESINS GROUP

SECTION I - PRODUCT INFORMATION

MANUFACTURER'S NAME: PPG INDUSTRIES INC.
PRODUCT SAFETY LOC.: 260 KAPPA DRIVE
PITTSBURGH, PA 15238
MSDS CONTACT: MANAGER, INDUSTRIAL HYGIENE
AND PRODUCT SAFETY
(412) 963-5822
EMERGENCY TELEPHONE: (304) 843-1300

CODE/IDENTITY : CE3606 (031486T)
TRADE NAME: WATER REDUCIBLE WHITE ENAMEL
CHEMICAL FAMILY: POLYESTER MELAMINE
DOT CLS: PAINT, FLAMMABLE LIQUID
DATE OF PREPARATION: 6/27/86
CUSTOMER PART #:

SECTION II - INGREDIENTS

INGREDIENTS	APPROX. % WT.	CAS NO.	EXPOSURE LIMITS ACGIH TLV	OSHA PEL	PPG IPEL
TITANIUM DIOXIDE	25	13463-67-7	10.00Mg/M3	15.00Mg/M3	10.00Mg/M3
BARIUM SULFATE	5	7727-43-7	10.00Mg/M3	NOT EST.	10.00Mg/M3
DEIONIZED WATER	35	7732-18-5	NOT EST.	NOT EST.	NOT EST.
ETHYLENE GLYCOL MONOBUTYL ETHER	5	111-76-2	25.00PPM	50.00PPM	25.00PPM
FILM FORMERS, RESINS, AND ADDITIVES	30	PROPRIETARY	NOT EST.	NOT EST.	NOT EST.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING RANGE : 100 - 171 DEG.C
VAPOR PRESSURE: 16.9 mmHg
VAPOR DENSITY : HEAVIER THAN AIR
% VOL/VOLUME : 58.30
EVAP RATE(BuOAc=100): 32

SOLUBILITY IN WATER: 41.8 %
WT/GAL (LBS): 11.22
pH: U/I
% SOLID BY WEIGHT: 57.6

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

DOT CATEGORY: COMBUSTIBLE
FLASHPOINT: 130 DEG. F PMCC FLAMMABLE LIMITS: LEL UI UEL U/I

EXTINGUISHING MEDIA:

USE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CLASS B EXTINGUISHERS (CARBON DIOXIDE, DRY CHEMICAL, OR UNIVERSAL AQUEOUS FILM FORMING FOAM) DESIGNED TO EXTINGUISH NFPA CLASS II COMBUSTIBLE LIQUID FIRES.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

CLOSED CONTAINERS MAY EXPLODE OR BURST (DUE TO THE BUILD-UP OF STEAM PRESSURE) WHEN EXPOSED TO EXTREME HEAT.

SPECIAL FIRE FIGHTING PROCEDURES:

WATER SPRAY MAY BE INEFFECTIVE. WATER SPRAY MAY BE USED TO COOL CLOSED CONTAINERS TO PREVENT PRESSURE BUILD-UP AND POSSIBLE AUTOIGNITION OR EXPLOSION WHEN EXPOSED TO EXTREME HEAT. IF WATER IS USED, FOG NOZZLES ARE PREFERABLE. FIRE-FIGHTERS SHOULD WEAR SELF CONTAINED BREATHING APPARATUS.

SECTION V - REACTIVITY DATA

STABILITY: STABLE **HAZARDOUS POLYMERIZATION:** NOT EXPECTED TO OCCUR

INCOMPATIBILITY (MATERIALS AND CONDITIONS TO AVOID):

AVOID CONTACT WITH STRONG ALKALIES, STRONG MINERAL ACIDS, OR STRONG OXIDIZING AGENTS.

HAZARDOUS DECOMPOSITION PRODUCTS:

MAY PRODUCE HAZARDOUS DECOMPOSITION PRODUCTS WHEN HEATED. WELDING, BRAZING, OR FLAME-CUTTING ON SURFACES COATED WITH THIS PRODUCT MAY PRODUCE FUMES INCLUDING:
Carbon Monoxide, Oxides of Nitrogen, Formaldehyde

SECTION VI - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:

PROVIDE MAXIMUM VENTILATION. ONLY PERSONNEL EQUIPPED WITH PROPER RESPIRATORY AND SKIN AND

Continued on Back of Page

WEAR CHEMICAL-TYPE SPLASH GOGGLES OR FULL FACE SHIELD.

SKIN PROTECTION:

WEAR PROTECTIVE CLOTHING, INCLUDING IMPERMEABLE APRON AND GLOVES CONSTRUCTED OF:
NITRILE, NEOPRENE OR LATEX RUBBER

RESPIRATORY PROTECTION:

OVEREXPOSURE TO VAPORS MAY BE PREVENTED BY ENSURING VENTILATION CONTROLS, VAPOR EXHAUST OR FRESH AIR ENTRY. NIOSH/MSHA-APPROVED (TC-23C-) PAINT SPRAY OR AIR SUPPLIED (TC-19C-) RESPIRATORS MAY ALSO REDUCE EXPOSURE. IN ALL CASES, READ RESPIRATOR MANUFACTURER'S INSTRUCTIONS AND LITERATURE CAREFULLY TO DETERMINE THE TYPE OF AIRBORNE CONTAMINANTS AGAINST WHICH THE RESPIRATOR IS EFFECTIVE AND HOW IT IS TO BE PROPERLY FITTED.

OTHER EQUIPMENT:

CLEAN OR DISCARD CONTAMINATED CLOTHING AND SHOES.

VENTILATION REQUIREMENTS:

PROVIDE GENERAL DILUTION OR LOCAL EXHAUST VENTILATION IN VOLUME AND PATTERN TO KEEP THE CONCENTRATION OF INGREDIENTS LISTED IN SECTION II BELOW THE LOWEST SUGGESTED EXPOSURE LIMITS, THE LEL IN SECTION IV BELOW THE STATED LIMIT, AND TO REMOVE DECOMPOSITION PRODUCTS DURING WELDING OR FLAME CUTTING ON SURFACES COATED WITH THIS PRODUCT.

SECTION X - SPECIAL PRECAUTIONS

HANDLING AND STORAGE PRECAUTIONS:

DO NOT STORE ABOVE 120 DEGREES F. STORE LARGE QUANTITIES IN BUILDINGS DESIGNED AND PROTECTED FOR STORAGE OF NFPA CLASS II COMBUSTIBLE LIQUIDS.
PROTECT FROM FREEZING.

OTHER PRECAUTIONS:

IF THIS MATERIAL IS PART OF A MULTIPLE COMPONENT COATING SYSTEM, READ THE MATERIAL SAFETY DATA SHEET(S) FOR THE OTHER COMPONENT OR COMPONENTS BEFORE BLENDING AS THE RESULTING MIXTURE MAY HAVE THE HAZARDS OF ALL OF ITS PARTS.
ALL CHEMICAL SUBSTANCES IN THIS PRODUCT COMPLY WITH ALL APPLICABLE RULES OR ORDERS UNDER THE ENVIRONMENTAL PROTECTION AGENCY'S TOXIC SUBSTANCE CONTROL ACT.

THIS MATERIAL SAFETY DATA SHEET HAS BEEN PREPARED IN ACCORDANCE WITH THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200)

U/I = UNKNOWN INFORMATION N/A = NOT APPLICABLE NOT EST. = NOT ESTABLISHED

LOCATION:

Coating: PPG CE 3606
White Basecoat

Given:
58.0 solids by weight
11.10 lbs/gal density
42.5 solids by volume
33.1% water by weight

Therefore:

Weight Basis:

Solids = (0.58)(11.10 lbs/gal) = 6.44 lbs
Water = (0.331)(11.10 lbs/gal) = 3.67 lbs
VOC = 11.10 - 6.44 - 3.67 = 0.99 lbs
Total 11.10 lbs

Volume Basis:

Solids = (0.425)(1 gal) = 0.425 gals
Water = (3.67 lbs)(gal/8.33 lbs) = 0.441 gals
VOC = 1 - 0.425 - 0.441 = 0.134 gals
Total 1.000 gals

$$\text{VOC Content} = \frac{0.990 \text{ lbs VOC}}{1\text{-}0.441 \text{ gals } H_2O} = 1.77 \text{ lbs VOC/gal} - H_2O$$

$$\text{NSPS} = \frac{0.990 \text{ lbs VOC}}{0.425 \text{ gal solids}} \times \frac{\text{Kg VOC}}{2.205 \text{ lbs}} \times \frac{\text{gal solids}}{3.785 \text{ liters}} = 0.28 \text{ Kg VOC/Liter solids}$$

$$\text{VOC Weight Fraction} = \frac{0.990 \text{ lbs VOC}}{11.10 \text{ lbs coating}} = 0.089$$

JVS 10/23/85

INMONT

CONTAINER COATINGS

technical data

Name Z125 Purair Bottom Varnish

Customer Metal Container **Attn.** Mr. Tom Vogl

Suggested Uses Bottom rim varnish on D & I aluminum beer cans to provide improved application, mobility, adhesion and abrasion resistance properties.

Type Material Modified acrylic

Physical Data

Color Clear - colorless **Viscosity** 125 ± 12 **Sec. #4 Ford Cup @ 77°F**

Weight Per Gallon 8.65 ± 0.15 **Weight Solids** 42.0 ± 1.6% ASTM

V.O.C. = 2.38 lbs./gallon minus water
ASTM D2369-81

Suggested Application Data

% WATER B.W. OF VOLATILES - 80.41 PER M. SEGAL 3/27/84

Method of Application Rollercoat **Appropriate Thinner** 80:20 Water: Butyl Cellosolve

Application Viscosity 125 ± 12 or reduce as required **Sec. #4 Ford Cup @ 77°F** --

Dry Film Weight 3-4 mgs./sq. inch **• Dry Film Thickness** --

Bake 385 **°F For** 2 **Min. Plate Temperature**

Additional Information This product contains internal emulsion lubricants; please mix thoroughly before using. Reissued to indicate revised V.O.C. data.

Date: 3/5/84 **Data Prepared By:** Container Coatings Development Lab
Cincinnati, Ohio

cc: Messrs. D'Adamo, Crawley, Hirt, Permenter & Fitzgerald

Coating: Inmont Z125
Bottom Varnish

Given: 42.0 Solids by Weight
8.65 lbs/gal Density
80.4 by Weight of Volatile Portion is Water
Assumed Organic Density of 0.85 Kg/liter (7.09 lbs/gal)

Therefore:

Weight Basis:

Solids = (.420)(8.65 lb/gal) = 3.63 lbs
Water = (.580)(8.65 lb/gal)(.804) = 4.03 lbs
VOC = 8.65 - 3.63 - 4.03 = 0.99 lbs
Total = 8.65 lbs

Volume Basis:

Solids = 1 - 0.484 - 0.140 = 0.376 gals
Water = (4.03 lbs)(gal/8.33 lbs) = 0.484 gals
VOC = (0.99 lbs)(gal/7.09 lbs) = 0.140 gals
Total = 1.000 gals

$$\text{VOC Content} = \frac{0.99 \text{ lbs VOC}}{1 - 0.484 \text{ gals}} = 1.92 \text{ lbs VOC/gal} - H_2O$$

$$\text{NSPS} = \frac{0.99 \text{ lbs VOC}}{0.376 \text{ gal solids}} \times \frac{\text{Kg VOC}}{2.205 \text{ lbs}} \times \frac{\text{gal solids}}{3.785 \text{ liters}} = 0.32 \text{ Kg VOC/liter solids}$$

$$\text{VOC Weight Fraction} = \frac{0.99 \text{ lbs VOC}}{8.65 \text{ lbs coating}} = 0.114$$

JVS 3/21/86

MATERIAL SAFETY DATA SHEET

(Approved by U.S. Department of Labor "Essentially Similar" to Form LSB-00S-4)

INMONT

Section I

MANUFACTURER'S NAME INMONT CORPORATION

Date Prepared: 12/1/82

STREET ADDRESS 1754 Dana Avenue

By: M. M. Segal

M. M. Segal

CITY, STATE, AND ZIP CODE Cincinnati, Ohio 45207

EMERGENCY TELEPHONE NO. (513) 841-6100 (201) 365-3513 - 3400 800 - 424-9300 (CHEMTREC)

CHEMICAL NAME AND SYNONYMS Aqueous Finishing Varnish

TRADE NAME S145-121A Purair

CHEMICAL FAMILY Modified Acrylic

FORMULA N.A.

Section II – HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS

PIGMENTS	%	TLV (Units)	SOLVENTS TLV (TWA) data in PPM unless otherwise noted;	%	TLV (Units)
N. A.			Mixture (See below)	54.2	N.A.
CATALYST			**ADDITIVES**		
Dimethylethanolamine	2.2	Unknown	N. A.		
VEHICLE			**OTHERS**		
N. A.			N. A.		

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV		%	TLV (Units)
			Butyl Carbitol	1.5	Unknown
Demineralized Water	42.9	N.A.	n-Propyl Alcohol	1.4	200
Butyl Cellosolve	5.2	25	Exempt Mineral Spirits	0.6	130
n-Butyl Alcohol	2.4	50	VM&P Naphtha	0.2	300

Section III – PHYSICAL DATA

BOILING POINT (°F)	201 - 446	SPECIFIC GRAVITY (H_2O=1)	1.044
VAPOR PRESSURE (mm Hg.) @ 25° C.	0.02-17.5	PERCENT VOLATILE BY VOLUME (%)	61.5
VAPOR DENSITY (AIR=1)	0.6 - 5.6	EVAPORATION RATE (.......... = 1)	--
SOLUBILITY IN WATER	Complete	BUTYL ACETATE = 1	0.002 - 1.8
APPEARANCE AND ODOR	Clear; high viscosity; mild acrylic, amine, glycol ether		

Section IV – FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED)	FLAMMABLE LIMITS	Lel	Uel
150°F P-M Closed Cup		0.7%	13.5%

EXTINGUISHING MEDIA CARBON DIOXIDE, DRY CHEMICAL, ALCOHOL FOAM

SPECIAL FIRE FIGHTING PROCEDURES USE WATER SPRAY TO KEEP CONTAINERS COOL

UNUSUAL FIRE AND EXPLOSION HAZARDS EXPOSURE OF CONTAINERS TO EXCESSIVE HEAT MAY CAUSE DISRUPTIVE PRESSURE.

Section V – HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE See Section II

EFFECTS OF OVEREXPOSURE Contains materials that are skin and eye irritants; may be toxic if taken internally. Prolonged inhalation of volatiles from the small amounts of organic solvents may cause drowsiness, dizziness or nausea.

EMERGENCY AND FIRST AID PROCEDURES Flush areas of exposed skin or irritated eyes with excess amounts of water. Remove exposed persons to fresh air after excessive inhalation.

SEEK MEDICAL ATTENTION IF NEEDED

FOR INGESTED HYDROCARBONS (SEE SECTION TWO) DO NOT INDUCE VOMITING – CALL PHYSICIAN

Section VI – REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID Avoid freezing and temperatures
	STABLE	X	above 100°F.

INCOMPATABILITY *(Materials to avoid)* OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION PRODUCTS UNKNOWN

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID
	WILL NOT OCCUR	X	

Section VII – SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Avoid exposure to skin and eyes. Avoid oral ingestion. Wear protective equipment such as goggles, gloves and rubber overshoes. Spills may be absorbed on an inert solid for incineration or proper disposal. Clean area thoroughly.

VENTILATE IN PATTERN AND VOLUME TO STAY BELOW TLV'S AND LEL'S IN SECTIONS TWO AND FOUR.

WASTE DISPOSAL METHOD DISPOSAL SHOULD BE IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS. FOR FLAMMABLE AND COMBUSTIBLE SOLVENT BASED SYSTEMS, INCINERATE – NOT IN CLOSED CONTAINERS. FOR SOLIDS AND MOST AQUEOUS SYSTEMS, DISPOSE OF IN APPROVED SANITARY LAND FILL.

Section VIII – SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)* ADSORPTION MASK – HYDROCARBON VAPOR CANNISTER

VENTILATION COMPLY WITH OSHA 1910.94	LOCAL EXHAUST 11 – 12 CHANGES PER HOUR	SPECIAL
	MECHANICAL *(General)* EXPLOSION PROOF MOTOR	OTHER NO SMOKING OR OPEN LIGHTS

PROTECTIVE GLOVES INSOLUBLE RUBBER GLOVES	EYE PROTECTION SAFETY GLASSES OR GOGGLES

OTHER PROTECTIVE EQUIPMENT FOR HIGHLY CORROSIVE MATERIALS, RUBBER BOOTS AND/OR APRON MAY BE REQUIRED. REMOVE CONTAMINATED CLOTHING AND SHOES – DISCARD WHERE CLEAN-UP MAY NOT BE POSSIBLE.

Section IX – SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING USE VENTILATED AREA (EQUIVALENT TO OUT OF DOORS)

STORE PER OSHA 1910.106 AVOID HIGH TEMPERATURES – STORE BELOW 120° F

OTHER PRECAUTIONS AVOID PROLONGED CONTACT WITH SKIN AVOID CONTACT WITH EYES

GROUND CONTAINERS WHEN POURING FOR INDUSTRIAL USE ONLY

DO NOT HANDLE UNTIL MANUFACTURER'S PRECAUTIONS HAVE BEEN READ AND UNDERSTOOD.

Coating: Inmont S145-121A
Overvarnish

Given: 46.3 Solids by Weight
41.6 Solids by Volume
8.70 lbs/gal Density
70.3% by Weight of Volatile Portion is Water

Therefore:

Weight Basis:

Solids = (.463)(8.70 lb/gal) = 4.03 lbs
Water = (.537)(8.70 lb/gal)(0.703) = 3.28 lbs
VOC = 8.70 - 4.03 - 3.28 = 1.39 lbs
Total = 8.70 lbs

Volume Basis:

Solids = (0.416)(1 gal) = 0.416 gals
Water = (3.28 lbs)(gal/8.33 lbs) = 0.394 gals
VOC = 1 - 0.416 - 0.394 = 0.190 gals
Total = 1.000 gals

$$\text{VOC Content} = \frac{1.39 \text{ lbs VOC}}{1 - 0.394 \text{ gals}} = 2.29 \text{ lbs VOC/gal} - H_2O$$

$$\text{NSPS} = \frac{1.39 \text{ lbs VOC}}{0.416 \text{ gal solids}} \times \frac{\text{Kg VOC}}{2.205 \text{ lbs}} \times \frac{\text{gal solids}}{3.785 \text{ liters}} = 0.40 \text{ Kg VOC/liter solids}$$

$$\text{VOC Weight Fraction} = \frac{1.39 \text{ lbs VOC}}{8.70 \text{ lbs coating}} = 0.160$$

JVS 3/21/86

BEST AVAILABLE COPY

Celanese Specialty Resins

CELANESE

Product Technical Information

Submitted to: Metal Container Corporation
666 Mason Ridge Center Drive
Suite 220
Creve Coeur, MO 63141

Attn: Mr. Tom Vogl

Date: October 18, 1983

Product

Name: Ecoliner® 3500C

Intended Use: Water Reducible Interior Spray for D & I Cans

Sales Specifications

Viscosity: 16 ± 4 sec. #4 Ford Cup @ 77°F.
23 ± 4 sec. #2 Zahn Cup @ 77°F.

Flashpoint: 120°F. Setaflash

% Solids (Weight): 19.0 ± 1.0 (High Bake Method - 10' @ 375°F., 1 gram sample)
20.0 ± 1.0 (ASTM-D2369-81)

Weight/Gallon (lbs): 8.45 ± 0.10

VOC: 3.72 ~~3.6~~ lbs./gal. $(-H_2O)$ - RACT) by Metho
.89 kg./l. (solids) - NSPS) 24

Application Suggestions

Substrate: Aluminum

Preparation: Chemically treated

Coating Wt. (dry): 100 ± 10 mgs. (beer)

Method: Direct Rollcoat ☐ Reverse Rollcoat ☐ Spray ☒

Other

Reduction: Usually none required

Suggested Thinner: DI Water, if needed

Clean Up Solvent(s): Flush thoroughly with water followed by 2-butoxyethanol. For soaking nozzles or wiping equipment 50/50 Dowanol PM/Water.

Cure Schedule: 60" @ 370°F. (Metal Temperature)

Alternate Cure Schedules: 1 - 2.5 minutes @ 370°F. (MT)

Special Instructions: DO NOT FREEZE - Recommend application with Spray Systems 4000-25 or 5000-25 nozzle, 600-800 psi pump pressure and 100-110°F. coating temperature. The volatile portion is 76.2% Water/23.8% Organic by volume.

Additional Information: 3500C is a higher solids version of 3500H.

F.D.A. Status Does ☒ Does Not ☐ meet ingredients requirements of 21 CFR 175.300, and when properly cured, meets applicable extraction requirements specified in this regulation.

Celanese Specialty Resins
10100 Linn Station Rd.
P.O. Box 37600
Louisville, Kentucky 40233
502-585-8011

Judee K. Walsh

Judee K. Walsh
Business Services Supervisor
Can Coatings

BEST AVAILABLE COPY

MATERIAL SAFETY DATA SHEET

CELANESE SPECIALTY RESINS
A Division of Celanese Corporation
10100 Linn Station Road
P.O. Box 37600
Louisville, Kentucky 40233

CELANESE

[illegible]gency [illegible]phone No. (502) 585-8663 (If no answer, (502) 585-8119)

Revision Date 1/4/84

Product Class Modified Epoxy Can Lining

I. IDENTIFICATION

Trade Name Ecoliner ® 3500C[illegible]

Manufacturers Code ID 29WXXX

Department of Transportation Hazard Classification Combustible Liquid

Shipping Name Combustible Liquid N.O.S.

U.N. Number NA1993

II. PHYSICAL DATA

Boiling Range 210-345 °F

Vapor Density Heavier ,than air

Weight Per Gallon 8.5

Evaporation Rate ☐ Faster ☒ Slower, than Butyl Acetate

Percent Volatile By Volume 85

Appearance and Odor Milky liquid Characteristic solvent odor

Solubility in water % by weight Miscible

Vapor Pressure at 20°C <10mmHg

III. HAZARDOUS INGREDIENTS

	CAS#	WT.%	OSHA PEL	TLV's*	
				TWA	STEL
n-Butanol	71-36-3	9	100 (skin)*	50 (skin)* ceiling	
2-Butoxyethanol	111-76-2	6	50 (skin)*	25 (skin)*	75 (skin)*
Mixed Amine		<2	25	25	

*Potential contribution to overall exposure via skin absorption.

IV. FIRE & EXPLOSION HAZARD DATA

Flashpoint 120 °F Setaflash

LEL 1.1 Est.

Extinguishing Media:
Use water spray, dry chemical, foam or carbon dioxide. Treat as a Class B fire.

Unusual Fire & Explosion Hazards: Closed containers may explode (due to buildup of pressure) when exposed to extreme heat.

Special Fire Fighting Procedures:
Water should be used to keep fire-exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect persons attempting to stop a leak. Water spray may be used to flush spills away from exposure. Wear self-contained breathing apparatus; wear goggles if eye protection not provided.

V. REACTIVITY DATA

Stability ☐ Unstable ☒ Stable

Hazardous Polymerization: ☐ May Occur ☒ Will not occu

Conditions To Avoid: Excessive heat

Incompatibility: (Materials to avoid) Acids

Hazardous Decomposition Products:
Carbon dioxide, carbon monoxide, oxides of nitrogen, formahdehyde.

VI HEALTH HAZARD DATA

Effects of Overexposure: No specific information available.

Ingestion (Swallowing) Contains materials that are slightly toxic.

Inhalation (Breathing) Contains materials which have the potential to cause headaches, nausea, dizziness and respiratory tract irritation on inhalation of vapor.

Skin (Contact & Absorbtion)

Contains materials which cause irritation on contact with skin.

Eye (Contact): Contains materials which may cause eye burns.

Chronic Effects of Exposure:

No specific information available.

Emergency & First Aid Procedures

Eye (Contact): Flush with plenty of water for at least 15 minutes and SEEK MEDICAL ATTENTION.

Skin (Contact): In case of contact with skin, flush with water.

Ingestion (Swallowing): If appreciable quantities are swallowed, SEEK MEDICAL ATTENTION.

Inhalation: (Breathing): In case of exposure to high concentration of vapors, remove to fresh air. Restore breathing.

VII SPILL OR LEAK PROCEDURES

Steps to be Taken in Case Material is Released or Spilled:

Eliminate ignition sources. Dike spill to minimize contamination. Completely absorb with inert material (sand, vermiculite, etc.), sweep or scoop up and put in disposal container. Flush area immediately with plenty of water; prevent washings from entering waterways. Uncontrolled spills which exceed 1 gallon may be reportable to the National Response Center. (800/424-8802)

Waste Disposal Method:

Incinerate in furnace or bury in landfill in accordance with federal, state and local regulations. U.S. EPA defines this product as a hazardous waste under RCRA.

VIII SPECIAL PROTECTION INFORMATION

Respiratory Protection:

Use with adequate ventilation. NIOSH approved organic vapor or air-line respirators should be used where ventilation is inadequate. NIOSH approved air-line respirators with auxiliary escape air-tanks or self-contained breathing apparatus should be used in confined spaces.

Ventilation:

Local Exhaust – Recommended when appropriate to control employee exposure.

Mechanical (General) – Not recommended as the sole means of controlling employee exposure.

Protective Gloves: Impervious gloves

Eye Protection: Chemical splash goggles

Other Protective Equipment:

Safety shower and eyewash facility

IX SPECIAL PRECAUTIONS

Precautions to be Taken in Handling and Storing:

Avoid contamination of skin. Do not apply to hot surfaces or use in areas where exposed to electric sparks. Keep away from heat and open flame.

Other Precautions:

There is a potential for some release of formaldehyde during drying and curing operations. Oven designs usually provide for adequate vapor exhaust, but you must review the actual characteristics of your operations.

Results of a lifetime inhalation study indicated animals exposed to levels of formaldehyde above TLV developed nasal cance Studies of occupationally exposed workers have not shown evidence of chronic effects such as cancer.

Coating: Celanese 3500-C
Inside Spray

Given: 20.0% Solids by Weight
17.1% Solids by Volume
17.9% VOC by Volume
8.45 lbs/gal Density
65.0% Water by Weight
Assumed Organic Density of 0.85 Kg/liter (7.09 lbs/gal)

Therefore:

Weight Basis:

Solids = (0.200) (8.45 lb/gal) = 1.69 lbs
Water = (0.650) (8.45 lb/gal) = 5.49 lbs
VOC = 8.45 - 1.69 - 5.49 = 1.27 lbs
Total = 8.45 lbs

Volume Basis:

Solids = 0.173 gals
Water = 1 - 0.173 - 0.179 = 0.648 gals
VOC = (1.27 lbs) (gal/7.09 lbs) = 0.179 gals
Total = 1.000 gals

$$\text{VOC Content} = \frac{1.27 \text{ lbs VOC}}{1 - 0.648 \text{ gals}} = 3.62 \text{ lbs VOC/gal} - H_2O$$

$$\text{NSPS} = \frac{1.27 \text{ lbs VOC}}{0.173 \text{ gal solids}} \times \frac{\text{Kg VOC}}{2.205 \text{ lbs}} \times \frac{\text{gal solids}}{3.785 \text{ liters}} = 0.88 \text{ Kg VOC/liter solids}$$

$$\text{VOC Weight Fraction} = \frac{1.27 \text{ lbs VOC}}{8.45 \text{ lbs coating}} = 0.150$$

JVS 3/21/86
Revised 7/18/86

ANHEUSER-BUSCH COMPANIES

January 9, 1987

Mr. Calir Fancy
Central Air Permitting Section
Department of Environmental Regulation
2600 Blairstone Road
Tallahassee, Florida 32301-8241

METAL CONTAINER CORPORATION - JACKSONVILLE
MODERNIZATION PROGRAM

Dear Clair:

On September 30, 1986 Metal Container Corporation (MCC), in conjunction with the plant's modernization program, requested approval of a schedule for start-up and emissions testing of thermal oxidizer No's 1 and 2. The schedule for completing and submitting an emissions testing program and operating permit applications by February 1, 1987 was subsequently approved by the Department.

Although the emissions testing program was originally envisioned to determine the destruction efficiency of the two thermal oxidizers, the inclusion of a capture efficiency determination has resulted in a much more lengthy and complex test program. A number of unexpected delays have resulted due to the increase in sampling points from four to sixteen, the lack of testing firms experienced with EPA method 25 and capture efficiency testing, and the availability of the only firm, Entropy, we are confident of in this area. Due to the complexity of the test program, we have arranged a pre-test meeting with the Jacksonville Bio-Environmental Services Division Staff on January 15, 1987.

Based upon the unexpected complexity of the test program, it will not be possible to meet the February 1, 1987 deadline. An extension of this deadline to April 1, 1987 is requested. Your cooperation in this matter is greatly appreciated. Please call me in St. Louis at (314) 577-4170 if you have any questions.

Sincerely,

Bob Lanham
for
John V. Stier
Manager, Environmental Affairs

JVS:pm
cc: Mr. Khurshid Mehta - Jacksonville BESD
J12987

DER

JAN 13 1987

BAQM

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

PS Form 3811, July 1983 447-845

DOMESTIC RETURN RECEIPT

● **SENDER: Complete items 1, 2, 3 and 4.**

Put your address in the "RETURN TO" space on the reverse side. Failure to do this will prevent this card from being returned to you. The return receipt fee will provide you the name of the person delivered to and the date of delivery. For additional fees the following services are available. Consult postmaster for fees and check box(es) for service(s) requested.

1. ☐ Show to whom, date and address of delivery.
2. ☐ Restricted Delivery. B5

3. **Article Addressed to:**

Mr. John V. Stier
Anheuser-Busch Company
One Busch Place
St. Louis, MO 63118-1852

4. **Type of Service:**

☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail

Article Number: P 408 530 538

Always obtain signature of addressee or agent and **DATE DELIVERED.**

5. Signature – Addressee
X

6. Signature – Agent
X

7. Date of Delivery

USPS ST LOUIS, MO MARYVILLE GARD SN STA
DEC 29 1986

8. Addressee's Address *(ONLY if requested and fee paid)*

P 408 530 538

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
NOT FOR INTERNATIONAL MAIL

(See Reverse)

Sent to Mr. John V. Stier	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to whom and Date Delivered	
Return Receipt Showing to whom, Date, and Address of Delivery	
TOTAL Postage and Fees	$
Postmark or Date 12/24/86	

PS Form 3800, Feb. 1982

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

December 23, 1986

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Mr. John V. Stier
Manager, Environmental Affairs
Anheuser-Busch Company
St. Louis, Missouri 63118-1852

Dear Mr. Stier

Re: Can Coating Line No. 1

The Bureau of Air Quality Management (BAQM) has received your application for a permit to construct/modify Can Coating Line No. 1 that is located at Metal Container facility in Duval County Florida.

Based on our initial review of your proposal, it has been determined that the following additional information is needed to complete your application.

This project will be reviewed pursuant to Rule 17-2.510, FAC, New Source Review for nonattainment Areas. Please refer to this section of our rules. Recommend a LAER determination for Can Coating Line No. 1 as required by the rules.

Give detailed description of the continuous emissions reductions at your facility. Specify for each year any increase or decrease for each source within your facility. List all emission offset credited. We need this information in order to establish if the Department has relied on it in issuing any construction permit.

What will be the maximum production for Can Coating Line No. 1? Will thermal oxidizer No. 1 be the only thermal oxidizer in operation at the facility? Submit a process flow diagram of your facility showing how it will be after this modification is accomplished.

Submit a material safety data sheet for the chemical compounds used at your facility. Include for each compound, the chemical abstract source number (CAS #). Estimate the emissions of noncriteria pollutants from this operation.

Estimate the total VOC emissions for all coating lines on a unit per 24-hour period basis. Include emissions from VOC solvents used for clean up and fugitive VOC emissions from the operation. Use the suggested format described in Rule 17-2.650(1)b. (45 FR 80824) for these calculations. Also, attach basis for all emission estimates.

Give a general chronological background information of your facility listing the actual VOC emissions and showing all modifications that affected VOC emissions. Use year 1981 as a baseline date.

If you have any questions about the information requested, please call Teresa Heron at (904)488-1344 or write to me at the above address.

Sincerely,

Thomas

for C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality
Management

CHF/TH/s

cc: J. Woosley
J. Cole

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

Nº 76137

RECEIPT FOR APPLICATION FEES AND MISCELLANEOUS REVENUE

Received from Metal Container Corp. Date Nov. 25, 1986

Anheuser Busch Companies
Address One Busch Place (202-4) St. Louis MO 63118 Dollars $ 1000.00

Applicant Name & Address same as above

Source of Revenue

Revenue Code 001031 Application Number AC 16-127873

By Patricia G. Adams

ANHEUSER-BUSCH COMPANIES

October 28, 1986

DER

NOV 25 1986

BAQM

Mr. William Thomas
Bureau of Air Quality Management
State of Florida
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32301

Metal Container Corporation - Jacksonville
Can Line No. 1
Air Permit Application

Dear Bill:

As requested, attached is an application and a check for $1000 to reinstate can line No. 1 from a standby to a full-time status. This application supplements the information provided in my August 18, 1986, correspondence to you on this subject.

Plrease let me know if I can provide any additional information.

Very truly yours,

J. V. Stier
Manager - Environmental Affairs

JVS:cmh
att.

cc Mr. P. Nolan (w/att.)

RECEIVED
DER-MAIL ROOM
1986 NOV 25 AM 11:30

1031

Anheuser-Busch Companies, Inc.
Executive Offices
One Busch Place
St. Louis, MO U.S.A. 63118-1852
Telex 447 117 ANBUSCH STL

AC 16-127873

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

DER
NOV 25 1986
BAQM

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Two-piece can manufacturing [ ] New[1] [X] Existing[1]

APPLICATION TYPE: [ ] Construction [ ] Operation [X] Modification

COMPANY NAME: METAL CONTAINER CORPORATION **COUNTY:** DUVAL

Identify the specific emission point source(s) addressed in this application (i.e. Lime Kiln No. 4 with Venturi Scrubber; Peaking Unit No. 2, Gas Fired) Can Line No. 1

SOURCE LOCATION: Street 1100 North Ellis Road City Jacksonville

UTM: East 428.440 km North 3356.377 km

Latitude 30 ° 20 ' 15 "N Longitude 81 ° 44 ' 42 "W

APPLICANT NAME AND TITLE: John V. Stier, Manager - Environmental Affairs

APPLICANT ADDRESS: Anheuser-Busch Companies, Inc. - One Busch Place (202-4) - St. Louis, MO 63118

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of METAL CONTAINER CORPORATION

I certify that the statements made in this application for a Can Line No. 1 permit are true, correct and complete to the best of my knowledge and belief. Further, I agree to maintain and operate the pollution control source and pollution control facilities in such a manner as to comply with the provision of Chapter 403, Florida Statutes, and all the rules and regulations of the department and revisions thereof. I also understand that a permit, if granted by the department, will be non-transferable and I will promptly notify the department upon sale or legal transfer of the permitted establishment.

*Attach letter of authorization

Signed: Timothy J Houghton

T. J. Houghton, Vice President & General Manager
Name and Title (Please Type)

Date: 10/31/86 Telephone No. (314) 957-9520

B. PROFESSIONAL ENGINEER REGISTERED IN FLORIDA (where required by Chapter 471, F.S.)

This is to certify that the engineering features of this pollution control project have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the treatment and disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgment, that

---

[1] See Florida Administrative Code Rule 17-2.100(57) and (104)

the pollution control facilities, when properly maintained and operated, will discharge an effluent that complies with all applicable statutes of the State of Florida and the rules and regulations of the department. It is also agreed that the undersigned will furnish, if authorized by the owner, the applicant a set of instructions for the proper maintenance and operation of the pollution control facilities and, if applicable, pollution sources.

Signed

CHARLES M. NOLAN
Name (Please Type)

THE NOLAN COMPANY
Company Name (Please Type)

11560 St. Augustine Road, Suite 5, Jacksonville, FL 32223
Mailing Address (Please Type)

Florida Registration No. 19889 Date: 11-18-86 Telephone No. (904) 262-0743

SECTION II: GENERAL PROJECT INFORMATION

A. Describe the nature and extent of the project. Refer to pollution control equipment, and expected improvements in source performance as a result of installation. State whether the project will result in full compliance. Attach additional sheet if necessary.

Can Line No. 1 will be reinstated from a standby to a full-time basis. The overvarnish and bottom varnish operation from the three other lines will be ducted to an existing thermal oxidizer in order to provide an overall net decrease of 3.2 tpy VOC. The project will result in full compliance of all laws and regulations.

B. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction January 19, 1987 Completion of Construction February 1, 1987

C. Costs of pollution control system(s): (Note: Show breakdown of estimated costs only for individual components/units of the project serving pollution control purposes. Information on actual costs shall be furnished with the application for operation permit.)

Existing thermal oxidizers.

D. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

AO16-2596 Issued 9/10/76, expired 3/31/81
AO16-55208 Issued 12/1/82, expires 5/31/87
AO16-44656 Issued 10/29/81, expired 9/30/86
AO16-55208 Issued 6/22/82, expires 5/31/87

E. Requested permitted equipment operating time: hrs/day 24; days/wk 7; wks/yr 52;

if power plant, hrs/yr _____; if seasonal, describe: ____________________

F. If this is a new source or major modification, answer the following questions. (Yes or No)

1. Is this source in a non-attainment area for a particular pollutant? __________
   a. If yes, has "offset" been applied? __________
   b. If yes, has "Lowest Achievable Emission Rate" been applied? __________
   c. If yes, list non-attainment pollutants. __________
2. Does best available control technology (BACT) apply to this source? If yes, see Section VI. __________
3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. __________
4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? __________
5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? __________

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? __________

   a. If yes, for what pollutants? __________
   b. If yes, in addition to the information required in this form, any information requested in Rule 17-2.650 must be submitted.

Attach all supportive information related to any answer of "Yes". Attach any justification for any answer of "No" that might be considered questionable.

SECTION III: AIR POLLUTION SOURCES & CONTROL DEVICES (Other than Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
WHITE BASECOAT*	VOC	8.9	86.6	
INSIDE SPRAY	VOC	15.0	134.9	
BOTTOM BARNISH	VOC	11.4	5.2	
OVERVARNISH	VOC	16.0	76.2	
CLEAN-UP SOLVENTS	VOC	77.7	2.0	

*Beer cans only; remainder of coatings listed are based on soft drink usage rates.

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): __________

2. Product Weight (lbs/hr): __________

C. Airborne Contaminants Emitted: (Information in this table must be submitted for each emission point, use additional sheets as necessary)

Name of Contaminant	Emission[1]		Allowed[2] Emission Rate per Rule 17-2	Allowable[3] Emission lbs/hr	Potential[4] Emission		Relate to Flow Diagram
	Maximum lbs/hr	Actual T/yr			lbs/yr	T/yr	
VOC	12.9	42.5	--	12.9	32.2	105.7	

[1] See Section V, Item 2.

[2] Reference applicable emission standards and units (e.g. Rule 17-2.600(5)(b)2. Table II, E. (1) - 0.1 pounds per million BTU heat input)

[3] Calculated from operating rate and applicable standard.

[4] Emission, if source operated without control (See Section V, Item 3).

D. Control Devices: (See Section V, Item 4)

Name and Type (Model & Serial No.)	Contaminant	Efficiency	Range of Particles Size Collected (in microns) (If applicable)	Basis for Efficiency (Section V Item 5)
SMITH ENGINEERING	VOC	90		
Thermal Oxidizer				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	
NATURAL GAS	0.0188	0.0188	19.1

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: ______ Percent Ash: ______

Density: 0.044 lb/cf lbs/gal Typical Percent Nitrogen: 0.5

Heat Capacity: 23,089 BTU/lb ______ BTU/gal

Other Fuel Contaminants (which may cause air pollution): ______

F. If applicable, indicate the percent of fuel used for space heating.

Annual Average ______ Maximum ______

G. Indicate liquid or solid wastes generated and method of disposal.

Wastewater from the can washing process is pretreated and sent to sent to the City of Jacksonville Buckman Street Treatment Plant. Spent solvents are sent to a solvent reclaimer.

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: 70 ft. Stack Diameter: 3.5 ft.

Gas Flow Rate: 18,750 ACFM 11,000 DSCFM Gas Exit Temperature: 400 °F.

Water Vapor Content: 5 % Velocity: 32.5 FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type O (Plastics)	Type I (Rubbish)	Type II (Refuse)	Type III (Garbage)	Type IV (Pathological)	Type V (Liq.& Gas By-prod.)	Type VI (Solid By-prod.)
Actual lb/hr Incinerated							
Uncontrolled (lbs/hr)							

Description of Waste __________

Total Weight Incinerated (lbs/hr) __________ Design Capacity (lbs/hr) __________

Approximate Number of Hours of Operation per day ______ day/wk ______ wks/yr. ______

Manufacturer __________

Date Constructed __________ Model No. __________

	Volume $(ft)^3$	Heat Release (BTU/hr)	Fuel		Temperature (°F)
			Type	BTU/hr	
Primary Chamber					
Secondary Chamber					

Stack Height: ______ ft. Stack Diamter: ______ Stack Temp. ______

Gas Flow Rate: ______ ACFM ______ DSCFM* Velocity: ______ FPS

*If 50 or more tons per day design capacity, submit the emissions rate in grains per standard cubic foot dry gas corrected to 50% excess air.

Type of pollution control device: ☐ Cyclone ☐ Wet Scrubber ☐ Afterburner

☐ Other (specify) __________

Brief description of operating characteristics of control devices: ______________________

____

____

____

____

Ultimate disposal of any effluent other than that emitted from the stack (scrubber water, ash, etc.):

____

____

____

____

NOTE: Items 2, 3, 4, 6, 7, 8, and 10 in Section V must be included where applicable.

SECTION V: SUPPLEMENTAL REQUIREMENTS

Please provide the following supplements where required for this application.

1. Total process input rate and product weight -- show derivation [Rule 17-2.100(127)]

2. To a construction application, attach basis of emission estimate (e.g., design calculations, design drawings, pertinent manufacturer's test data, etc.) and attach proposed methods (e.g., FR Part 60 Methods 1, 2, 3, 4, 5) to show proof of compliance with applicable standards. To an operation application, attach test results or methods used to show proof of compliance. Information provided when applying for an operation permit from a construction permit shall be indicative of the time at which the test was made.

3. Attach basis of potential discharge (e.g., emission factor, that is, AP42 test).

4. With construction permit application, include design details for all air pollution control systems (e.g., for baghouse include cloth to air ratio; for scrubber include cross-section sketch, design pressure drop, etc.)

5. With construction permit application, attach derivation of control device(s) efficiency. Include test or design data. Items 2, 3 and 5 should be consistent: actual emissions = potential (1-efficiency).

6. An 8 1/2" x 11" flow diagram which will, without revealing trade secrets, identify the individual operations and/or processes. Indicate where raw materials enter, where solid and liquid waste exit, where gaseous emissions and/or airborne particles are evolved and where finished products are obtained.

7. An 8 1/2" x 11" plot plan showing the location of the establishment, and points of airborne emissions, in relation to the surrounding area, residences and other permanent structures and roadways (Example: Copy of relevant portion of USGS topographic map).

8. An 8 1/2" x 11" plot plan of facility showing the location of manufacturing processes and outlets for airborne emissions. Relate all flows to the flow diagram.

9. The appropriate application fee in accordance with Rule 17-4.05. The check should be made payable to the Department of Environmental Regulation.

10. With an application for operation permit, attach a Certificate of Completion of Construction indicating that the source was constructed as shown in the construction permit.

SECTION VI: BEST AVAILABLE CONTROL TECHNOLOGY

A. Are standards of performance for new stationary sources pursuant to 40 C.F.R. Part 60 applicable to the source?

☐ Yes ☐ No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

☐ Yes ☐ No

Contaminant	Rate or Concentration

C. What emission levels do you propose as best available control technology?

Contaminant	Rate or Concentration

D. Describe the existing control and treatment technology (if any).

1. Control Device/System:
2. Operating Principles:
3. Efficiency:*
4. Capital Costs:

*Explain method of determining

5. Useful Life:

6. Operating Costs:

7. Energy:

8. Maintenance Cost:

9. Emissions:

Contaminant	Rate or Concentration

10. Stack Parameters

a. Height: ft.

b. Diameter: ft.

c. Flow Rate: ACFM

d. Temperature: °F.

e. Velocity: FPS

E. Describe the control and treatment technology available (As many types as applicable, use additional pages if necessary).

1.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

2.

a. Control Device:

b. Operating Principles:

c. Efficiency:[1]

d. Capital Cost:

e. Useful Life:

f. Operating Cost:

g. Energy:[2]

h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

---

[1] Explain method of determining efficiency.

[2] Energy to be reported in units of electrical power - KWH design rate.

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

3.

a. Control Device: b. Operating Principles:

c. Efficiency:[1] d. Capital Cost:

e. Useful Life: f. Operating Cost:

g. Energy:[2] h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

4.

a. Control Device: b. Operating Principles:

c. Efficiency:[1] d. Capital Costs:

e. Useful Life: f. Operating Cost:

g. Energy:[2] h. Maintenance Cost:

i. Availability of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operate within proposed levels:

F. Describe the control technology selected:

1. Control Device: 2. Efficiency:[1]

3. Capital Cost: 4. Useful Life:

5. Operating Cost: 6. Energy:[2]

7. Maintenance Cost: 8. Manufacturer:

9. Other locations where employed on similar processes:

a. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

---

[1] Explain method of determining efficiency.
[2] Energy to be reported in units of electrical power - KWH design rate.

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

b. (1) Company:

(2) Mailing Address:

(3) City: (4) State:

(5) Environmental Manager:

(6) Telephone No.:

(7) Emissions:[1]

Contaminant	Rate or Concentration

(8) Process Rate:[1]

10. Reason for selection and description of systems:

[1] Applicant must provide this information when available. Should this information not be available, applicant must state the reason(s) why.

SECTION VII - PREVENTION OF SIGNIFICANT DETERIORATION

A. Company Monitored Data

1. ____________no. sites ____________ TSP ____________( ) SO^2* ____________ Wind spd/dir

Period of Monitoring ______/______/______ to ______/______/______
month day year month day year

Other data recorded ____

Attach all data or statistical summaries to this application.

*Specify bubbler (B) or continuous (C).

2. Instrumentation, Field and Laboratory

a. Was instrumentation EPA referenced or its equivalent? ☐ Yes ☐ No

b. Was instrumentation calibrated in accordance with Department procedures?

☐ Yes ☐ No ☐ Unknown

B. Meteorological Data Used for Air Quality Modeling

1. _____ Year(s) of data from ____/____/____ to ____/____/____
month day year month day year

2. Surface data obtained from (location)______________________________

3. Upper air (mixing height) data obtained from (location)______________________________

4. Stability wind rose (STAR) data obtained from (location)______________________________

C. Computer Models Used

1. ______________________________ Modified? If yes, attach description.

2. ______________________________ Modified? If yes, attach description.

3. ______________________________ Modified? If yes, attach description.

4. ______________________________ Modified? If yes, attach description.

Attach copies of all final model runs showing input data, receptor locations, and principle output tables.

D. Applicants Maximum Allowable Emission Data

Pollutant	Emission Rate	
TSP	______________________________	grams/sec
SO^2	______________________________	grams/sec

E. Emission Data Used in Modeling

Attach list of emission sources. Emission data required is source name, description of point source (on NEDS point number), UTM coordinates, stack data, allowable emissions, and normal operating time.

F. Attach all other information supportive to the PSD review.

G. Discuss the social and economic impact of the selected technology versus other applicable technologies (i.e., jobs, payroll, production, taxes, energy, etc.). Include assessment of the environmental impact of the sources.

H. Attach scientific, engineering, and technical material, reports, publications, journals, and other competent relevant information describing the theory and application of the requested best available control technology.

METAL CONTAINER CORPORATION
JACKSONVILLE CAN PLANT
ACTUAL VOC EMISSIONS

Scenario	Total Facility VOC Emissions (Tons)
1981 Actual	327.0
1982 Actual	318.0
1983 Actual	339.2
1984 Actual	368.2
1985 Actual	345.7
Modernized Projection	347.3
Permit Limitation	403.5
Maximum Increase in Emissions; Line 1	+42.5
Proposed Emissions Decrease	-45.7

offset

decrease - 3.2 facility

JVS: 8/9/86

METALL CONTAINER CORPORATION

JACKSONVILLE CAN PLANT

PROPOSED VOC EMISSIONS REDUCTION

	Actual Emissions (tpy)		
Process Operation	Uncontrolled	Controlled	Net Decrease
All Beer Cans			
12 Ounce			
Bottom Varnish	6.63	3.64	2.99
Overvarnish	74.83	41.16	33.67
16 Ounce			
Bottom Varnish	1.26	0.69	0.57
Overvarnish	18.96	10.43	8.53
TOTALS	**101.68**	**55.92**	**45.76**
All Soft Drink Cans			
12 Ounce			
Bottom Varnish	6.69	3.68	3.01
Overvarnish	102.90	56.59	46.31
16 Ounce			
Bottom Varnish	1.27	0.70	0.57
Overvarnish	26.07	14.34	11.73
TOTALS	**136.93**	**75.31**	**61.62**

METAL CONTAINER CORPORATION
JACKSONVILLE FLORIDA BEVERAGE CAN MANUFACTURING FACILITY
CAN LINE NUMBER 1 AIR PERMITTING ANALYSIS
AUGUST 9, 1986

CAN LINE NUMBER ONE OPERATING ON ALL 16 OUNCE CANS
65% OF ALL BEER CANS ARE WHITE BASECOATED
80% OF ALL CANS ARE OVERVARNISHED

MAXIMUM CAN PRODUCTION	
PER MINUTE:	1000
PER HOUR:	60000
PER DAY (@75% EFF):	1.080E+06
PER YEAR (@75% EFF):	3.942E+08

COATING/SOLVENT	MANUFACTURERS IDENTIFICATION	USAGE (GALLONS)	DENSITY (LBS/GAL)	VOC FRACTION (BY WEIGHT)	UNCONTROLLED VOC EMISSIONS (TONS/YEAR)	CAPTURE EFFICIENCY (BY WEIGHT)	VOC EMISSIONS				USAGE RATE (GALS/1000 CANS)
							FUGITIVE (TONS/YEAR)	T.O. INLET (TONS/YEAR)	T.O. OUTLET (TONS/YEAR)	TOTAL (TONS/YEAR)	
100 % BEER CAN PRODUCTION											
WHITE BASECOAT	PPG CE3606	33,310	11.10	0.089	16.45	0.80	3.29	13.16	1.32	4.61	0.130
INSIDE SPRAY	CELANESE 3500-C	83,965	8.45	0.150	53.21	0.80	10.64	42.57	4.26	14.90	0.213
BOTTOM VARNISH	INMONT Z125-3	3,942	8.65	0.114	1.94	0.50	0.97	0.97	0.10	1.07	0.010
OVERVARNISH	INMONT S145-121A	41,943	8.70	0.160	29.19	0.50	14.60	14.60	1.46	16.06	0.133
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	1,971	6.71	0.777	5.14	0.00	5.14	0.00	0.00	5.14	0.005
				SUBTOTALS	105.94		34.64	71.30	7.13	41.77	
100 % SOFT DRINK CAN PRODUCTION											
INSIDE SPRAY	CELANESE 3500-C	104,956	8.45	0.150	66.52	0.80	13.30	53.21	5.32	18.62	0.266
BOTTOM VARNISH	INMONT Z125-3	3,981	8.65	0.114	1.96	0.50	0.98	0.98	0.10	1.08	0.010
OVERVARNISH	INMONT S145-121A	46,137	8.70	0.160	32.11	0.50	16.06	16.06	1.61	17.66	0.146
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	1,971	6.71	0.777	5.14	0.00	5.14	0.00	0.00	5.14	0.005
				SUBTOTALS	105.73		35.48	70.25	7.02	42.50	

METAL CONTAINER CORPORATION
JACKSONVILLE FLORIDA BEVERAGE CAN MANUFACTURING FACILITY
MODERNIZED PROJECTED EMISSIONS
AUGUST 9, 1986

NOTE: ASSUMES 65% OF BEER CANS ARE WHITE BASECOATED AND 80% OVERVARNISHED

TWELVE OUNCE CAN PRODUCTION FROM TWO LINES	
PER MINUTE:	2800
PER HOUR:	168000
PER YEAR:	1.344E+09

COATING/SOLVENT	MANUFACTURERS IDENTIFICATION	USAGE (GALLONS)	DENSITY (LBS/GAL)	VOC FRACTION (BY WEIGHT)	UNCONTROLLED VOC EMISSIONS (TONS/YEAR)	CAPTURE EFFICIENCY (BY WEIGHT)	VOC EMISSIONS				USAGE RATE (GALS/1000 CANS)
							FUGITIVE (TONS/YEAR)	T.O. INLET (TONS/YEAR)	T.O. OUTLET (TONS/YEAR)	TOTAL (TONS/YEAR)	
100 % BEER CAN PRODUCTION											
WHITE BASECOAT	PPG CE3606	87,360	11.10	0.089	43.15	0.80	8.63	34.52	3.45	12.08	0.100
INSIDE SPRAY	CELANESE 3500-C	215,040	8.45	0.150	136.28	0.80	27.26	109.03	10.90	38.16	0.160
BOTTOM VARNISH	INMONT Z125-3	13,440	8.65	0.114	6.63	0.50	3.31	3.31	0.33	3.64	0.010
OVERVARNISH	INMONT S145-121A	107,520	8.70	0.160	74.83	0.50	37.42	37.42	3.74	41.16	0.100
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	6,720	6.71	0.777	17.52	0.00	17.52	0.00	0.00	17.52	0.005
				SUBTOTALS	278.41		94.13	184.28	18.43	112.56	
100 % SOFT DRINK CAN PRODUCTION											
INSIDE SPRAY	CELANESE 3500-C	268,800	8.45	0.150	170.35	0.80	34.07	136.28	13.63	47.70	0.200
BOTTOM VARNISH	INMONT Z125-3	13,574	8.65	0.114	6.69	0.50	3.35	3.35	0.33	3.68	0.010
OVERVARNISH	INMONT S145-121A	147,840	8.7	0.160	102.90	0.50	51.45	51.45	5.14	56.59	0.110
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	6,720	6.71	0.777	17.52	0.00	17.52	0.00	0.00	17.52	0.005
				SUBTOTALS	297.46		106.38	191.08	19.11	125.49	

SIXTEEN OUNCE CAN PRODUCTION FROM ONE LINE
PER MINUTE: 1400
PER HOUR: 84000
PER YEAR: 2.560E+08

COATING/SOLVENT	MANUFACTURERS IDENTIFICATION	USAGE (GALLONS)	DENSITY (LBS/GAL)	VOC FRACTION (BY WEIGHT)	UNCONTROLLED VOC EMISSIONS (TONS/YEAR)	CAPTURE EFFICIENCY (BY WEIGHT)	VOC EMISSIONS FUGITIVE (TONS/YEAR)	T.O. INLET (TONS/YEAR)	T.O. OUTLET (TONS/YEAR)	TOTAL (TONS/YEAR)	USAGE RATE (GALS/1000 CANS)
100 % BEER CAN PRODUCTION											
WHITE BASECOAT	PPG CE3606	21,632	11.10	0.089	10.69	0.80	2.14	8.55	0.85	2.99	0.130
INSIDE SPRAY	CELANESE 3500-C	54,528	8.45	0.150	34.56	0.80	6.91	27.65	2.76	9.68	0.213
BOTTOM VARNISH	INMONT Z125-3	2,560	8.65	0.114	1.26	0.50	0.63	0.63	0.06	0.69	0.010
OVERVARNISH	INMONT S145-121A	27,238	8.70	0.160	18.96	0.50	9.48	9.48	0.95	10.43	0.133
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	1,280	6.71	0.777	3.34	0.00	3.34	0.00	0.00	3.34	0.005
				SUBTOTALS	68.80		22.50	46.30	4.63	27.13	
100 % SOFT DRINK CAN PRODUCTION											
INSIDE SPRAY	CELANESE 3500-C	68,160	8.45	0.150	43.20	0.80	8.64	34.56	3.46	12.09	0.266
BOTTOM VARNISH	INMONT Z125-3	2,586	8.65	0.114	1.27	0.50	0.64	0.64	0.06	0.70	0.010
OVERVARNISH	INMONT S145-121A	37,453	8.70	0.160	26.07	0.50	13.03	13.03	1.30	14.34	0.146
CLEAN-UP SOLVENTS	METHYL ETHYL KETONE	1,280	6.71	0.777	3.34	0.00	3.34	0.00	0.00	3.34	0.005
				SUBTOTALS	73.88		25.65	48.23	4.82	30.47	

Specifically, each line still consists of a basecoater, inside spray machine, bottom varnisher, overvarnisher and necker lubricator.

3 of 4 lines from 950 to 1500
Can per minute

flattened

1981 Overvarnish unit No 1 and No 2
1982 Overvarnish # coating line No 3 and No 4

1981

315.5 TPY	1981 Actual Emissions
48.0 TPY	Emission Credits
363.5 TPY	Total VOC Baseline for Plant RACT limits
40 ±	
403.5 TPY	