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

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
NOTICE OF PERMITS

Mr. J. R. Kolanek, Manager
Environmental Services
Harris Semiconductor
P. O. Box 883
Melbourne, Florida 32901

April 4, 1989

Enclosed are construction permits Nos. AC 05-157786, -157787, -158237, and -159488 for Harris Semiconductor to consolidate multiple permits previously issued for Building Nos. 51, 62, 63 and 58 at their facility in Palm Bay, Brevard County, Florida. These permits are issued pursuant to Section 403, Florida Statutes.

Any party to these permits has the right to seek judicial review of the permits 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 these permits are filed with the Clerk of the Department.

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:

C. Collins, CF District
L. Hutker, Harris

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of business on 4-5-89.

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.

Martha J. Wise 4-5-89
Clerk Date

Final Determination

Harris Semiconductor
Brevard County
Palm Bay, Florida

Construction Permit Numbers:
AC 05-157786
AC 05-157787
AC 05-158237
AC 05-159484

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

March 29, 1989

Final Determination

Harris Semiconductor
Brevard County
Palm Bay, Florida

Construction Permit Numbers:
AC 05-157786
AC 05-157787
AC 05-158237
AC 05-159484

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

March 31, 1989

Final Determination

The four construction permit applications have been reviewed by the Department. Public Notice of the Department's Intent to Issue was published in the Florida Today Newspaper on March 4, 1989. The Technical Evaluation and Preliminary Determination (TE & PD) were available for public inspection at the DER's Central Florida District and Bureau of Air Quality Management offices.

Comments were received from Mr. J. R. Kolanek, Manager of Environmental Services - Harris Semiconductor. The Bureau's responses, which are in the same order as the comments (Items), are as follows:

1. Response to Item 1: TE & PD

   o The omission of the word "not" was an error and is acknowledged. Since it was used in a descriptive nature and does not affect the Department's review and "Intent to Issue," the TE & PD will not be reissued.

2. Response to Item 2: AC 05-157786, -157787, -158237, and -159484

   o The Bureau will agree to the following change:

   Specific Condition

   No. 6.a):

From: "a sample shall be taken annually from each scrubber stack and analyzed using EPA Reference Method 25;"

To: "a sample shall be taken annually from each scrubber stack and analyzed using EPA Reference Method 25 or, with Department approval, EPA Reference Method 25A, 40 CFR 60, Appendix A;"

3. Response to Item 3:

   o Since the U.S. EPA's current policy on the maximum allowable time frame to assess actual pollutant emissions from a source is 30 days, the Bureau cannot approve of any time frame in excess of that. This is why the annual material balance scheme is to be verifiable on a monthly basis and was imposed in Specific Condition No. 6. Therefore, no change will be made.

- o Because the approximate efficiencies of the control equipment have been established and calculated through tests and analysis, it would not be necessary to repeat this annually unless some operation or production process parameter changes. Consequently, the inlet concentration, if needed, can be estimated by knowing the outlet concentration and the penetration (1-efficiency), which is known from previous measurements. Therefore, actual pollutant emissions established from performance testing the outlet stream is in agreement with the reference test method(s). No change is necessary.

Attachment to be Incorporated:

o AC 05-157786, -157787, -158237, and -159484
3. Mr. J. R. Kolanek's letter received March 1, 1989.

The Bureau will incorporate the changes in the appropriate construction permits, as referenced above in the final determination. It is recommended that the construction permits be issued as drafted, with the above revisions and attachments incorporated.

CAPE PUBLICATIONS, C.

The Times
Published Weekly on Wednesday

THE TRIBUNE
Published Weekly on Wednesday

FLORIDA TODAY
Published Daily

STATE OF FLORIDA
COUNTY OF BREVARD

Before the undersigned authority personally appeared **Linda L. Spicer** who on oath says that he/she is **Legal Advertising Clerk** of the **FLORIDA TODAY**, a newspaper published in Brevard County, Florida; that the attached copy of advertising being a Legal Notice in the matter of permit to Harris Semiconductor in the Court was published in the **FLORIDA TODAY NEWSPAPER** in the issues of March 4,1989

Affiant further says that the said **FLORIDA TODAY NEWSPAPER** is a newspaper published in said Brevard County, Florida and that the said newspaper has heretofore been continuously published in said Brevard County, Florida regularly as stated above, and has been entered as second class mail matter at the post office in **COCOA**, said Brevard County, Florida for a period of one year next preceeding 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.

Linda L. Spicer

Sworn and subscribed to before me this

4th day of March A.D., 19 89

Cathy Thomas

Notary Public
State of Florida at Large
My Commission Expires March 29, 1992

Department of Environmental Regulation
Notice of Intent to Issue

The Department of Environmental Regulation hereby gives notice of its intent to issue permits to Harris Semiconductor, Post Office Box 883, Melbourne, Florida 32901, to consolidate multiple permits previously issued for Buildings No. 51, 62, 63 and 58, which are sources involved with the fabrication and testing of integrated circuits. The proposed project will occur at the applicant's existing facility in Brevard County, Florida. The Department is issuing this Intent to Issue for the reasons stated in the Technical Evaluation and Preliminary Determination.

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. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within fourteen (14) days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. 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) pursuant to Section 120.57, Florida Statutes.

The petition shall contain the following information:

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;

(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;

(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;

(d) A statement of the material facts disputed by Petitioner, if any;

(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;

(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and,

(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

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 position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the applications have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

The applications are 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
Central Florida District
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803-3767

Any person may send written comments on the proposed action to Mr. Bill Thomas at the Department's Tallahassee address. All comments mailed within 14 days of the publication of this notice will be considered in the Department's final determination.

TO099784-1T-3/4, 1989,
Saturday

Purolator 462658
2-28-89
Palm Bay, FL

file 141

HARRIS

FS-JRK-123-89

C. H. Fancy, P.E.
Deputy Chief
Bureau of Air Quality Management
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399

RECEIVED
MAR 1 1989
DER - BAQM

SUBJECT: TECHNICAL EVALUATION AND PRELIMINARY DETERMINATION AIR PERMIT FOR BUILDING 51, 62, 63, AND 58

Dear Mr. Fancy:

We are in receipt of the subject Technical Evaluation and Preliminary Determination, which was received February 13, 1989. We have proceeded with publication of the required notice.

We would like to make the following comments on the subject matter.

Item 1 Technical Evaluation item C.2. second paragraph reads, "However, because this area is used as a production area, the wet stations..."

This sentence should read, "However, because this area is <u>not</u> used as a production area, the wet stations..."

Item 2 Permit AC05-157786, AC05-157787, AC05-158237, and AC05-159484, under Specific Conditions 7.a) refers to EPA reference Method 25, the correct EPA reference method is Methods 25A.

Item 3 Monitoring frequency - Harris has been classifying its VOC/solvent emissions sources into three categories:

1. significant
2. moderate
3. minor

Of the VOC/solvent emission sources covered by the subject consolidated permit applications, they fall into the following corresponding categories:

Significant	Moderate	Minor
F51S02 - solvent	F58S01 - combined	F58S02 - solvent
F51S03 - combined	F62S02 - acid	
F51S04 - combined	F63S03 - solvent	
F51S05 - solvent		
F63S02 - solvent		

These classifications are based on type of manufacturing facility and potential emissions. Harris Semiconductor is requesting that emission monitoring of the air emissions be on the following frequencies.

1. Significant - annual
2. Moderate - three year cycle
3. Minor - five year cycle.

We recommend that only the actual emissions of VOC sources be monitored. This is due primarily to the fact that several of our exhaust systems are configured in such a manner that inlet samples to the scrubbers cannot be collected in such a manner as to assure the accuracy of the data collection.

If you should have any questions about the above comments, please contact me at (407) 724-7467.

Sincerely,

James R. Kolanek

J. R. Kolanek, Manager
Environmental Services

/pgc

cc: N. A. Baldisserotto
D. R. Erdley
L. R. Hutker
R. R. Sands
J. R. Steiner

copied: B. Mitchell
C. Collins, CF Dist.
CHF/ET

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

PERMITTEE:
Harris Semiconductor
P. O. Box 883
Melbourne, Florida 32901

Permit Number: AC 05-157786
Expiration Date: April 30, 1990
County: Brevard
Latitude/Longitude: 28° 01' 20" N
80° 36' 10" W
Project: Building 51

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (F.A.C.) 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 drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the permitting of Building 51, a wafer fabrication source, of which there are two clean room modules. The scrubber control systems are:

- o F51SO1: a Tri Mer Corp. 9,500 scfm horizontal counter-flow fume scrubber using polypropylene packing for acid gas removal; Model No. F/W 3;
- o F51SO2: a Duall Ind. 10,000 scfm horizontal cross-flow fume scrubber using polypropylene packing for VOC/solvent removal; Model No. F-101;
- o F51SO3: a Duall Ind. 24,000 scfm horizontal cross-flow fume scrubber using polypropylene packing for acid gas and VOC/ solvent removal; Model No. F-101;
- o F51SO4: the same as F51SO3; and,
- o F51SO5: a Harrison 18,000 scfm horizontal cross-flow fume scrubber using plastic saddle packing for VOC/solvent removal; Model No. HF-180.

The building/source is located at the permittee's existing facility located on Palm Bay Road in the City of Palm Bay. The UTM coordinates are Zone 17, 538.7 km East and 3100.9 km North.

The Source Classification Codes are: Major Group 36

o Cold Solvent Cleaning/ Stripping	4-01-003-99	Tons VOC/solvent consumed

The source shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted in the General and Specific Conditions.

Attachments to be Incorporated:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202(1), and Mr. James R. Kolanek's cover letter received November 28, 1988.
2. Technical Evaluation and Preliminary Determination dated February 3, 1989.
3. Mr. J. R. Kolanek's letter received March 1, 1989.

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 enforcement 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 systems 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 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 a 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 noncompliance 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).
( ) Compliance with New Source Performance Standards.

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. The maximum allowable VOC/solvent emissions from Building No. 51 shall be 33.3 tons per year.

2. The VOC/solvent vapor exhaust scrubber must be on during the working hours.

3. Annual operation shall be 8760 hours per year.

4. Objectionable odors shall not be allowed off plant property.

SPECIFIC CONDITIONS:

5. An inspection and maintenance plan shall be submitted to the DER's Central Florida District office as part of the operating permit application. The plan shall include provisions for the prevention and correction of VOC/solvent losses from leaks and equipment malfunctions.

6. By March 31 of each calendar year, an annual operating report shall be submitted to the DER's Central Florida District office demonstrating compliance with the VOC/solvent emissions limit for Building No. 51. The emissions shall be determined by a material balance scheme, verifiable on a monthly basis, and shall include the following:

a) a beginning inventory of full containers, cylinders and storage tanks at the beginning of each calendar year;
b) plus all purchased deliveries after the beginning inventory (verifiable by invoices);
c) minus all quantities picked-up and shipped-off the premise after the beginning inventory (verifiable by invoices);
d) minus all quantities deep well injected during the calendar year, justified by assumptions and established scrubber efficiencies; and,
e) minus an ending inventory of full containers, cylinders, and storage tanks; and, should occur at the beginning of the following calendar year.

7. Each scrubber system's efficiency and potential VOC/solvent emissions shall be established by a sampling and analysis program, which includes:

a) a sample shall be taken annually from each scrubber stack and analyzed using EPA Reference Method 25 or, with Department approval, EPA Reference Method 25A, 40 CFR 60, Appendix A;
b) the DER's Central Florida District office shall receive 15 days notice in writing prior to sampling; and,
c) the report, summarizing the sampling results, shall be submitted to the DER's Central Florida District office within 45 days after the last test run is completed.

8. This permit will supercede all other permits previously issued on this source/Building No. 51.

9. The source/Building No. 51 is subject to all applicable provisions of F.A.C. Chapters 17-2 and 17-4.

10. Projected potential acid emissions are 3.7 TPY.

PERMITTEE:
Harris Semiconductor

Permit Number: AC 05-157786
Expiration Number: April 30, 1990

SPECIFIC CONDITIONS:

11. Building No. 51 is subject to the provisions of F.A.C. Rules 17-2.240: Circumvention; 17-2.250: Excess Emissions; and, 17-4.130: Plant Operation - Problems.

12. Any modification pursuant to F.A.C. Rule 17-2.100(119), Modification, shall be submitted to the DER's Central Florida District office and the Bureau of Air Quality Management office for approval.

13. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the BAQM prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

14. An application for an operation permit must be submitted to the Central Florida District office at least 90 days prior to the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever comes first. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rule 17-4.220).

Issued this 31 day of March, 1989

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Dale Twachtmann

Dale Twachtmann, Secretary

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

PERMITTEE:
Harris Semiconductor
P. O. Box 883
Melbourne, Florida 32901

Permit Number: AC 05-157787
Expiration Date: April 30, 1990
County: Brevard
Latitude/Longitude: 28° 01' 20" N
80° 36' 10" W
Project: Building 62

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (F.A.C.) 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 drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the permitting of Building 62, which houses a research and development laboratory, a prototype wafer fabrication process, and an analytical services laboratory. The scrubber control systems are:

- F62SO1: a Beverly Pacific 24,000 scfm horizontal cross-flow vapor scrubber using polypropylene packing for acid gas removal; Model No. PS-24T; and,
- F62SO2: a Beverly Pacific 12,000 scfm vertical counter-current vapor scrubber using polypropylene packing for VOC/solvent removal; Model No. PS-12VT.

The building/source is located at the permittee's existing facility located on Palm Bay Road in the City of Palm Bay. The UTM coordinates are Zone 17, 538.7 km East and 3100.9 km North.

The Source Classification Codes are: Major Group 36
- Cold Solvent Cleaning/ Stripping: 4-01-003-99 Tons VOC/solvent consumed

The source shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted in the General and Specific Conditions.

Attachments to be Incorporated:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202(1), and Mr. James R. Kolanek's cover letter received November 28, 1988.
2. Technical Evaluation and Preliminary Determination dated February 3, 1989.
3. Mr. J. R. Kolanek's letter received March 1, 1989.

PERMITTEE:
Harris Semiconductor

Permit Number: AC 05-157787
Expiration Date: April 30, 1990

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 enforcement 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 systems 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 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 a 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 noncompliance 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).
( ) Compliance with New Source Performance Standards.

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. The maximum allowable VOC/solvent emissions from Building No. 62 shall be 0.8 tons per year.

2. The VOC/solvent vapor exhaust scrubber must be on during the working hours.

3. Annual operation shall be 8760 hours per year.

4. Objectionable odors shall not be allowed off plant property.

SPECIFIC CONDITIONS:

5. An inspection and maintenance plan shall be submitted to the DER's Central Florida District office as part of the operating permit application. The plan shall include provisions for the pre vention and correction of VOC/solvent losses from leaks and equipment malfunctions.

6. By March 31 of each calendar year, an annual operating report shall be submitted to the DER's Central Florida District office demonstrating compliance with the VOC/solvent emissions limit for Building No. 62. The emissions shall be determined by a material balance scheme, verifiable on a monthly basis, and shall include the following:

a) a beginning inventory of full containers, cylinders and storage tanks at the beginning of each calendar year;
b) plus all purchased deliveries after the beginning inventory (verifiable by invoices);
c) minus all quantities picked-up and shipped-off the premise after the beginning inventory (verifiable by invoices);
d) minus all quantities deep well injected during the calendar year, justified by assumptions and established scrubber efficiencies; and,
e) minus an ending inventory of full containers, cylinders, and storage tanks; and, should occur at the beginning of the following calendar year.

7. Each scrubber system's efficiency and potential VOC/solvent emissions shall be established by a sampling and analysis program, which includes:

a) a sample shall be taken annually from each scrubber stack and analyzed using EPA Reference Method 25 or, with Department approval, EPA Reference Method 25A, 40 CFR 60, Appendix A;
b) the DER's Central Florida District office shall receive 15 days notice in writing prior to sampling; and,
c) the report, summarizing the sampling results, shall be submitted to the DER's Central Florida District office within 45 days after the last test run is completed.

8. This permit will supercede all other permits previously issued on this source/Building No. 62.

9. The source/Building No. 62 is subject to all applicable provisions of F.A.C. Chapters 17-2 and 17-4.

10. Projected potential acid emissions are 0.2 TPY.

PERMITTEE:
Harris Semiconductor

Permit Number: AC 05-157787
Expiration Number: April 30, 1990

SPECIFIC CONDITIONS:

11. Building No. 62 is subject to the provisions of F.A.C. Rules 17-2.240: Circumvention; 17-2.250: Excess Emissions; and, 17-4.130: Plant Operation - Problems.

12. Any modification pursuant to F.A.C. Rule 17-2.100(119), Modification, shall be submitted to the DER's Central Florida District office and the Bureau of Air Quality Management office for approval.

13. The permittee shall, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the BAQM prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

14. An application for an operation permit must be submitted to the Central Florida District office at least 90 days prior to the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever occurs first. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rule 17-4.220).

Issued this 31 day of March, 1989

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Dale Twachtmann

Dale Twachtmann, Secretary

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

PERMITTEE:
Harris Semiconductor
P. O. Box 883
Melbourne, Florida 32901

Permit Number: AC 05-158237
Expiration Date: April 30, 1990
County: Brevard
Latitude/Longitude: 28° 01' 20" N
80° 36' 10" W
Project: Building 63

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (F.A.C.) 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 drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the permitting of Building 63, which is a wafer fabrication and assembly source. The scrubber control systems are:

- o F63SO1: a Beverly Pacific 50,000 scfm horizontal cross-flow scrubber vapor using polypropylene packing for acid gas removal; Model No. CB-60;
- o F63SO2: a Beverly Pacific 10,000 scfm vertical counter-current vapor scrubber using polypropylene packing for VOC/solvent removal; Model No. PS-12VT; and,
- o F63SO3: a Tri Mer Corp. 6,000 scfm horizontal counter-flow fume scrubber using polypropylene packing for VOC/solvent removal; Model No. F/WR-5.

The building/source is located at the permittee's existing facility located on Palm Bay Road in the City of Palm Bay. The UTM coordinates are Zone 17, 538.7 km East and 3100.9 km North.

The Source Classification Codes are: Major Group 36
- o Cold Solvent Cleaning/ Stripping 4-01-003-99 Tons VOC/solvent consumed

The source shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted in the General and Specific Conditions.

Attachments to be Incorporated:
1. Application to Construct Air Pollution Sources, DER Form 17-1.202(1), and Mr. James R. Kolanek's cover letter received December 9, 1988.
2. Technical Evaluation and Preliminary Determination dated February 3, 1989.
3. Mr. J. R. Kolanek's letter received March 1, 1989.

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 enforcement 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 systems 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 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 a 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 noncompliance 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).
( ) Compliance with New Source Performance Standards.

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. The maximum allowable VOC/solvent emissions from Building No. 63 shall be 6.1 tons per year.

2. The VOC/solvent vapor exhaust scrubber must be on during the working hours.

3. Annual operation shall be 8760 hours per year.

4. Objectionable odors shall not be allowed off plant property.

SPECIFIC CONDITIONS:

5. An inspection and maintenance plan shall be submitted to the DER's Central Florida District office as part of the operating permit application. The plan shall include provisions for the prevention and correction of VOC/solvent losses from leaks and equipment malfunctions.

6. By March 31 of each calendar year, an annual operating report shall be submitted to the DER's Central Florida District office demonstrating compliance with the VOC/solvent emissions limit for Building No. 63. The emissions shall be determined by a material balance scheme, verifiable on a monthly basis, and shall include the following:

a) a beginning inventory of full containers, cylinders and storage tanks at the beginning of each calendar year;
b) plus all purchased deliveries after the beginning inventory (verifiable by invoices);
c) minus all quantities picked-up and shipped-off the premise after the beginning inventory (verifiable by invoices);
d) minus all quantities deep well injected during the calendar year, justified by assumptions and established scrubber efficiencies; and,
e) minus an ending inventory of full containers, cylinders, and storage tanks; and, should occur at the beginning of the following calendar year.

7. Each scrubber system's efficiency and potential VOC/solvent emissions shall be established by a sampling and analysis program, which includes:

a) a sample shall be taken annually from each scrubber stack and analyzed using EPA Reference Method 25 or, with Department approval, EPA Reference Method 25A, 40 CFR 60, Appendix A;
b) the DER's Central Florida District office shall receive 15 days notice in writing prior to sampling; and,
c) the report, summarizing the sampling results, shall be submitted to the DER's Central Florida District office within 45 days after the last test run is completed.

8. This permit will supercede all other permits previously issued on this source/Building No. 63.

9. The source/Building No. 63 is subject to all applicable provisions of F.A.C. Chapters 17-2 and 17-4.

10. Projected potential acid emissions are 0.2 TPY.

PERMITTEE:
Harris Semiconductor

Permit Number: AC 05-158237
Expiration Number: April 30, 1990

SPECIFIC CONDITIONS:

11. Building No. 63 is subject to the provisions of F.A.C. Rules 17-2.240: Circumvention; 17-2.250: Excess Emissions; and, 17-4.130: Plant Operation - Problems.

12. Any modification pursuant to F.A.C. Rule 17-2.100(119), Modification, shall be submitted to the DER's Central Florida District office and the Bureau of Air Quality Management office for approval.

13. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the BAQM prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

14. An application for an operation permit must be submitted to the Central Florida District office at least 90 days prior to the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever comes first. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rule 17-4.220).

Issued this 31 day of March, 1989

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Dale Twachtmann

Dale Twachtmann, Secretary

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

PERMITTEE:
Harris Semiconductor
P. O. Box 883
Melbourne, Florida 32901

Permit Number: AC 05-159484
Expiration Date: April 30, 1990
County: Brevard
Latitude/Longitude: 28° 01' 20" N
80° 36' 10" W
Project: Building 58

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (F.A.C.) 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 drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the permitting of Building 58, which is a source whose primary manufacturing operations are assembly and testing of integrated circuits. The scrubber control systems and dust collector system are:

- o F58SO1: a Tri Mer Corp. 12,500 scfm horizontal counter-flow vapor scrubber using polypropylene packing for caustic and corrosive vapor removal; Model No. F/W 5;
- o F58SO2: a Harrison 3,000 scfm horizontal cross-flow vapor scrubber using plastic saddle packing for VOC/solvent removal; Model No. HF-30; and,
- o F58EO1: a Torit 3,000 cfm filter cartridge dust collector with a pulse-jet cleaning cycle; Model No. TD 486.

The building/source is located at the permittee's existing facility located on Palm Bay Road in the City of Palm Bay. The UTM coordinates are Zone 17, 538.7 km East and 3100.9 km North.

The Source Classification Codes are: Major Group 36
- o Cold Solvent Cleaning/ Stripping 4-01-003-99 Tons VOC/solvent consumed

The source shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted in the General and Specific Conditions.

Attachments to be Incorporated:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202(1), and Mr. James R. Kolanek's cover letter received January 17, 1989.
2. Technical Evaluation and Preliminary Determination dated February 3, 1989.
3. Mr. J. R. Kolanek's letter received March 1, 1989.

PERMITTEE:
Harris Semiconductor

Permit Number: AC 05-159484
Expiration Date: April 30, 1990

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 enforcement 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 systems 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 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 a 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 noncompliance 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).
( ) Compliance with New Source Performance Standards.

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. The maximum allowable VOC/solvent emissions from Building No. 58 shall be 3.2 tons per year.

2. The VOC/solvent vapor exhaust scrubber must be on during the working hours.

3. Annual operation shall be 8760 hours per year.

4. Objectionable odors shall not be allowed off plant property.

SPECIFIC CONDITIONS:

5. An inspection and maintenance plan shall be submitted to the DER's Central Florida District office as part of the operating permit application. The plan shall include provisions for the prevention and correction of VOC/solvent losses from leaks and equipment malfunctions.

6. By March 31 of each calendar year, an annual operating report shall be submitted to the DER's Central Florida District office demonstrating compliance with the VOC/solvent emissions limit for Building No. 58. The emissions shall be determined by a material balance scheme, verifiable on a monthly basis, and shall include the following:

a) a beginning inventory of full containers, cylinders and storage tanks at the beginning of each calendar year;
b) plus all purchased deliveries after the beginning inventory (verifiable by invoices);
c) minus all quantities picked-up and shipped-off the premise after the beginning inventory (verifiable by invoices);
d) minus all quantities deep well injected during the calendar year, justified by assumptions and established scrubber efficiencies; and,
e) minus an ending inventory of full containers, cylinders, and storage tanks; and, should occur at the beginning of the following calendar year.

7. Each scrubber system's efficiency and potential VOC/solvent emissions shall be established by a sampling and analysis program, which includes:

a) a sample shall be taken annually from each scrubber stack and analyzed using EPA Reference Method 25 or, with Department approval, EPA Reference Method 25A, 40 CFR 60, Appendix A;
b) the DER's Central Florida District office shall receive 15 days notice in writing prior to sampling; and,
c) the report, summarizing the sampling results, shall be submitted to the DER's Central Florida District office within 45 days after the last test run is completed.

8. This permit will supercede all other permits previously issued on this source/Building No. 58.

9. The source/Building No. 58 is subject to all applicable provisions of F.A.C. Chapters 17-2 and 17-4.

10. Projected potential acid emissions are 0.3 TPY.

PERMITTEE:
Harris Semiconductor

Permit Number: AC 05-159484
Expiration Number: April 30, 1990

SPECIFIC CONDITIONS:

11. Building No. 58 is subject to the provisions of F.A.C. Rules 17-2.240: Circumvention; 17-2.250: Excess Emissions; and, 17-4.130: Plant Operation - Problems.

12. Any modification pursuant to F.A.C. Rule 17-2.100(119), Modification, shall be submitted to the DER's Central Florida District office and the Bureau of Air Quality Management office for approval.

13. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the BAQM prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

14. An application for an operation permit must be submitted to the Central Florida District office at least 90 days prior to the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever occurs first. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rule 17-4.220).

Issued this 31 day of March, 1989

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Dale Twachtmann

Dale Twachtmann, Secretary

Bruce's Copy

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

February 7, 1989

CERTIFIED MAIL-RETURN RECEIPT REQUESTED

Mr. James R. Kolanek
Manager, Environmental Services
Harris Semiconductor
Post Office Box 883
Melbourne, Florida 32901

Dear Mr. Kolanek:

Attached is one copy of the Technical Evaluation and Preliminary Determination and proposed permits for Harris Semiconductor to consolidate multiple permits previously issued for Buildings No. 51, 62, 63 and 58, which are sources involved with the fabrication and testing of integrated circuits.

Please submit any written comments 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: C. Collins, Cent. Fl Dist.
L. R. Hutker, P.E., HS

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

In the Matter of
Applications for Permits by:

Harris Semiconductor
Post Office Box 883
Melbourne, Florida 32901

DER File Nos. AC 05-157786
AC 05-517787
AC 05-158237
AC 05-159484

INTENT TO ISSUE

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

The applicant, Harris Semiconductor, applied on November 28, 1988, December 9, 1988, and January 17, 1989, to the Department of Environmental Regulation for permits to consolidate multiple permits previously issued for Buildings No. 51, 62, 63 and 58, which are sources involved with the fabrication and testing of integrated circuits. The proposed project will occur at the applicant's existing facility located in Melbourne, Brevard County, Florida.

The Department has permitting jurisdiction under Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Rules 17-2 and 17-4. The project is not exempt from permitting procedures. The Department has determined that air construction permits were needed for the proposed work.

Pursuant to Section 403.815, F.S., and DER Rule 17-103.150, F.A.C., you (the applicant) are required to publish at your own expense the enclosed Notice of Intent to Issue Permits. The notice must be published one time only within 30 days, in the legal ad section of a newspaper of general circulation in the area affected. For the purpose of this rule, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. The applicant shall provide proof of publication to the Department, at the address specified, within seven days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the denial of the permits.

The Department will issue the permits with the attached conditions unless a 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. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the permit applicant and the parties listed below must be filed within 14 days of receipt of this intent. Petitions filed by other persons must be filed within 14 days of publication of the notice or within 14 days of receipt of this intent, whichever occurs first. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. 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.

The Petition shall contain the following information:

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;

(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;

(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;

(d) A statement of the material facts disputed by petitioner, if any;

(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;

(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and,

(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

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 position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the applicant have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such

person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

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:

C. Collins, Cent. FL Dist.
L. R. Hutker, P.E., HS

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 2-10-89.

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.

Martha McWise 2-10-89
Clerk Date

State of Florida
Department of Environmental Regulation
Notice of Intent to Issue

The Department of Environmental Regulation hereby gives notice of its intent to issue permits to Harris Semiconductor, Post Office Box 883, Melbourne, Florida 32901, to consolidate multiple permits previously issued for Buildings No. 51, 62, 63 and 58, which are sources involved with the fabrication and testing of integrated circuits. The proposed project will occur at the applicant's existing facility in Brevard County, Florida. The Department is issuing this Intent to Issue for the reasons stated in the Technical Evaluation and Preliminary Determination.

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. The petition must contain the information set below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within fourteen (14) days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. 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.

The Petition shall contain the following information:

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department Permit File Number and the county in which the project is proposed;

(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;

(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;

(d) A statement of the material facts disputed by petitioner, if any;

(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;

(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and,

(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

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 position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the applications have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 14 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

The applications are 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
Central Florida District
3319 Maguire Blvd., Suite 232
Orlando, Florida 32803-3767

Any person may send written comments on the proposed action to Mr. Bill Thomas at the Department's Tallahassee address. All comments mailed within 14 days of the publication of this notice will be considered in the Department's final determination.

Technical Evaluation
and
Preliminary Determination

Harris Semiconductor
Brevard County
Palm Bay, Florida

Construction Permit Numbers:
AC 05-157786
AC 05-157787
AC 05-158237
AC 05-159484

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

February 7, 1989

I. Application

A. Applicant

Harris Semiconductor
Post Office Box 883
Melbourne, Florida 32901

B. Project and Location

The applicant has applied for construction permits for Buildings Nos. 51, 62, 63 and 58, in order to consolidate multiple permits previously issued for these sources/buildings.

The existing facility is located on Palm Bay Road, City of Palm Bay, Florida. The UTM coordinates are Zone 17, 538.7 km East and 3100.9 km North.

C. Process and Controls

1. Building 51

Building 51 is a wafer fabrication facility. The second floor of the two-story building houses two clean room modules. Both fabrication areas employ a series of manufacturing procedures referred to as layering, patterning, doping and heating processes. The frequency and sequence of these processes can vary depending on the desired nature of the final product.

Wet stations that house vats containing a variety of acid and caustic compounds are located throughout the clean rooms. Building 51 utilizes approximately 50 stations, one-third of which contain vats of solvent-based chemicals. Less than one-fourth of the stations are heated. Presently, stainless steel covers are being fabricated for all of the vats containing solvents. Gas cabinets, vacuum pumps, and chemical drains are located in areas dedicated to the containment of vented units. Storage cabinets safely hold virgin chemicals until they are ready for use.

The exhaust system for the building is divided amongst five scrubbers. The scrubbers numbered F51SO1, F51SO2, and F51SO3 serve the east module, while F51SO4 and F51SO5 serve the west module. Scrubber F51SO1 is an acid control system. Scrubbers F51SO2 and F51SO5 are solvent control systems. Scrubbers F51SO3 and F51SO4 are both acid and solvent control systems.

2. Building 62

Building 62 is comprised of two units: building A and building B. Building B's activities do not involve air

pollution. The first floor of building A contains Semiconductor's research and development lab, and an analytical services laboratory, while a technical and prototype assembly lab resides on the second floor of the two-story building.

In the research and development laboratory, wafer fabrication processes (layering, patterning, doping and heating) are simulated. The goal of the lab is to develop new film processes for use in the on-site production of semiconductor wafers. These new operations may require new chemicals and equipment, as well as experimental wet chemistry techniques. The area resembles a small wafer fabrication area, with a variety of fab equipment being present. However, because this area is used as a production area, the wet stations, coaters, developers, etchers, aligners, sputtering systems, deposition furnaces, and associated burn boxes and pumps are present in low numbers.

The analytical services laboratory is responsible for physical and chemical characterization of microelectronic materials and products. A wide variety of analysis techniques are employed, including spectroscopy, separation methods, thermal analysis, and wet chemistry. The vented wet stations provide a safe location for analytical procedures involving wet chemistry.

For both of the above mentioned areas, gas cylinders that provide necessary process gases to the lab equipment are contained in vented gas cabinets located in the chases behind the appropriate area of use. Chemical storage cabinets hold virgin chemicals until they are ready for use.

In the technical lab on the second floor, electronic testing of new products (circuits that have not yet been released to the customer) and prototype assembly of circuits occur. A relatively small number of equipment requiring venting exists in this area.

There are 19 wet stations located in the building. Approximately half of these stations house vats containing solvents. There are presently five stations containing heated vats; of these, four are acid stations and one is a solvent station.

The exhaust for the building is divided between two scrubber control systems. Acid vapors are vented to scrubber F62S01, while solvent exhaust streams are ducted to scrubber F62S02. Both control systems reside on the site grounds directly outside the south wall of building A.

3. Building 63

The primary processes occurring in building 63 are wafer fabrication and assembly. Because the processes and equipment

utilized in the two areas are, for the most part, dissimilar, the two areas are described separately.

The wafer fabrication area employs a series of manufacturing procedures referred to as layering, patterning, doping and heating. The frequency and sequence of these processes can vary depending on the desired nature of the final product.

In the controlled environment of the fabrication clean room, wafer surfaces first undergo acid and/or solvent cleaning, followed by thermal oxidation in furnaces to form a layer of silicon dioxide on the wafer surface.

During the patterning process, the wafers are initially baked and primed. Coaters then spin a thin layer of "photoresist" on the wafer, after which the wafers are soft baked. Next, the circuit pattern is projected onto the wafers via "aligners" or "steppers." Developers are then applied to remove unpolymerized areas of photoresist. This is followed by a solvent rinse.

Next, the wafers are hard-baked, inspected to determine accuracy, and etched by wet (acid bath) or dry (plasma vapor) mechanisms. Once etching is complete, the photoresist is stripped off the wafer using chemical baths or plasma techniques.

In another step of the fabrication process, "dopant" atoms are either diffused into the wafer in diffusion furnaces or accelerated into the wafer using "ion implantation." Fumes from the vapor deposition furnaces are oxidized in 'burn boxes.' The oxidized gases are then vented to scrubber control systems. Additional material may be layered on the wafer surface in vapor and crystal (epitaxial) deposition furnaces. Metallization to interconnect uppermost circuit layers is performed by deposition (using "sputtering" systems) or evaporation.

In addition to the fabrication clean room, the building houses a chemical mixing room. This room contains vented stations and chemical cabinets.

Vented gas cabinets, vacuum pumps and chemical drains are located in chases between the processing areas of the fab.

In the two assembly areas, a series of processing and quality control steps are incorporated that produce integrated circuits from the wafers. Wafers are cut (or 'diced') into the individual units (or die) they are comprised of. The die are then put into the circuit packages and the wires are ultrasonically bonded. The resulting integrated circuits are tested for a wide variety of parameters including tolerance, temperature and humidity changes, endurance, and electrical

conductivity. Vented equipment includes degreasers, die wash units, bake ovens, fine leak systems, furnaces, and stations dedicated to the cleaning of product parts.

Wet stations that house vats containing a variety of acid and caustic compounds are located in the two areas. Approximately 20 stations are utilized. Five of these stations are estimated to be heated, and five stations contain vats of chemicals that are covered. Approximately half of the 20 stations are dedicated to the use of solvents.

Three wet scrubber control systems handle equipment exhausts from building 63. Two of these systems, F63SO1 and F63SO2, are located on the east side of the building at ground level. F63SO1 provides exhaust and pollution control for acid exhaust drawn from the equipment in the wafer fab and chemical mix room, while F63SO2 provides solvent exhaust for the fab, the chemical mix room, and one of the assembly areas. The third scrubber control system, F63SO3, is located on the roof and provides solvent exhaust for equipment in the other assembly area.

Each of the two assembly areas house a fine leak system that utilize Krypton 85 gas to pressurize electronic components and to detect faulty hermetic seals in circuits. Each system has its own exhaust fan. The systems and the corresponding roof fans are permitted under a radioactive materials license by the State of Florida's HRS Office of Radiation Control (license # 662-3).

In addition, the furnaces used for the burn-in of parts in Major Programs assembly are directly vented to the roof via vent pipes.

4. Building 58

The primary manufacturing operations in building 58 are assembly and testing of integrated circuits. In the Assembly and Test areas, a series of processing and quality control steps are incorporated to produce the final product. Wafers are cut (or 'diced') into individual units (or die) they are comprised of. The die are then put into circuit packages and the wires are ultrasonically bonded. The resulting integrated circuits are tested for a wide variety of parameters including tolerance, temperature and humidity changes, endurance, and electrical conductivity. Vented equipment includes saws, soldering stations, degreasers, die wash units, bake ovens, fine leak test systems, compressors, furnaces, chemical cabinets, and wet stations dedicated to the cleaning of product parts.

In addition, the two-story building houses a Brand area, a P.C. Board Technology Lab, and a Product Development Lab.

In the Brand area, product information is stamped onto the

integrated circuit packages. Vented equipment includes wet stations, branders, and chemical storage cabinets.

The P.C. Board Technology and Product Development Labs manufacture printed circuit boards. Examples of equipment attached to the exhaust system are coaters, ovens, etchers, and wet stations. Defective parts are tested in the Reliability Lab and the etchers and wet stations are vented.

Scrubber control system F58SO1 treats caustic and corrosive contaminated exhaust from the Assembly, Test, Brand, and Reliability Lab areas. Scrubber control system F58SO2 vents contaminated air streams from the Analog Product Development Lab. Exhaust fan F58EO1 provides venting for equipment in the Assembly, Test, Brand, and P.C. Board Technology Labs. The scrubbers are located on the roof, and the fan is mounted on the west side of the building at ground level.

In a room on the east side of the building, an automatic abrading machine is used to remove stamped-on labels from semiconductors. The exhaust generated from the process is contaminated with alumina powder. A Torit Model TD 486 dust collector is employed to capture the dust. The dust collector resides on the exterior wall of the building.

The assembly area houses a fine leak system that utilizes Krypton 85 gas to pressurize electronic components and to detect faulty hermetic seals in circuits. The system has its own exhaust fan, and is permitted under a radioactive materials license by the State of Florida's HRS Office of Radiation Control (license # 662-3).

5. General

A material balance scheme will be used to account for the annual VOC/solvent emissions released into the atmosphere by the sources and facility. A program of sampling and analysis will be used to assess the VOC/solvent emissions from each building/source. The emissions shall be verifiable on a monthly basis pursuant to EPA's policy.

The Standard Industrial Classification Codes are:

- Major Group 36: Electrical and Electronic Machinery, Equipment, and Supplies
- Industry Group No. 367: Electronic Components and Accessories
- Industry No. 3674: Semiconductors and Related Devices

The following table presents the projected potential VOC/solvent emissions from each building/source and the facility:

Table 2

Building	Potential VOC/solvent Emissions (TPY)
4	10.96
51	33.29
54	95.65
57	1.66
58	3.24
59	0.50
60	min.
61	0.25
62	0.83
63	6.14
Total:	152.52

Note: Annual hours of operation at 8760.

Since the potential emissions are less than 250 TPY for the facility, the potential emissions projected from Buildings 51, 62, 63 and 58 will be reviewed pursuant to F.A.C. Rule 17-2.520, Sources Not Subject to Prevention of Significant Deterioration or Nonattainment Requirements.

Since there is no specific emission limiting standard contained in F.A.C. Rule 17-2.600 nor is there any standards of performance for new stationary sources contained in F.A.C. Rule 17-2.660, the sources will be permitted in accordance with F.A.C. Rule 17-2.620, General Pollutant Emission Limiting Standards.

In F.A.C. 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. Pursuant to F.A.C. Rule 17-2.620(2), no person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor. Objectionable odor is defined as any odor present in the outdoor atmosphere, which by itself or in combination with other odors, is or may be harmful or injurious to human health or welfare, which unreasonably interferes with the comfortable use and enjoyment of life or property, or which creates a nuisance according to F.A.C. Rule 17-2.100(132).

The buildings/sources operations are subject to the provisions of F.A.C. Rules 17-2.240: Circumvention; 17-2.250: Excess Emissions; and, 17-4.130: Plant Operation - Problems.

III. Summary of Emissions

A. Emission Limitations

The regulated pollutant emissions from these buildings/sources are VOC/solvents in accordance with F.A.C. Rule 17-2.620.

Specific acid solutions are also being used during the manufacturing operations. There are no specific emission limiting standards for these specific acids. However, the acid vapors will be scrubbed to reduce emissions.

The following table presents the maximum allowable VOC/solvent emissions and the potential acid vapor emissions from Buildings 51, 62, 63 and 58:

Table 3

Building	Maximum Allowable VOC/Solvent Emissions	Potential Acid Vapor Emissions
51	33.3	3.7
62	0.8	0.2
63	6.1	0.2
58	3.2	0.3

Note: Annual hours of operation at 8760.

The permitted emissions are in compliance with all requirements of F.A.C. Rules 17-2 and 17-4.

B. Air Quality Impacts

From the technical review of the application packages and supplementary material, an air quality analysis was not required.

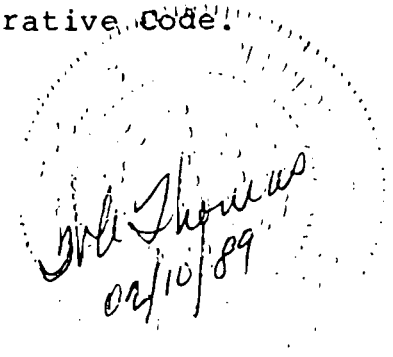
IV. Conclusion

The maximum allowable VOC/solvent emissions from Buildings 51, 62, 63 and 58 are in compliance with F.A.C. Rules 17-2 and 17-4. Even though there are no emission standards for acid vapors, the applicant has installed scrubber systems to control their emissions.

A system of material balance and sampling/analysis will be used to account for pollutant emissions from the facility and each building/source and their scrubber systems. The emissions shall be verifiable on a monthly basis pursuant to EPA's policy.

The General and Specific Conditions listed in the proposed permits (attached) will ensure compliance with all applicable requirements of F.A.C. Rules 17-2 and 17-4.

Based on the information provided by Harris Semiconductor, the Department has reasonable assurance that the consolidation of multiple permits previously issued for these sources/buildings, as described in this evaluation, and subject to the conditions proposed herein, will not cause or contribute to a violation of any air quality standard, PSD increment, or any other technical provision of Chapter 17-2 of the Florida Administrative Code.



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

PERMITTEE:
Harris Semiconductor
P. O. Box 883
Melbourne, Florida 32901

Permit Number: AC 05-157786
Expiration Date: April 30, 1990
County: Brevard
Latitude/Longitude: 28° 01' 20" N
80° 36' 10" W
Project: Building 51

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (F.A.C.) 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 drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the permitting of Building 51, a wafer fabrication source, of which there are two clean room modules. The scrubber control systems are:

- o F51SO1: a Tri Mer Corp. 9,500 scfm horizontal counter-flow fume scrubber using polypropylene packing for acid gas removal; Model No. F/W 3;
- o F51SO2: a Duall Ind. 10,000 scfm horizontal cross-flow fume scrubber using polypropylene packing for VOC/solvent removal; Model No. F-101;
- o F51SO3: a Duall Ind. 24,000 scfm horizontal cross-flow fume scrubber using polypropylene packing for acid gas and VOC/solvent removal; Model No. F-101;
- o F51SO4: the same as F51SO3; and,
- o F51SO5: a Harrison 18,000 scfm horizontal cross-flow fume scrubber using plastic saddle packing for VOC/solvent removal; Model No. HF-180.

The building/source is located at the permittee's existing facility located on Palm Bay Road in the City of Palm Bay. The UTM coordinates are Zone 17, 538.7 km East and 3100.9 km North.

The Source Classification Codes are: Major Group 36

o Cold Solvent Cleaning/ Stripping	4-01-003-99	Tons VOC/solvent consumed

The source shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted in the General and Specific Conditions.

Attachments to be Incorporated:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202(1), and Mr. James R. Kolanek's cover letter received November 28, 1988.
2. Technical Evaluation and Preliminary Determination dated February 7, 1989.

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 enforcement 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 systems 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 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 a 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 noncompliance 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).
( ) Compliance with New Source Performance Standards.

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. The maximum allowable VOC/solvent emissions from Building No. 51 shall be 33.3 tons per year.

2. The VOC/solvent vapor exhaust scrubber must be on during the working hours.

3. Annual operation shall be 8760 hours per year.

4. Objectionable odors shall not be allowed off plant property.

SPECIFIC CONDITIONS:

5. An inspection and maintenance plan shall be submitted to the DER's Central Florida District office as part of the operating permit application. The plan shall include provisions for the prevention and correction of VOC/solvent losses from leaks and equipment malfunctions.

6. By March 31 of each calendar year, an annual operating report shall be submitted to the DER's Central Florida District office demonstrating compliance with the VOC/solvent emissions limit for Building No. 51. The emissions shall be determined by a material balance scheme, verifiable on a monthly basis, and shall include the following:

a) a beginning inventory of full containers, cylinders and storage tanks at the beginning of each calendar year;
b) plus all purchased deliveries after the beginning inventory (verifiable by invoices);
c) minus all quantities picked-up and shipped-off the premise after the beginning inventory (verifiable by invoices);
d) minus all quantities deep well injected during the calendar year, justified by assumptions and established scrubber efficiencies; and,
e) minus an ending inventory of full containers, cylinders, and storage tanks; and, should occur at the beginning of the following calendar year.

7. Each scrubber system's efficiency and potential VOC/solvent emissions shall be established by a sampling and analysis program, which includes:

a) a sample shall be taken annually from each scrubber stack and analyzed using EPA Reference Method 25;
b) the DER's Central Florida District office shall receive 15 days notice in writing prior to sampling; and,
c) the report, summarizing the sampling results, shall be submitted to the DER's Central Florida District office within 45 days after the last test run is completed.

8. This permit will supercede all other permits previously issued on this source/Building No. 51.

9. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the BAQM prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

10. An application for an operation permit must be submitted to the Central Florida District office at least 90 days prior to

SPECIFIC CONDITIONS:

the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever comes first. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rule 17-4.220).

11. Building No. 51 is subject to the provisions of F.A.C. Rules 17-2.240: Circumvention; 17-2.250: Excess Emissions; and, 17-4.130: Plant Operation - Problems.

12. Any modification pursuant to F.A.C. Rule 17-2.100(119), Modification, shall be submitted to the DER's Central Florida District office and the Bureau of Air Quality Management office for approval.

13. Projected potential acid emissions are 3.7 TPY.

14. The source/Building No. 51 is subject to all applicable provisions of F.A.C. Rules 17-2 and 17-4.

Issued this_____day of_____, 19___.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

_____
Dale Twachtmann, Secretary

ATTACHMENT 1

Available Upon Request

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

PERMITTEE:
Harris Semiconductor
P. O. Box 883
Melbourne, Florida 32901

Permit Number: AC 05-157787
Expiration Date: April 30, 1990
County: Brevard
Latitude/Longitude: 28° 01' 20" N
80° 36' 10" W
Project: Building 62

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (F.A.C.) 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 drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the permitting of Building 62, which houses a research and development laboratory, a prototype wafer fabrication process, and an analytical services laboratory. The scrubber control systems are:

- o F62SO1: a Beverly Pacific 24,000 scfm horizontal cross-flow vapor scrubber using polypropylene packing for acid gas removal; Model No. PS-24T; and,
- o F62SO2: a Beverly Pacific 12,000 scfm vertical counter-current vapor scrubber using polypropylene packing for VOC/solvent removal; Model No. PS-12VT.

The building/source is located at the permittee's existing facility located on Palm Bay Road in the City of Palm Bay. The UTM coordinates are Zone 17, 538.7 km East and 3100.9 km North.

The Source Classification Codes are: Major Group 36

o Cold Solvent Cleaning/ Stripping	4-01-003-99	Tons VOC/solvent consumed

The source shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted in the General and Specific Conditions.

Attachments to be Incorporated:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202(1), and Mr. James R. Kolanek's cover letter received November 28, 1988.
2. Technical Evaluation and Preliminary Determination dated February 7, 1989.

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 enforcement 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 systems 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 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 a 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 noncompliance 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).
( ) Compliance with New Source Performance Standards.

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. The maximum allowable VOC/solvent emissions from Building No. 62 shall be 0.8 tons per year.

2. The VOC/solvent vapor exhaust scrubber must be on during the working hours.

3. Annual operation shall be 8760 hours per year.

4. Objectionable odors shall not be allowed off plant property.

SPECIFIC CONDITIONS:

5. An inspection and maintenance plan shall be submitted to the DER's Central Florida District office as part of the operating permit application. The plan shall include provisions for the prevention and correction of VOC/solvent losses from leaks and equipment malfunctions.

6. By March 31 of each calendar year, an annual operating report shall be submitted to the DER's Central Florida District office demonstrating compliance with the VOC/solvent emissions limit for Building No. 62. The emissions shall be determined by a material balance scheme, verifiable on a monthly basis, and shall include the following:

a) a beginning inventory of full containers, cylinders and storage tanks at the beginning of each calendar year;
b) plus all purchased deliveries after the beginning inventory (verifiable by invoices);
c) minus all quantities picked-up and shipped-off the premise after the beginning inventory (verifiable by invoices);
d) minus all quantities deep well injected during the calendar year, justified by assumptions and established scrubber efficiencies; and,
e) minus an ending inventory of full containers, cylinders, and storage tanks; and, should occur at the beginning of the following calendar year.

7. Each scrubber system's efficiency and potential VOC/solvent emissions shall be established by a sampling and analysis program, which includes:

a) a sample shall be taken annually from each scrubber stack and analyzed using EPA Reference Method 25;
b) the DER's Central Florida District office shall receive 15 days notice in writing prior to sampling; and,
c) the report, summarizing the sampling results, shall be submitted to the DER's Central Florida District office within 45 days after the last test run is completed.

8. This permit will supercede all other permits previously issued on this source/Building No. 62.

9. The permittee shall, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the BAQM prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

10. An application for an operation permit must be submitted to the Central Florida District office at least 90 days prior to

SPECIFIC CONDITIONS:

the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever occurs first. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rule 17-4.220).

11. Building No. 62 is subject to the provisions of F.A.C. Rules 17-2.240: Circumvention; 17-2.250: Excess Emissions; and, 17-4.130: Plant Operation - Problems.

12. Any modification pursuant to F.A.C. Rule 17-2.100(119), Modification, shall be submitted to the DER's Central Florida District office and the Bureau of Air Quality Management office for approval.

13. Projected potential acid emissions are 0.2 TPY.

14. The source/Building No. 62 is subject to all applicable provisions of F.A.C. Rules 17-2 and 17-4.

Issued this_____day of_____, 19___.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

_____
Dale Twachtmann, Secretary

ATTACHMENT 1

Available Upon Request

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

PERMITTEE:
Harris Semiconductor
P. O. Box 883
Melbourne, Florida 32901

Permit Number: AC 05-158237
Expiration Date: April 30, 1990
County: Brevard
Latitude/Longitude: 28° 01' 20" N
80° 36' 10" W
Project: Building 63

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (F.A.C.) 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 drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the permitting of Building 63, which is a wafer fabrication and assembly source. The scrubber control systems are:

- o F63SO1: a Beverly Pacific 50,000 scfm horizontal cross-flow vapor scrubber using polypropylene packing for acid gas removal; Model No. CB-60;
- o F63SO2: a Beverly Pacific 10,000 scfm vertical counter-current vapor scrubber using polypropylene packing for VOC/solvent removal; Model No. PS-12VT; and,
- o F63SO3: a Tri Mer Corp. 6,000 scfm horizontal counter-flow fume scrubber using polypropylene packing for VOC/solvent removal; Model No. F/WR-5.

The building/source is located at the permittee's existing facility located on Palm Bay Road in the City of Palm Bay. The UTM coordinates are Zone 17, 538.7 km East and 3100.9 km North.

The Source Classification Codes are: Major Group 36

o Cold Solvent Cleaning/ Stripping	4-01-003-99	Tons VOC/solvent consumed

The source shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted in the General and Specific Conditions.

Attachments to be Incorporated:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202(1), and Mr. James R. Kolanek's cover letter received December 9, 1988.
2. Technical Evaluation and Preliminary Determination dated February 7, 1989.

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 enforcement 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 systems 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 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 a 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 noncompliance 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).
( ) Compliance with New Source Performance Standards.

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. The maximum allowable VOC/solvent emissions from Building No. 63 shall be 6.1 tons per year.

2. The VOC/solvent vapor exhaust scrubber must be on during the working hours.

3. Annual operation shall be 8760 hours per year.

4. Objectionable odors shall not be allowed off plant property.

SPECIFIC CONDITIONS:

5. An inspection and maintenance plan shall be submitted to the DER's Central Florida District office as part of the operating permit application. The plan shall include provisions for the prevention and correction of VOC/solvent losses from leaks and equipment malfunctions.

6. By March 31 of each calendar year, an annual operating report shall be submitted to the DER's Central Florida District office demonstrating compliance with the VOC/solvent emissions limit for Building No. 63. The emissions shall be determined by a material balance scheme, verifiable on a monthly basis, and shall include the following:

a) a beginning inventory of full containers, cylinders and storage tanks at the beginning of each calendar year;
b) plus all purchased deliveries after the beginning inventory (verifiable by invoices);
c) minus all quantities picked-up and shipped-off the premise after the beginning inventory (verifiable by invoices);
d) minus all quantities deep well injected during the calendar year, justified by assumptions and established scrubber efficiencies; and,
e) minus an ending inventory of full containers, cylinders, and storage tanks; and, should occur at the beginning of the following calendar year.

7. Each scrubber system's efficiency and potential VOC/solvent emissions shall be established by a sampling and analysis program, which includes:

a) a sample shall be taken annually from each scrubber stack and analyzed using EPA Reference Method 25;
b) the DER's Central Florida District office shall receive 15 days notice in writing prior to sampling; and,
c) the report, summarizing the sampling results, shall be submitted to the DER's Central Florida District office within 45 days after the last test run is completed.

8. This permit will supercede all other permits previously issued on this source/Building No. 63.

9. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the BAQM prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

10. An application for an operation permit must be submitted to the Central Florida District office at least 90 days prior to

SPECIFIC CONDITIONS:

the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever comes first. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rule 17-4.220).

11. Building No. 63 is subject to the provisions of F.A.C. Rules 17-2.240: Circumvention; 17-2.250: Excess Emissions; and, 17-4.130: Plant Operation - Problems.

12. Any modification pursuant to F.A.C. Rule 17-2.100(119), Modification, shall be submitted to the DER's Central Florida District office and the Bureau of Air Quality Management office for approval.

13. Projected potential acid emissions are 0.2 TPY.

14. The source/Building No. 63 is subject to all applicable provisions of F.A.C. Rules 17-2 and 17-4.

Issued this_____day of_____, 19___.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

_____
Dale Twachtmann, Secretary

ATTACHMENT 1

Available Upon Request

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

PERMITTEE:
Harris Semiconductor
P. O. Box 883
Melbourne, Florida 32901

Permit Number: AC 05-159484
Expiration Date: April 30, 1990
County: Brevard
Latitude/Longitude: 28° 01' 20" N
80° 36' 10" W
Project: Building 58

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code (F.A.C.) 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 drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

For the permitting of Building 58, which is a source whose primary manufacturing operations are assembly and testing of integrated circuits. The scrubber control systems and dust collector system are:

- o F58SO1: a Tri Mer Corp. 12,500 scfm horizontal counter-flow vapor scrubber using polypropylene packing for caustic and corrosive vapor removal; Model No. F/W 5;
- o F58SO2: a Harrison 3,000 scfm horizontal cross-flow vapor scrubber using plastic saddle packing for VOC/solvent removal; Model No. HF-30; and,
- o F58EO1: a Torit 3,000 cfm filter cartridge dust collector with a pulse-jet cleaning cycle; Model No. TD 486.

The building/source is located at the permittee's existing facility located on Palm Bay Road in the City of Palm Bay. The UTM coordinates are Zone 17, 538.7 km East and 3100.9 km North.

The Source Classification Codes are: Major Group 36

o Cold Solvent Cleaning/ Stripping	4-01-003-99	Tons VOC/solvent consumed

The source shall be in accordance with the permit application and plans, documents, amendments, and drawings except as otherwise noted in the General and Specific Conditions.

Attachments to be Incorporated:

1. Application to Construct Air Pollution Sources, DER Form 17-1.202(1), and Mr. James R. Kolanek's cover letter received January 17, 1989.
2. Technical Evaluation and Preliminary Determination dated February 7, 1989.

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 enforcement 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 systems 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 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 a 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 noncompliance 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).
( ) Compliance with New Source Performance Standards.

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. The maximum allowable VOC/solvent emissions from Building No. 58 shall be 3.2 tons per year.

2. The VOC/solvent vapor exhaust scrubber must be on during the working hours.

3. Annual operation shall be 8760 hours per year.

4. Objectionable odors shall not be allowed off plant property.

SPECIFIC CONDITIONS:

5. An inspection and maintenance plan shall be submitted to the DER's Central Florida District office as part of the operating permit application. The plan shall include provisions for the prevention and correction of VOC/solvent losses from leaks and equipment malfunctions.

6. By March 31 of each calendar year, an annual operating report shall be submitted to the DER's Central Florida District office demonstrating compliance with the VOC/solvent emissions limit for Building No. 58. The emissions shall be determined by a material balance scheme, verifiable on a monthly basis, and shall include the following:

a) a beginning inventory of full containers, cylinders and storage tanks at the beginning of each calendar year;
b) plus all purchased deliveries after the beginning inventory (verifiable by invoices);
c) minus all quantities picked-up and shipped-off the premise after the beginning inventory (verifiable by invoices);
d) minus all quantities deep well injected during the calendar year, justified by assumptions and established scrubber efficiencies; and,
e) minus an ending inventory of full containers, cylinders, and storage tanks; and, should occur at the beginning of the following calendar year.

7. Each scrubber system's efficiency and potential VOC/solvent emissions shall be established by a sampling and analysis program, which includes:

a) a sample shall be taken annually from each scrubber stack and analyzed using EPA Reference Method 25;
b) the DER's Central Florida District office shall receive 15 days notice in writing prior to sampling; and,
c) the report, summarizing the sampling results, shall be submitted to the DER's Central Florida District office within 45 days after the last test run is completed.

8. This permit will supercede all other permits previously issued on this source/Building No. 58.

9. The permittee, for good cause, may request that this construction permit be extended. Such a request shall be submitted to the BAQM prior to 60 days before the expiration of the permit (F.A.C. Rule 17-4.090).

10. An application for an operation permit must be submitted to the Central Florida District office at least 90 days prior to

SPECIFIC CONDITIONS:

the expiration date of this construction permit or within 45 days after completion of compliance testing, whichever occurs first. To properly apply for an operation permit, the applicant shall submit the appropriate application form, fee, certification that construction was completed noting any deviations from the conditions in the construction permit, and compliance test reports as required by this permit (F.A.C. Rule 17-4.220).

11. Building No. 58 is subject to the provisions of F.A.C. Rules 17-2.240: Circumvention; 17-2.250: Excess Emissions; and, 17-4.130: Plant Operation - Problems.

12. Any modification pursuant to F.A.C. Rule 17-2.100(119), Modification, shall be submitted to the DER's Central Florida District office and the Bureau of Air Quality Management office for approval.

13. Projected potential acid emissions are 0.3 TPY.

14. The source/Building No. 58 is subject to all applicable provisions of F.A.C. Rules 17-2 and 17-4.

Issued this_____day of_____, 19___.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION

_____
Dale Twachtmann, Secretary

ATTACHMENT 1

Available Upon Request

DEPARTMENT OF ENVIRONMENTAL REGULATION

AC 05-158237

WIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Stationary [ ] New[1] [X] Existing[1]

APPLICATION TYPE: [ ] Construction [ ] Operation [X] Modification

COMPANY NAME: Harris Semiconductor COUNTY: Brevard

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) _____

SOURCE LOCATION: Street Palm Bay Road City Palm Bay

UTM: East 17-538700 North 17-3100900

Latitude 28 ° 01 ' 20 "N Longitude 80 ° 36 ' 10 "W

APPLICANT NAME AND TITLE: J. R. Kolanek; Manager Environmental Services

APPLICANT ADDRESS: P.O. Box 883, Melbourne, Fl 32901

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Harris Semiconductor

I certify that the statements made in this application for a modified 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: James R. Kolanek

J. R. Kolanek, Manager, Envtronmental Svcs
Name and Title (Please Type)

Date: 12/5/88 Telephone No. (407) 724-7467

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 Lawrence R. Hutker

Lawrence R. Hutker
Name (Please Type)

Harris Semiconductor
Company Name (Please Type)

P.O. Box 883, Melbourne, Florida 32901
Mailing Address (Please Type)

lorida Registration No. 35972 Date: 12/5/88 Telephone No. (407) 729-4655

SECTION II: GENERAL PROJECT INFORMATION

. Deecribe 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.

This is a modification and consolidation of existing air permits.

1. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction N/A Completion of Construction

. 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.)

N/A

. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

A005-121930 issued 9/16/86; expires 9/14/91

AC05-104512 issued 1/14/86; expires 6/30/86

AC05-108260 issued 2/28/86; expires 6/30/86

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? No

   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. No

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. No

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

   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 then Incinerators)

A. Raw Materials and Chemicals Used in your Process, if applicable:

Description	Contaminants		Utilization Rate - lbs/hr	Relate to Flow Diagram
	Type	% Wt		
---SEE ATTACHMENT C ----				

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): not applicable

2. Product Weight (lbs/hr): not applicable

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	
---SEE ATTACHMENT B ----							

[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)
---SEE ATTACHMENT D ---				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ 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.

Waste water from air scrubbers is discharged to on-site Waste Water Treatment Plant--discharge to deepwell under UIC - Permit #UC05-126519.

--------SEE ATTACHMENT D--------

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: _____ ft. Stack Diameter: _____ ft.

Gas Flow Rate: _____ ACFM _____ DSCFM Gas Exit Temperature: _____ °F.

Water Vapor Content: _____ % Velocity: _____ FPS

SECTION IV: INCINERATOR INFORMATION

not applicable

Type of Waste	Type 0 (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: _____ Steck 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) _____

DEQ Form 17-1.202(1)

Brief description of operating characteristics of control devices: _____

Ultimate disposal of any effluent other then 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. Availaoility of construction materials and process chemicals:

j. Applicability to manufacturing processes:

k. Ability to construct with control device, install in available space, and operat 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 afficiency.
[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 meterials 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.

HARRIS SEMICONDUCTOR

AIR PERMIT - BUILDING 63

ATTACHMENT A

PROCESS DESCRIPTION

Attachment A

The primary processes occurring in Building 63 are wafer fabrication and assembly. Because the processes and equipment utilized in the two areas are, for the most part, dissimilar, the two areas are described separately.

The VHSIC wafer fabrication area employs a series of manufacturing procedures referred to as layering, patterning, doping and heating. The frequency and sequence of these processes can vary depending on the desired nature of the final product.

In the controlled environment of the fabrication clean room, wafer surfaces first undergo acid and/or solvent cleaning, followed by thermal oxidation in furnaces to form a layer of silicon dioxide on the wafer surface.

During the patterning process, the wafers are initially baked and primed. Coaters then spin a thin layer of "photoresist" on the wafer, after which the wafers are soft baked. Next, the circuit pattern is projected onto the wafers via "alligners" or "steppers." Developers are then applied to remove unpolymerized areas of photoresist. This is followed by a solvent rinse.

Next, the wafers are hard-baked, inspected to determine accuracy, and etched by wet (acid bath) or dry (plasma vapor) mechanisms. Once etching is complete, the photoresist is stripped off the wafer using chemical baths or plasma techniques.

In another step of the fabrication process, "dopant" atoms are either diffused into the wafer in diffusion furnaces, or accelerated into the wafer using "ion implantation." Fumes from the vapor deposition furnaces are oxidized in 'burn boxes.' The oxidized gases are then exhausted to scrubber systems. Additional material may be layered on the wafer surface in vapor and crystal (epitaxial) deposition furnaces. Metallization to interconnect uppermost circuit layers is performed by deposition (using "sputtering" systems) or evaporation.

In addition to the fabrication clean room, the building houses a chemical mixing room. This room contains exhausted stations and chemical cabinets.

Exhausted gas cabinets, vacuum pumps and chemical drains are located in the chases between the processing areas of the fab.

In the two assembly areas, a series of processing and quality control steps are incorporated that produce integrated circuits from the wafers. Wafers are cut (or 'diced') into the individual units (or die) they are comprised of. The die are then put into the circuit packages and the wires are ultrasonically bonded. The resulting integrated circuits are tested for a wide variety of parameters including tolerance to temperature and humidity changes, endurance, and electrical conductivity. Exhausted equipment includes degreasers, die wash units, bake ovens, fine leak systems, furnaces, and stations dedicated to the cleaning of product parts.

Wet stations that house vats containing a variety of acid and caustic compounds are located in the two areas. Approximately 20 stations are utilized. Five of these stations are estimated to be heated, and five stations contain vats of chemicals that are covered. Approximately half of the 20 stations are dedicated to the use of solvents.

Three wet scrubbing systems handle equipment exhaust from building 63. Two of these systems, F63S01 and F63S02, are located on the east side of the building at ground level. F63S01 provides exhaust and pollution control for acid exhaust drawn from the equipment in the wafer fab and chemical mix room, while F63S02 provides solvent exhaust for the fab, the chemical mix room, and one of the assembly areas. The third scrubber system, F63S03, is located on the roof. This scrubber provides solvent exhaust for equipment in the other assembly area (see attached location maps.)

Each of the two assembly areas house a fine leak system that utilize Krypton 85 gas to pressurize electronic components and to detect faulty hermetic seals in circuits. Each system has its own exhaust fan; the systems and the corresponding roof fans are permitted under a radioactive materials license by the State of Florida Department of Health and Rehabilitative Services Office of Radiation Control (license number 662-3.)

In addition, the BTU furnaces used for the burn-in of parts in Major Programs assembly are directly exhausted to the roof via vent pipes.

HARRIS SEMICONDUCTOR

AIR PERMIT - BUILDING 63

ATTACHMENT B

AIR EMISSIONS

SOLVENT MONITORING--BUILDING 63

Monitoring work was performed on the building 63 solvent scrubber systems F63S02 and F63S03 during December of 1986. Tests conducted include EPA methods 25A (flame ionization detection.) The results of the testing is included in this application.

FID test results revealed that total accumulative monitored VOC emissions for the building were 6.14 tons/year expressed as propane. This figure is based on a hypothetical production schedule of 8760 hours a year. The following assumptions were made regarding monitoring work on this building:

-VOC values refer to all organic emissions including organic solvents.

-All data was corrected for 2 ppm background noise that is normally present in the ambient air.

-The F.I.D. accumulative emission figure is based on the maximum concentration of VOC's observed during the monitoring time frame.

EPA METHOD 25-A (F.I.D. ANALYSIS) BUILDING 63
VOC EMISSIONS DURING FULL PRODUCTION

TEST DATE	SCRUBBER #	PRODUCTN SCHEDULE (HRS/YR)	VOC EMISSIONS (TON/YR)
12/10/88	F63S02	8760	2.02
12/11/88	F63S03	8760	4.12

TOTAL PROJECTED VOC EMISSIONS FOR BLDG 63 = 6.14 TONS/YEAR

ACID MONITORING--BUILDING 63

Monitoring was performed on the building 63 acid scrubber F63S01 in August of 1988. Samples were collected using modified EPA method 8 sampling train. The impinger medium consisted of a 0.1 N sodium hydroxide solution. The analytical methodology utilized to determine the ions of highest concentration is as follows:

Chloride ion--EPA Method 325.3
Fluoride ion--EPA Method 340.2
Nitrate, phosphite, and sulfate ions--ion chromatography

All results were in pounds per hour as "X", where "X" represents the acid compound present in highest concentration.

The test results revealed that the total accumulative monitored acid emissions for the building were 0.2146 tons/year expressed as hydrochloric, hydrofluoric, nitric, phosphoric and sulfuric acids. This figure is based on a hypothetical production schedule of 8760 hours a year. The monitoring was performed over an 8 hour time interval when the full production was occurring.

When a resulting acid concentration was expressed as a "less than 'y' " value, where 'y' represents the lowest detectable limit possible using the analytical methodology employed, acid emissions were taken to be equal to this 'y' limit value.

RESULTS OF ACID MONITORING--BUILDING 63
PERFORMED IN AUGUST OF 1988
BASED ON FULL PRODUCTION

Scrubber #		HCl	HF	Nitric Acid	Phos-phoric Acid	Sulfuric Acid	TOTAL (TON/YR)
F63S01 outlet	(lb/hr)	0.0100	0.0090	0.0090	0.0120	0.0090	
	(ton/yr)	0.0438	0.0394	0.0394	0.0526	0.0394	0.2146

TOTAL ACID EMISSIONS INTO SCRUBBER OUTLET = 0.2146 TONS/YEAR

HARRIS SEMICONDUCTOR

AIR PERMIT - BUILDING 63

ATTACHMENT C

RAW MATERIALS AND CHEMICALS

BUILDING 63 CONSOLIDATED AIR PERMIT
PROCESS SOLVENTS

1,1,1-TRIMETHYL-N-TRIMETHYL ETHER
2-ETHOXYETHANOL
2-METHOXYETHANOL
2-METHYOXYETHYL ACETATE
ACETONE
AMMONIUM FLUORIDE
AMMONIUM HYDROXIDE
CELLOSOLVE ACETATE
CHLORINATED HYDROCARBONS
CHLOROPENTAFLUOROETHANE
CHLOROTRIFLUOROMETHANE
DIBUTYLPHTHALATE
DICHLORODIFLUOROMETHANE
ETHANOL
ETHYL CYANOACRYLATE
FLUOROCARBON 77
GLYCOL ESTER
HEXAMETHYLDISILAZANE
HYDROQUINONE
ISOPROPANOL
METHANOL
METHYL ETHYL KETONE
METHYL METHACRYLATE
METHYL PHENYL ETHER
METHYLENE CHLORIDE
METHYL ISOPROPYL KETONE
MONOETHANOLAMINE
N-ALKYL DIMETHYL BENZYL
N-BUTYL ACETATE
PROPYLENE GLYCOL MONOMETHYL ETHER ACETATE
POTASSIUM HYDROXIDE
TERT-BUTYL ALCOHOL
TETRAETHYL ORTHOSILICATE
TETRAMETHYL BORATE
TETRAMETHYL PHOSPHITE
TETRAMETHYL AMMONIUM HYDROXIDE
TOLUENE
TRICHLOROETHANE
TRICHLOROTRIFLUOROETHANE
XYLENE

BUILDING 63 CONSOLIDATED AIR PERMIT
PROCESS GASES

AMMONIA
ARGON
ARSINE
BORON TRICHLORIDE
BORON TRIFLUORIDE
CARBON DIOXIDE
CARBON TETRAFLUORIDE
CHLORINE
DIBORANE
DICHLOROSILANE
GERMAINE
GERMANIUM HEXAFLUORIDE
GERMANIUM TETRAFLUORIDE
GERMANIUM TRIBROMIDE
HALOCARBON 23
HELIUM
HYDROGEN
HYDROGEN CHLORIDE
NITROGEN
NITROGEN TRIFLUORIDE
NITROUS OXIDE
OXYGEN
OZONE
PHOSPHINE
PHOSPHOROUS PENTAFLUORIDE
PROPANE
SILANE
SULFUR HEXAFLUORIDE
TUNGSTEN HEXAFLUORIDE

BUILDING 63 CONSOLIDATED AIR PERMIT
PROCESS CHEMICALS

ALKYL ARYL SULFONIC ACID
AMMONIUM HYDROXIDE
BARIUM HYDROXIDE
CERIC SULFATE
CHLOROMETHYLATE ALPHAMETHYLPOLYSTYRENE
CHLOROSULFONIC ACID
CRESOL
ETHYL BENZYL AMMONIUM CHLORIDE
FERRIC CYANIDE
GLACIAL ACETIC ACID
GUM RESIN
HF
HYDROCHLORIC ACID
HYDROGEN PEROXIDE
LEAD OXIDE
NITRIC ACID
PHOSPHORIC ACID
POLYDIMETHYLSILOXANE
POTASSIUM CYANIDE
POTASSIUM FERRICYANIDE
POTASSIUM HYDROXIDE
POTASSIUM PHOSPHATE MONOBASIC
SILANAMINE
SULFURIC ACID
TRIBUTOXYETHYLPHOSPHATE

HARRIS SEMICONDUCTOR

AIR PERMIT - BUILDING 63

ATTACHMENT D

CONTROL EQUIPMENT

HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 63
PERMIT NUMBER: AO 05-121930
PERMIT TYPE : OPERATING

DATE ISSUED : 09/16/86
RENEWAL DATE: 07/16/91
DATE EXPIRES: 09/14/91

AREA SERVED:
PROCESS DESCRIPTION: ACID VAPOR SCRUBBER

PERMIT LIMITS

VOL. RATE (SCFM): 50,000
ACID MIST (LB/HR): 0.0007
SOLVENTS (LB/HR): --
VOCS (LB/HR): --
OPER. (HRS/YEAR): 6336

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT : 03/01
NOTIFICATION OF VE TEST : 10/26
ANNUAL VIS EMISSION TEST: 11/10

EQUIPMENT INFORMATION

MANUFACTURER : BEVERLY PACIFIC
MODEL NUMBER : PS-50HT
LOCATION : B63 GROUND EAST SIDE
HARRIS ID NUMBER : F63S01
VOLUME FLOW RATE (CFM): 50,000
RECIRCULATION RATE (GPM): 225
MAKEUP WATER RATE (GPM): 22.0
STACK HEIGHT (FT): 31
STACK DIAMETER (IN): 54
STACK VELOCITY (FPM):
DUCT MATERIAL : polypro

PERMIT HISTORY

PERMIT NUMBER: AC 05-54996
DATE EXPIRED : 06/01/84

PERMIT NUMBER: AC 05-104511
DATE EXPIRED : 06/30/86

PERMIT NUMBER:
DATE EXPIRED :

HARRIS ID # : F63S01
MANUFACTURER : BEVERLY PACIFIC MODEL NUMBER : CB-60
SERIAL NUMBER: F-600 MATERIAL : FIBERGLASS
DESCRIPTION : HORIZONTAL CROSS FLOW, NON-CLOGGING PVC SPRAY NOZZLES, 2" POLYPROPYLENE PACKING, PVC MIST ELIMINATOR DWG. F-600-6

DESIGN DATA
VOLUME FLOW RATE (CFM): 50,000 PRESSURE DROP (IN):
RECIRCULATION RATE (GPM): 225 MAKE UP RATE (GPM): 22

ACTUAL DATA
VOLUME FLOW RATE (CFM): PRESSURE DROP (IN): N/E DATE: 87-06-03
RECIRCULATION RATE (GPM): 90 MAKE UP RATE (GPM): 7.5 DATE: "

RECIRCULATION PUMP INFORMATION

MANUFACTURER : FILTER PUMP IND MODEL NUMBER : 36E 188-105
SERIAL NUMBER: F 1280 HP : 3 RPM : 3450
BRKR LOCATION: NEXT TO UNIT FED FROM MCC : 634

FAN INFORMATION

HARRIS ID # :
MANUFACTURER : BEVERLY PACIFIC MODEL NUMBER: CB-60
SERIAL NUMBER: F-600 MATERIAL : FIBERGLASS
DESCRIPTION : CENTRIFUGAL TYPE, CLASS II, BACKWARD CURVED BLADES, DWG. F-600-6

DESIGN DATA
VOLUME FLOW RATE (CFM): 50.000 STATIC PRESS (IN): 5.0

ACTUAL DATA SPEED (RPM): 632 DATE: SUBMITTAL
VOLUME FLOW RATE (CFM): STATIC PRESS (IN): DATE:

FAN MOTOR INFORMATION

MANUFACTURER : MODEL NUMBER :
SERIAL NUMBER: HP : 75 RPM :
BRKR LOCATION: NEXT TO UNIT FED FROM MCC : 634

ttachment :

HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 63
PERMIT NUMBER: AC 05-104512
PERMIT TYPE : CONSTRUCTION

DATE ISSUED : 01/14/86
RENEWAL DATE: 04/01/86
DATE EXPIRES: 06/30/86

AREA SERVED:
PROCESS DESCRIPTION: VOC/SOLVENT SCRUBBER

PERMIT LIMITS

VOL. RATE (SCFM): 10,000
ACID MIST (LB/HR): --
SOLVENTS (LB/HR): 0.0042
VOCS (LB/HR): --
OPER. (HRS/YEAR): 6336

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT :
NOTIFICATION OF VE TEST :
ANNUAL VIS EMISSION TEST:

EQUIPMENT INFORMATION

MANUFACTURER : BEVERLY PACIFIC
MODEL NUMBER : PS-12VT
LOCATION : B63 GROUND EAST SIDE
HARRIS ID NUMBER : F63S02
VOLUME FLOW RATE (CFM): 10,000
RECIRCULATION RATE (GPM): 45
MAKEUP WATER RATE (GPM): 4.0
STACK HEIGHT (FT): 35
STACK DIAMETER (IN): 30
STACK VELOCITY (FPM):
DUCT MATERIAL :

PERMIT HISTORY

PERMIT NUMBER: AC 05-54995
DATE EXPIRED : 06/01/84

PERMIT NUMBER: AC 05-104512
DATE EXPIRED : 06/30/86

PERMIT NUMBER:
DATE EXPIRED :

HARRIS ID # : F63S02
MANUFACTURER : BEVERLY PACIFIC MODEL NUMBER : PS-12VT
SERIAL NUMBER: F-600 MATERIAL : FIBERGLASS
DESCRIPTION : VERTICAL COUNTER-CURRENT, NON-CLOGGING PVC SPRAY NOZZLES, POLYPROPYLENE PACKING, PVC MIST ELIMINATOR, DWG. F-600-7

DESIGN DATA
VOLUME FLOW RATE (CFM): 12,000 PRESSURE DROP (IN):
RECIRCULATION RATE (GPM): 45 MAKE UP RATE (GPM): 4.0

ACTUAL DATA
VOLUME FLOW RATE (CFM): 6040 PRESSURE DROP (IN): 1.5 DATE: 12/10/86
RECIRCULATION RATE (GPM): 18 MAKE UP RATE (GPM): 4 DATE: 06/03/87

RECIRCULATION PUMP INFORMATION
MANUFACTURER : FILTER PUMP IND MODEL NUMBER : 35G205-82
SERIAL NUMBER: F 481 HP : 1.5 RPM : 3450
BRKR LOCATION: NEXT TO UNIT FED FROM MCC : 634

FAN INFORMATION
HARRIS ID # :
MANUFACTURER : BEVERLY PACIFIC MODEL NUMBER: CB-24
SERIAL NUMBER: F-600 MATERIAL : FIBERGLASS
DESCRIPTION : CENTRIFUGAL TYPE, CLASS II, BACKWARD CURVED BLADES. DWG. F-600-7

DESIGN DATA
VOLUME FLOW RATE (CFM): 8,823 STATIC PRESS (IN): 6.0

ACTUAL DATA SPEED (RPM): 1651 DATE: SUBMITTAL
VOLUME FLOW RATE (CFM): 6040 STATIC PRESS (IN): DATE: 12/10/86

FAN MOTOR INFORMATION
MANUFACTURER : MODEL NUMBER :
SERIAL NUMBER: HP : 15 RPM :
BRKR LOCATION: FS 63-1 FED FROM MCC : 634

ttachment :

HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 63
PERMIT NUMBER: AC 05-108260
PERMIT TYPE : CONSTRUCTION

DATE ISSUED : 02/28/86
RENEWAL DATE: 04/01/86
DATE EXPIRES: 06/30/86

AREA SERVED: WEST ASSEMBLY AREA
PROCESS DESCRIPTION: FUME SCRUBBER

PERMIT LIMITS

VOL. RATE (SCFM): 6,000
ACID MIST (LB/HR): --
SOLVENTS (LB/HR): 0.005
VOCS (LB/HR): --
OPER. (HRS/YEAR): 2112

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT :
NOTIFICATION OF VE TEST :
ANNUAL VIS EMISSION TEST:

EQUIPMENT INFORMATION

MANUFACTURER : TRI-MER CORP.
LOCATION : B63 ROOF WEST SIDE
HARRIS ID NUMBER : F63S03
VOLUME FLOW RATE (CFM): 6,000
RECIRCULATION RATE (GPM): 36
MAKEUP WATER RATE (GPM): 3.5

MODEL NUMBER : F/W 5
STACK HEIGHT (FT): 11
STACK DIAMETER (IN): 22
STACK VELOCITY (FPM):
DUCT MATERIAL : galv.

PERMIT HISTORY

PERMIT NUMBER: AC 05-108260
DATE EXPIRED : 06/30/86

PERMIT NUMBER:
DATE EXPIRED :

PERMIT NUMBER:
DATE EXPIRED :

HARRIS ID # : F63S03
MANUFACTURER : TRI-MER CORP. MODEL NUMBER : F/WR-5
SERIAL NUMBER: 9054 MATERIAL : POLYPRO
DESCRIPTION : HORIZONTAL COUNTER-FLOW, MIST ELIMINATOR, BLACK POLYPRO FILTER PACK, DWG. 1000-1408 (8/85)

DESIGN DATA
VOLUME FLOW RATE (CFM): 6000 PRESSURE DROP (IN):
RECIRCULATION RATE (GPM): 36 MAKE UP RATE (GPM): 3.5

ACTUAL DATA
VOLUME FLOW RATE (CFM): 6840 PRESSURE DROP (IN): DATE: 12/11/86
RECIRCULATION RATE (GPM): 30 MAKE UP RATE (GPM): 3 DATE: 01/16/87

RECIRCULATION PUMP INFORMATION
MANUFACTURER : CENTURY MODEL NUMBER : 8-159317-01
SERIAL NUMBER: BB1 HP : 1 RPM : 3450
BRKR LOCATION: NEXT TO UNIT FED FROM MCC : 2-2

FAN INFORMATION
HARRIS ID # :
MANUFACTURER : TRI-MER CORP. MODEL NUMBER: 300
SERIAL NUMBER: 5857 MATERIAL : PVC
DESCRIPTION : CENTRIFUGAL BLOWER, BACKWARD INCLINED BLADES

DESIGN DATA
VOLUME FLOW RATE (CFM): 6,000 STATIC PRESS (IN): 4.0

ACTUAL DATA SPEED (RPM): DATE:
VOLUME FLOW RATE (CFM): 6840 STATIC PRESS (IN): DATE: 12/11/86

FAN MOTOR INFORMATION
MANUFACTURER : LINCOLN TEFC MODEL NUMBER : FRAME 213T
SERIAL NUMBER: N/A HP : 7.5 RPM : 1745/3450
BRKR LOCATION: NEXT TO UNIT FED FROM MCC : 63-4-18

ttachment :

The Tri-Mer Fume Washer

Designers and Manufacturers of Corrosion Control Systems

WHY SPECIFY A TRI-MER BLOWER

Summarizing our unique combination of product benefits, TRI-MER blowers offer you . . .

Exceptional Corrosion Resistance
Compatability With Pollution Control Systems
Fire Retardancy
Excellence in Design and Materials
Easy Installation and Maintenance
Quality Control and Fine Balance
Wide Range of Sizes and Discharge Configurations
Broad Selection of Accessories

✱ NOW LET'S LOOK AT PERFORMANCE
HERE ARE SOME FACTS YOU NEED TO KNOW:

When ordering a blower, most buyers are concerned with three parameters; C.F.M., static pressure, and horsepower required. Occasionally outlet velocity may be important. C.F.M. concerns the volume of air you wish to move, static pressure corresponds to pressure drop, and horsepower required relates to efficiency.

Static pressure or resistance to air flow in a system is usually measured in inches of water. It equals the sum of all the pressure losses due to friction through the ductwork including straight sections, restrictions, and turns. Static pressure is sometimes calculated, sometimes estimated, and sometimes measured on an equivalent system. Whatever your method of determining your requirement, our backwardly-inclined non-overloading wheel design will protect your operation if system changes occur. In the event of static pressure change, only the C.F.M. and velocity will be altered; horsepower requirement remains essentially the same for the fan speed selected originally.

The table below illustrates this power limiting principle used in our Type I unplasticized PVC fans. **Note that color band on chart corresponds to best selection bands (shaded areas) on capacity tables.**

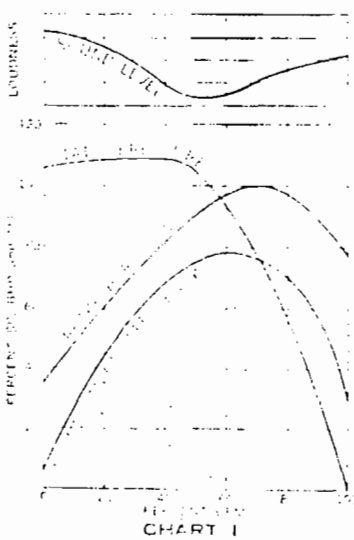


CHART I
TYPICAL FAN PERFORMANCE

Design and Performance

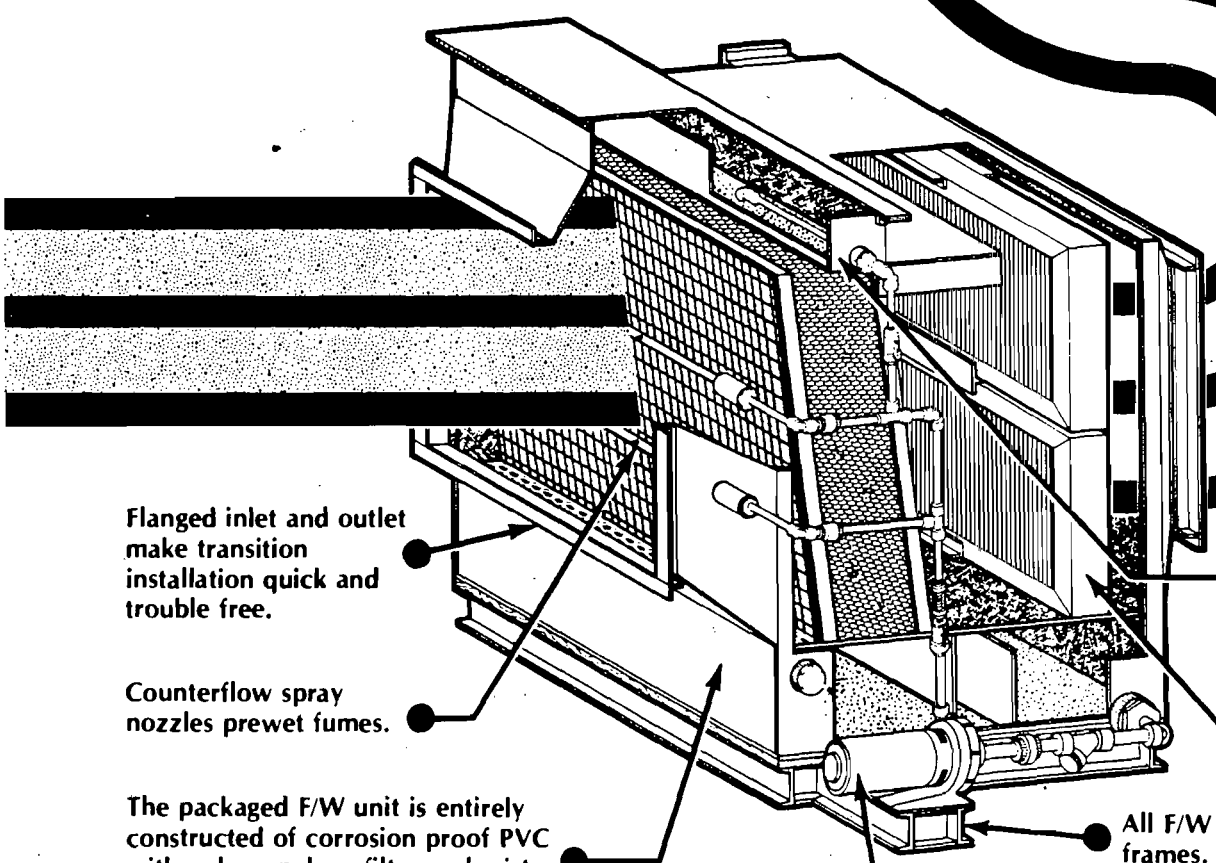
Moderate Efficiency in Working Range – maximum efficiency level covers best selection area of static pressure curve, well to the right of peak allowing ample pressure reserve at most efficient rating points.

Lowest Sound Level in Working Range – Lowest sound level falls in best pressure selection range.

Non-overloading Horsepower Characteristic – brake horsepower levels off at at point that allows economical selection of motors that will not overload if system changes occur.

Design Features of the Tri-Mer Fume Washer

TRI-MER fume washers offer an efficient economically packaged solution to your corrosive fume problems. Couple this unit to a TRI-MER all PVC fan, or use your existing fan, and you're ready for operation. A simple inexpensive installation.



Flanged inlet and outlet make transition installation quick and trouble free.

Counterflow spray nozzles prewet fumes.

The packaged F/W unit is entirely constructed of corrosion proof PVC with polypropylene filter and mist eliminator packs.

An overflow weir keeps the polypropylene filter pack flooded with water.

Downstream mist eliminato packs pull excess moisture from the air stream.

All F/W units come with self supportin frames.

Units through Model F/W-9 are available with integral recirculation tank and pump as shown.

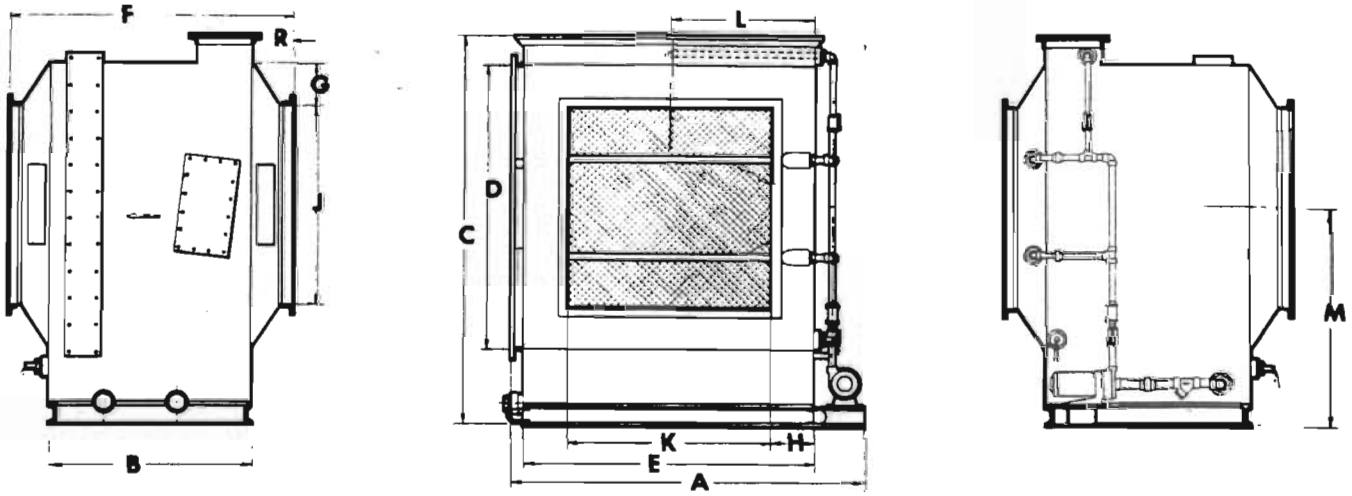
NOTE — Models F/W-10 through F/W-16 require remote recirculation tanks per manufacturers suggestion.

F/W with integral recirculation tank.

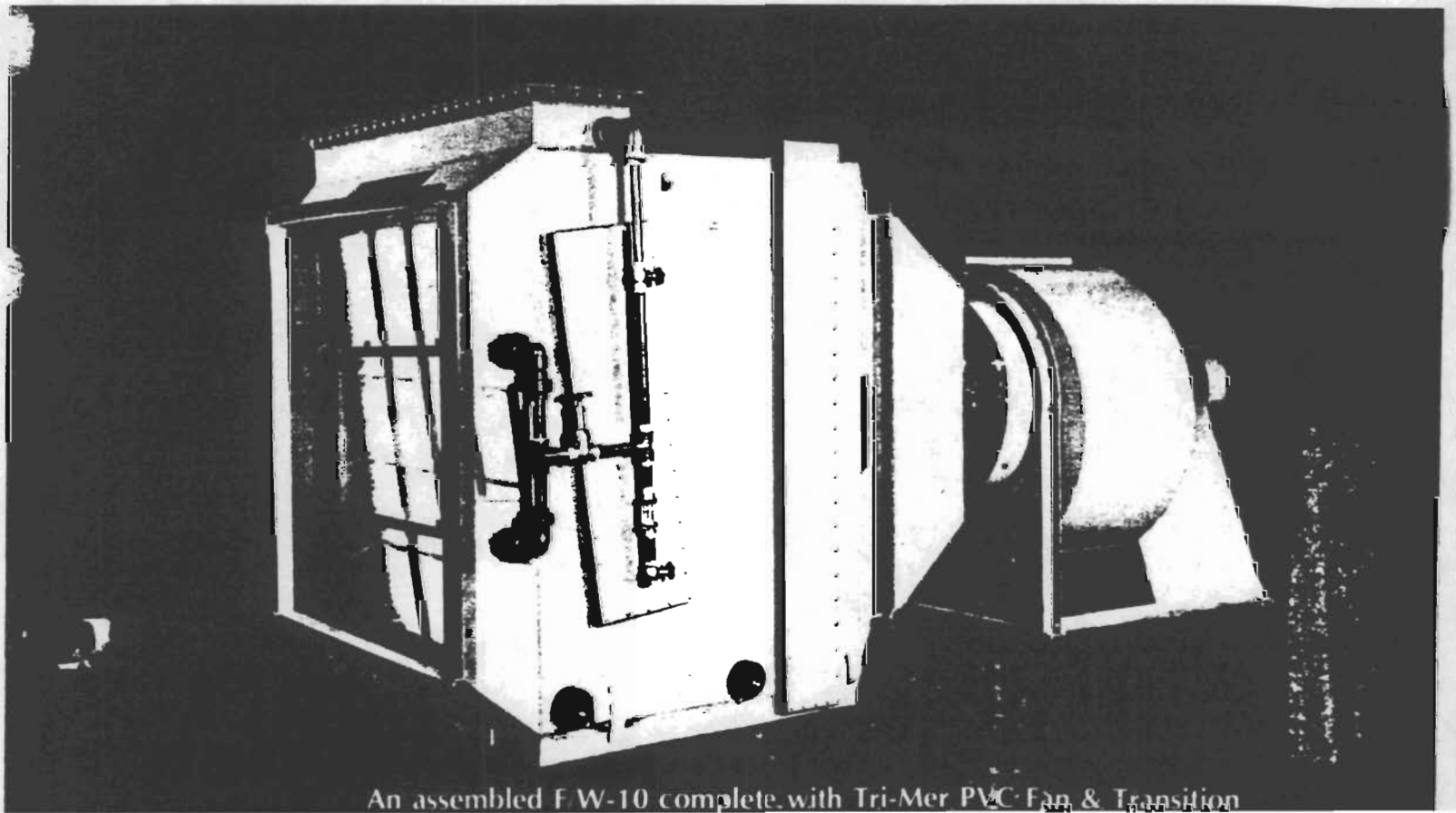
F/W	A		B		C		D	E	F	G	H	J	K	L	M		R	CHANNEL	ANGLE	DRAIN	GPM	NO. OF HEADERS	PIPE	CFM CAPACITY
1	3'-11½"	4'-4½"	3'-6"	4'-3"	5'-3"		3'-4"	3'-4"	4'-10"	6"	6"	28"	28"	1'-8"	2'-0¾"	3'-0¾"	8"	4"@5.4#	1½"x1½"x3/16"	3"	8	2	¾"	3,000 to 5,500
2	4'-3½"	4'-8½"	3'-10"	4'-6¾"	5'-6¾"		3'-8"	3'-4"	5'-2"	4½"	4½"	35"	35"	1'-10"	2'-2¾"	3'-2¾"	8"	4"@5.4#	1½"x1½"x3/16"	3"	9	2	¾"	5,500 to 7,000
3	5'-0½"	5'-5½"	3'-6"	5'-3¾"	6'-3¾"		4'-5"	4'-5"	4'-10"	8"	8"	37"	37"	2'-4½"	2'-7¼"	3'-7¼"	8"	4"@5.4#	1½"x1½"x3/16"	3"	12	2	¾"	7,000 to 9,500
4	5'-6"	5'-11"	4'-0"	5'-8¾"	6'-8¾"		4'-10"	4'-10"	5'-6"	6½"	6½"	45"	45"	2'-5"	2'-9¾"	3'-9¾"	9"	4"@5.4#	2"x2"x¼"	3"	14	2	¾"	9,500 to 11,500
5	6'-0"	6'-5"	3'-8½"	6'-2¾"	7'-2¾"		5'-4"	5'-4"	5'-2½"	9½"	9½"	45"	45"	2'-8"	3'-0¾"	4'-0¾"	9"	4"@5.4#	2"x2"x¼"	3"	16	2	¾"	11,500 to 14,000
6	6'-8"	7'-1"	4'-1½"	6'-10¾"	7'-10¾"		6'-0"	6'-0"	6'-1½"	11"	11"	50"	50"	3'-0"	3'-4¾"	4'-4¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	19	2	¾"	14,000 to 17,000
7	6'-11"	7'-5"	3'-10¾"	7'-3"	8'-3"		6'-4"	6'-4"	5'-10¾"	11"	11"	54"	54"	3'-2"	3'-6¾"	4'-6¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	22	2	¾"	17,000 to 20,000
8	7'-8"	8'-1"	4'-3"	7'-10¾"	8'-10¾"		7'-0"	7'-0"	6'-3"	1'-0½"	1'-0½"	59"	59"	3'-6"	3'-9¾"	3'-9¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	28	2	¾"	20,000 to 24,000
9	8'-5"	9'-0"	4'-0¾"	8'-8"	9'-8"		7'-9"	7'-9"	6'-0¾"	1'-1½"	1'-1½"	66"	66"	3'-10½"	4'-2¾"	5'-2¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	34	3	¾"	24,000 to 30,000
10	9'-7"		4'-5"	9'-11⅞"			8'-11"	8'-11"	6'-5"	1'-3½"	1'-3½"	76"	76"	4'-5½"	5'-0⅛"		1'-0"	6"@8.2#	2"x2"x¼"	3"	44	3	1"	30,000 to 40,000
11	12'-1"		4'-2½"	9'-9¾"			8'-9"	11'-5"	6'-2½"	10"	2'-2"	85"	85"	5'-8"	4'-7⅛"		1'-0"	6"@8.2#	2"x2"x¼"	3"	56	3	1"	40,000 to 50,000
12	14'-5"		4'-5½"	9'-9¾"			8'-9"	13'-9"	8'-5½"	10"	2'-7½"	85"	102"	6'-10½"	4'-11⅛"		2'-0"	6"@8.2#	2"x2"x¼"	3"	66	3	1"	50,000 to 60,000
14	17'-9"		4'-5½"	9'-9¾"			8'-9"	17'-1"	8'-5½"	10"	3'-2½"	85"	128"	8'-5½"	4'-11⅛"		2'-0"	6"@8.2#	2"x2"x¼"	3"	81	3	1"	60,000 to 75,000
15	20'-8"		4'-2½"	9'-9¾"			8'-9"	19'-10"	8'-2½"	10"	3'-9½"	85"	147"	9'-11"	4'-11⅛"		2'-0"	6"@8.2#	2"x2"x¼"	3"	93	3	1½"	75,000 to 87,000
16	20'-8"		4'-7"	11'-0¾"			10'-0"	20'-0"	8'-7"	1'-5½"	3'-0"	85"	240"	10'-0"	5'-6¾"		2'-0"	6"@8.2#	2"x2"x¼"	3"	106	3	1½"	87,000 to 100,000

* NOTE — For exact unit weight check with manufacturers.

* NOTE — Double pack models are available where particularly heavy loadings exist. Check with manufacturer for dimensional changes.



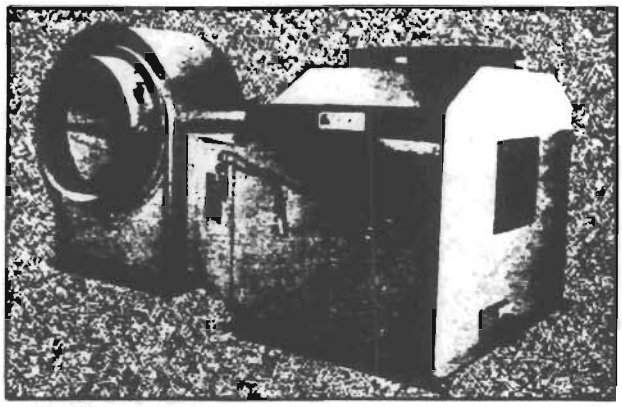
Typical three view drawing of units with integral recirculation tanks.



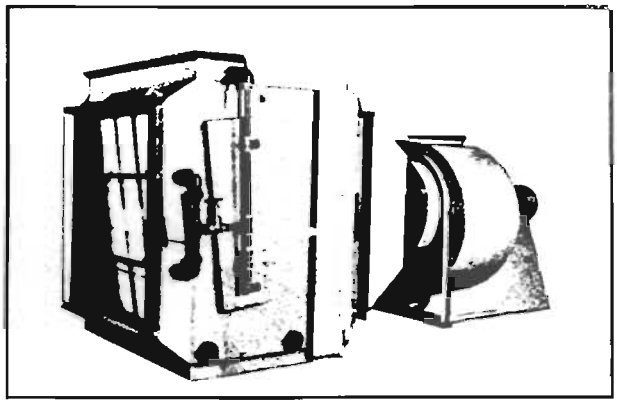
An assembled F/W-10 complete with Tri-Mer PVC Fan & Transition

Other TRI-MER PVC Equipment

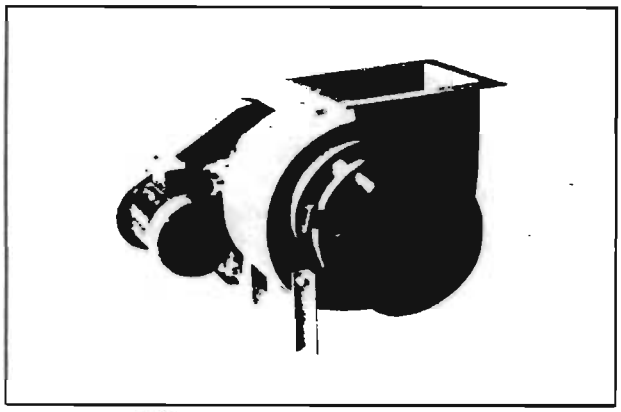
As long time specialists in designing corrosive fume control systems, TRI-MER offers a complete line of PVC air movers and associated equipment. This includes the patented fan/separator (fume scrubber), fume washers (crossflow scrubbers), PVC centrifugal fans, an *all PVC* stack fan, as well as PVC hoods and duct. Special fabrications such as consoles, tanks, and small plating lines are available.



Fan/Separator

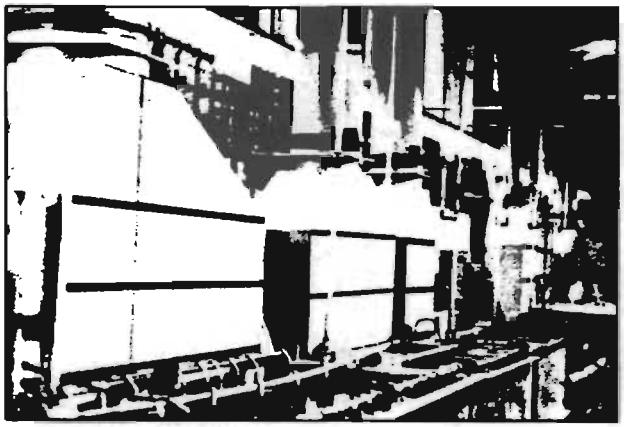


Fume/Washer (Crossflow Scrubber)

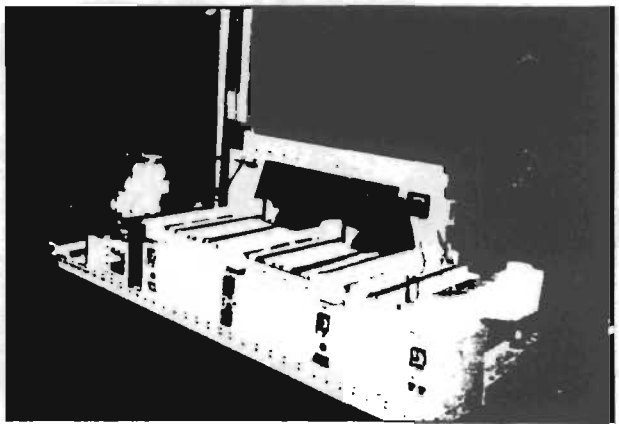


PVC Centrifugal Fan

PVC Stack Fan (Cutaway View)



PVC Hoods & Duct



Special Fabrications

Tri-Mer Corporation
Factory and Main Offices
1400 Monroe, Owosso, Michigan 48867
Phone (517) 723-7838 Telex 228545

Tri-Mer Corporation
California Sales Offices
P.O. Box 1152, Costa Mesa, California 92626
Phone: (714) 548-5853

EUROPEAN REPRESENTATIVE
JAEGER K. G.
D BRAUNSCHWEIG, WEST GERMANY

Litho in U.S.A.

PVC

UNPLASTICIZED POLYVINYL CHLORIDE

NON-OVERLOADING BLOWERS

(BACKWARD INCLINED BLADES)

Tri-Mer® Corporation

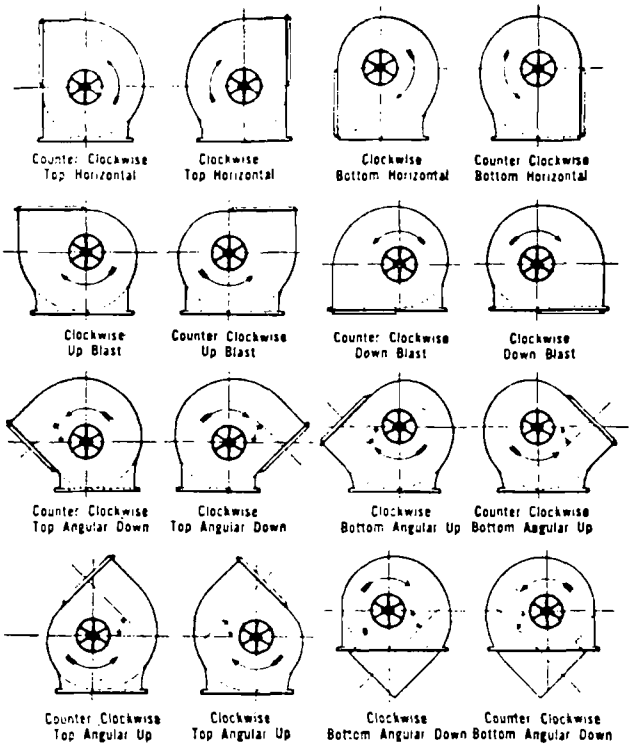
Air Pollution Control Systems

DESIGN • ENGINEERING • MANUFACTURING

1400 Monroe Street • Owosso, Michigan 48867 • 517-723/5124 • Telex 228545

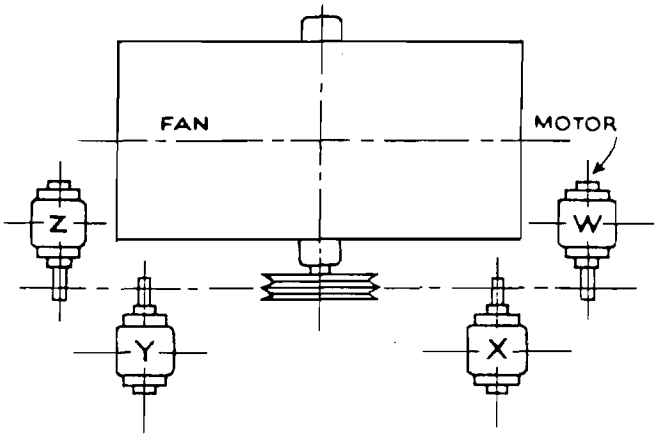
STANDARD NOMENCLATURE

Direction of Rotation and Discharge



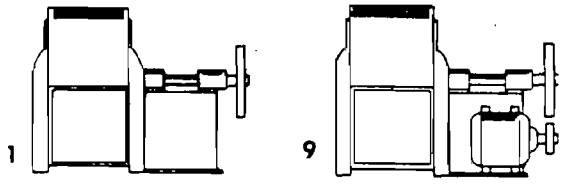
Direction of rotation is determined from the drive side. On single inlet fans, drive side is considered as opposite inlet, regardless of actual drive location.

STANDARD MOTOR POSITIONS



The location of motor is determined from plan view of the blower, designating the motor position by letters W, X, Y and Z as the case may be.

ARRANGEMENTS OF DRIVE



ARRANGEMENT No. 1, SWSI

For belt drive or direct connection. Wheel overhung. Two bearings on base. Furnished in sizes 122 to 600 inclusive. Single inlet only.

ARRANGEMENT No. 9, SWSI

For belt drive. Arrangement No. 1 designed for mounting prime mover on side of base. Furnished in sizes 122 to 600 inclusive. Single inlet only.

SWSI – Class II

Heavier design than Class I. A one piece intermediate stiffening ring is also welded into each blade. Tip speed limit approximately 13000 FPM and 6 inches total pressure.

CONSTRUCTION FEATURES

- HOUSING—All P.V.C.
- WHEEL—P.V.C. and Coated Steel
- INLET—1½" P.V.C. Angle Flange
- OUTLET—1½" P.V.C. Angle Flange
- DRAIN—2" P.V.C. Flanged
- CLEANOUT DOOR—P.V.C. Bolted
- STEEL FRAME—Epoxy Coated

Blowers are very rugged with heavy angle iron bracing, over capacity shaft and bearings. Formed P.V.C. venturi inlets give streamlined flow into the wheel with its own matching cone for very high efficiency and quiet operation. OPERATING TEMPERATURES UP TO 155°F.

BEST AVAILABLE COPY

CAPACITY TABLES

TRI-MER CORPORATION

SIZE 30

Wheel Diameter = 30" · Wheel Circumference = 7.85 · Inlet Diameter = [illegible] · Fan Outlet Area = [illegible] sq. ft. · Safe RPM = 1530 · Maximum BHP = 5.25 (RPM/1000)³

CFM	OV	¼" SP RPM	¼" SP BHP	⅜" SP RPM	⅜" SP BHP	½" SP RPM	½" SP BHP	⅝" SP RPM	⅝" SP BHP	¾" SP RPM	¾" SP BHP	1" SP RPM	1" SP BHP	2" SP RPM	2" SP BHP	3" SP RPM	3" SP BHP	4" SP RPM	4" SP BHP	5" SP RPM	5" SP BHP	6" SP RPM	6" SP BHP
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	342	[illegible]	360	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	391	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1144	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1120	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	1197	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

TRI-MER CORPORATION

SIZE 33

Wheel Diameter = [illegible] · Wheel Circumference = [illegible] · Inlet Diameter = [illegible] · Fan Outlet Area = [illegible] sq. ft. · Safe RPM = [illegible] · Maximum BHP = [illegible] (RPM/1000)³

CFM	OV	¼" SP RPM	¼" SP BHP	⅜" SP RPM	⅜" SP BHP	½" SP RPM	½" SP BHP	⅝" SP RPM	⅝" SP BHP	¾" SP RPM	¾" SP BHP	1" SP RPM	1" SP BHP	2" SP RPM	2" SP BHP	3" SP RPM	3" SP BHP	4" SP RPM	4" SP BHP	5" SP RPM	5" SP BHP	6" SP RPM	6" SP BHP
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	410	[illegible]	[illegible]	[illegible]	465	.85	[illegible]	1.12										
[illegible]	[illegible]	[illegible]	[illegible]	405	[illegible]	434	.71	[illegible]	[illegible]	485	[illegible]	534	1.27										
[illegible]	1000	[illegible]	[illegible]	432	.67	[illegible]	[illegible]	483	[illegible]	507	1.12	553	1.44	[illegible]	[illegible]								
[illegible]	1100	[illegible]	[illegible]	459	.79	[illegible]	.96	508	1.12	531	1.29	574	[illegible]	723	[illegible]								
[illegible]	1200	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.11	533	1.29	555	1.46	596	[illegible]	742	[illegible]	[illegible]	5.14						
[illegible]	1300	[illegible]	[illegible]	515	[illegible]	538	[illegible]	[illegible]	[illegible]	581	[illegible]	621	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1005	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]	544	1.27	566	[illegible]	587	[illegible]	607	[illegible]	645	[illegible]	773	[illegible]	[illegible]	[illegible]	1012	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]	574	1.47	594	[illegible]	614	[illegible]	[illegible]	[illegible]	671	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1126	10.8		
[illegible]	[illegible]	[illegible]	[illegible]	604	1.59	[illegible]	[illegible]	643	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	6.31	[illegible]	[illegible]	1175	11.4	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.34	1069	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	2.54	[illegible]	[illegible]	743	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1105	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.56	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1147	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.61	873	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1132	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	1050	[illegible]	[illegible]	8.42	1069	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1136	10.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						
[illegible]	3400	1136	11.6	1195	[illegible]	1203	12.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						

BHP shown does not include belt drive loss.

TRI-MER CORPORATION

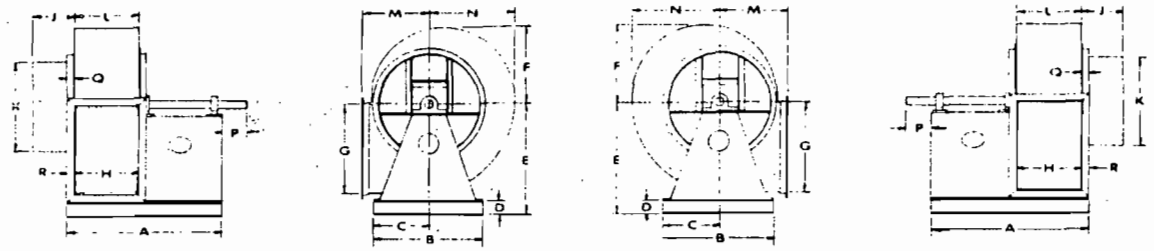
SIZE 36

Wheel Diametar = 36½" · Wheel Circumference = 9.55' · Inlet Diameter = 40⅞" · Fan Outlet Area = 7.66 sq. ft. · Safe RPM = 1255 · Maximum BHP = 15.3 (RPM/1000)³

CFM	OV	¼" SP RPM	¼" SP BHP	⅜" SP RPM	⅜" SP BHP	½" SP RPM	½" SP BHP	⅝" SP RPM	⅝" SP BHP	¾" SP RPM	¾" SP BHP	1" SP RPM	1" SP BHP	2" SP RPM	2" SP BHP	3" SP RPM	3" SP BHP	4" SP RPM	4" SP BHP	5" SP RPM	5" SP BHP	6" SP RPM	6" SP BHP
[illegible]	800	300	.41	330	.55	356	.69	382	.83	407	.99	455	1.33										
[illegible]	900	[illegible]	.51	351	.66	376	.81	[illegible]	.97	422	1.14	466	[illegible]	529	[illegible]								
[illegible]	1000	[illegible]	.61	374	[illegible]	397	.95	419	1.13	440	1.31	481	[illegible]	533	[illegible]								
[illegible]	[illegible]	[illegible]	[illegible]	397	.93	419	[illegible]	440	1.31	460	[illegible]	[illegible]	[illegible]	640	[illegible]	[illegible]	[illegible]						
[illegible]	[illegible]	[illegible]	[illegible]	422	1.09	442	1.29	[illegible]	1.51	481	[illegible]	517	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						
[illegible]	[illegible]	[illegible]	[illegible]	446	[illegible]	466	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]	472	[illegible]	491	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.71	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10.1	[illegible]	13.1		
[illegible]	[illegible]	[illegible]	[illegible]	524	[illegible]	541	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	603	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	910	10.7	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	593	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.31	646	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1071	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	4.78	744	[illegible]	[illegible]	5.61	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1035	[illegible]	1104	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	800	6.42	811	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.83	867	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1117	[illegible]	[illegible]	25.2	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	916	9.41	924	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1161	[illegible]	[illegible]	[illegible]		
[illegible]	[illegible]	961	10.6	973	11.3	981	11.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1205	[illegible]				
[illegible]	[illegible]	1019	12.5	1031	13.3	1038	13.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				

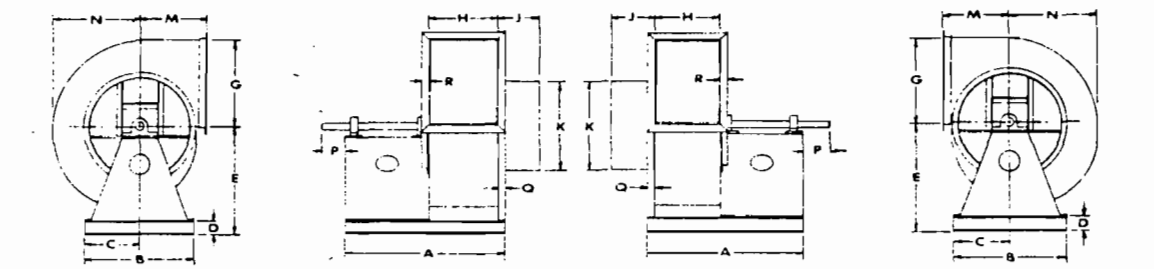
BHP shown does not include belt drive loss.

SWSI ARRANGEMENT 1



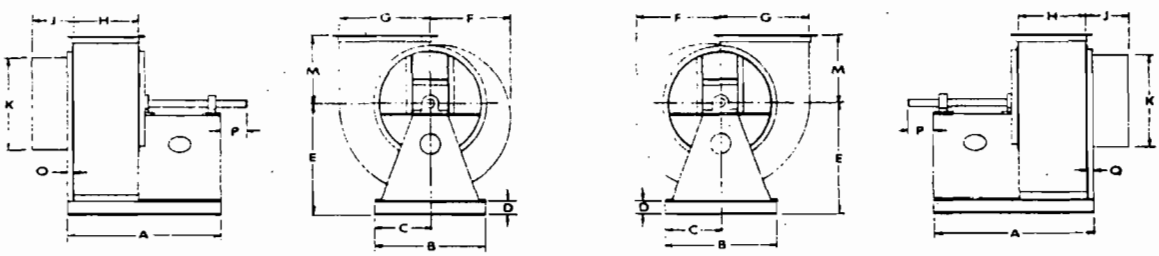
C.W. BOTTOM HORIZONTAL

C.C.W. BOTTOM HORIZONTAL



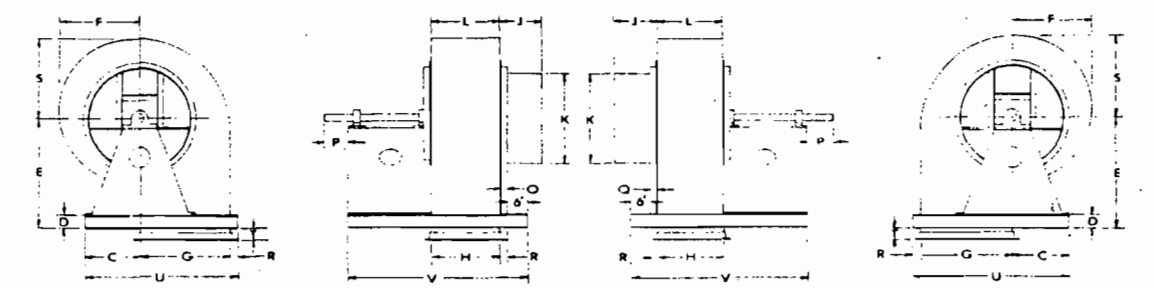
C.W. TOP HORIZONTAL

C.C.W. TOP HORIZONTAL



C.W. UP BLAST

C.C.W. UP BLAST



C.W. DOWN BLAST

C.C.W. DOWN BLAST

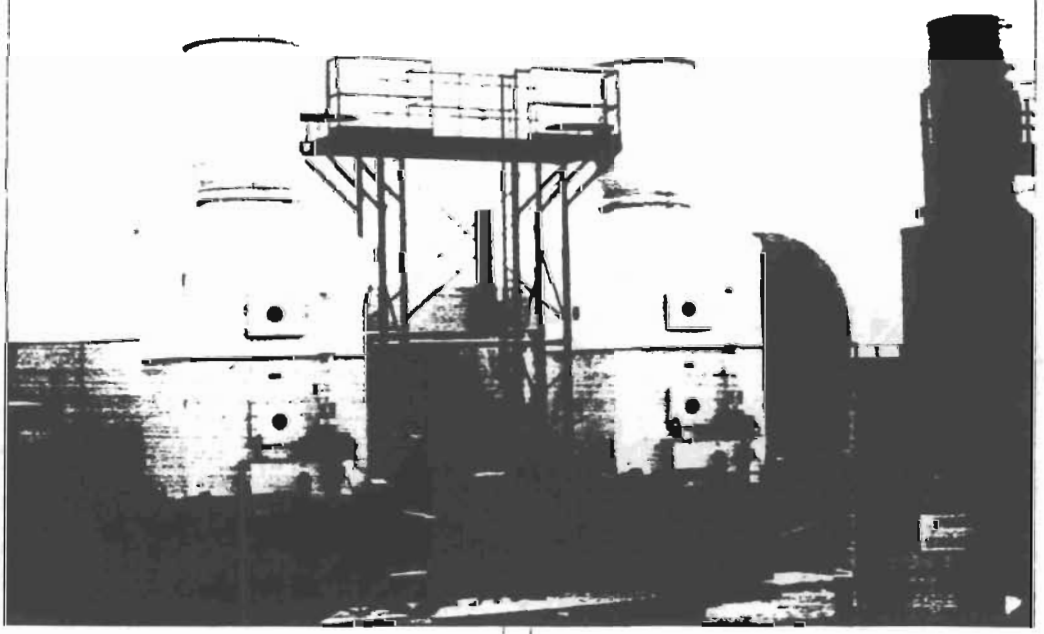
DIMENSIONS — CLASS II

CERTIFIED PRINTS FURNISHED UPON REQUEST

MODEL Nº	WHEEL DIA	SHAFT DIA	KEYWAY	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V
105	10½	1	¼×⅛×3½	21⅜	12	6	4	15½	8¼	11½	8⅜	12	11	8⅜	9	10¼	4	–	1½	10¼	3	19	27⅜
122	12¼	1	¼×⅛×3½	28⅜	16	8	4	19⅝	10	13	9⅜	12	13	9⅜	10½	11⅜	4	1¼	1½	11⅜	3	22½	34⅜
150	15	1 7/16	⅜×3/16×3½	31½	20	10	4	22½	12¼	16	11¾	12	16	11¾	12⅜	14	4	1¼	1½	14	3	27½	37½
182	18¼	1 7/16	⅜×3/16×3½	34¼	25	12½	4	26	15	19½	14¼	12	19	14¼	14⅜	17	4	1½	1½	17	3	33½	40¼
222	22¼	1 11/16	⅜×3/16×3½	41¼	30	15	4	30¼	18¼	23¾	17¼	12	24	17¼	17¼	20¾	4	1½	2	20¾	4	40¾	47¼
245	24½	1 11/16	⅜×3/16×3½	45⅛	32	16	4	32⅜	20⅛	26⅛	19⅛	12	26	19⅛	19¼	22¾	4	2	2	22¾	4	44⅛	51⅛
270	27	1 15/16	½×¼×3½	48¾	34	17	4	34⅜	22	28¼	21¼	12	28	21¼	21½	25¼	4¾	2	2	25¼	4	47¼	54¾
300	30	1 15/16	½×¼×4	50⅞	40	20	4	38½	24⅜	32	23⅜	12	32	23⅜	23⅜	28	5¼	2	2	28	4	54	56⅞
330	33	2 3/16	½×¼×4	54⅞	44	22	4	41½	27	35	25⅞	12	35	25⅞	25⅜	30¾	4½	2	2	30¾	4	59	60⅞
365	36½	2 7/16	⅝×5/16×4½	57½	50	25	4	45½	29⅞	39	28½	12	39	28½	28	34	4½	2	2	34	4	66	63½
402	40¼	2 11/16	⅝×5/16×4½	62⅛	54	27	4	49½	32⅞	43	31⅜	12	44	31½	30⅜	37½	5½	2	2	37½	4	72	68⅛
445	44½	2 11/16	⅝×5/16×5	67½	59	29½	4	54	36¼	47⅜	35	12	48	35	34	41¼	5½	2½	2	41¼	4	78⅞	73½
490	49	2 15/16	⅜×⅜×5	72½	69	34½	4	58¾	40⅝	52¼	38½	12	53	38½	37⅛	45¾	5½	2½	2	45¾	4	88¾	76½
540	54	3 3/16	⅜×⅜×5	77¾	69	34½	6	66⅞	44½	58⅜	43¾	12	60	43¾	43½	50	5½	2½	2	50	4	94⅞	83¼
600	60	3 7/16	⅜×⅜×5	80¼	75	37½	6	73¾	46¾	64¾	45¼	12	64	45¾	46	53½	6½	2½	2	53½	4	104¼	86¼

BEVERLY PACIFIC CORPORATION

SCRUBBERS

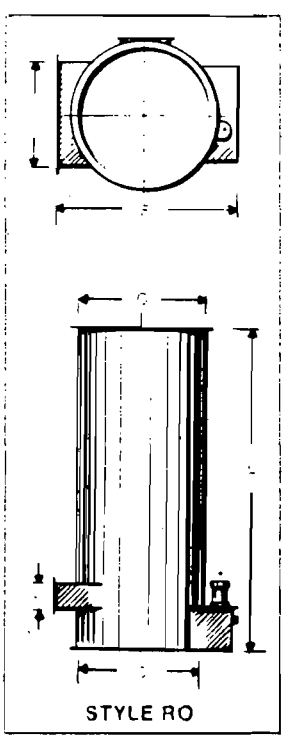


FIBERGLASS REINFORCED PLASTIC

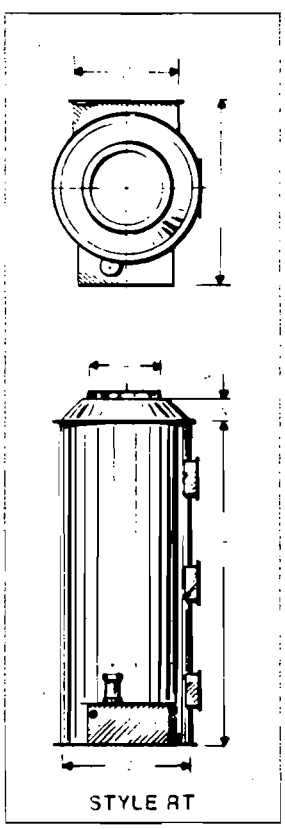
PACKED SCRUBBER DIMENSIONAL CHART

MODEL NUMBERS
DIMENSIONS IN INCHES

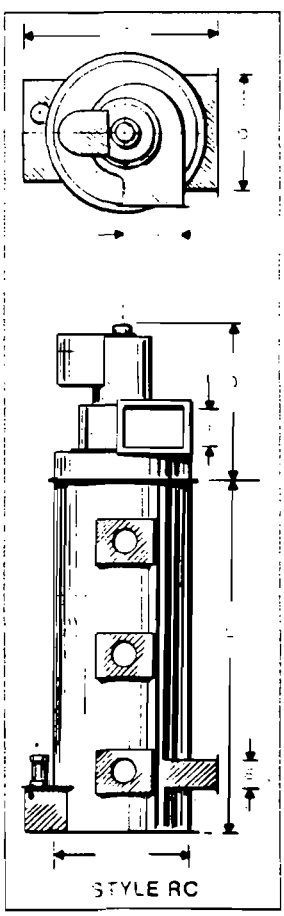
	PS-2	PS-4	PS-6	PS-8	PS-12	PS-18	PS-24	PS-30	PS-40	PS-50
A	78	82	84	94	101	108	112	114	118	118
B	24	36	42	48	60	72	84	96	108	120
C	28	40	48	58	72	84	96	108	120	136
D	22	34	40	46	58	70	80	92	104	116
E	6	8	10	11	12	16	18	20	24	24
F	46	58	66	76	90	102	114	126	138	154
G	42	54	60	66	78	90	102	114	126	138
H	13⅜	16⅜	22½	26¼	29½	35¼	39	47¼	52⅜	63⅜
I	10⅜	12⅞	17	20½	22¾	27	30	37½	40¾	49¾
J	18	22	28	34	38	45	50	62	66	80
K	6	8	10	10	12	16	19	20	24	24
L	84	87	89	104	112	118	122	124	128	128
M	64	64	70	77	89	102	102	102	114	114
N	35	49	55	62	76	88	103	116	128	142
O	38	52	58	65	79	91	106	119	131	145
P	14	16	22	26	30	36	42	50	54	66
Q	45	50	61	64	68	72	78	86	93	103
R	35	44	55	65	75	85	94	108	120	141
S	46	52	59	69	72	79	82	97	100	110
T	36	48	54	60	72	84	96	108	120	132
WHEEL DIA.	12¼	15	20	24½	27	33	36½	44½	49	60
CFM x 1000	1-2	2-4	4-6	6-8	8-12	12-18	18-24	24-30	30-40	40-50
RECIRC. GPM	7	15	25	35	45	75	105	135	175	225
MAKE-UP GPM	0.7	1.5	2.0	3.0	4.0	7.0	10.0	13.0	17.0	22.0
HT OP. WT.	388	745	1110	1570	2690	4085	5670	7595	11790	16040
HT SHIP WT.	220	385	550	770	1210	1925	2750	3795	5390	7040
VT OP. WT.	318	660	1060	1500	2630	3910	5470	7400	11650	15800
VT SHIP WT.	150	300	500	700	1150	1750	2550	3600	5250	6800



STYLE RO



STYLE RT



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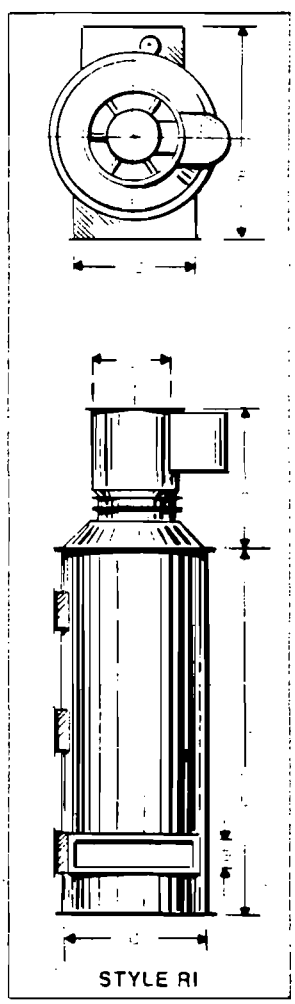
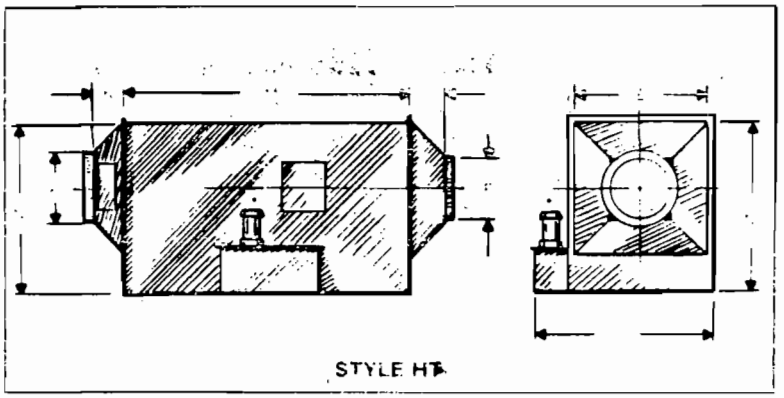
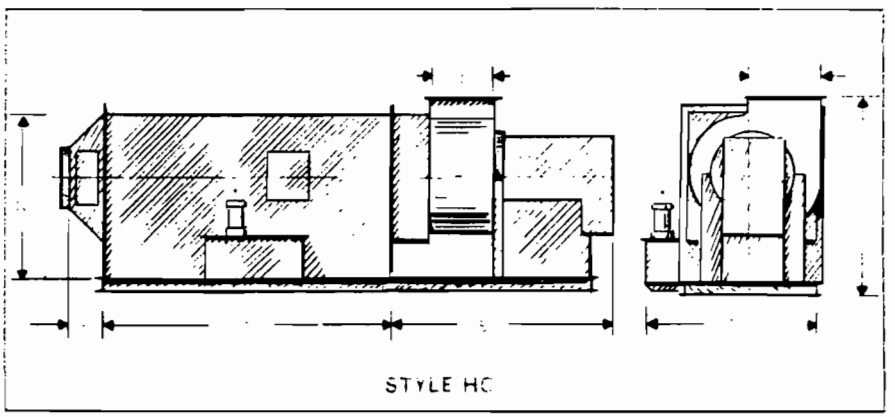


STYLE RI

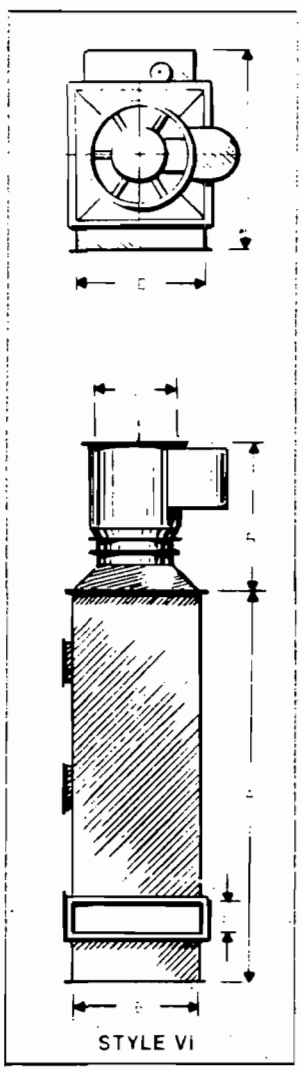


STYLE HT

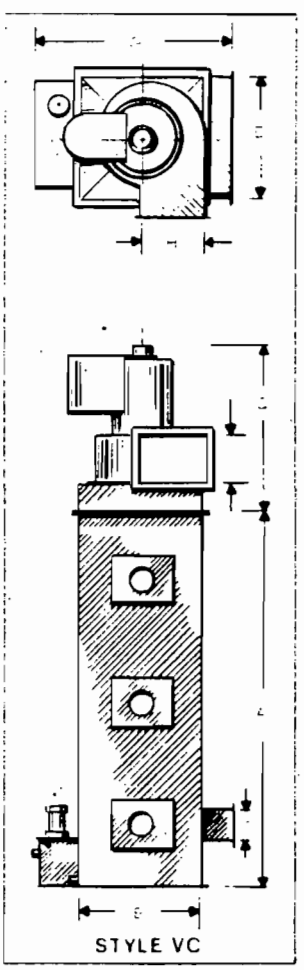


STYLE HC

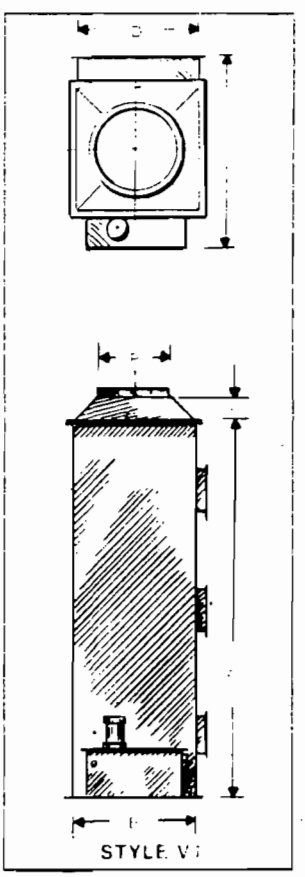
*May require one or more pumps.



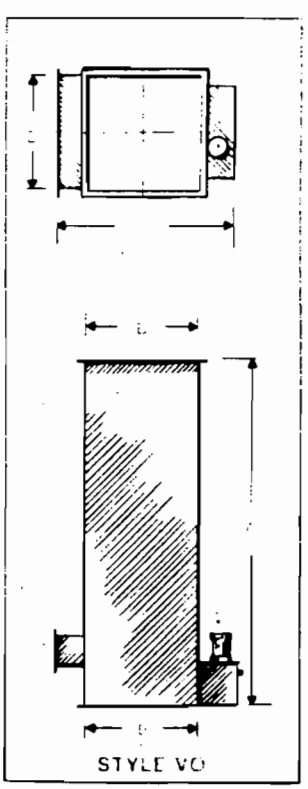
STYLE VI



STYLE VC



STYLE VT



STYLE VO

COMPUTERIZED PACKING MEDIA SELECTION

The most common mistake made by scrubber manufacturers today is the use of only one type of packing media for all types of contaminant removal. Beverly Pacific Corporation scrubbers are designed with a computer program assist to determine the most beneficial packing media to achieve high removal efficiency coupled with low pressure drop providing the user with the ultimate in lower operating costs consistent with the contaminant removal requirements.

SCRUBBER CONFIGURATIONS

Beverly Pacific Corporation manufactures scrubbers of both crossflow and counter-current configurations.

The CROSSFLOW design is of low profile, rectangular shape wherein the contaminated air stream moves horizontally through the packing media and is scrubbed by the liquid flowing downward through the packing. This configuration is ideal for roof-top mounting and is available in ten (10) standard sizes with or without integral centrifugal fans.

The COUNTER-CURRENT design is offered in two (2) configurations, round or rectangular. While the round tower unit is the most economical in initial cost, the rectangular towerunit permits larger CFM volume using the same amount of floor space. In the counter-current design, the contaminated airstream flows up through the packing media and is scrubbed by the liquid flowing downward. The round and rectangular tower units are each offered in ten (10) sizes and are available with or without integral inline or centrifugal fans.

SCRUBBER MAKE-UP WATER CONSUMPTION

Beverly Pacific's scrubber design is based on a scrubbing liquid recirculation rate of 5 GPM per 1000 CFM of contaminated air. Of that 5 GPM, losses due to absorption and/or evaporation range from 0.2 GPM to 0.6 GPM, depending on inlet gas temperature and gas stream dust load.

ENTRAINMENT SEPARATION

The unique design of Beverly Pacific's mist eliminator section provides up to 99+% moisture particle entrapment at a pressure drop of approximately 0.5" W.G.

CONSTRUCTION

The structural housings are fabricated of Fiberglass Reinforced Plastic (FRP) materials which provide structural strength, are corrosion-resistant and light in weight. Resin selection depends on the corrosive element involved. Resins can also be of fire-retardant grade if required. Our construction technique employs the use of female molds resulting in an extremely smooth, attractive, gelcoated exterior surface (note the upper right photo on the facing page). Beverly Pacific Corporation's construction methods meet or exceed the requirements of NBS-PS 15-69 for custom contact-molded reinforced polyester chemical resistant process equipment.

OPTIONAL EQUIPMENT, FITTINGS AND ACCESSORIES

FITTINGS, such as drain, overflow, make-up water, access doors, etc. can usually be located to facilitate installation and maintenance.

RECIRCULATION RESERVOIR(S) are normally an integral part of the scrubber but, if required, can be furnished for remote installation.

RECIRCULATION PUMP(S) can be located within the built-in reservoir, but can also be installed in remote reservoir units.

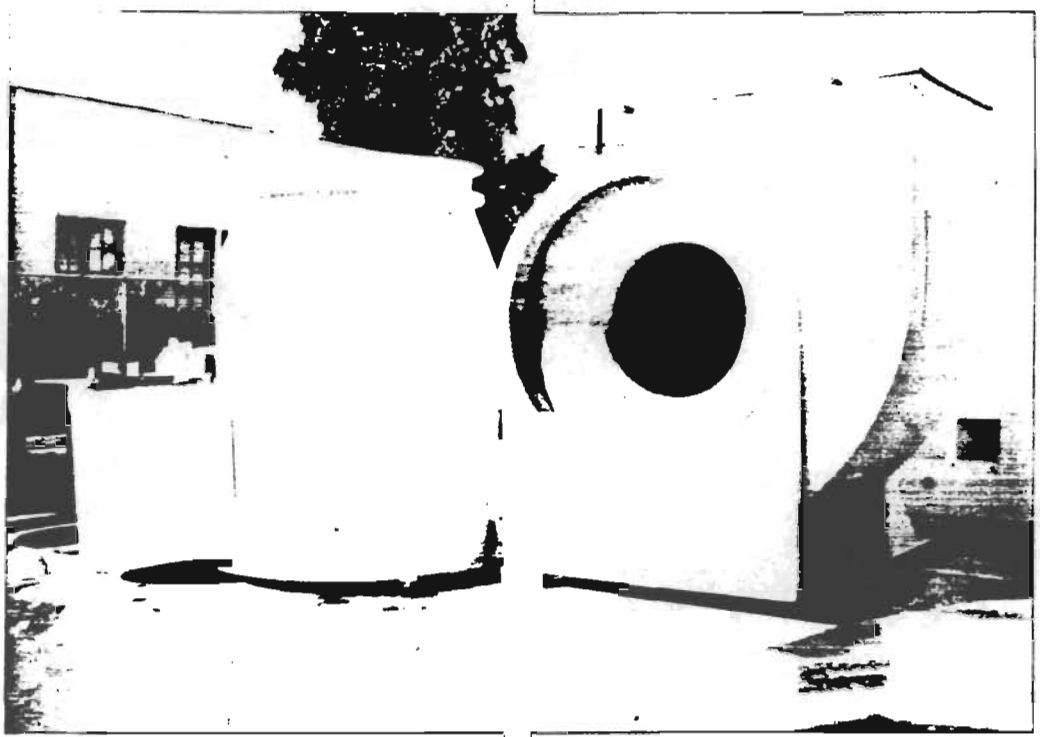
SPECIAL RESERVOIR(S) can be furnished in applications where it is necessary to remove non-soluble particulate accumulation to prevent pump damage and minimize maintenance.

pH CONTROL SENSING/METERING equipment can be provided where contaminate absorption requires the addition of acid or caustic to the recirculated scrubbing liquid.

BEVERLY PACIFIC CORPORATION

Industrial Systems Division

EXHAUST FANS



FIBERGLASS REINFORCED PLASTIC

EXHAUST FAN INTRODUCTION

Beverly Pacific's complete line of centrifugal and inline exhaust fans have proven their reliability with years of successful, continuous corrosive service throughout the nation and around the world.

Our solid "FRP" construction defies corrosion and each is designed to provide smooth, quiet and maintenance-free operation . . . this superior combination permits peak performance with the lowest possible power consumption.

A wide selection of standard models, types and sizes are available to meet your specific requirements.

FAN WHEEL SUPERIORITY

The Beverly Pacific fan wheels are fabricated of corrosion-resistant Fiberglass Reinforced Plastic (FRP) materials. The fan wheel design is that of a "backward curve blade," Class II construction, and are available in standard sizes of 12¼" through 66" diameters.

All of Beverly Pacific's fan wheels are both statically and dynamically balanced and run on a test stand prior to final assembly to insure continuous, vibration-free performance.

Every surface in contact with the air stream is corrosion resistant. The steel hub (providing the positive-lock connection to the drive shaft) is totally encapsulated in the wheel laminate and even the weight added during the wheel balancing process is corrosion resistant, Fiberglass Reinforced Plastic materials.

Should your particular requirement involve moving a volume of only a few hundred CFM at ¼" S.P. or over 80,000 CFM at 6" S.P., Beverly Pacific has a proven standard size to meet your requirement.

EXHAUST FANS STANDARD AND OPTIONAL EQUIPMENT

Standard Equipment: Beverly Pacific's centrifugal fans are equipped with a scroll bottom drain and flanged discharge outlet, and are furnished with a purchaser's choice of twelve (12) discharge outlet directions and a choice of right or left fan wheel rotation. Both of our fan styles, centrifugal and inline, are equipped with an OSHA approved belt guard and powered by 230-460/30/60 Hz motors . . . totally enclosed, fan-cooled, (TEFC) up to 20 horsepower, and Multi-guard motors are furnished when horsepower requirements are 25 or larger. Also, as standard equipment, Beverly Pacific furnishes the following list of first-line, top quality drive components which were selected based on motor horsepower, RPM, tip speed and weight of fan wheel, with a safety factor of 1.3 times the motor horsepower.

a. BEARINGS — Beverly Pacific furnishes Dodge-Type K pillow blocks on the inline model. These Dodge bearings have Timken-tapered roller bearings, are fully self-aligning and designed to meet the stringent demands of power transmission. Based on radial and thrust load computations, bearing life expectancy is in excess of 100,000 hours.

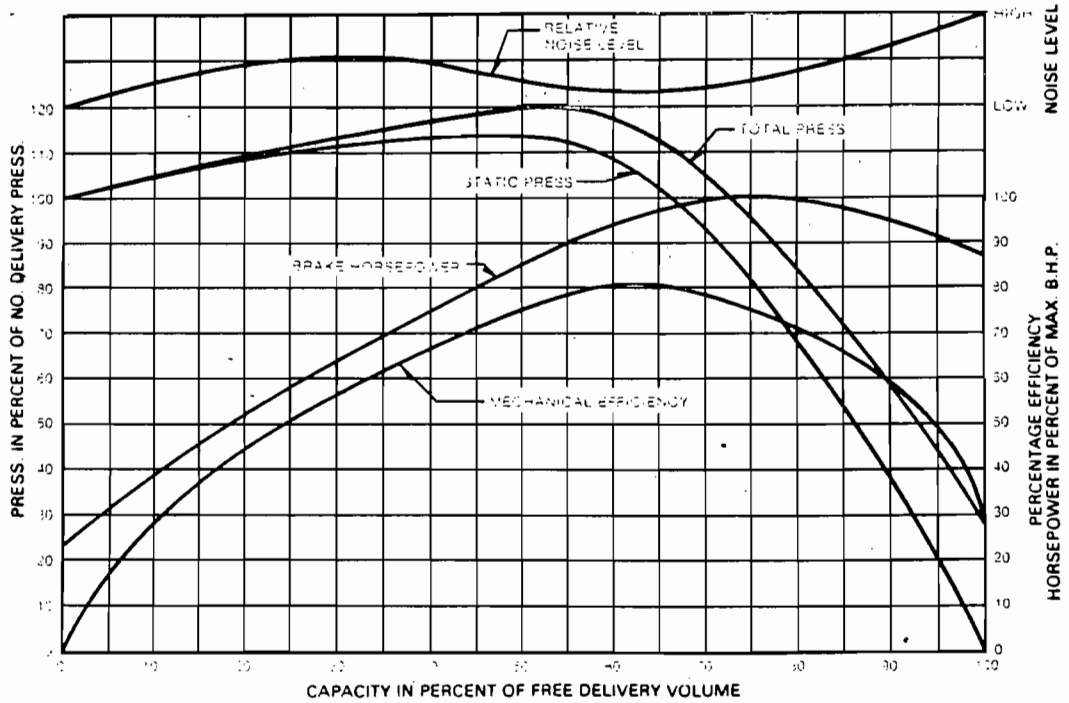
b. SHEAVES — Beverly Pacific Corporation furnishes Dodge sheaves, which are cast from the finest quality gray iron and machined to rigid quality control specifications. Groove design and spacing conforms to ASA, MPTA and RMA standards. These sheaves are equipped with Taper-Lock bushings, a superior mounting well recognized and widely used in industry.

c. V-BELTS — Beverly Pacific furnishes Dodge Sealed-Life Belts, Type A, B and C which have a longer wearing protective cover, crowned top, concave sidewall, exceptional stability and an improved cord section which prevents failures caused by cord separation.

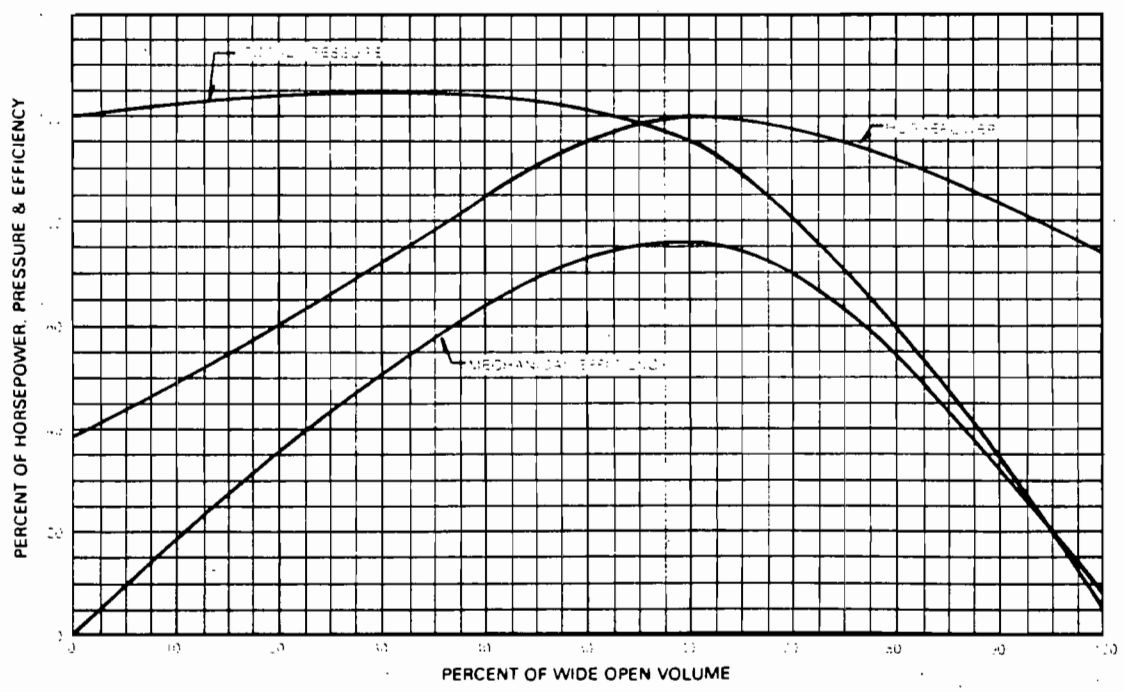
d. WHEEL BACKING PLATES — Beverly Pacific uses Rex taper-lock, single-duty, Type B, steel sprocket, in the backing plate of all FRP fan wheels. This steel sprocket is completely embedded and encased with FRP materials to prevent corrosion attack.

e. DRIVE SHAFTS — Beverly Pacific uses ground and polished, 1045 TGP shafting rounds, as produced by Inland Steel. This medium carbon steel is used because of its greater strength and hardness. The mechanical properties, based on ¾" — 1¼" diameter round bars of 1045, include a tensile strength of 98,000 PSI, yield strength of 59,000 PSI and a Brinnel Hardness of 212.

BEVERLY PACIFIC CORPORATION
CENTRIFUGAL FAN CHARACTERISTIC CURVE



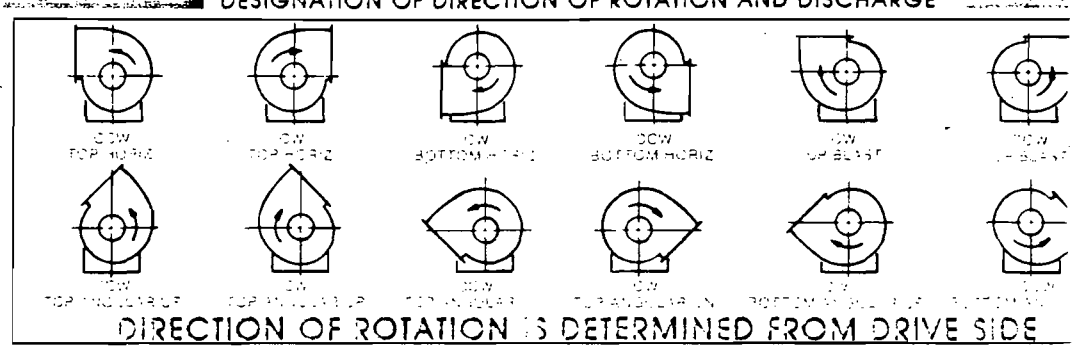
BEVERLY PACIFIC CORPORATION
INLINE FAN CHARACTERISTIC CURVE



CENTRIFUGAL INDUSTRIAL EXHAUST FANS

	CB-12	CB-13	CB-15	CB-16	CB-18	CB-20	CB-22	CB-24	CB-27	CB-30	CB-33	C
MID-RANGE CFM RECOMMENDED	2,150	2,625	3,200	3,900	4,750	5,800	7,075	8,650	10,550	12,875	15,700	1
FAN WHEEL DIAMETER	12¼	13½	15	16½	18¼	20	22¼	24½	27	30	33	3
A	13½	14½	16½	18¼	20	22	24½	26	29¼	32¼	36	4
B	10⅝	11⅝	12⅞	14⅜	15	17	18¾	20½	22¾	25	27	3
C	13⅜	14⅞	16⅜	18⅜	20	22½	24	26¼	29½	32	35¼	3
D	34¼	35¼	40⁷⁄₁₆	42⁷⁄₁₆	45	47¾	54	57¼	61½	64¾	66¾	6
E	22¼	22½	27¼	29¾	32⅜	36½	39¼	43¼	49	53	58¾	6
F	15	16	18	19	20	23	26	28	30	33	36	3
G	11	11½	12½	14	15½	17¼	19	21½	23	25½	28½	1
H	13⅜	14⅜	15⅞	17⅜	18	21	22¾	24½	26¾	29	31	1
I	16	16	18¼	18¾	20	20½	23	23	25	26	26	2
J	3	3	4	4	4	4	6	6	6	6	6	1
K	9¼	10¼	11¼	12½	13½	15	16	18	20½	22	24	1
L	9¼	10¼	11¼	12½	13½	15	16	18	20½	22	24	1
M	3½	3¾	4¼	4½	5	5¾	6⅞	6⅞	7⅞	8¼	9½	
DRIVE SHAFT DIAMETER	1	1	1³⁄₁₆	1³⁄₁₆	1⁷⁄₁₆	1⁷⁄₁₆	1¹¹⁄₁₆	1¹¹⁄₁₆	1¹⁵⁄₁₆	1¹⁵⁄₁₆	1¹⁵⁄₁₆	1
SHIPPING WEIGHT POUNDS	170	205	230	400	550	600	650	720	850	1,000	1,380	

DESIGNATION OF DIRECTION OF ROTATION AND DISCHARGE



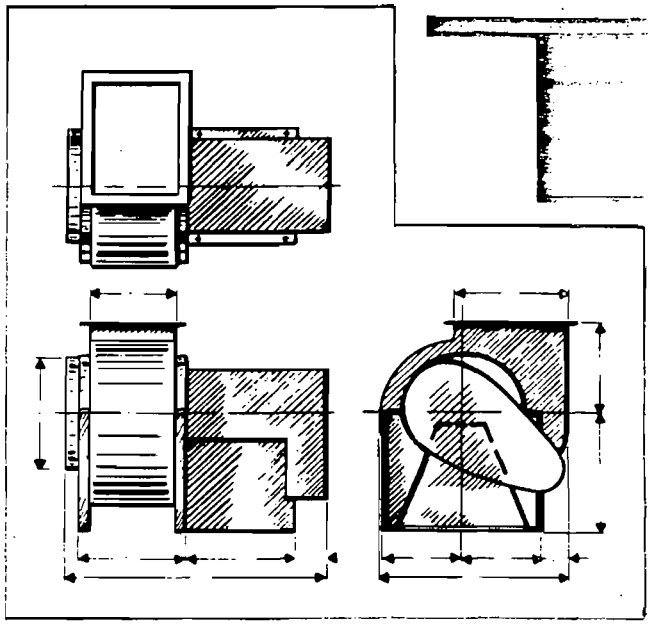
DIRECTION OF ROTATION IS DETERMINED FROM DRIVE SIDE

INLINE EXHAUST FANS

	IB-12	IB-15	IB-18	IB-20	IB-22	IB-24	IB-27	IB-30	IB-33	IB-36	IB-40
MID-RANGE CFM RECOMMENDED	2,550	3,842	4,648	5,614	6,948	8,424	10,242	12,644	15,300	18,718	22,761
FAN WHEEL DIAMETER	12¼	15	18¼	20	22¼	24½	27	30	33	36½	40½
P	21"	28"	32½"	36½"	40"	47"	53"	55"	58"	63¾"	70"
Q	14"	16"	20"	22"	24"	26"	30"	32"	36"	42"	46"
R	18"	22"	26"	28"	32"	34"	38"	42"	45"	50"	56"
S	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"
T	23"	28"	31"	32"	34"	35"	37"	39"	40½"	45"	52"
U	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"
DRIVE SHAFT DIAMETER	1	1³⁄₁₆	1⁷⁄₁₆	1⁷⁄₁₆	1¹¹⁄₁₆	1¹¹⁄₁₆	1¹⁵⁄₁₆	1¹⁵⁄₁₆	1¹⁵⁄₁₆	2³⁄₁₆	2³⁄₁₆
SHIPPING WEIGHT POUNDS	90	130	290	320	350	380	450	525	730	850	1,110

DIMENSIONAL CHART

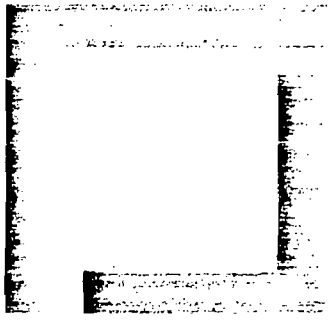
CB-40	CB-44	CB-49	CB-54	CB-60	CB-66	
23,375	28,525	34,775	42,450	51,775	63,175	MID-RANGE CFM RECOMMENDED
40¼	44½	49	54¼	60	66	FAN WHEEL DIAMETER
44½	49	54	60	66⅝	72	A
34½	37½	40¾	44¾	49⅝	54¾	B
43	47¼	52⅜	57⅝	63⅞	70¼	C
79¾	84¾	88	93	97⅝	104⅜	D
72½	79½	88¼	97	108	119	E
42	49¾	49	54	58	64	F
34½	37½	41	46	50⅛	55	G
40½	43½	46¾	50¾	53⅝	60¾	H
27½	29½	29½	31¼	33	33	I
8	8	8	8	8	8	J
25¾	26¾	30	34	37	40	K
25¾	26¾	30	34	37	40	L
11¼	12¼	14⅝16	15⅝16	17⅝	19⅞	M
2⅜16	2⅞16	2⅞16	2¹⁵⁄16	2¹⁵⁄16	2¹⁵⁄16	DRIVE SHAFT DIAMETER
2.050	2,300	2,650	3.110	3,525	4,000	SHIPPING WEIGHT POUNDS



Beverly Pacific's FRP constructed fans have a Type "A" classification for spark resistance.

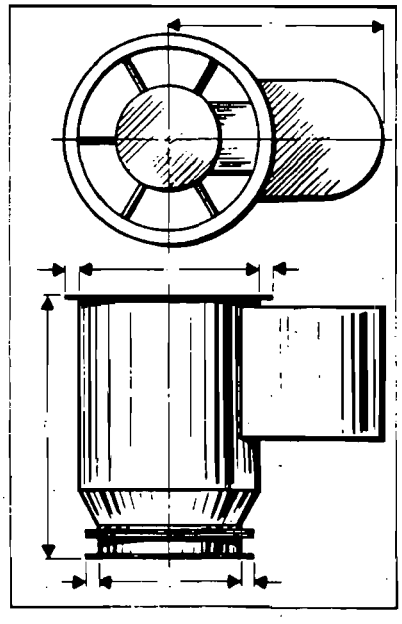
STANDARD CLASSIFICATIONS FOR SPARK RESISTANT CONSTRUCTION

TYPE	CONSTRUCTION
A	All parts of the fan in contact with the air or gas being handled shall be made of non-ferrous material.
B	The fan shall have an entirely non-ferrous wheel and non-ferrous ring about the opening through which the shaft passes.
C	The fan shall be so constructed that a shift of the wheel or shaft will not permit two ferrous parts of the fan to rub or strike.



DIMENSIONAL CHART

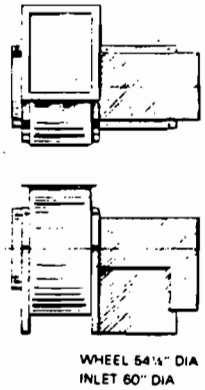
IB-49	IB-54	IB-60	IB-66	
33,733	41,349	50,579	61,201	MID-RANGE CFM RECOMMENDED
49	54¼	60	66	FAN WHEEL DIAMETER
84"	93"	104"	116"	P
54"	60"	66"	72"	Q
66"	72"	80"	88"	R
3"	3"	3"	3"	S
65"	68"	72"	76"	T
3"	3"	3"	3"	U
2⅞16	2¹⁵⁄16	2¹⁵⁄16	2¹⁵⁄16	DRIVE SHAFT DIAMETER
1.420	1,650	1,800	2,100	SHIPPING WEIGHT POUNDS



CENTRIFUGAL CAPACITY RATING TABLES

WHITE BACKGROUND APPLIES TO CLASS I WHEELS
BLUE BACKGROUND APPLIES TO CLASS II WHEELS

CB-54

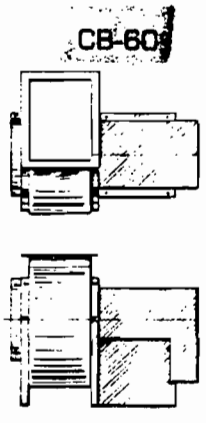


WHEEL 54¼" DIA
INLET 60" DIA

CLASS	MAX RPM
I	655
II	830

Volume of air CFM	¼" S.P. RPM	¼" S.P. BHP	½" S.P. RPM	½" S.P. BHP	1" S.P. RPM	1" S.P. BHP	1½" S.P. RPM	1½" S.P. BHP	2" S.P. RPM	2" S.P. BHP	2½" S.P. RPM	2½" S.P. BHP	3" S.P. RPM	3" S.P. BHP	3½" S.P. RPM	3½" S.P. BHP	4" S.P. RPM	4" S.P. BHP	4½" S.P. RPM	4½" S.P. BHP	5" S.P. RPM	5" S.P. BHP	5½" S.P. RPM	5½" S.P. BHP	6" S.P. RPM	6" S.P. BHP
13584	180	.86	220	1.48																						
15282	191	1.02	229	1.72	286	3.30																				
16980	204	1.23	239	2.00	302	3.66																				
18678	217	1.47	251	2.30	309	4.06	383	6.07																		
20376	231	1.74	263	2.62	311	4.52	389	6.58																		
22074	245	2.06	274	2.99	328	5.02	376	7.17																		
23772	258	2.42	287	3.41	338	5.58	383	7.82																		
25470	273	2.82	300	3.88	348	6.17	393	8.53																		
27168	288	3.25	313	4.39	360	6.78	403	9.30	441	11.8	480	14.6	518	17.6	554	20.6										
28866	303	3.77	327	4.88	372	7.47	412	10.1	451	12.8	488	15.8	523	18.6	557	21.9										
30564	318	4.31	341	5.58	383	8.17	422	11.0	460	13.8	495	16.7	529	19.8	562	23.0										
32262	333	4.88	354	6.27	396	8.86	434	11.9	470	14.8	504	17.9	536	21.0	569	24.4										
33960	348	5.52	366	6.99	409	9.62	446	12.9	480	16.0	513	19.1	544	22.4	576	25.7										
35658	364	6.28	383	7.78	422	10.7	458	13.8	490	17.2	523	20.4	554	23.8												
37356	380	7.16	398	8.64	435	11.7	469	14.9	502	18.4	533	21.9	563	25.3												
39054	396	8.08	412	8.56	448	12.8	482	18.1	514	18.6	543	23.3	573	26.9												
40752	411	8.19	428	10.6	463	13.9	495	17.3	526	20.9	555	24.8	583	28.5												
42450	428	10.3	443	11.6	479	15.2	508	18.7	538	22.4	566	26.3	593	30.3												
44148	444	11.5	458	12.7	490	16.5	521	20.1	550	23.9	578	27.9	604	32.1												
45846	461	12.7	474	13.9	503	17.8	534	21.7	562	25.8	590	29.6	619	33.8												
47544	477	14.0	489	18.2	517	18.3	548	23.3	575	27.2	602	31.4	629	35.8												
49242	494	15.4	505	16.7	532	20.8	561	24.9	588	29.0	614	33.3	639	37.7												
50940	510	14.8	520	18.2	546	22.5	575	28.7	601	31.8	626	35.3														
54366	543	20.3	552	21.8	576	26.0	602	30.7	629	35.1	652	39.6														
57732	576	23.9	583	25.6	606	30.1	630	34.9																		
61128	609	28.3	616	29.6	636	34.4																				

CB-60

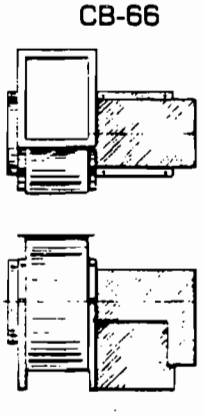


WHEEL 60" DIA.
INLET 66" DIA.

CLASS	MAX RPM
I	590
II	750

Volume of air CFM	¼" S.P. RPM	¼" S.P. BHP	½" S.P. RPM	½" S.P. BHP	1" S.P. RPM	1" S.P. BHP	1½" S.P. RPM	1½" S.P. BHP	2" S.P. RPM	2" S.P. BHP	2½" S.P. RPM	2½" S.P. BHP	3" S.P. RPM	3" S.P. BHP	3½" S.P. RPM	3½" S.P. BHP	4" S.P. RPM	4" S.P. BHP	4½" S.P. RPM	4½" S.P. BHP	5" S.P. RPM	5" S.P. BHP	5½" S.P. RPM	5½" S.P. BHP	6" S.P. RPM	6" S.P. BHP
14569	163	1.14	198	1.81																						
18639	173	1.25	207	2.11	268	4.04																				
20710	184	1.60	216	2.45	273	4.48																				
22781	196	1.80	226	2.81	280	4.87	329	7.42																		
24852	209	2.13	238	3.21	288	5.51	334	8.06																		
26923	221	2.53	248	3.66	296	6.15	340	8.78																		
28994	233	2.96	260	4.17	305	6.83	346	9.56																		
31065	247	3.45	271	4.75	315	7.55	355	10.4																		
33136	260	3.98	283	5.37	326	8.29	364	11.3	398	14.5	434	17.9	468	21.5	501	25.6										
35207	273	4.61	296	6.06	336	8.14	373	12.4	407	15.6	441	18.1	473	22.8	503	26.7										
37278	287	5.27	308	6.83	347	10.0	381	13.4	416	16.9	447	20.4	478	24.2	508	28.2										
39349	301	5.97	320	7.47	358	10.9	392	14.6	425	18.2	455	21.9	485	25.7	514	29.8										
41420	315	6.75	331	8.55	370	12.0	403	15.7	434	19.8	464	23.4	492	27.4	521	31.5										
43491	329	7.58	346	8.54	381	13.1	414	16.8	443	21.0	473	25.0	501	29.1												
45562	343	8.76	359	10.5	394	14.4	424	18.3	454	22.9	482	26.7	509	30.9												
47633	358	9.89	373	11.8	405	15.7	435	18.7	465	24.8	491	28.5	518	32.8												
49704	372	11.2	386	12.8	418	17.0	447	21.2	476	25.6	501	30.3	527	34.8												
51775	387	12.8	400	14.2	430	18.8	459	22.9	486	27.4	512	32.2	537	37.1												
53846	402	14.1	414	15.8	443	20.2	471	24.7	497	29.2	523	34.1	546	39.2												
55917	416	16.5	428	17.0	456	21.8	483	26.6	508	31.2	533	36.2	557	41.4												
57988	431	17.1	442	18.6	468	23.6	495	29.5	520	33.3	544	38.4	568	43.7												
60086	446	18.8	456	20.4	481	25.6	507	30.5	532	35.5	555	40.7	578	46.2												
62130	461	20.7	470	22.3	494	27.6	518	32.7	543	37.9	566	43.2	589	48.7												
88272	491	24.8	499	26.7	521	31.8	544	37.5	568	43.8	589	48.6														
70414	520	29.3	527	31.6	548	36.8																				
74566	550	34.7	557	36.4	576	42.1																				

CB-66



WHEEL 66" DIA
INLET 72" DIA

CLASS	MAX RPM
I	540
II	685

Volume of air CFM	¼" S.P. RPM	¼" S.P. BHP	½" S.P. RPM	½" S.P. BHP	1" S.P. RPM	1" S.P. BHP	1½" S.P. RPM	1½" S.P. BHP	2" S.P. RPM	2" S.P. BHP	2½" S.P. RPM	2½" S.P. BHP	3" S.P. RPM	3" S.P. BHP	3½" S.P. RPM	3½" S.P. BHP	4" S.P. RPM	4" S.P. BHP	4½" S.P. RPM	4½" S.P. BHP	5" S.P. RPM	5" S.P. BHP	5½" S.P. RPM	5½" S.P. BHP	6" S.P. RPM	6" S.P. BHP
20218	148	1.25	181	2.18																						
22743	167	1.61	188	2.55	244	4.89																				
25270	168	1.82	187	2.88	248	5.42																				
27797	179	2.18	208	3.40	255	6.01	299	8.98																		
30324	190	2.58	216	3.88	262	6.68	304	9.75																		
32951	201	3.06	226	4.43	269	7.45	309	10.6																		
35378	212	3.58	236	5.05	278	8.27	315	11.5																		
37905	224	4.17	247	5.74	286	9.14	323	12.6																		
40432	236	4.82	258	6.50	296	10.0	331	13.7	363	17.5	395	21.7	426	26.0	455	30.9										
42959	248	5.58	269	7.34	306	11.0	339	15.0	371	18.9	401	23.1	430	27.6	458	32.3										
45486	261	6.38	280	8.27	315	12.1	347	16.3	378	20.4	407	24.7	435	29.3	462	34.1										
48013	274	7.23	291	9.29	326	13.2	357	17.6	386	22.0	414	26.5	441	31.1	467	36.1										
50540	287	8.17	301	10.3	336	14.5	367	19.0	396	23.7	422	28.3	447	33.1	473	38.1										
53067	299	9.30	315	11.5	347	16.0	376	20.5	403	25.4	430	30.3	455	35.2												
55594	312	10.5	327	12.8	359	17.4	386	22.1	413	27.2	438	32.3	463	37.4												
58121	325	11.9	338	14.1	369	18.0	396	23.8	422	29.1	447	34.5	471	39.8												
60648	338	13.5	351	15.6	380	20.6	407	25.7	432	31.8	456	38.7	478	42.3												
63175	352	15.3	364	17.2	391	22.5	417	27.7	442	33.2	465	39.0	488	44.8												
65702	365	17.0	376	18.9	403	24.4	428	29.8	452	35.8	475	41.3	496	47.5												
68229	378	18.8	389	20.6	414	26.5	438	32.1	462	37.8	485	43.8	506	50.2												
70756	392	20.7	402	22.5	425	29.6	450	34.5	473	40.3	495	46.5	516	52.9												
73283	406	22.9	415	24.7	437	30.9	461	36.8	483	43.0	505	49.3	526	55.9												
75810	419	25.0	427	27.0	449	33.4	472	39.6	494	45.9	514	52.3	535	59.0												
80864	446	30.1	453	32.3	474	38.5	495	45.4	516	52.9	536	60.7														
85918	473	35.4	479	38.6	498	44.8	518	51.6																		
90972	500	42.0	505	44.4	523	51.0																				

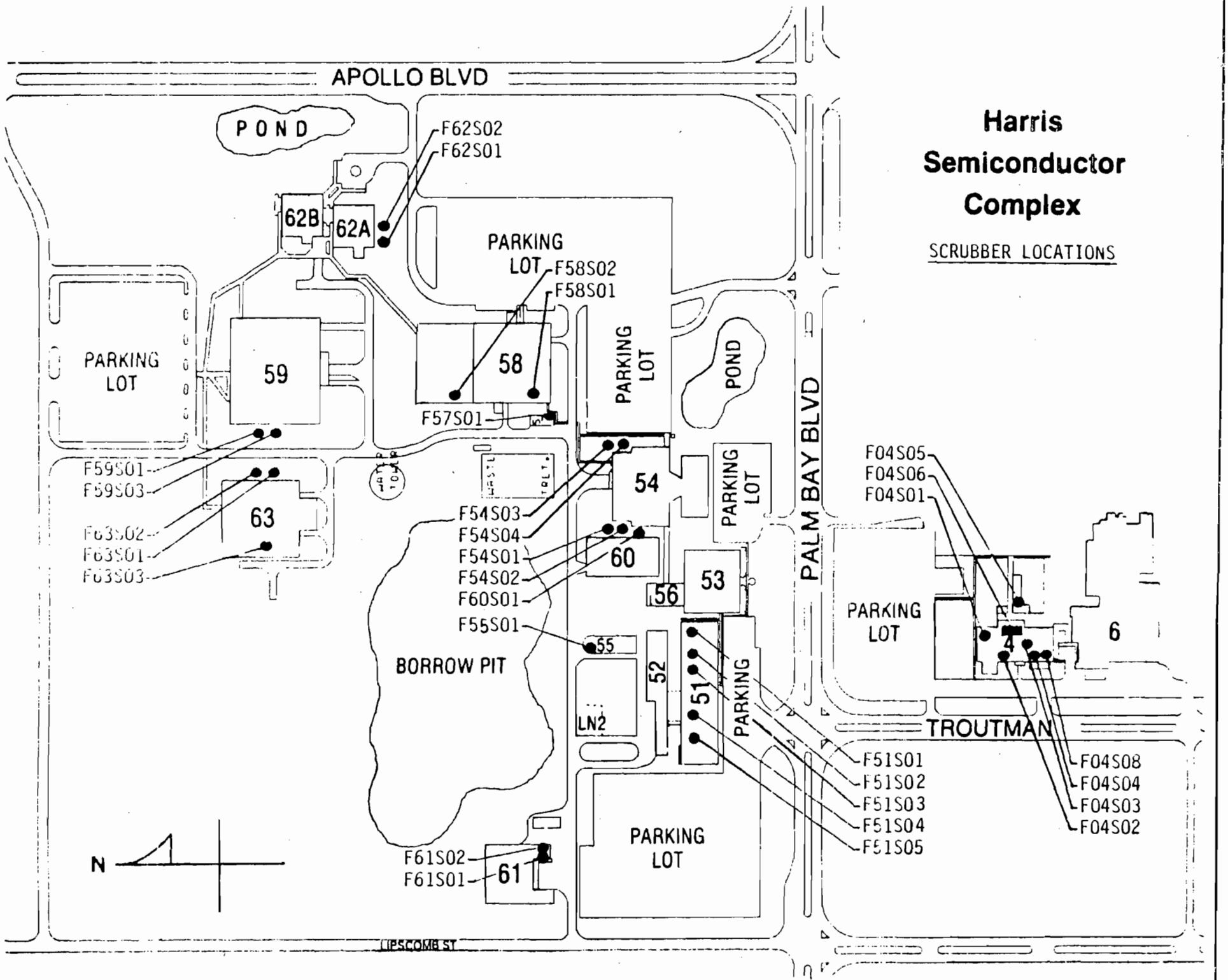
USE CAPACITY TABLES AS GUIDE ONLY

HARRIS SEMICONDUCTOR

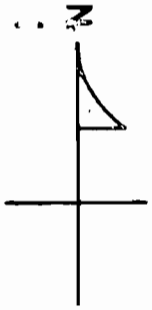
AIR PERMIT - BUILDING 63

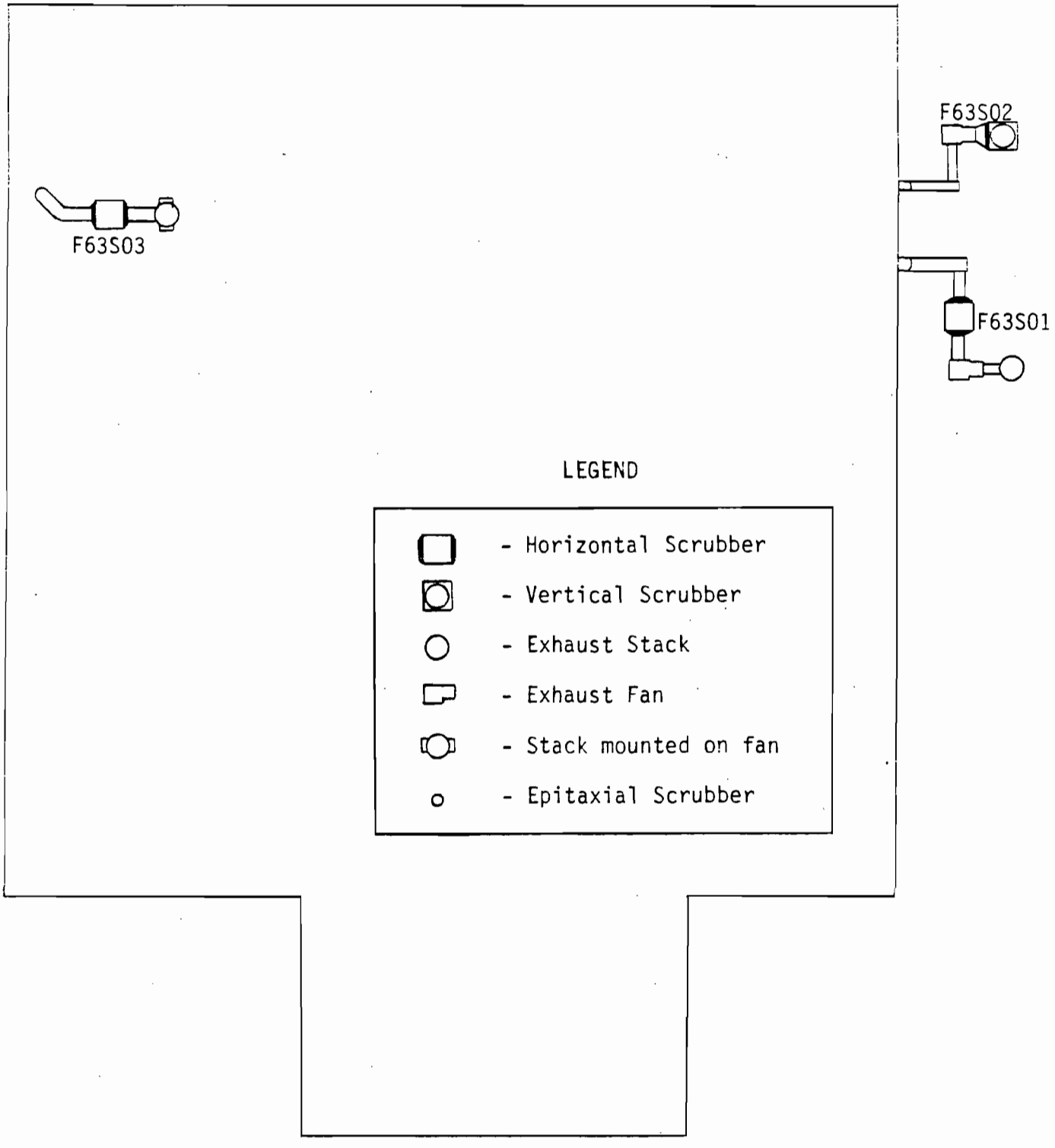
ATTACHMENT E

SITE LOCATION MAPS


Harris
Semiconductor
Complex
SCRUBBER LOCATIONS
APOLLO BLVD
POND
F62S02
F62S01
62B
62A
PARKING
LOT
F58S02
F58S01
PARKING
LOT
59
58
PARKING
LOT
POND
PALM BAY BLVD
F57S01
F04S05
F04S06
F04S01
F59S01
F59S03
54
PARKING
LOT
63
F63S02
F63S01
F63S03
F54S03
F54S04
F54S01
F54S02
F60S01
F55S01
60
53
56
PARKING
LOT
6
4
55
BORROW PIT
52
51
PARKING
LN2
TROUTMAN
F51S01
F51S02
F51S03
F51S04
F51S05
F04S08
F04S04
F04S03
F04S02
N
F61S02
F61S01
61
PARKING
LOT
LIPSCOMB ST

HARRIS SEMICONDUCTOR
SCRUBBER LOCATIONS
BUILDING 63





AC 05-157787

DEPARTMENT OF ENVIRONMENTAL REGULATION

WIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Stationary [ ] New[1] [X] Existing[1]

APPLICATION TYPE: [ ] Construction [ ] Operation [X] Modification

COMPANY NAME: HARRIS SEMICONDUCTOR COUNTY: Brevard

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) Building 62

SOURCE LOCATION: Street Palm Bay Road City Palm Bay

UTM: East 17 - 538700 North 17 - 3100900

Latitude 28 ° 01 ' 20 "N Longitude 80 ° 36 ' 10 "W

APPLICANT NAME AND TITLE: J. R. Kolanek, Manager Environmental Services

APPLICANT ADDRESS: M/S 59-006, P.O. Box 883, Melbourne, Florida 32901

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Harris Semiconductor

I certify that the statements made in this application for a modified 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: James R. Kolanek

J. R. Kolanek, Manager Environmental Services
Name and Title (Please Type)

Date: 10-28-88 Telephone No. (407) 724-7467

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 Lawrence R. Hutker

Lawrence R. Hutker
Name (Please Type)

HARRIS SEMICONDUCTOR
Company Name (Please Type)

M/S 59-006, P.O. Box 883, Melbourne, Florida 32901
Mailing Address (Please Type)

lorida Registration No. 35972 Date: 10-28-88 Telephone No. (407) 729-4655

SECTION II: GENERAL PROJECT INFORMATION

. 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.

This is a modification and consolidation of existing air permits.

3. Schedule of project covered in this application (Construction Permit Application Only)

Start of Conatruction N/A Completion of Construction N/A

. 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.)

N/A

. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

AO 05-121927; expires 9/14/91

AC 05-104513; expires 6/30/86

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? No

   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. No

3. Does the State "Prevention of Significant Deterioriation" (PSD) requirement apply to this source? If yes, see Sections VI and VII. No

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

   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		
----- SEE ATTACHMENT C ------				

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): not applicable

2. Product Weight (lbs/hr): not applicable

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	
----- SEE ATTACHMENT B -----							

[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)
----- SEE ATTACHMENT D -----				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ 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.

Waste water from air scrubbers is discharged to on-site waste water treatment plant; discharge to deepwell under UIC - Permit #UC05-126519.

--- SEE ATTACHMENT D ---

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: _____ ft. Stack Diameter: _____ ft.

Gas Flow Rate: _____ ACFM _____ DSCFM Gas Exit Temperature: _____ °F.

Water Vapor Content: _____ % Velocity: _____ FPS

SECTION IV: INCINERATOR INFORMATION

Type of Waste	Type 0 (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. Availaoility 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 devices, 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.

HARRIS SEMICONDUCTOR

AIR PERMIT – BUILDING 62

ATTACHMENT A

PROCESS DESCRIPTION

Attachment A

Building 62 is comprised of two units; building A and building B. Building B houses offices, a cafeteria, and conference rooms. The first floor of building A contains Semiconductor's research and development lab, and an analytical services laboratory, while a technical and prototype assembly lab reside on the second floor of the two-story building.

In the research and development laboratory, wafer fabrication processes (layering, patterning, doping and heating) are simulated. The goal of the lab is to develop new film processes for use in the on-site production of semiconductor wafers. These new operations may require new chemicals and equipment, as well as experimental wet chemistry techniques. The area resembles a small wafer fabrication area, with a variety of fab equipment being present. However, because this area is not used as a production area, the wet stations, coaters, developers, etchers, alligners, sputtering systems, and deposition furnaces, and associated burn boxes and pumps are present in low numbers.

The analytical services laboratory is responsible for physical and chemical characterization of microelectronic materials and products. A wide variety of analysis techniques are employed, including spectroscopy, separation methods, thermal analysis, and wet chemistry. The exhausted wet stations provide a safe location for analytical procedures involving wet chemistry.

For both of the above mentioned areas, gas cylinders that provide necessary process gases to the lab equipment are contained in exhausted gas cabinets located in the cases behind the appropriate area of use. Chemical storage cabinets hold virgin chemicals until they are ready for use.

In the technical lab on the second floor, electronic testing of new products (circuits that have not yet been released to the customer), and prototype assembly of circuits occurs. A relatively small number of equipment requiring exhaust exists in this area.

There are 19 wet stations located in the building. Approximately half of these stations house vats containing solvents. There are presently five stations containing heated vats; of these, four are acid stations, and one is a solvent station.

The exhaust for the building is divided between two scrubbers. Acid vapors are vented to scrubber number F62S01, while solvent exhaust streams are ducted to scrubber number F59S03. Both systems reside on the site grounds directly outside the south wall of building A (see site plan and scrubber location maps attached.)

HARRIS SEMICONDUCTOR

AIR PERMIT – BUILDING 62

ATTACHMENT B

AIR EMISSIONS

ACID MONITORING--BUILDING 62

Monitoring was performed on the building 62 acid scrubber F62S01 in August of 1988. Samples were collected using modified EPA method 8 sampling train. The impinger medium consisted of a 0.1 N sodium hydroxide solution. The analytical methodology utilized to determine the ions of highest concentration is as follows:

Chloride ion--EPA Method 325.3
Fluoride ion--EPA Method 340.2
Nitrate, phosphite, and sulfate ions--ion chromatography

All results were in pounds per hour as "X", where "X" represents the acid compound present in highest concentration.

The test results revealed that the total accumulative monitored acid emissions for the building were 0.2497 tons/year expressed as hydrochloric, hydrofluoric, nitric, phosphoric and sulfuric acids. This figure is based on a hypothetical production schedule of 8760 hours a year. The monitoring was performed over an 8 hour time interval when the full production was occurring.

When a resulting acid concentration was expressed as a "less than 'y' " value, where 'y' represents the lowest detectable limit possible using the analytical methodology employed, acid emissions were taken to be equal to this 'y' limit value.

RESULTS OF ACID MONITORING--BUILDING 62
PERFORMED IN AUGUST OF 1988

Scrubber #		HCl	HF	Nitric Acid	Phosphoric Acid	Sulfuric Acid	TOTAL (TON/YR
F62S01 outlet	(lb/hr)	0.0160	0.0040	0.0200	0.0120	0.0050	
	(ton/yr)	0.0701	0.0175	0.0876	0.0526	0.0219	0.249

TOTAL ACID EMISSIONS INTO SCRUBBER OUTLET = 0.2497 TONS/YEAR

SOLVENT MONITORING--BUILDING 62

Monitoring work was performed on the building 62 solvent scrubber system F62S02 during December of 1986 and August of 1987. Tests conducted include EPA methods 25A (flame ionization detection) and TO-1 (Tenax adsorption and GC/MS analysis.) The results of the testing is included in this application.

FID test results revealed that total accumulative monitored VOC emissions for the building were 0.83 tons/year expressed as propane. This figure is based on a hypothetical production schedule of 8760 hours a year. The following assumptions were made regarding monitoring work on this building:

-VOC values refer to all organic emissions including organic solvents.

-All data was corrected for 2 ppm background noise that is normally present in the ambient air.

-The F.I.D. accumulative emission figure is based on the maximum concentration of VOC's observed during the monitoring time frame.

EPA METHOD 25-A (F.I.D. ANALYSIS) BUILDING 62
VOC EMISSIONS DURING PRODUCTION HOURS

TEST DATE	SCRUBBER #	VOC EMISSIONS (TON/YR)
12/08/86	F62S02	MIN
08/17/87	F62S02	0.83

NOTE: ABOVE BASED ON ACTUAL OPERATING HOURS.

TOTAL VOC EMISSIONS FROM BUILDING 62
AS DETECTED BY EPA METHOD 25-A*

SCRUB#	PRODUCTN SCHEDULE	PRODUCTN EMISSIONS (TON/YR)
F62S02	8760	0.83

* Based on highest loading observed.

TOTAL PROJECTED VOC EMISSIONS FOR BLDG 62 = 0.83 TONS/YEAR

permitted
0.2 TPY @ 2112 hrs/yr

GC/MS:

AUGUST RESULTS-SCRUBBER NUMBER F62S02

ACETONE (LB/HR).....	2.86
TRICHLOROETHANE (LB/HR).....	0.04
METHYLENE CHLORIDE (LB/HR).....	---
TETRACHLOROMETHYLENE (LB/HR).....	trace
FREON-113 (LB/HR).....	1.19
CHLOROFORM (LB/HR).....	trace
BENZENE (LB/HR).....	trace
TRICHLOROETHYLENE (LB/HR).....	---
TOLUENE (LB/HR).....	trace
METHYL ISOBUTYL KETONE (LB/HR).....	---
ETHYL BENZENE (LB/HR).....	trace
XYLENES (LB/HR).....	trace

HARRIS SEMICONDUCTOR

AIR PERMIT – BUILDING 62

ATTACHMENT C

RAW MATERIALS AND CHEMICALS

HARRIS SEMICONDUCTOR
BUILDING 62 CONSOLIDATED AIR PERMIT
PROCESS CHEMICALS

ammonia
ammonium persulfate
acetic acid
ammonium chloride
ammonium fluoride
ammonium hydroxide
alkyl aryl sulfonic acid
benzene
benzidine dihydrochloride
boron tribromide
calcium carbonate
calcium sulfate
carbon tetrachloride
ceric ammonium nitrate
cupric sulfate
ceric sulfate
citric acid
carbon disulfide
chromium trioxide
carbon tribromide
chromic acid
chlorinated hydrocarbons
creosol
cyanide
DMAB
dodecylbenzene sulfonic acid
ethylene diamine tetraacetic acid
ethylene dichloride
ferric chloride
ferric cyanide
ferrous chloride
formic acid
ferric ammonium nitrate
glacial acetic acid
graphite
glycerine
gold chloride
hydrochloric acid
hydrofluoric acid
hydrogen peroxide
hydrocarbon propellant
iodine
isoparrafinic hydrocarbons
lead oxide
lead nitrate
nickel
(CONT.)

nitric acid
nickel sulfate
nickelous chloride
palladium
pump oil
piperidine
perchloric acid
potassium dichromate
potassium ferricyanide
potassium ferricyanide trihydrate
potassium hydroxide
potassium cyanide
potassium iodide
potassium permanganate
potassium phosphate monobasic
palladium chloride
potassium nitrate
P-toluene sulfonic acid
potassium 2-chloro-4-nitrobenzoate
phosphorus oxychloride
phosphoric acid
parrafinic grease
sodium persulfate
sodium hypophosphite
silver chloride
sodium hypochlorite
sulfuric acid
silanamine
sodium thiosulfate
sec-butanol
silicone
sodium chloride
p-toluene sulfonic acid
1,2,4 trichlorobenzene
tetra methyl ammonium hydroxide
zinc chloride

HARRIS SEMICONDUCTOR
BUILDING 62 CONSOLIDATED AIR PERMIT
PROCESS SOLVENTS

acetone
aromatic phenol
alkanolamine
n-butyl acetate
2-butoxy ethanol
bis ether
butanol
bromotrifluoromethane
cellosolve acetate
chlorothene
carbon tetrachloride
chloroform
dichlorodifluoromethane
dimethyl formamide
diethylene glycol monobutyl ether
dibutyl phthalate
1,2-dichloroethane
2-ethyl-1,3-hexanediol
2-ethoxyethyl acetate
ethylene glycol monobutyl ether acetate
ethylene glycol monomethyl ether
ethanol
ethacol
ethylene diamine
ethylene glycol
ethanolamine
ethyl acetate
freon TF
freon 12
formaldehyde
freon 14
freon T-WD 602
freon TA
freon TMS
glycol ether
hexane
hexamethyldisilazane
isopropyl alcohol
5-methyl-2-hexanone
methyl ethyl ketone
methyl T butyl ether
monoethanolamine
1-methoxy-2-propanol
2-methoxy-1-propanol
methanol
n-methyl-2-pyrrolidone

(CONT.)

oxyphenol polyethoxylate
propylene glycol methyl ether acetate
2-pentanone
petroleum ether
sec-butyl alcohol
tetraethyl orthosilicate
trimethyl borate
trimethyl phosphite
toluene
trichlorotrifluoroethane
tetrafluoromethane
tetramethyl ammonium hydroxide
trichlorotrifluoroethane
1,1,2-trichloro-1,2,2 trifluoroethane
1,1,1 trichloroethane
1,2,4 trichlorobenzene
1,1,1 trimethyl-n-trimethyl ether
trichloroethylene
xylene

HARRIS SEMICONDUCTOR
BUILDING 62 CONSOLIDATED AIR PERMIT
PROCESS GASSES

arsine
carbon dioxide
nitrogen
potassium hydroxide
propane
argon
nitrous oxide
oxygen
silane
helium
acetylene
hydrogen
phosphine
ammonia
dichlorosilane
chlorine
freon 115
freon 116
freon 14
germanium tetrafluoride
halocarbon 13-B1
halocarbon 23
sulfur hexafluoride
carbon tetrafluoride
trifluoromethane
nitrous oxide
nitrogen trifluoride
phosphorous pentafluoride
phosphorus trifluoride
tungsten hexafluoride

HARRIS SEMICONDUCTOR

AIR PERMIT - BUILDING 62

ATTACHMENT D

CONTROL EQUIPMENT

HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 62
PERMIT NUMBER: AO 05-121927
PERMIT TYPE : OPERATING

DATE ISSUED : 09/18/86
RENEWAL DATE: 07/16/91
DATE EXPIRES: 09/14/91

AREA SERVED:
PROCESS DESCRIPTION: ACID VAPOR SCRUBBER

PERMIT LIMITS

VOL. RATE (SCFM): 24,000
ACID MIST (LB/HR): 0.0537
SOLVENTS (LB/HR): --
VOCS (LB/HR): --
OPER. (HRS/YEAR): 2112

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT : 03/01
NOTIFICATION OF VE TEST : 10/26
ANNUAL VIS EMISSION TEST: 11/10

EQUIPMENT INFORMATION

MANUFACTURER : BEVERLY PACIFIC
MODEL NUMBER : PS-24HT
LOCATION : B62 GROUND SOUTHWEST CORNER
HARRIS ID NUMBER : F62S01
VOLUME FLOW RATE (CFM): 24,000
RECIRCULATION RATE (GPM): 105
MAKEUP WATER RATE (GPM): 10.0
STACK HEIGHT (FT): 35
STACK DIAMETER (IN): 28
STACK VELOCITY (FPM):
DUCT MATERIAL :

PERMIT HISTORY

PERMIT NUMBER: AC 05-54994
DATE EXPIRED : 06/00/84

PERMIT NUMBER: AC 05-104514
DATE EXPIRED : 06/30/86

PERMIT NUMBER:
DATE EXPIRED :

SCRUBBER INFORMATION

HARRIS ID # : F62S01
MANUFACTURER : BEVERLY PACIFIC MODEL NUMBER : PS-24HT
SERIAL NUMBER: F-600 MATERIAL : FIBERGLASS
DESCRIPTION : HORIZONTAL CROSS FLOW, NON-CLOGGING PVC SPRAY NOZZLES, POLYPROPYLENE PACKING, PVC MIST ELIMINATOR, DWG. F-600-3

DESIGN DATA
VOLUME FLOW RATE (CFM): 24,000 PRESSURE DROP (IN):
RECIRCULATION RATE (GPM): 105 MAKE UP RATE (GPM): 10

ACTUAL DATA
VOLUME FLOW RATE (CFM): PRESSURE DROP (IN): N/E DATE: 06/03/87
RECIRCULATION RATE (GPM): 58 MAKE UP RATE (GPM): 7.5 DATE: "

RECIRCULATION PUMP INFORMATION

MANUFACTURER : FILTER PUMP IND MODEL NUMBER : 35G 205-672
SERIAL NUMBER: F 1081 HP : 2 RPM : 3450
BRKR LOCATION: NEXT TO UNIT FED FROM MCC : DEM

FAN INFORMATION

HARRIS ID # :
MANUFACTURER : BEVERLY PACIFIC MODEL NUMBER: CB-40
SERIAL NUMBER: F-600 MATERIAL : FIBERGLASS
DESCRIPTION : CENTRIFUGAL TYPE, CLASS II, BACKWARD CURVED BLADES, DWG. F-600-3

DESIGN DATA
VOLUME FLOW RATE (CFM): 21,000 STATIC PRESS (IN): 5.0

ACTUAL DATA SPEED (RPM): 936 DATE: SUBMITTAL
VOLUME FLOW RATE (CFM): STATIC PRESS (IN): DATE:

FAN MOTOR INFORMATION

MANUFACTURER : MODEL NUMBER :
SERIAL NUMBER: HP : 40 RPM :
BRKR LOCATION: FS62A2 FED FROM MCC : DEM #11

Attachment :

HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 62
PERMIT NUMBER: AC 05-104513
PERMIT TYPE : CONSTRUCTION

DATE ISSUED : 01/15/86
RENEWAL DATE: 04/01/86
DATE EXPIRES: 06/30/86

AREA SERVED:
PROCESS DESCRIPTION: VOC/SOLVENT SCRUBBER

PERMIT LIMITS

VOL. RATE (SCFM): 12,000
ACID MIST (LB/HR): --
SOLVENTS (LB/HR): 0.0537
VOCS (LB/HR): --
OPER. (HRS/YEAR): 2112

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT :
NOTIFICATION OF VE TEST :
ANNUAL VIS EMISSION TEST:

EQUIPMENT INFORMATION

MANUFACTURER : BEVERLY PACIFIC
MODEL NUMBER : PS-12VT
LOCATION : B62 GROUND SOUTHWEST CORNER
HARRIS ID NUMBER : F62S02
VOLUME FLOW RATE (CFM): 12,000
RECIRCULATION RATE (GPM): 45
MAKEUP WATER RATE (GPM): 4.0
STACK HEIGHT (FT): 35
STACK DIAMETER (IN): 31
STACK VELOCITY (FPM):
DUCT MATERIAL :

PERMIT HISTORY

PERMIT NUMBER: AC 05-54992
DATE EXPIRED : 06/00/84

PERMIT NUMBER: AC 05-104513
DATE EXPIRED : 06/30/86

PERMIT NUMBER:
DATE EXPIRED :

SCRUBBER INFORMATION

HARRIS ID # : F62S02
MANUFACTURER : BEVERLY PACIFIC MODEL NUMBER : PS-12VT
SERIAL NUMBER: F-600 MATERIAL : FIBERGLASS
DESCRIPTION : VERTICAL COUNTER-CURRENT, NON-CLOGGING PVC SPRAY NOZZLES, POLYPROPYLENE PACKING, PVC MIST ELIMINATOR, DWG. F-600-4

DESIGN DATA
VOLUME FLOW RATE (CFM): 12,000 PRESSURE DROP (IN):
RECIRCULATION RATE (GPM): 45 MAKE UP RATE (GPM): 4.0

ACTUAL DATA
VOLUME FLOW RATE (CFM): 10,235 PRESSURE DROP (IN): 0.8 DATE: 12/08/86
RECIRCULATION RATE (GPM): 40 MAKE UP RATE (GPM): 3 DATE: 06/03/87

RECIRCULATION PUMP INFORMATION

MANUFACTURER : FILTER PUMP MODEL NUMBER : 35G 205X504
SERIAL NUMBER: P18904 HP : 1.5 RPM : 3450
BRKR LOCATION: NEXT TO UNIT FED FROM MCC : DEM

FAN INFORMATION

HARRIS ID # :
MANUFACTURER : BEVERLY PACIFIC MODEL NUMBER: CB-27
SERIAL NUMBER: F-600 MATERIAL : FIBERGLASS
DESCRIPTION : CENTRIFUGAL TYPE, CLASS II, BACKWARD CURVED BLADES DWG. F-600-4

DESIGN DATA
VOLUME FLOW RATE (CFM): 8,500 STATIC PRESS (IN): 6.0

ACTUAL DATA SPEED (RPM): 1483 DATE: SUBMITTAL
VOLUME FLOW RATE (CFM): 10,235 STATIC PRESS (IN): DATE: 12/08/86

FAN MOTOR INFORMATION

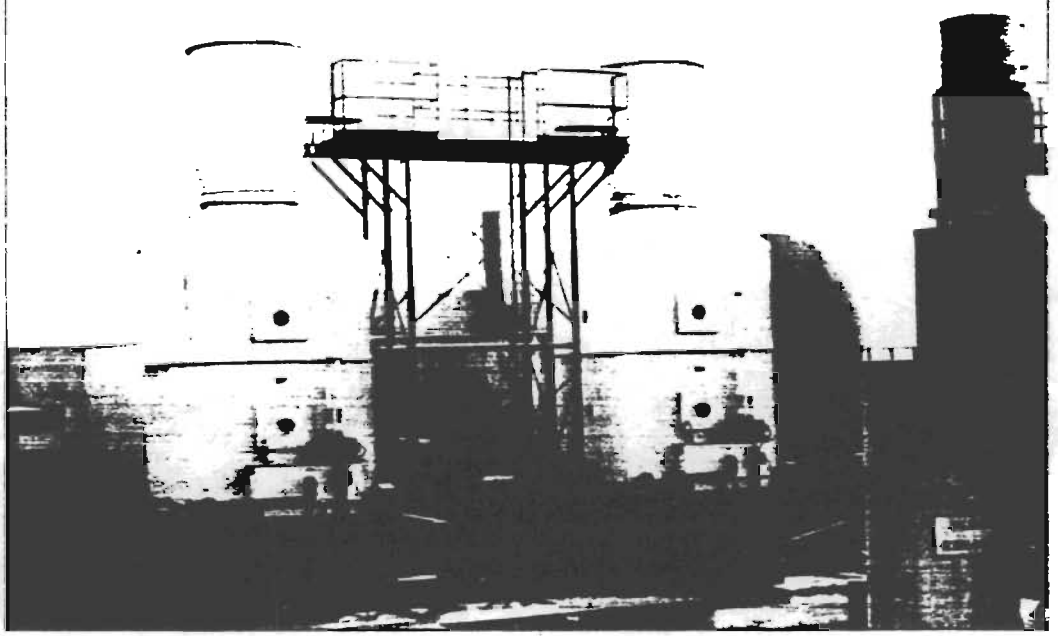
MANUFACTURER : MODEL NUMBER :
SERIAL NUMBER: HP : 20 RPM :
BRKR LOCATION: FS62A1 FED FROM MCC : DEM #3

Attachment :

[redacted]

BEVERLY PACIFIC CORPORATION

SCRUBBERS



FIBERGLASS REINFORCED PLASTIC

COMPUTERIZED PACKING MEDIA SELECTION

The most common mistake made by scrubber manufacturers today is the use of only one type of packing media for all types of contaminant removal. Beverly Pacific Corporation scrubbers are designed with a computer program assist to determine the most beneficial packing media to achieve high removal efficiency coupled with low pressure drop providing the user with the ultimate in lower operating costs consistent with the contaminant removal requirements.

SCRUBBER CONFIGURATIONS

Beverly Pacific Corporation manufactures scrubbers of both crossflow and counter-current configurations.

The CROSSFLOW design is of low profile, rectangular shape wherein the contaminated air stream moves horizontally through the packing media and is scrubbed by the liquid flowing downward through the packing. This configuration is ideal for roof-top mounting and is available in ten (10) standard sizes with or without integral centrifugal fans.

The COUNTER-CURRENT design is offered in two (2) configurations, round or rectangular. While the round tower unit is the most economical in initial cost, the rectangular tower unit permits larger CFM volume using the same amount of floor space. In the counter-current design, the contaminated airstream flows up through the packing media and is scrubbed by the liquid flowing downward. The round and rectangular tower units are each offered in ten (10) sizes and are available with or without integral inline or centrifugal fans.

SCRUBBER MAKE-UP WATER CONSUMPTION

Beverly Pacific's scrubber design is based on a scrubbing liquid recirculation rate of 5 GPM per 1000 CFM of contaminated air. Of that 5 GPM, losses due to absorption and/or evaporation range from 0.2 GPM to 0.6 GPM, depending on inlet gas temperature and gas stream dust load.

ENTRAINMENT SEPARATION

The unique design of Beverly Pacific's mist eliminator section provides up to 99+% moisture particle entrapment at a pressure drop of approximately 0.5" W.G.

CONSTRUCTION

The structural housings are fabricated of Fiberglass Reinforced Plastic (FRP) materials which provide structural strength, are corrosion-resistant and light in weight. Resin selection depends on the corrosive element involved. Resins can also be of fire-retardant grade if required. Our construction technique employs the use of female molds resulting in an extremely smooth, attractive, gelcoated exterior surface (note the upper right photo on the facing page). Beverly Pacific Corporation's construction methods meet or exceed the requirements of NBS-PS 15-69 for custom contact-molded reinforced polyester chemical resistant process equipment.

OPTIONAL EQUIPMENT, FITTINGS AND ACCESSORIES

FITTINGS, such as drain, overflow, make-up water, access doors, etc. can usually be located to facilitate installation and maintenance.

RECIRCULATION RESERVOIR(S) are normally an integral part of the scrubber but, if required, can be furnished for remote installation.

RECIRCULATION PUMP(S) can be located within the built-in reservoir, but can also be installed in remote reservoir units.

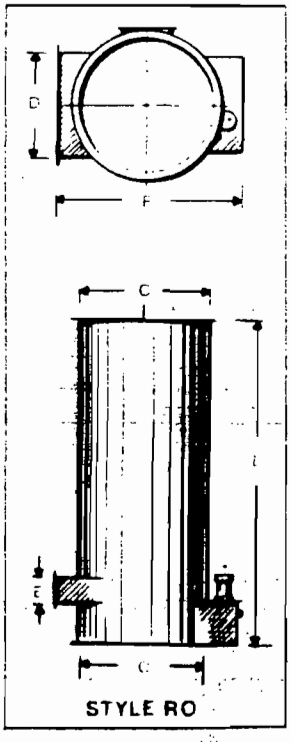
SPECIAL RESERVOIR(S) can be furnished in applications where it is necessary to remove non-soluble particulate accumulation to prevent pump damage and minimize maintenance.

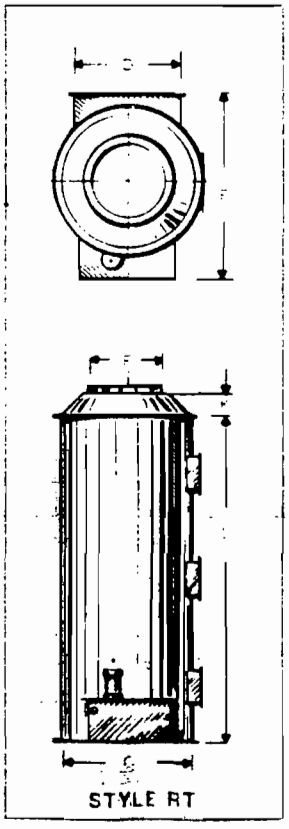
pH CONTROL SENSING/METERING equipment can be provided where contaminate absorption requires the addition of acid or caustic to the recirculated scrubbing liquid.

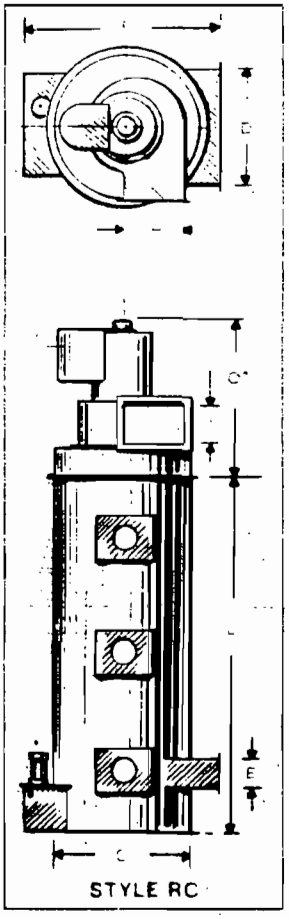
PACKED SCRUBBER DIMENSIONAL CHART

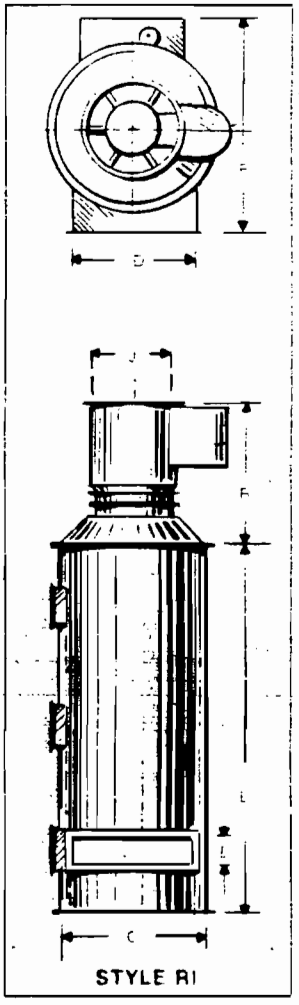
MODEL NUMBERS
DIMENSIONS IN INCHES

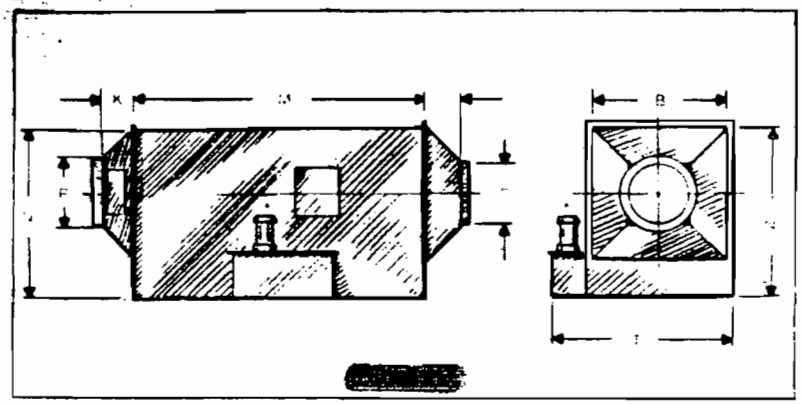
	PS-2	PS-4	PS-6	PS-8	PS-12	PS-18		PS-30	PS-40	PS-50
A	78	82	84	94	101	108		114	118	118
B	24	36	42	48	60	72		96	108	120
C	28	40	48	58	72	84		108	120	136
D	22	34	40	46	58	70		92	104	116
E	6	8	10	11	12	16		20	24	24
F	46	58	66	76	90	102		126	138	154
G	42	54	60	66	78	90		114	126	138
H	13⅜	16⅜	22½	26¼	29⅛	35¼		47¼	52⅜	63⅞
I	10⅜	12⅞	17	20½	22¾	27		37½	40½	49½
J	18	22	28	34	38	45		62	66	80
K	6	8	10	10	12	16		20	24	24
L	84	87	89	104	112	118		124	128	128
M	64	64	70	77	89	102		102	114	114
N	35	49	55	62	76	88		116	128	142
O	38	52	58	65	79	91		119	131	145
P	14	16	22	26	30	36		50	54	66
Q	45	50	61	64	68	72		86	93	103
R	35	44	55	65	75	85		108	120	141
S	46	52	59	69	72	79		97	100	110
T	36	48	54	60	72	84		108	120	132
WHEEL DIA.	12¼	15	20	24½	27	33		44½	49	60
CFM x 1000	1-2	2-4	4-6	6-8	8-12	12-18		24-30	30-40	40-50
RECIRC. GPM	7	15	25	35	45	75		*135	175	225
MAKE-UP GPM	0.7	1.5	2.0	3.0	4.0	7.0		13.0	17.0	22.0
HT OP. WT.	388	745	1110	1570	2690	4085		7595	11790	16040
HT SHIP WT.	220	385	550	770	1210	1925		3795	5390	7040
VT OP. WT.	318	660	1060	1500	2630	3910	5470	7400	11650	15800
VT SHIP WT.	150	300	500	700	1150	1750	2550	3600	5250	6800

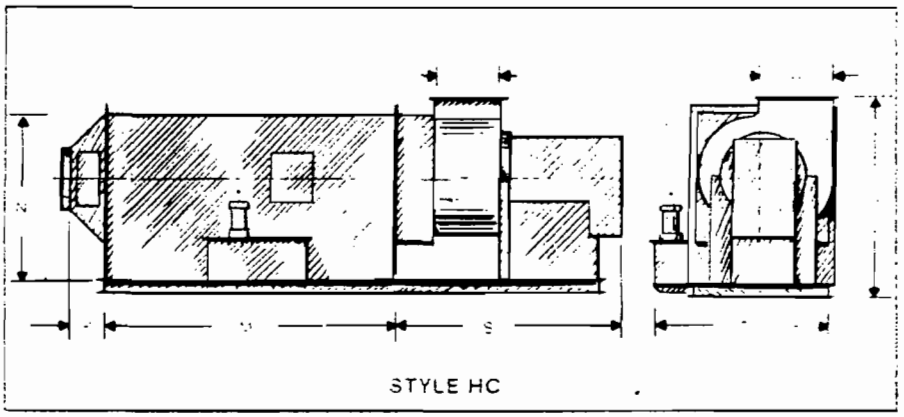




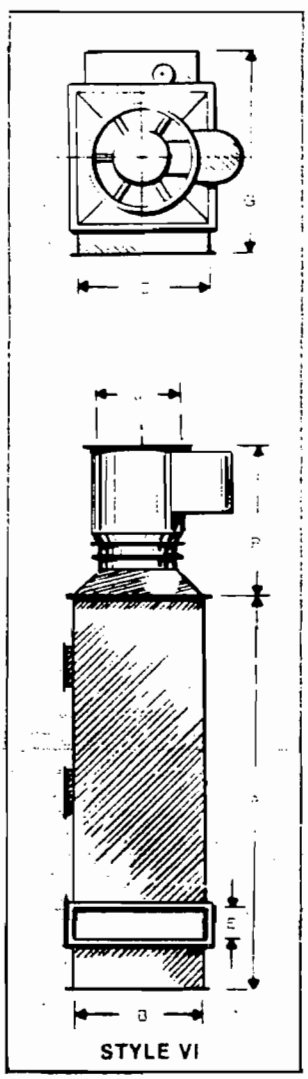


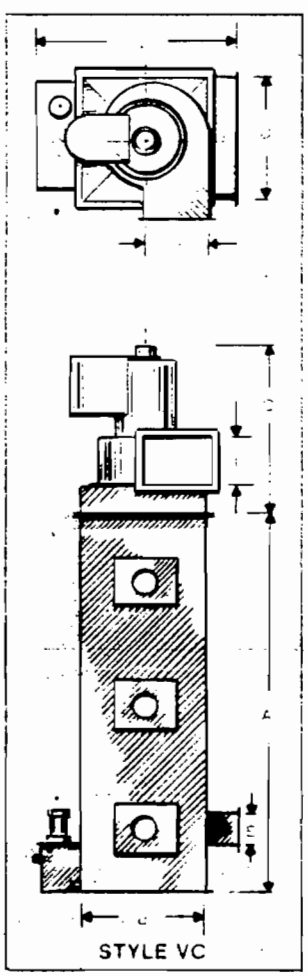


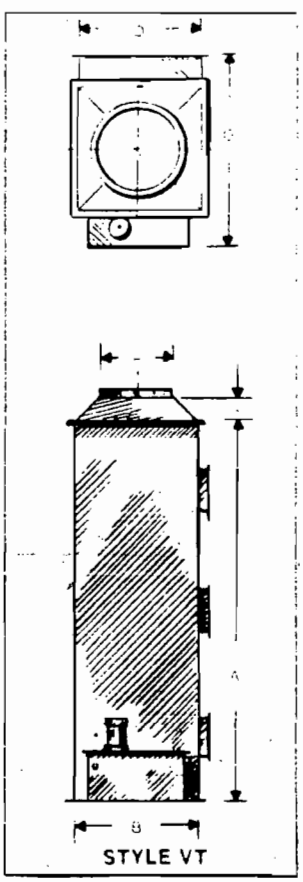


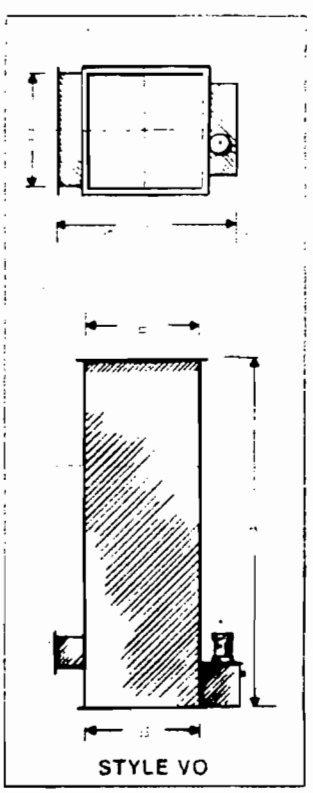


*May require one or more pumps.









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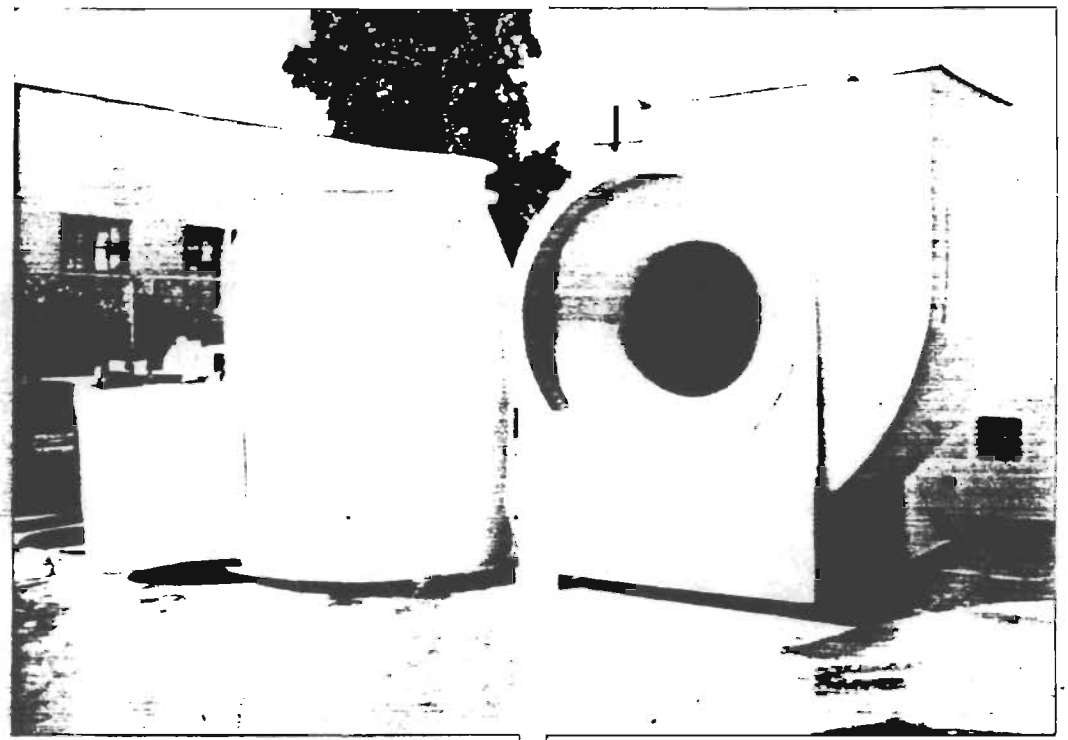
BEVERLY PACIFIC CORPORATION

Industrial Systems Division

EXHAUST FANS



FIBERGLASS REINFORCED PLASTIC

EXHAUST FAN INTRODUCTION

Beverly Pacific's complete line of centrifugal and inline exhaust fans have proven their reliability with years of successful, continuous corrosive service throughout the nation and around the world.

Our solid "FRP" construction defies corrosion and each is designed to provide smooth, quiet and maintenance-free operation . . . this superior combination permits peak performance with the lowest possible power consumption.

A wide selection of standard models, types and sizes are available to meet your specific requirements.

FAN WHEEL SUPERIORITY

The Beverly Pacific fan wheels are fabricated of corrosion-resistant Fiberglass Reinforced Plastic (FRP) materials. The fan wheel design is that of a "backward curve blade," Class II construction, and are available in standard sizes of 12¼" through 66" diameters.

All of Beverly Pacific's fan wheels are both statically and dynamically balanced and run on a test stand prior to final assembly to insure continuous, vibration-free performance.

Every surface in contact with the air stream is corrosion resistant. The steel hub (providing the positive-lock connection to the drive shaft) is totally encapsulated in the wheel laminate and even the weight added during the wheel balancing process is corrosion resistant, Fiberglass Reinforced Plastic materials.

Should your particular requirement involve moving a volume of only a few hundred CFM at ¼" S.P. or over 80,000 CFM at 6" S.P., Beverly Pacific has a proven standard size to meet your requirement.

EXHAUST FANS STANDARD AND OPTIONAL EQUIPMENT

Standard Equipment: Beverly Pacific's centrifugal fans are equipped with a scroll bottom drain and flanged discharge outlet, and are furnished with a purchaser's choice of twelve (12) discharge outlet directions and a choice of right or left fan wheel rotation. Both of our fan styles, centrifugal and inline, are equipped with an OSHA approved belt guard and powered by 230-460/30/60 Hz motors . . . totally enclosed, fan-cooled, (TEFC) up to 20 horsepower, and Multi-guard motors are furnished when horsepower requirements are 25 or larger. Also, as standard equipment, Beverly Pacific furnishes the following list of first-line, top quality drive components which were selected based on motor horsepower, RPM, tip speed and weight of fan wheel, with a safety factor of 1.3 times the motor horsepower.

a. BEARINGS — Beverly Pacific furnishes Dodge-Type K pillow blocks on the inline model. These Dodge bearings have Timken-tapered roller bearings, are fully self-aligning and designed to meet the stringent demands of power transmission. Based on radial and thrust load computations, bearing life expectancy is in excess of 100,000 hours.

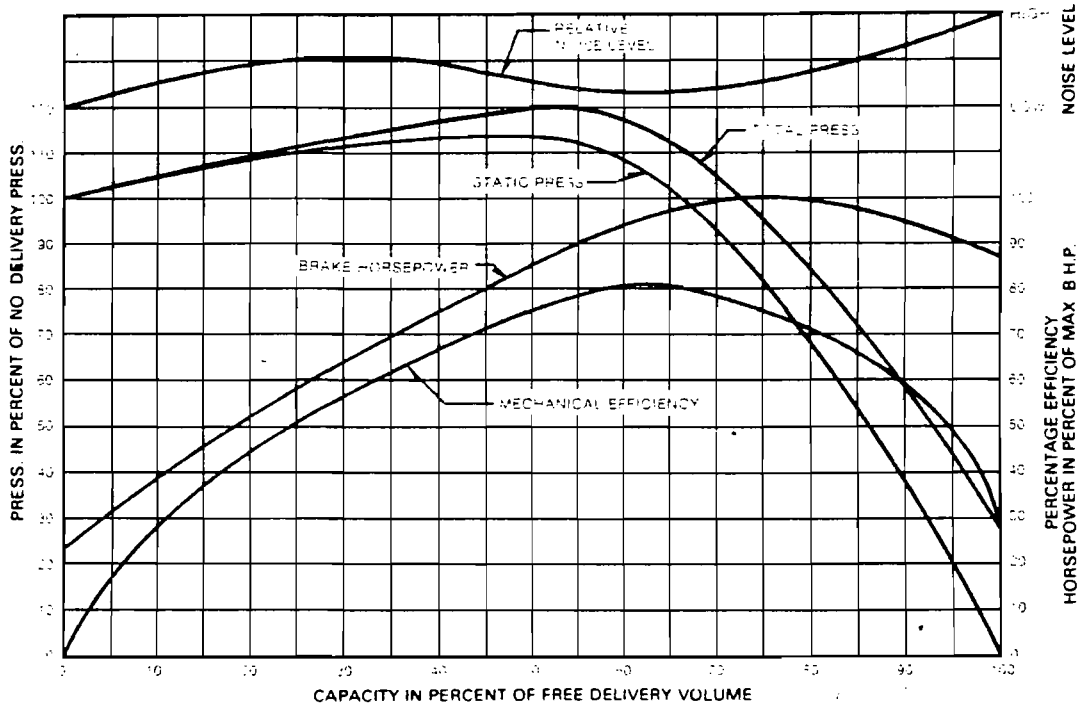
b. SHEAVES — Beverly Pacific Corporation furnishes Dodge sheaves, which are cast from the finest quality gray iron and machined to rigid quality control specifications. Groove design and spacing conforms to ASA, MPTA and RMA standards. These sheaves are equipped with Taper-Lock bushings, a superior mounting well recognized and widely used in industry.

c. V-BELTS — Beverly Pacific furnishes Dodge Sealed-Life Belts, Type A, B and C which have a longer wearing protective cover, crowned top, concave sidewall, exceptional stability and an improved cord section which prevents failures caused by cord separation.

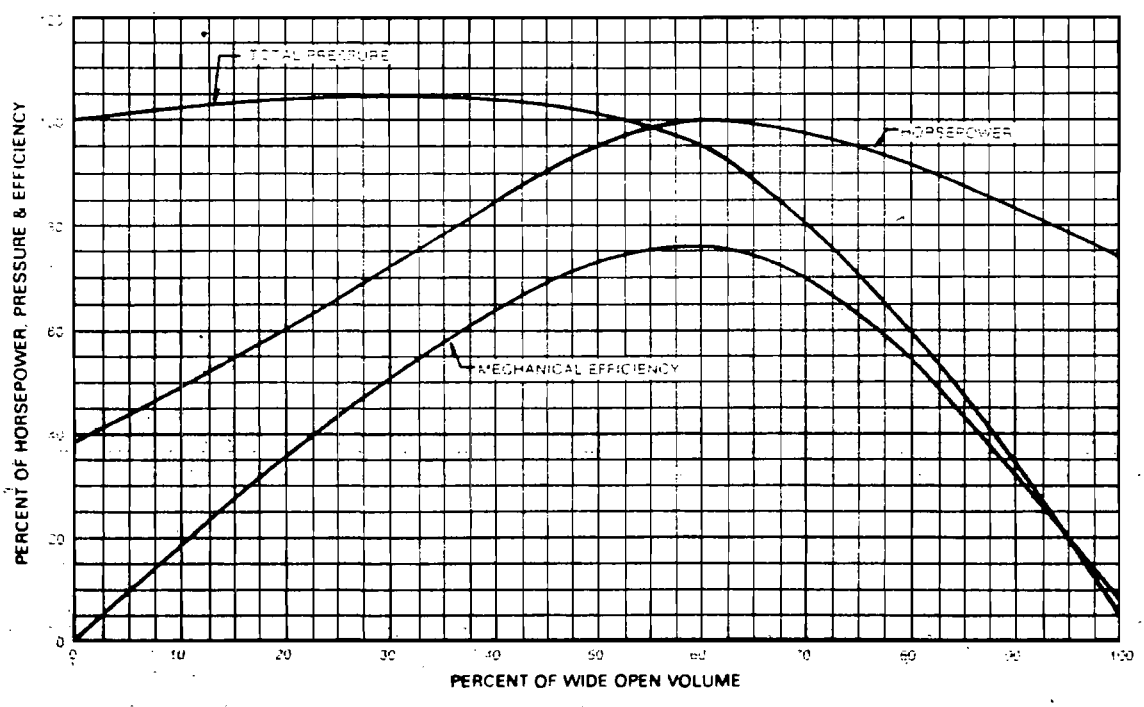
d. WHEEL BACKING PLATES — Beverly Pacific uses Rex taper-lock, single-duty, Type B, steel sprocket, in the backing plate of all FRP fan wheels. This steel sprocket is completely embedded and encased with FRP materials to prevent corrosion attack.

e. DRIVE SHAFTS — Beverly Pacific uses ground and polished, 1045 TGP shafting rounds, as produced by Inland Steel. This medium carbon steel is used because of its greater strength and hardness. The mechanical properties, based on ¾" — 1¼" diameter round bars of 1045, include a tensile strength of 98,000 PSI, yield strength of 59,000 PSI and a Brinnel Hardness of 212.

BEVERLY PACIFIC CORPORATION
CENTRIFUGAL FAN CHARACTERISTIC CURVE



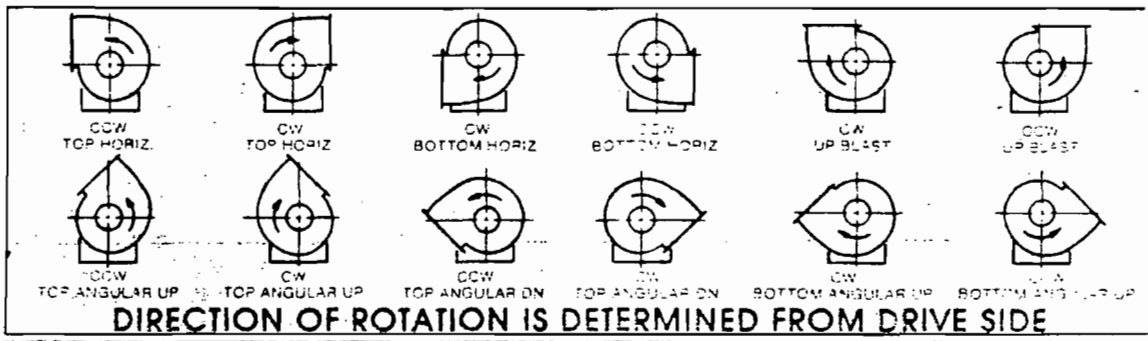
BEVERLY PACIFIC CORPORATION
INLINE FAN CHARACTERISTIC CURVE



CENTRIFUGAL INDUSTRIAL EXHAUST FANS

	CB-12	CB-13	CB-15	CB-16	CB-18	CB-20	CB-22	CB-24	CB-27	CB-30	CB-33	CB-36
MID-RANGE CFM RECOMMENDED	2,150	2,625	3,200	3,900	4,750	5,800	7,075	8,650	10,550	12,875	15,700	19,150
FAN WHEEL DIAMETER	12¼	13½	15	16½	18¼	20	22¼	24½	27	30	33	36½
A	13½	14½	16½	18¼	20	22	24½	26	29¼	32¼	36	40
B	10⅝	11⅝	12⅞	14⅜	15	17	18¾	20½	22¾	25	27	30
C	13⅜	14⅞	16⅜	18⅜	20	22½	24	26¼	29½	32	35¼	39
D	34¼	35¼	40 7/16	42 7/16	45	47¾	54	57¼	61½	64¾	68¾	69¾
E	22¼	22½	27¼	29¾	32⅜	36½	39¼	43¼	49	53	58¾	65¼
F	15	16	18	19	20	23	26	28	30	33	36	51½
G	11	11½	12½	14	15½	17¼	19	21½	23	25½	28½	30½
H	13⅜	14⅞	15⅞	17⅞	18	21	22¾	24½	26¾	29	31	34
I	16	16	18¼	18¾	20	20½	23	23	25	26	26	26
J	3	3	4	4	4	4	6	6	6	6	6	6
K	9¼	10¼	11¼	12½	13½	15	16	18	20½	22	24	27
L	9¼	10¼	11¼	12½	13½	15	16	18	20½	22	24	27
M	3½	3¾	4¼	4½	5	5¾	6⅞	6⅞	7⅞	8¼	9½	10¼
DRIVE SHAFT DIAMETER	1	1	1 3/16	1 3/16	1 7/16	1 7/16	1 11/16	1 11/16	1 15/16	1 15/16	1 15/16	2 3/16
SHIPPING WEIGHT POUNDS	170	205	230	400	550	600	650	720	850	1,000	1,380	1,610

DESIGNATION OF DIRECTION OF ROTATION AND DISCHARGE



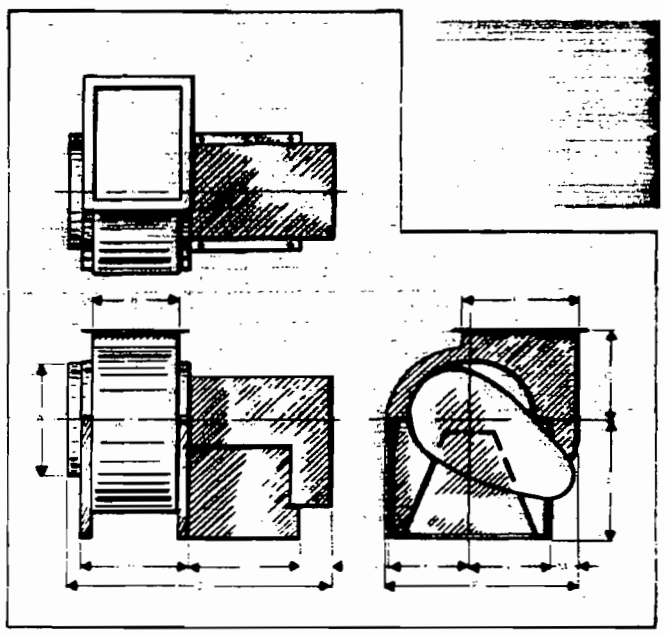
DIRECTION OF ROTATION IS DETERMINED FROM DRIVE SIDE

INLINE EXHAUST FANS

	IB-12	IB-15	IB-18	IB-20	IB-22	IB-24	IB-27	IB-30	IB-33	IB-36	IB-40	IB-44
MID-RANGE CFM RECOMMENDED	2,550	3,842	4,848	5,814	6,948	8,424	10,242	12,644	15,300	18,718	22,761	27,822
FAN WHEEL DIAMETER	12¼	15	18¼	20	22¼	24½	27	30	33	36½	40½	44½
P	21"	28"	32½"	36½"	40"	47"	53"	55"	58"	63¾"	70"	78"
Q	14"	18"	20"	22"	24"	26"	30"	32"	36"	42"	46"	50"
R	18"	22"	26"	28"	32"	34"	38"	42"	45"	50"	56"	62"
S	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	3"
T	23"	28"	31"	32"	34"	35"	37"	39"	40½"	45"	52"	63"
U	2"	2"	2"	2"	2"	3"	3"	3"	3"	3"	3"	3"
DRIVE SHAFT DIAMETER	1	1 3/16	1 7/16	1 7/16	1 11/16	1 11/16	1 15/16	1 15/16	1 15/16	2 3/16	2 3/16	2 7/16
SHIPPING WEIGHT POUNDS	90	130	290	320	350	380	450	525	730	880	1,110	1,250

DIMENSIONAL CHART

CB-44	CB-49	CB-54	CB-60	CB-66	
28,525	34,775	42,450	51,775	63,175	MID-RANGE CFM RECOMMENDED
44½	49	54¼	60	66	FAN WHEEL DIAMETER
49	54	60	66	72	A
37½	40¾	44¾	49¾	54¾	B
47¼	52⅝	57⅝	63⅞	70¼	C
84¾	88	93	97⅞	104⅞	D
79½	88¼	97	108	119	E
49¾	49	54	59	64	F
37½	41	46	50½	55	G
43½	48¾	50¾	53¾	60¾	H
29½	29½	31¼	33	33	I
8	8	8	8	8	J
26¼	30	34	37	40	K
26¼	30	34	37	40	L
12¼	14⅝₁₆	15⅝₁₆	17⅝	19⅞	M
2⅞₁₆	2⅞₁₆	2¹⅝₁₆	2¹⅝₁₆	2¹⅝₁₆	DRIVE SHAFT DIAMETER
2,300	2,650	3,110	3,525	4,000	SHIPPING WEIGHT POUNDS



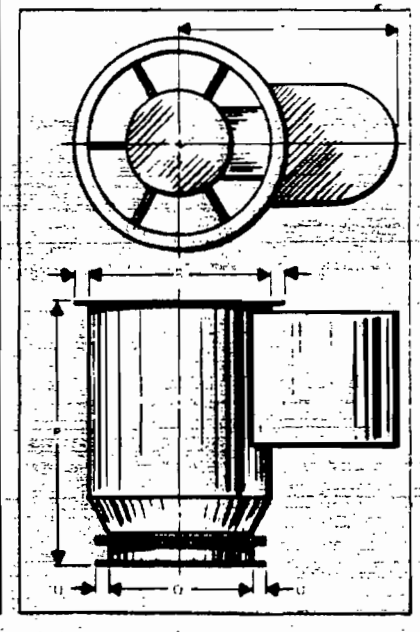
...erly Pacific's FRP constructed fans have a Type "A" classification for spark resistance.

STANDARD CLASSIFICATIONS FOR SPARK RESISTANT CONSTRUCTION

TYPE	CONSTRUCTION
A	All parts of the fan in contact with the air or gas being handled shall be made of non-ferrous material.
B	The fan shall have an entirely non-ferrous wheel and non-ferrous ring about the opening through which the shaft passes.
C	The fan shall be so constructed that a shift of the wheel or shaft will not permit two ferrous parts of the fan to rub or strike.

DIMENSIONAL CHART

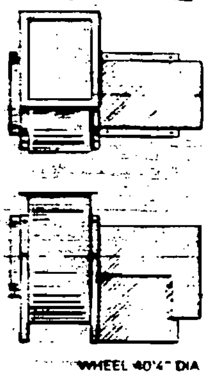
IB-49	IB-54	IB-60	IB-66	
33,733	41,349	50,579	61,201	MID-RANGE CFM RECOMMENDED
49	54¼	60	66	FAN WHEEL DIAMETER
84"	93"	104"	116"	P
54"	60"	66"	72"	Q
56"	72"	80"	88"	R
3"	3"	3"	3"	S
65"	66"	72"	76"	T
3"	3"	3"	3"	U
2⅞₁₆	2¹⅝₁₆	2¹⅝₁₆	2¹⅝₁₆	DRIVE SHAFT DIAMETER
1,420	1,650	1,800	2,100	SHIPPING WEIGHT POUNDS



CENTRIFUGAL CAPACITY RATING TABLES

DATA ON WHITE BACKGROUND APPLIES TO CLASS I WHEELS
DATA ON BLUE BACKGROUND APPLIES TO CLASS II WHEELS

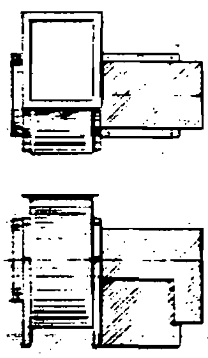
[redacted]



WHEEL 40¼" DIA
INLET 44¼" DIA
CLASS MAX RPM
I 880
II 1120

Volume	¼" S.P.		½" S.P.		1" S.P.		1½" S.P.		2" S.P.		2½" S.P.		3" S.P.		3½" S.P.		4" S.P.		4½" S.P.		5" S.P.		5½" S.P.		6" S.P.	
of air CFM	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
9480	283	.47	297	0.81																						
8415	298	.66	309	0.95	389	1.27																				
8350	275	.88	323	1.10	407	2.01																				
10285	293	.81	338	1.26	417	2.23	480	3.34																		
11220	312	.96	354	1.44	429	2.49	490	3.62																		
12185	330	1.14	370	1.64	442	2.77	507	3.86																		
13080	348	1.33	387	1.87	455	3.07	516	4.30																		
14025	368	1.55	405	2.13	470	3.39	529	4.69																		
14960	386	1.79	423	2.42	486	3.73	543	5.11	596	6.54	647	8.07	698	9.70	747	11.6										
15895	408	2.07	441	2.73	502	4.11	556	5.59	607	7.05	657	8.62	706	10.2	751	12.0	[illegible]	13.9								
16830	428	2.37	458	3.07	517	4.50	569	6.05	620	7.61	667	9.21	714	10.9	756	12.6	[illegible]	14.5	806	16.6						
17765	449	2.69	476	3.45	534	4.90	585	6.55	634	8.20	679	9.86	722	11.6	767	13.4	[illegible]	15.3	849	17.8	883	18.8				
18700	470	3.04	493	3.84	551	5.40	602	7.07	647	8.87	692	10.5	734	12.3	776	14.1	[illegible]	16.1	[illegible]	18.1	[illegible]	20.2	[illegible]	22.8		
19635	491	3.46	516	4.29	569	5.92	617	7.63	661	9.48	705	11.2	747	13.1	[illegible]	14.9	827	17.0	[illegible]	19.0	900	21.1	[illegible]	23.4	[illegible]	25.8
20570	512	3.94	536	4.76	587	6.48	633	8.24	677	10.1	719	12.0	[illegible]	13.9	[illegible]	15.9	[illegible]	17.8	874	20.0	910	22.1	[illegible]	24.4	[illegible]	26.7
21505	533	4.45	556	5.35	605	7.07	649	8.90	693	10.8	732	12.8	772	14.8	[illegible]	16.8	[illegible]	18.9	[illegible]	21.0	[illegible]	23.2	[illegible]	25.4	[illegible]	27.8
22440	555	5.05	576	5.83	624	7.68	667	9.57	709	11.5	748	13.6	[illegible]	15.7	[illegible]	17.8	[illegible]	19.9	[illegible]	22.0	900	24.3	[illegible]	26.5	[illegible]	29.0
23375	577	5.71	597	6.42	642	8.36	684	10.3	726	12.3	763	14.3	800	16.7	[illegible]	18.8	872	21.8	[illegible]	23.2	[illegible]	25.4	973	27.8	[illegible]	30.3
24310	599	6.31	618	7.04	660	9.10	702	11.1	741	13.0	779	15.3	814	17.0	[illegible]	19.9	[illegible]	22.1	918	24.4	948	26.7	[illegible]	[illegible]	[illegible]	31.5
25245	621	7.01	638	7.89	679	9.85	720	11.9	757	14.0	796	16.3	830	18.6	[illegible]	21.0	[illegible]	23.3	931	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	32.9
26180	643	7.71	659	8.38	697	10.6	738	12.8	775	15.0	811	17.3	846	19.7	[illegible]	22.1	912	24.5	944	[illegible]	976	[illegible]	[illegible]	31.9	[illegible]	34.4
27115	665	8.49	680	9.12	717	11.5	756	13.7	793	16.0	829	18.3	862	20.7	[illegible]	23.3	[illegible]	25.8	[illegible]	28.3	[illegible]	30.9	[illegible]	[illegible]	1047	[illegible]
28050	687	9.32	701	10.0	736	12.4	775	14.7	810	17.0	844	19.4	878	21.9	[illegible]	24.5	940	27.2	971	[illegible]	1001	[illegible]	[illegible]	[illegible]	[illegible]	37.5
[illegible]	732	11.2	744	12.0	777	14.3	812	16.9	847	19.3	879	21.8	[illegible]	[illegible]	[illegible]	27.0	972	[illegible]	1000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	40.0
31790	776	13.2	786	14.3	817	16.5	849	19.2	[illegible]	21.5	914	24.5	944	27.1	974	29.9	1004	32.7	1032	35.7	[illegible]	38.7	[illegible]	41.7	1113	44.8
33060	820	16.6	831	[illegible]	[illegible]	18.9	[illegible]	21.6	[illegible]	[illegible]	[illegible]	27.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	42.1	1115	[illegible]		

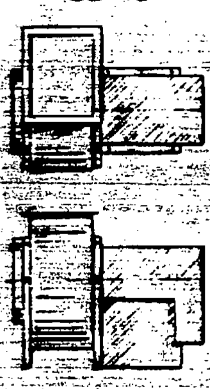
CB-44



WHEEL 44½ DIA.
INLET 49" DIA
CLASS MAX. RPM
I 825
II 1015

Volume	¼" S.P.		½" S.P.		1" S.P.		1½" S.P.		2" S.P.		2½" S.P.		3" S.P.		3½" S.P.		4" S.P.		4½" S.P.		5" S.P.		5½" S.P.		6" S.P.	
of air CFM	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
9128	219	.57	269	0.89																						
10269	233	.68	280	1.16	351	2.22																				
11410	249	.82	292	1.34	358	2.46																				
12551	265	.99	306	1.64	377	2.73	443	4.08																		
13692	282	1.17	321	1.76	388	3.04	450	4.43																		
14833	298	1.39	335	2.01	400	3.38	459	4.82																		
15974	316	1.63	350	2.29	412	3.75	467	5.25																		
17115	333	1.89	366	2.61	425	4.15	479	5.74																		
18256	351	2.19	382	2.95	439	4.56	491	6.25	538	7.00	586	8.86	632	11.8	675	14.0										
19397	369	2.53	399	3.33	454	5.03	503	6.82	549	8.63	595	10.5	638	12.6	679	14.7	[illegible]	17.0								
20538	388	2.90	416	3.76	468	5.50	515	7.41	561	9.30	603	11.2	646	13.3	685	15.5	[illegible]	17.8	765	20.3						
21679	406	3.29	432	4.22	482	6.03	529	8.01	573	10.0	614	12.0	654	14.1	693	16.4	[illegible]	18.7	[illegible]	21.2	[illegible]	[illegible]				
22820	425	3.71	446	4.70	499	6.60	544	8.64	586	10.7	626	12.8	664	15.0	702	17.3	[illegible]	19.7	776	22.2	810	24.7	[illegible]	27.5		
23961	444	4.22	467	5.34	515	7.24	558	9.33	600	11.5	638	13.7	675	16.0	[illegible]	[illegible]	[illegible]	20.7	[illegible]	23.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25102	463	4.81	485	5.81	531	7.93	572	10.0	612	12.3	650	14.7	687	17.0	[illegible]	19.4	[illegible]	21.9	791	24.4	[illegible]	27.0	[illegible]	[illegible]	[illegible]	32.4
26243	482	5.44	503	6.43	547	8.64	587	10.8	627	13.2	663	15.7	[illegible]	18.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27384	502	6.17	521	7.13	564	9.38	603	11.6	642	14.1	676	16.7	711	19.2	[illegible]	21.7	777	[illegible]	[illegible]	[illegible]	841	[illegible]	872	[illegible]	[illegible]	[illegible]
28525	522	6.87	540	7.85	580	10.2	619	12.6	656	15.0	691	17.7	724	20.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
29666	542	7.77	[illegible]	8.61	597	11.1	635	13.5	670	16.1	705	18.8	736	21.6	[illegible]	[illegible]	[illegible]	[illegible]	831	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30807	562	8.57	577	9.40	614	12.0	651	14.8	685	17.2	719	19.9	751	22.9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
31948	582	9.42	[illegible]	10.2	631	13.0	668	15.8	701	18.3	734	21.1	[illegible]	24.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
33089	602	10.3	615	11.2	648	14.0	684	16.8	717	19.6	745	22.4	780	25.4	[illegible]	[illegible]	[illegible]	31.5	[illegible]	34.8	[illegible]	37.7	921	[illegible]	947	44.0
34230	622	11.3	634	12.3	666	15.1	701	18.0	733	20.8	763	23.7	794	[illegible]	[illegible]	[illegible]	[illegible]	33.2	[illegible]	36.3	[illegible]	[illegible]	[illegible]	42.7	[illegible]	45.9
[illegible]	[illegible]	13.7	673	14.6	702	17.5	734	20.6	766	23.6	795	26.6	[illegible]	[illegible]	[illegible]	32.1	879	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	50.0
38794	702	16.1	711	17.5	720	20.2	768	23.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	40.0	[illegible]	43.6	[illegible]	47.2	[illegible]	51.0	1007	54.5
41076	742	19.0	751	20.5	776	23.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	43.9	[illegible]	47.5	[illegible]	51.5	1000	55.4		

CB-49



WHEEL 49" DIA
INLET 54" DIA
CLASS MAX. RPM
I 725
II 920

Volume	¼" S.P.		½" S.P.		1" S.P.		1½" S.P.		2" S.P.		2½" S.P.		3" S.P.		3½" S.P.		4" S.P.		4½" S.P.		5" S.P.		5½" S.P.		6" S.P.	
of air CFM	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
11128	199	[illegible]	244	1.21																						
12519	212	[illegible]	[illegible]	[illegible]	320	[illegible]																				
13910	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]																				
[illegible]	241	[illegible]	277	[illegible]	343	3.31	402	[illegible]																		
[illegible]	256	1.42	291	2.14	[illegible]	[illegible]	408	[illegible]																		
[illegible]	271	[illegible]	[illegible]	2.44	[illegible]	4.10	416	[illegible]																		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]																		
[illegible]	302	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]																		
[illegible]	319	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	11.8	[illegible]	14.3	[illegible]	[illegible]										
22647	335	3.07	362	4.04	412	6.10	[illegible]	8.27	[illegible]	10.4	540	12.7	[illegible]	15.2	617	17.8	[illegible]	20.7								
[illegible]	352	3.51	377	[illegible]	425	[illegible]	[illegible]	[illegible]	[illegible]	11.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						
[illegible]	369	[illegible]	392	[illegible]	438	[illegible]	481	9.77	520	12.1	[illegible]	14.6	[illegible]	17.1	630	19.9	[illegible]	22.7	[illegible]	[illegible]	[illegible]	[illegible]				
27870	386	4.50	405	[illegible]	[illegible]	8.01	[illegible]	10.4	[illegible]	13.0	[illegible]	15.6	[illegible]	18.2	[illegible]	21.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	403	5.17	424	[illegible]	[illegible]	8.78	[illegible]	11.3	[illegible]	14.0	[illegible]	16.7	613	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	438	[illegible]	466	7.80	497	[illegible]	[illegible]	13.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	473	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	14.1	[illegible]	17.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
37357	510	10.3	[illegible]	11.4	[illegible]	14.5	[illegible]	17.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
40339	[illegible]	12.8	[illegible]	[illegible]	[illegible]	17.9	[illegible]	20.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
41730	[illegible]	13.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	21.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	601	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
47294	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	23.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		

USE CAPACITY TABLES AS GUIDE ONLY

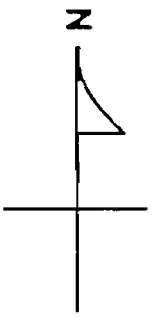
HARRIS SEMICONDUCTOR

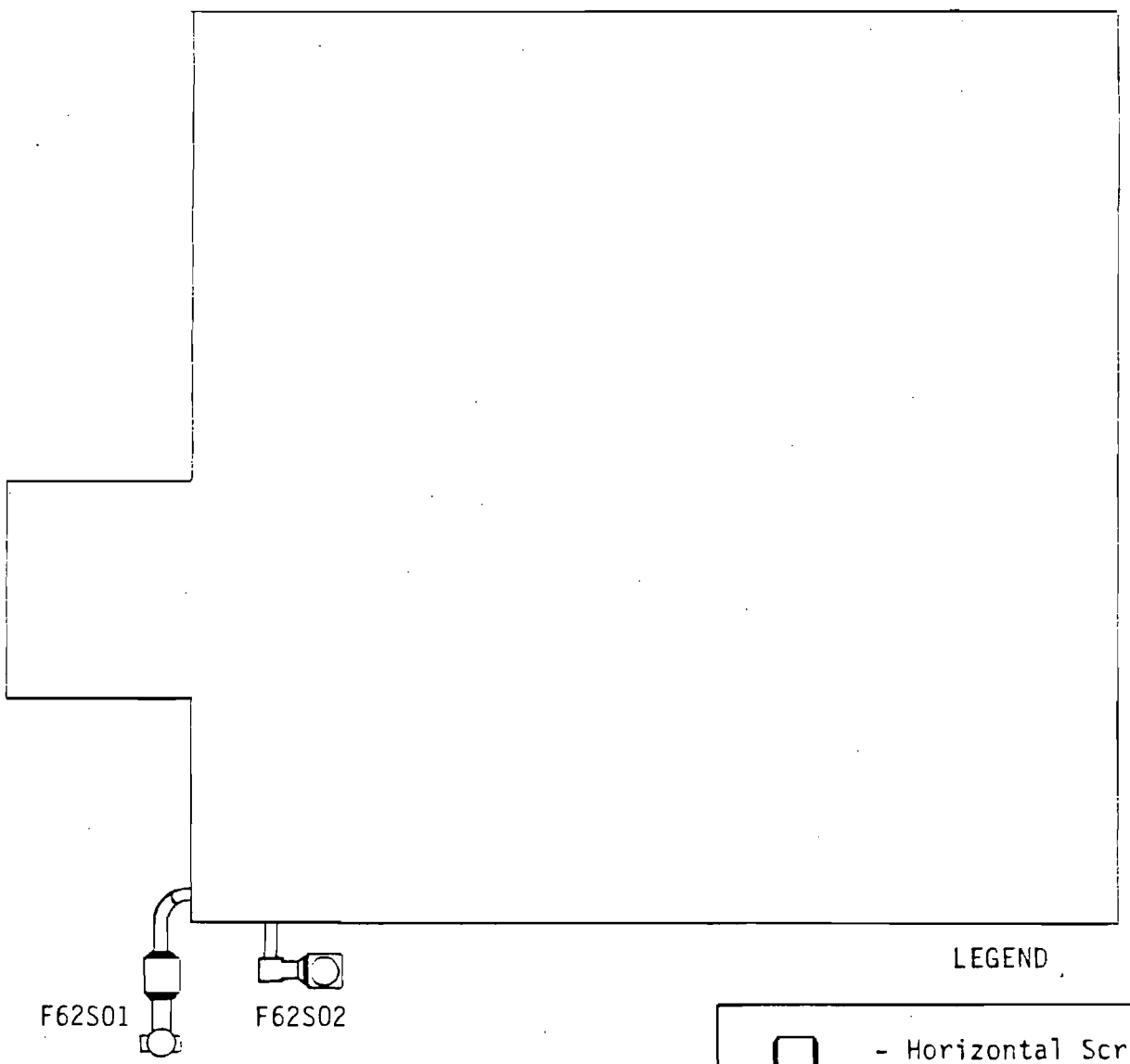
AIR PERMIT – BUILDING 62

ATTACHMENT E

SITE LOCATION MAPS

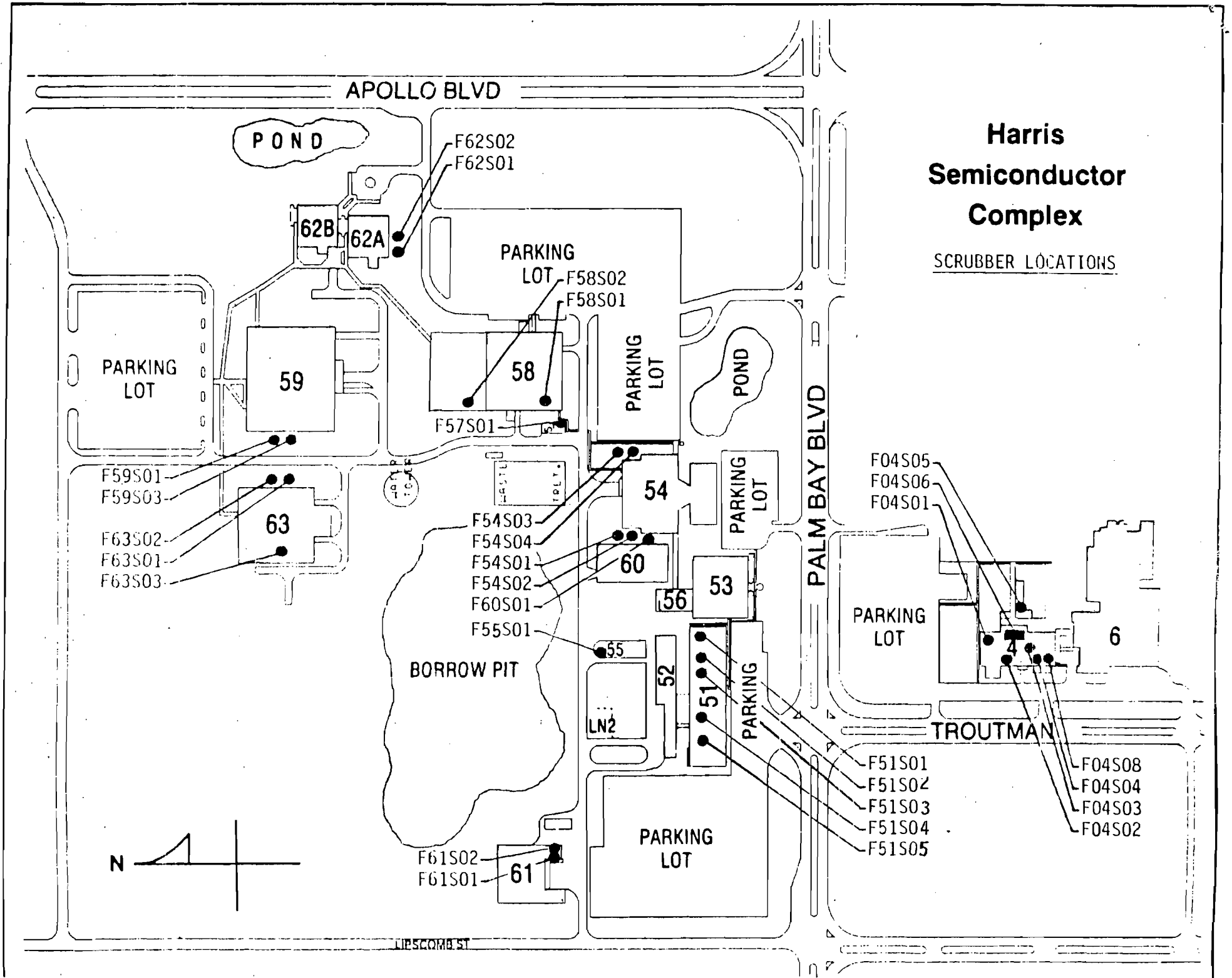
HARRIS SEMICONDUCTOR
SCRUBBER LOCATIONS
BUILDING 62





LEGEND

- Horizontal Scrubber
- Vertical Scrubber
- Exhaust Stack
- Exhaust Fan
- Stack mounted on fan
- Epitaxial Scrubber


Harris
Semiconductor
Complex
SCRUBBER LOCATIONS
APOLLO BLVD
POND
F62S02
F62S01
62B
62A
PARKING
LOT
F58S02
F58S01
PARKING
LOT
59
58
PARKING
LOT
POND
PALM BAY BLVD
F57S01
F59S01
F59S03
63
F63S02
F63S01
F63S03
F54S03
F54S04
F54S01
F54S02
F60S01
F55S01
54
PARKING
LOT
60
56
53
55
52
51
PARKING
BORROW PIT
LN2
F04S05
F04S06
F04S01
PARKING
LOT
4
6
TROUTMAN
F51S01
F51S02
F51S03
F51S04
F51S05
F04S08
F04S04
F04S03
F04S02
PARKING
LOT
F61S02
F61S01
61
N
TIPSCOMB ST

AC05-157785

DEPARTMENT OF ENVIRONMENTAL REGULATION

WIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

BOB GRAHAM
GOVERNOR

VICTORIA J. TSCHINKEL
SECRETARY

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Stationary [ ] New[1] [X] Existing[1]

APPLICATION TYPE: [ ] Construction [ ] Operation [X] Modification

COMPANY NAME: Harris Semiconductor COUNTY: Brevard

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) B-51 Manufacturing Fab

SOURCE LOCATION: Street Palm Bay Road City Palm Bay

UTM: East 17-538700 North 17-3100900

Latitude 28 ° 01 ' 20 "N Longitude 80 ° 36 ' 10 "W

APPLICANT NAME AND TITLE: J. R. Kolanek; Manager Environmental Services

APPLICANT ADDRESS: P.O. Box 883, Melbourne, Fl 32901

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Harris Semiconductor

I certify that the statements made in this application for a modified 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: James R. Kolanek

J. R. Kolanek, Manager, Environmental Svcs
Name and Title (Please Type)

Date: 10-28-88 Telephone No. (407) 724-7467

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 Lawrence R Hutker

Lawrence R. Hutker
Name (Please Type)

Harris Semiconductor
Company Name (Please Type)

P.O. Box 883, Melbourne, Florida 32901
Mailing Address (Please Type)

lorida Registration No. 35972 Date: 10-28-88 Telephone No. (407) 729-4655

SECTION II: GENERAL PROJECT INFORMATION

. 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.

This is a modification and consolidation of existing air permits.

. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction N/A Completion of Construction

. 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.)

N/A

. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

AO 05-109853 issued 11/5/85 expires 10/30/90; AO 05-109855 issued 11/5/85 expires 10/30/90;

AO 05-117085 issued 5/20/86 expires 5/22/91; AO 05-71405 issued 9/13/83 expires 9/12/88.

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? No

   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. No

3. Does the State "Prevention of Significant Deterioration" (PSD) requirement apply to this source? If yes, see Sections VI and VII. No

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

   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		
SEE ATTACHMENT	"C"			

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	
SEE ATTACHMENT "B"							

[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).

J. 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)
SEE ATTACHMENT	"D"			

E. Fuels Not applicable.

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ 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.

Waste water from air scrubbers is discharged to on-site waste water treatment plant.

Discharges to deepwell under UIC permit #UC05-126519.

--- SEE ATTACHMENT "D" ---

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: _____ ft. Stack Diameter: _____ ft.

Gas Flow Rate: _____ ACFM _____ DSCFM Gas Exit Temperature: _____ °F.

Water Vapor Content: _____ % Velocity: _____ FPS

SECTION IV: INCINERATOR INFORMATION

NOT APPLICABLE

Type of Waste	Type 0 (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 [X] No

Contaminant	Rate or Concentration

B. Has EPA declared the best available control technology for this class of sources (If yes, attach copy)

[ ] Yes [X] 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. Availaoility 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 Oevice:

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.

HARRIS SEMICONDUCTOR

AIR PERMIT – BUILDING 51

ATTACHMENT A

PROCESS DESCRIPTION

Attachment A

Building 51 is a wafer fabrication facility. The second floor of the two-story building houses two clean room modules. Both fabrication areas employ a series of manufacturing procedures referred to as layering, patterning, doping and heating processes. The frequency and sequence of these processes can vary depending on the desired nature of the final product.

In the controlled environment of the fabrication clean rooms, wafer surfaces first undergo acid and/or solvent cleaning, followed by thermal oxidation in furnaces to form a layer of silicon dioxide on the wafer surface.

During the patterning process, the wafers are initially baked and primed. Coaters then spin a thin layer of "photoresist" on the wafer, after which the wafers are soft baked. Next, the circuit pattern is projected onto the wafers via "alligners" or "steppers." Developers are then applied to remove unpolymerized areas of photoresist. This is followed by a solvent rinse.

Next, the wafers hard-baked, inspected to determine accuracy, and etched by wet (acid bath) or dry (plasma vapor) mechanisms. Once etching is complete, the photoresist is stripped off the wafer using chemical baths or plasma techniques.

In another step of the fabrication process, "dopant" atoms are either diffused into the wafer in diffusion furnaces, or accelerated into the wafer using "ion implantation." Fumes from the vapor deposition furnaces are oxidized in "burn boxes." Additional material may be layered on the wafer surface in vapor and crystal (epitaxial) deposition furnaces. Metallization to interconnect uppermost circuit layers is performed by deposition (using "sputtering" systems) or evaporation.

Wet stations that house vats containing a variety of acid and caustic compounds are located throughout the clean rooms. Building 51 utilizes approximately 50 stations, one-third of which contain vats of solvent-based chemicals. Less than one-quarter of these solvent stations are heated. Previously, no covers were used on the vats. However, stainless steel covers are presently being serviced to fit all vats containing solvents in the fabrication area.

Gas cabinets, vacuum pumps and chemical drains are located in areas dedicated to the containment of these exhausted units. Storage cabinets safely hold virgin chemicals until they are ready for use.

The exhaust system for the building is divided amongst five scrubbers. The scrubbers numbered F51S01, F51S02, and F51S03 serve the east module, while F51S04 and F51S05 serve the west module. Scrubbers numbered F51S01, F51S03 and F51S04 are acid scrubbers, while F51S02 and F51S05 provide pollution control and exhaust for equipment containing solvents.

1 - acid
2 - VOC
3 - acid & VOC
4 - acid & VOC
5 - VOC

3&4

HARRIS SEMICONDUCTOR

AIR PERMIT – BUILDING 51

ATTACHMENT B

AIR EMISSIONS

ACID MONITORING--BUILDING 51

Monitoring was performed on the building 51 acid scrubber systems in August of 1988. Samples were collected using a modified EPA method 8 sampling train. The impinger medium consisted of a 0.1 N sodium hydroxide solution. The analytical methodology utilized to determine the ions of highest concentration is as follows;

Chloride ion--EPA Method 325.3
Fluoride ion--EPA Method 340.2
Nitrate, phosphite, and sulfate ions--ion chromatography

All results were in pounds per hour as "X", where "X" represents the acid compound present in highest concentration.

The test results revealed that the total accumulative monitored acid emissions for the building were 3.7318 tons/year expressed as hydrochloric, hydrofluoric, nitric, phosphoric and sulfuric acids. This figure is based on a hypothetical production schedule of 8760 hours a year. The monitoring was performed over an 8 hour time interval when the full production was occurring.

When a resulting acid concentration was expressed as a "less than 'y' " value, where 'y' represents the lowest detectable limit possible using the analytical methodology employed, acid emissions were taken to be equal to this 'y' limit value.

RESULTS OF ACID MONITORING--BUILDING 51
PERFORMED IN AUGUST OF 1988

Scrubber #		HCl	HF	Nitric Acid	Phosphoric Acid	Sulfuric Acid	TOTAL (TON/YR
F51S01 outlet	(lb/hr)	0.0130	0.0010	0.0060	0.0030	0.0040	
	(ton/yr)	0.0569	0.0044	0.0263	0.0131	0.0175	0.118
F51S03 outlet	(lb/hr)	0.0160	0.0190	0.2510	0.0110	0.0120	
	(ton/yr)	0.0701	0.0832	1.0994	0.0482	0.0526	1.353
F51S04 outlet	(lb/hr)	0.0280	0.0320	0.4360	0.0070	0.0130	
	(ton/yr)	0.1226	0.1402	1.9097	0.0307	0.0569	2.260
							3.731

TOTAL ACID EMISSIONS INTO SCRUBBER OUTLETS = 3.7318 TONS/YEAR

SOLVENT MONITORING--BUILDING 51

Monitoring work was conducted on the building 51 solvent scrubber systems F51S02, F51S03, F51S04, & F51S05 in November of 1987. Tests employed were EPA methods 25A (flame ionization detection) and TO-1 (Tenax adsorption and GC/ms analysis.)

FID test results revealed that total accumulative monitored VOC emissions for the building were 33.29 tons/year expressed as propane. This figure is based on a hypothetical production schedule of 8760 hours a year. The following assumptions were made regarding monitoring work on this building:

-VOC values refer to all organic emissions including organic solvents.

-All data was corrected for 2 ppm background noise that is normally present in the ambient air.

-The F.I.D. accumulative emission figure is based on the maximum concentration of VOC's observed during the monitoring time frame.

TOTAL VOC EMISSIONS FROM BUILDING 51
AS DETECTED BY EPA METHOD 25-A
NOVEMBER, 1987

SCRUB#	PRODUCTN SCHEDULE	PRODUCTN EMISSIONS (TON/YR)
F51S02	8760	11.39
F51S03	8760	3.72
F51S04	8760	1.71
F51S05	8760	16.47
		33.29

24.1 TPY permitted 6336

TOTAL PROJECTED VOC EMISSIONS FOR BLDG. 51 = 33.29 TONS/YEAR

EPA METHOD TO-1: GC/MASS SPEC ANALYSIS OF SCRUBBER EMISSIONS
NOVEMBER RESULTS-

	SCRUBBER #			
	F51S02	F51S03	F51S04	F51S05
ACETONE (LB/HR)	0.58	---	---	0.60
XYLENES (LB/HR)	0.02	---	0.11	1.00
ETHYL BENZENE (LB/HR)	---	---	---	0.14
1,2-DICHLOROBENZENE (LB/HR)	---	---	---	---
1,1-DICHLORDETHENE (LB/HR)	---	---	---	---
TETRACHLOROETHENE (LB/HR)	---	---	---	---
1,1,1-TRICHLOROETHANE (LB/HR)	---	---	---	---

HARRIS SEMICONDUCTOR

AIR PERMIT – BUILDING 51

ATTACHMENT C

RAW MATERIALS AND CHEMICALS

PROCESS GASES

1. ALUMINUM OXIDE
2. ARGON
3. ARSINE
4. BORON TRIFLUORIDE
5. SULFUR HEXAFLUORIDE
6. CARBON DIOXIDE
7. DICHLOROSILANE
8. HELIUM
9. NITROGEN
10. NITROUS OXIDE
11. OXYGEN
12. PHOSPHINE
13. SILANE
14. ARSENIC
15. BORON TRIBROMIDE
16. NITROGEN DIOXIDE
17. HYDROGEN CHLORIDE
18. PHOSPHORUS TRICHLORIDE
19. HYDROGEN

PROCESS CHEMICALS

1. AMMONIA
2. AMMONIUM HYDROXIDE
3. AMMONIUM FLUORIDE
4. POTASSIUM HYDROXIDE
5. SODIUM HYDROXIDE
6. SULFURIC ACID
7. CERIC SULFATE
8. DICHLOROBENZENE
9. CHROMIUM TRIOXIDE
10. COPPER SULFATE
11. TETRAMETHYL AMMONIUM HYDROXIDE
12. DIMETHYLPOLYSILOXANE
13. NITRIC ACID
14. PHOSPHORIC ACID
15. CHROMIC ACID
16. HYDROFLUORIC ACID
17. ACETIC ACID
18. ETHYLENE DIAMINE TETRAACETIC ACID
19. SILICON
20. CHROMIUM TRIOXIDE
21. GUM RESIN
22. PHENOL-FORMALDEHYDE RESIN
23. HYDROGEN PEROXIDE
24. HEXAMETHYLDISILAZANE
25. DODECYLBENZENESULFONIC ACID
26. PHOSPHATE
27. FERRIC CHLORIDE

PROCESS CHEMICALS

SOLVENTS

1. 1,1,1 TRICHLOROETHANE
2. ACETONE
3. BUTYL CELLOSOLVE
4. AROMATIC PHENOL
5. 1,2,4 TRICHLOROBENZENE
6. XYLENE
7. CELLOSOLVE ACETATE
8. ISOPARAFFINIC HYDROCARBONS
9. DICHLORODIFLUOROMETHANE
10. ETHANOLAMINE
11. METHYLENE CHLORIDE
12. ISOPROPANOL
13. PROPYLENE GLYCOL MONOETHYL ETHER ACETATE
14. PROPYLENE GLYCOL MONOMETHYL ETHER
15. ETHYLENE GLYCOL MONOETHYL ETHER ACETATE
16. ETHYLENE GLYCOL MONOBUTYL ETHER
17. TETRAFLUOROMETHANE
18. CHLOROPENTAFLUOROETHANE
19. CHLOROTRIFLUOROMETHANE
20. ETHANOL
21. TRICHLOROTRIFLUOROETHANE
22. TRICHLOROTRIFLUOROMETHANE
23. TRICHLORODIFLUOROETHANE
24. METHANOL
25. GLYCOL ETHER
26. MONOETHANOLAMINE
27. METHYL ETHYL KETONE
28. TETRAFLUOROETHANE
29. N-BUTYL ACETATE
30. 2-ETHOXYETHYL ACETATE
31. ETHYL BENZENE
32. POLYPHENYL ETHER
33. AMMONIUM FLUORIDE
34. 1-METHOXY-2-PROPANOL
35. 2-METHOXY-2-PROPANOL

HARRIS SEMICONDUCTOR

AIR PERMIT – BUILDING 51

ATTACHMENT D

CONTROL EQUIPMENT

HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 51
PERMIT NUMBER: AO 05-117085
PERMIT TYPE : OPERATING

DATE ISSUED : 05/20/86
RENEWAL DATE: 03/23/91
DATE EXPIRES: 05/22/91

AREA SERVED: ANALOG EXPANSION
PROCESS DESCRIPTION: EXHAUST SYSTEM SCRUBBER

PERMIT LIMITS

VOL. RATE (SCFM): 9,500
ACID MIST (LB/HR): 0.0437
SOLVENTS (LB/HR): --
VOCS (LB/HR): --
OPER. (HRS/YEAR): 6336

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT : 03/01
NOTIFICATION OF VE TEST : NOT SPEC.
ANNUAL VIS EMISSION TEST: NOT SPEC.

EQUIPMENT INFORMATION

MANUFACTURER : TRI-MER CORP.
LOCATION : B51 ROOF
HARRIS ID NUMBER : F51S01
VOLUME FLOW RATE (CFM): 9,500
RECIRCULATION RATE (GPM): 30
MAKEUP WATER RATE (GPM): 3.0

MODEL NUMBER : F/W 3
STACK HEIGHT (FT):
STACK DIAMETER (IN): 3
STACK VELOCITY (FPM):
DUCT MATERIAL :

PERMIT HISTORY

PERMIT NUMBER: AO 05-38487
DATE EXPIRED : 04/08/86

PERMIT NUMBER:
DATE EXPIRED :

PERMIT NUMBER:
DATE EXPIRED :

SCRUBBER INFORMATION

HARRIS ID # : F51S01
MANUFACTURER : TRI-MER CORP. MODEL NUMBER : F/W 3
SERIAL NUMBER: 7026 MATERIAL : PVC
DESCRIPTION : HORIZONTAL COUNTER-FLOW. MIST ELIMINATOR.
POLYPRO FILTER PACK:DRAWING D1000-585 (6/80)

DESIGN DATA
VOLUME FLOW RATE (CFM): 9.500 PRESSURE DROP (IN):
RECIRCULATION RATE (GPM): 30 MAKE UP RATE (GPM): 3.0

ACTUAL DATA
VOLUME FLOW RATE (CFM): PRESSURE DROP (IN): N/E DATE: 6/3/87
RECIRCULATION RATE (GPM): N/E MAKE UP RATE (GPM): N/R DATE: "

RECIRCULATION PUMP INFORMATION

MANUFACTURER : FLOTEK MODEL NUMBER : C7P3-1194V
SERIAL NUMBER: 603887B801 HP : 1 RPM : 3450/2850
BRKR LOCATION: NEXT TO UNIT FED FROM MCC : TAC 76127

FAN INFORMATION

HARRIS ID # : F51E13
MANUFACTURER : TRI-MER CORP. MODEL NUMBER: 24 UB
SERIAL NUMBER: 7026 MATERIAL : PVC
DESCRIPTION : CENTRIFUGAL BLOWER. BACKWARD INCLINED BLADES

DESIGN DATA
VOLUME FLOW RATE (CFM): 6.000 STATIC PRESS (IN):

ACTUAL DATA SPEED (RPM): DATE:
VOLUME FLOW RATE (CFM): STATIC PRESS (IN): DATE:

FAN MOTOR INFORMATION

MANUFACTURER : LINCOLN MODEL NUMBER :
SERIAL NUMBER: HP : 15 RPM : 1750
BRKR LOCATION: NEXT TO UNIT FED FROM MCC : TAC 76127

HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 51
PERMIT NUMBER: AO 05-109855
PERMIT TYPE : OPERATING

DATE ISSUED : 11/05/85
RENEWAL DATE: 08/31/90
DATE EXPIRES: 10/30/90

AREA SERVED:
PROCESS DESCRIPTION: SILICON WAFER CHEM TREAT AIR WASHER (SYS 6)

PERMIT LIMITS

VOL. RATE (SCFM): 10.000
ACID MIST (LB/HR): --
SOLVENTS (LB/HR): --
VOCS (LB/HR): 1.246
OPER. (HRS/YEAR): 6336

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT : 03/01
NOTIFICATION OF VE TEST : 11/06
ANNUAL VIS EMISSION TEST: 11/21

EQUIPMENT INFORMATION

MANUFACTURER : DUALL IND.
LOCATION : B51 PENTHOUSE
HARRIS ID NUMBER : F51S02
VOLUME FLOW RATE (CFM): 10,000
RECIRCULATION RATE (GPM): 30
MAKEUP WATER RATE (GPM): 1.5

MODEL NUMBER : F-101
STACK HEIGHT (FT): 2
STACK DIAMETER (IN):
STACK VELOCITY (FPM):
DUCT MATERIAL :

PERMIT HISTORY

PERMIT NUMBER: AO 05-36166
DATE EXPIRED :

PERMIT NUMBER:
DATE EXPIRED :

PERMIT NUMBER:
DATE EXPIRED :

SCRUBBER INFORMATION

HARRIS ID # : F51S02
MANUFACTURER : DUALL IND. MODEL NUMBER : F-101
SERIAL NUMBER: 4476 MATERIAL : PVC
DESCRIPTION : HORIZONTAL CROSS-FLOW. FOUR STAGE. MIST ELIMINATOR. SINGLE FILTER PACK. OPEN ORIFICE TYPE SPRAY NOZZLES

DESIGN DATA
VOLUME FLOW RATE (CFM): 10.000 PRESSURE DROP (IN): 2.0
RECIRCULATION RATE (GPM): 30 MAKE UP RATE (GPM): 1.5

ACTUAL DATA
VOLUME FLOW RATE (CFM): 8,200 PRESSURE DROP (IN): N/E DATE: 1/16/87
RECIRCULATION RATE (GPM): 12 MAKE UP RATE (GPM): N/E DATE: 6/3/87

RECIRCULATION PUMP INFORMATION

MANUFACTURER : GENERAL ELECT. MODEL NUMBER : 5K47SG976
SERIAL NUMBER: N/A HP : 2 RPM : 3450
BRKR LOCATION: FED FROM MCC :

FAN INFORMATION

HARRIS ID # : F51E18
MANUFACTURER : DUALL IND. MODEL NUMBER: 49
SERIAL NUMBER: 4476 MATERIAL : PVC
DESCRIPTION : CENTRIFUGAL BLOWER

DESIGN DATA
VOLUME FLOW RATE (CFM): 10.000 STATIC PRESS (IN):

ACTUAL DATA SPEED (RPM): DATE:
VOLUME FLOW RATE (CFM): 8.200 STATIC PRESS (IN): 4.3 DATE: 1/16/87

FAN MOTOR INFORMATION

MANUFACTURER : MODEL NUMBER :
SERIAL NUMBER: HP : 15 RPM : 1750
BRKR LOCATION: FED FROM MCC :

Attachment :

HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 51
PERMIT NUMBER: AO 05-109853
PERMIT TYPE : OPERATING

DATE ISSUED : 11/05/85
RENEWAL DATE: 08/31/90
DATE EXPIRES: 10/30/90

AREA SERVED:
PROCESS DESCRIPTION: SILICON WAFER CHEM TREAT AIR WASHER (SYS 3 AND 5)

PERMIT LIMITS

VOL. RATE (SCFM): 24.000
ACID MIST (LB/HR): 0.0649
SOLVENTS (LB/HR): --
VOCS (LB/HR): 0.0174
OPER. (HRS/YEAR): 6336

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT : 03/01
NOTIFICATION OF VE TEST : 11/06
ANNUAL VIS EMISSION TEST: 11/21

EQUIPMENT INFORMATION

MANUFACTURER : DUALL IND.
LOCATION : B51 PENTHOUSE
HARRIS ID NUMBER : F51S03
VOLUME FLOW RATE (CFM): 24,000
RECIRCULATION RATE (GPM): 72
MAKEUP WATER RATE (GPM): 4.0

MODEL NUMBER : F-101
STACK HEIGHT (FT):
STACK DIAMETER (IN):
STACK VELOCITY (FPM):
DUCT MATERIAL :

PERMIT HISTORY

PERMIT NUMBER: AO 05-36165
DATE EXPIRED :

PERMIT NUMBER:
DATE EXPIRED :

PERMIT NUMBER:
DATE EXPIRED :

SCRUBBER INFORMATION

HARRIS ID # : F51S03
MANUFACTURER : DUALL IND. MODEL NUMBER : F-101
SERIAL NUMBER: 4194 MATERIAL : PVC
DESCRIPTION : HORIZONTAL CROSS-FLOW. FOUR STAGE. MIST ELIMINATOR. SINGLE FILTER PACK. OPEN ORIFICE TYPE SPRAY NOZZLES

DESIGN DATA
VOLUME FLOW RATE (CFM): 24.000 PRESSURE DROP (IN): 2.0
RECIRCULATION RATE (GPM): 72 MAKE UP RATE (GPM): 4.0

ACTUAL DATA
VOLUME FLOW RATE (CFM): PRESSURE DROP (IN): N/E DATE: 6/3/87
RECIRCULATION RATE (GPM): N/E MAKE UP RATE (GPM): N/E DATE: "

RECIRCULATION PUMP INFORMATION

MANUFACTURER : LINCOLN MODEL NUMBER : 2509
SERIAL NUMBER: 1605666 3420 HP : 1.5 RPM : 3420
BRKR LOCATION: FED FROM MCC : #5

FAN INFORMATION

HARRIS ID # : F51E03
MANUFACTURER : TRI-MER CORP. MODEL NUMBER: 44 CW
SERIAL NUMBER: 5303 MATERIAL : PVC
DESCRIPTION : CENTRIFUGAL BLOWER. BACKWARD INCLINED BLADES

DESIGN DATA
VOLUME FLOW RATE (CFM): 30.000 STATIC PRESS (IN):

ACTUAL DATA SPEED (RPM): DATE:
VOLUME FLOW RATE (CFM): STATIC PRESS (IN): DATE:

FAN MOTOR INFORMATION

MANUFACTURER : MODEL NUMBER :
SERIAL NUMBER: HP : 30 RPM : 1750
BRKR LOCATION: FED FROM MCC : #5

HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 51
PERMIT NUMBER: AO 05-109853
PERMIT TYPE : OPERATING

DATE ISSUED : 11/05/85
RENEWAL DATE: 08/31/90
DATE EXPIRES: 10/30/90

AREA SERVED:
PROCESS DESCRIPTION: SILICON WAFER CHEM TREAT AIR WASHER (SYS 3 AND 5)

PERMIT LIMITS

VOL. RATE (SCFM): 24.000
ACID MIST (LB/HR): 0.0649
SOLVENTS (LB/HR): --
VOCS (LB/HR): 0.0174
OPER. (HRS/YEAR): 6336

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT : 03/01
NOTIFICATION OF VE TEST : 11/06
ANNUAL VIS EMISSION TEST: 11/21

EQUIPMENT INFORMATION

MANUFACTURER :
LOCATION : B51 PENTHOUSE
HARRIS ID NUMBER : F51S04
VOLUME FLOW RATE (CFM): 12,100
RECIRCULATION RATE (GPM):
MAKEUP WATER RATE (GPM):

MODEL NUMBER :
STACK HEIGHT (FT): 2
STACK DIAMETER (IN):
STACK VELOCITY (FPM):
DUCT MATERIAL :

PERMIT HISTORY

PERMIT NUMBER: 36163
DATE EXPIRED : 11/21/85

PERMIT NUMBER:
DATE EXPIRED :

PERMIT NUMBER:
DATE EXPIRED :

SCRUBBER INFORMATION

HARRIS ID # : F51S04
MANUFACTURER : DUALL IND. MODEL NUMBER : F-101
SERIAL NUMBER: 4194 MATERIAL : PVC
DESCRIPTION : HORIZONTAL CROSS-FLOW. FOUR STAGE. MIST ELIMINATOR. SINGLE FILTER PACK. OPEN ORIFICE TYPE SPRAY NOZZLES

DESIGN DATA
VOLUME FLOW RATE (CFM): 24.000 PRESSURE DROP (IN):
RECIRCULATION RATE (GPM): 72 MAKE UP RATE (GPM): 4.0

ACTUAL DATA
VOLUME FLOW RATE (CFM): PRESSURE DROP (IN): N/E DATE: 6/3/87
RECIRCULATION RATE (GPM): N/E MAKE UP RATE (GPM): N/E DATE: "

RECIRCULATION PUMP INFORMATION

MANUFACTURER : LINCOLN MODEL NUMBER : 2500
SERIAL NUMBER: 1597787 HP : 1.5 RPM : 3420
BRKR LOCATION: FED FROM MCC : #5

FAN INFORMATION

HARRIS ID # :
MANUFACTURER : HARTZELL MODEL NUMBER: 41-40-GR3
SERIAL NUMBER: 15530 MATERIAL : FIBERGLASS
DESCRIPTION : CENTRIFUGAL BLOWER. BACKWARD CURVED BLADES

DESIGN DATA
VOLUME FLOW RATE (CFM): 24500 STATIC PRESS (IN):

ACTUAL DATA SPEED (RPM): DATE:
VOLUME FLOW RATE (CFM): STATIC PRESS (IN): DATE:

FAN MOTOR INFORMATION

MANUFACTURER : MODEL NUMBER :
SERIAL NUMBER: HP : 30 RPM :
BRKR LOCATION: FED FROM MCC : #5

Attachment :

HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 51
PERMIT NUMBER: AO 05-71405
PERMIT TYPE : OPERATING

DATE ISSUED : 09/13/83
RENEWAL DATE: 07/14/88
DATE EXPIRES: 09/12/88

AREA SERVED:
PROCESS DESCRIPTION: SILICON WAFER CHEM TREAT SOLVENT SCRUBBER (SYS 6)

PERMIT LIMITS

VOL. RATE (SCFM): NOT SPEC.
ACID MIST (LB/HR): --
SOLVENTS (LB/HR): 0.0893
VOCS (LB/HR): 0.0008
OPER. (HRS/YEAR): 6336

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT : 03/01
NOTIFICATION OF VE TEST : 08/10
ANNUAL VIS EMISSION TEST: 08/20

EQUIPMENT INFORMATION

MANUFACTURER : HARRISON
LOCATION : B51 PENTHOUSE
HARRIS ID NUMBER : F51S05
VOLUME FLOW RATE (CFM): 18,000
RECIRCULATION RATE (GPM): 45
MAKEUP WATER RATE (GPM): 4.5

MODEL NUMBER : HF-180
STACK HEIGHT (FT):
STACK DIAMETER (IN):
STACK VELOCITY (FPM):
DUCT MATERIAL :

PERMIT HISTORY

PERMIT NUMBER: N/A
DATE EXPIRED :

PERMIT NUMBER:
DATE EXPIRED :

PERMIT NUMBER:
DATE EXPIRED :

SCRUBBER INFORMATION

HARRIS ID # : F51S05
MANUFACTURER : HARRISON MODEL NUMBER : HF-180
SERIAL NUMBER: N/A MATERIAL : POLYPRO
DESCRIPTION : HORIZONTAL CROSS-FLOW. PLASTIC SADDLE PACKING.LIQUID DISTRIBUTION THROUGH MAIN HEADER. NO SPRAY NOZZLES DWG HPS-217-C 11/21/83

DESIGN DATA
VOLUME FLOW RATE (CFM): 18.000 PRESSURE DROP (IN):
RECIRCULATION RATE (GPM): 45 MAKE UP RATE (GPM): 4.5

ACTUAL DATA
VOLUME FLOW RATE (CFM): PRESSURE DROP (IN): N/E DATE: 6/3/87
RECIRCULATION RATE (GPM): N/E MAKE UP RATE (GPM): N/E DATE: "

RECIRCULATION PUMP INFORMATION

MANUFACTURER : GENERAL ELECT. MODEL NUMBER : 5K33KN42
SERIAL NUMBER: AYD/ HP : 1/3 RPM : 1725
BRKR LOCATION: FED FROM MCC : #5

FAN INFORMATION

HARRIS ID # :
MANUFACTURER : TRANE MODEL NUMBER: 81 TYPE AF
SERIAL NUMBER: K3H244576 MATERIAL :
DESCRIPTION : SIZE 44. CLASS I

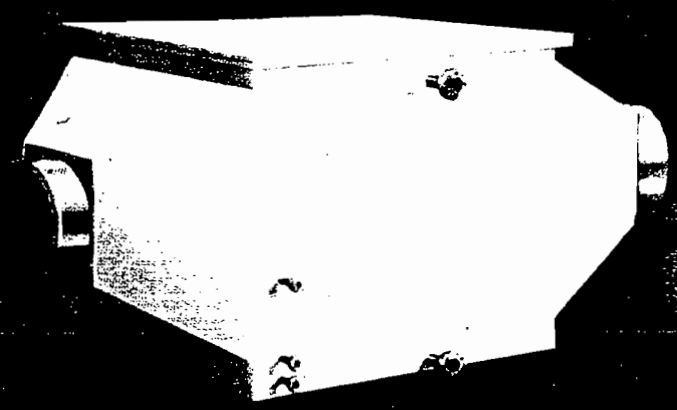
DESIGN DATA
VOLUME FLOW RATE (CFM): STATIC PRESS (IN):

ACTUAL DATA SPEED (RPM): DATE:
VOLUME FLOW RATE (CFM): STATIC PRESS (IN): DATE:

FAN MOTOR INFORMATION

MANUFACTURER : US ELECTRICAL MODEL NUMBER :
SERIAL NUMBER: HP : 30 RPM : 1760
BRKR LOCATION: FED FROM MCC :

Plastic Packed Scrubbers



THE HARRISON SYSTEM

Harrison is a prime designer and producer of complete plastic exhaust systems, custom engineered scrubbing systems, as well as duct and fittings, tanks, and hoods. As a result of this capability and experience, design and manufacture of standard, pre-engineered fume scrubbers is a natural extension.

MATERIALS

Self-supporting or fiberglass armored PVC and Polypropylene, fiberglass armored Kynar, and solid fiberglass construction offers a wide range of resistance to acids, alkalis, solvents, and other corrosives at operating temperatures to approximately 250°F. Harrison systems do not use any metal in contact with the process stream.

PRE-ENGINEERING

Pre-engineered design reduces cost by eliminating the necessity to re-invent each item ordered. It results in more reliable service thru improved workmanship achieved by repetitive production control, and speeds quotations and approval drawings because costs and designs are immediately available. In addition to significant savings in approval and order time, Harrison reduces delivery time by stocking scrubber components including packing, support grids, distributor plates, nozzles, duct reducers, and sheet stock.

SCRUBBER CONFIGURATION

Most fume removal applications can be served by the two scrubber designs shown in this catalog. Vertical Counter Current style directs liquid down vertically, and unwanted fumes upward in the opposite direction. Horizontal Cross Flow unit directs liquid down vertically, but unwanted fumes are driven horizontally at 90° to the liquid. In both designs, liquid and fumes are inter-mixed in the packed bed section of the scrubber where fumes are removed by chemical reaction or water solubility. Scrubber shape does not affect performance. Horizontal design presents a low profile and is suitable where head room is limited. Verticals require more head room, but use only minimum floor space.

SCRUBBER DESIGN AND OPERATION

Highest scrubber efficiency (volumetric % of contaminate removed) is obtained by having the proper amount of contact surface area (packing) wetted by sufficient liquid (recirculated liquid rate) for an optimum residence time (packing depth) to allow unwanted fumes to take a treacherous path thru the wetted packing to permit their maximum removal from the carrier air stream by chemical reaction or water solubility.

Air stream resistance encountered in the packing (static pressure loss) is a function of air velocity, cross-sectional packing area, and packing depth. Harrison scrubbers utilize proven packing depth to achieve efficiencies approaching 99+%, when operated within recommendations.

LIQUID DISTRIBUTION AND MIST ELIMINATION

Simple liquid distribution is achieved thru a main header pipe feeding perforated laterals, without use of troublesome spray nozzles. Nozzles are subject to plugging, and produce a difficult-to-remove atomized mist carryover. In the Harrison design, any large droplets of liquid caught in the upward moving air stream are easily and efficiently removed by a short bed of dry packing located above the liquid distributor.

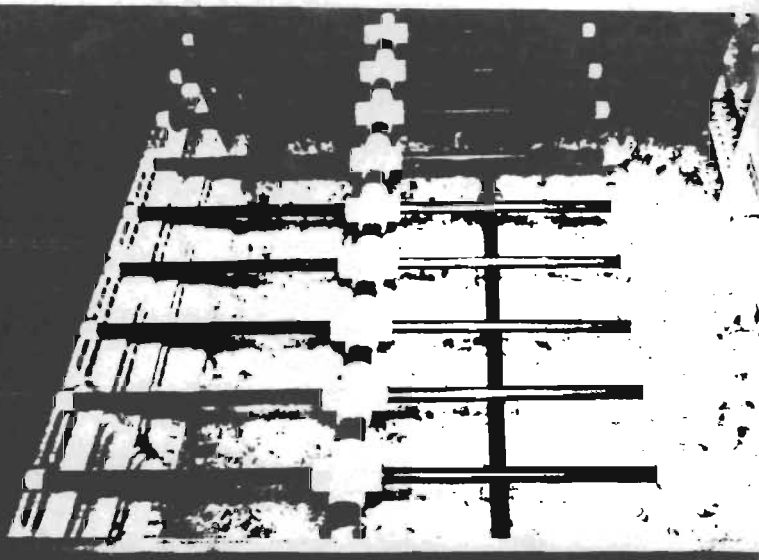
STATIC PRESSURE LOSS

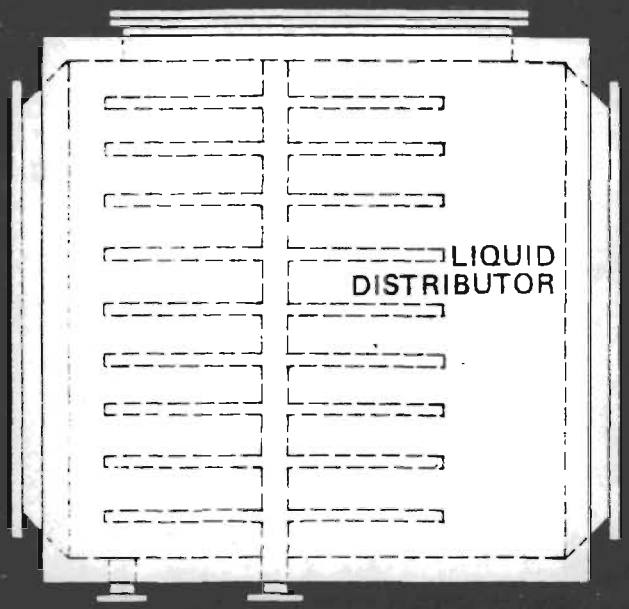
Use of high-surface-area, low-pressure-drop plastic saddles in a balanced design result in low static pressure loss of only 0.4 inches H_2O (w.g.) per foot of packed depth in Vertical Counter Current scrubbers, and 0.33 in Horizontal Cross Flow units. At the same time, sufficient irrigation rates constantly keep saddles clear of potential sludge buildup. Thereby, continuous, non-clogging operation at a proper rate of intermixing turbulence between liquid and fumes is achieved for 99+% efficiency.

LIQUID SUMP OPERATION

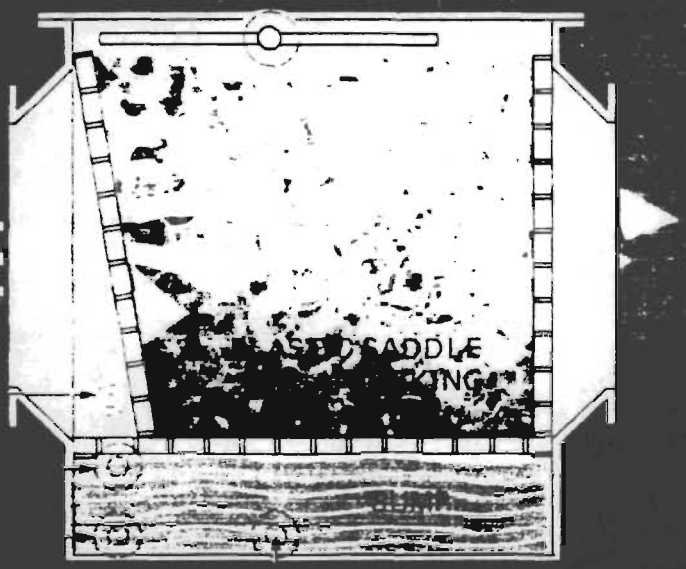
Harrison scrubbers employ an integral liquid recirculating sump which reduces amount of liquid consumption required by 90 to 95% in most applications. Therefore, considerably less effluent must be handled and treated. The sump reservoir is contained within the scrubber itself. Harrison recommends optimum rate of effluent removal. When effluent is acidic only, additional liquid conservation can be obtained with either scrubber design with the simple optional recovery system shown with the vertical scrubber drawing on page 4. If central treating facilities exist, no sump, recirculation, or independent recovery is needed. In this case, treated liquid would be directed over the packing in a single pass, then treated, then returned to the scrubber, etc. In both instances where effluent is treated, liquid consumption would be reduced to only that amount lost by evaporation.

Harrison
Box 184 Aurora Ohio 44202/216-562-9545

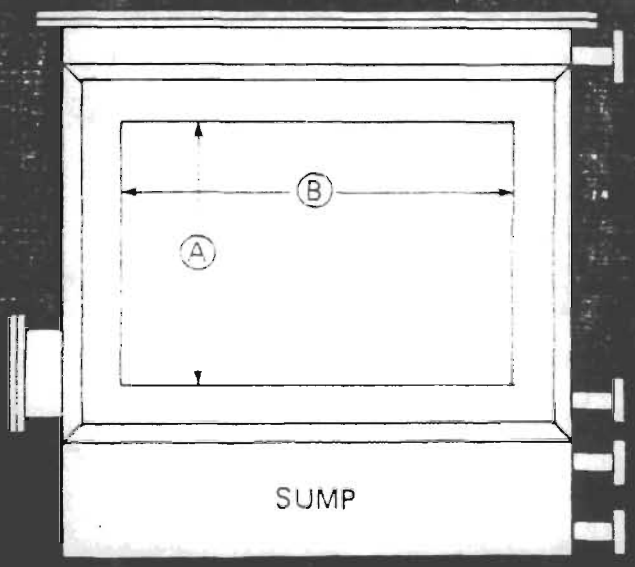




TOP VIEW



SIDE VIEW (CUT-A-WAY)



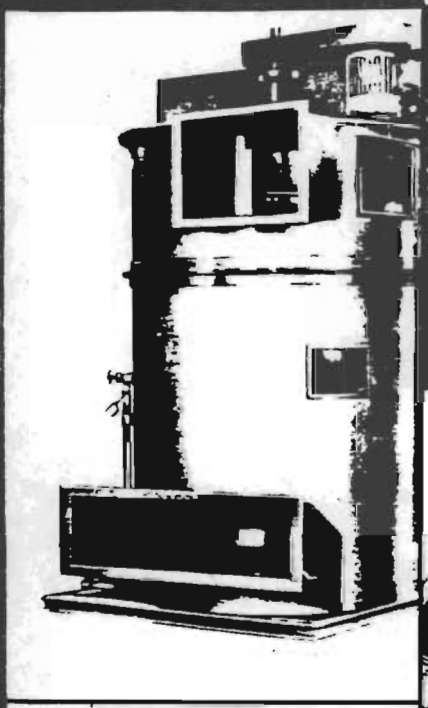
INLET SIDE VIEW

BEST AVAILABLE COPY

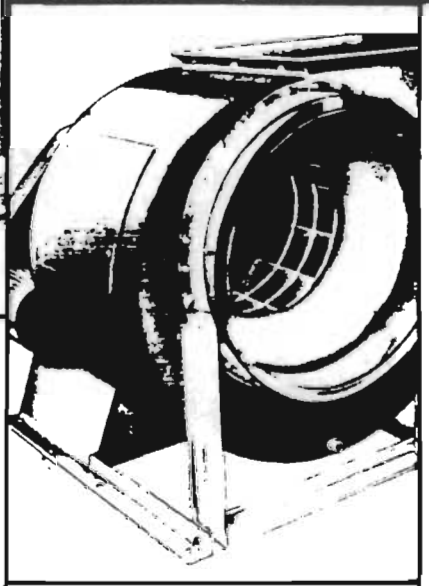
HORIZONTAL CROSS-FLOW

Model	CFM	Inlet & Outlet A x B In.	Length L Ft.	Width W In.	C In.	D In.	E In.	F In.	G In.	Sump Capacity Gal.	Rec. Liquid GPM	Overall Height In.	Ship* Wt. Lbs.	Operating Wt. Lbs.
HF-8	800	11x11	6	17	¾	1	1	1¼	1	58	17	35	182	646
HF-12	1,200	14x14	6	20	¾	1	1	1¼	1	69	21	38	224	781
HF-17	1,700	18x18	6	24	¾	1	1	1½	1¼	82	24	42	275	926
HF-21	2,100	21x21	6	27	¾	1	1	1½	1¼	92	28	45	316	1028
HF-25	2,500	24x24	6	30	¾	1½	1½	1½	1¼	102	32	48	357	1166
HF-31	3,100	27x27	6	33	¾	1½	1½	1½	1¼	113	35	51	419	1313
HF-37	3,700	30x30	6	36	¾	1½	1½	1½	1¼	125	39	54	481	1445
HF-45	4,500	33x33	6	39	¾	1½	1½	1½	1¼	134	42	57	563	1669
HF-50	5,000	36x36	6	42	¾	1½	1½	1½	1¼	144	45	5.0 ft.	615	1733
HF-67	6,700	36x36	6	48	1	2	2	1½	1¼	165	51	5.5	690	1980
HF-85	8,500	42x42	6	54	1	2	2	2	1½	186	56	6.0	824	2276
HF-106	10,300	48x48	[illegible]	60	1	2	2	2	1½	206	60	6.5	1035	2639
HF-126	12,600	54x54	[illegible]	66	1	2	2	2	1½	[illegible]	[illegible]	7.0	1242	2890
HF-150	15,000	60x60	[illegible]	72	1	2	2	2½	2	247	[illegible]	7.5	1546	3460
HF-176	17,600	66x66	[illegible]	78	[illegible]	2	2	2½	2	268	[illegible]	8.0	1751	[illegible]
HF-190	19,000	66x72	[illegible]	84	1	[illegible]	[illegible]	2½	2	300	[illegible]	[illegible]	[illegible]	[illegible]
HF-220	22,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HF-245	24,500	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	27,200	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	30,000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
HF-327	32,700	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

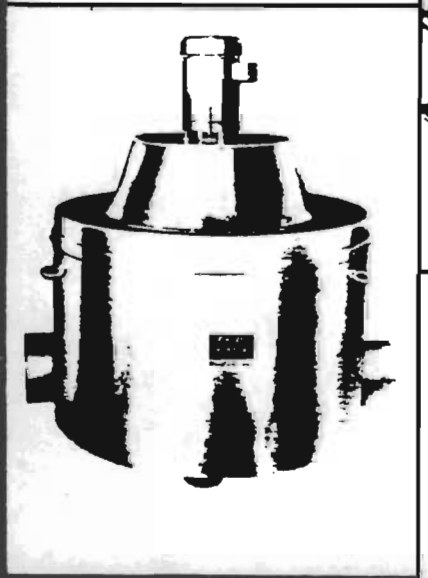
MEET YOUR
POLLUTION CONTROL
REQUIREMENTS
WITH THE LEADER IN
PVC FABRICATIONS



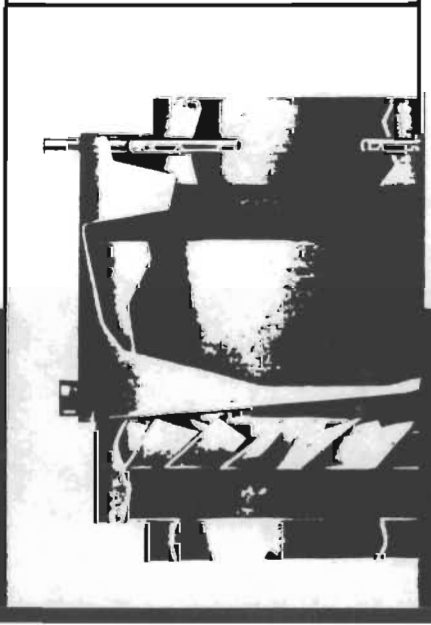
Duall



CONTROLLED ENVIRONMENTS FOR INDUSTRY
P. O. BOX 10428 – 904/396-7733
JACKSONVILLE, FLORIDA 32247-0428
DANIEL J. KLOS



PVC CONSTRUCTED
FUME SCRUBBERS
CENTRIFUGAL FANS
DUCTING and HOODS
OIL MIST COLLECTORS
COMPLETE SYSTEMS



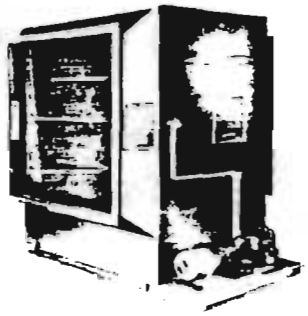
Duall
INDUSTRIES, INC.
700 S. McMillan Street • Owosso, Michigan 48867
Phone (517) 725-8184 • Telex 228-532

P. O. Box 1000 • 102 Hillside Drive
Forest City, N.C. 28043 • (704) 245-8725

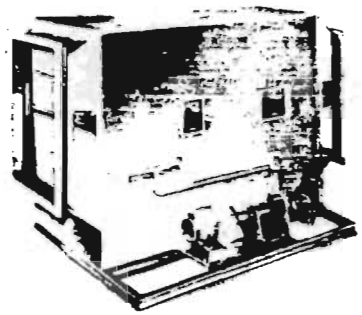
Duall

Fume Scrubbers in 6 Types

F-101 SERIES

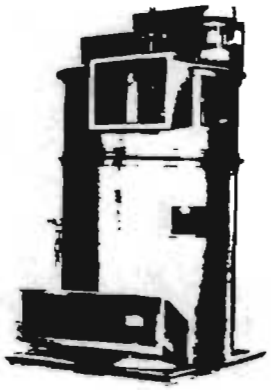


Single Pack

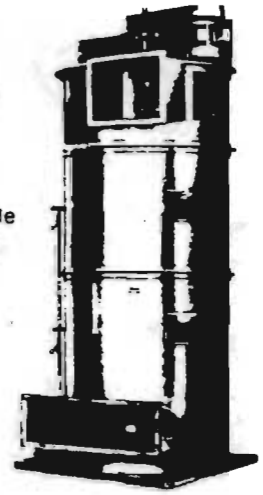


Double Pack

FW-300 SERIES



Single Pack



Double Pack

Duall Single Pack (four Stage) Fume Scrubbers solve most industrial air pollution problems. They are especially effective on water soluble fumes and odors, or with pH control on many low soluble contaminants.

Some typical proven applications are:
- Acid fumes.
- Plating fumes.
- Cleaning fumes.
- Lab hood fumes.
- Anodizing fumes.
- Pickling fumes.
- Rust-proofing fumes.
- Die-casting fumes.
- Water soluble odors.

Duall Single Pack Fume Scrubbers incorporate these advantages:
- Low cost.
- Low maintenance.
- Low water consumption.
- Low static pressure drop.
- 100% corrosion resistant.

Duall Double Pack (six stage) Fume Scrubbers offer the broadest range of answers to industrial air pollution problems. By double scrubbing the air these scrubbers provide maximum efficiency on tough fumes and odors which can not be completely absorbed in a single pack type scrubber.

Duall's Double Pack Scrubbers have proven effective on the following typical applications:
- Bright dip fumes.
- Strip tank fumes.
- Etching fumes.
- Most low solubility fumes and odors.

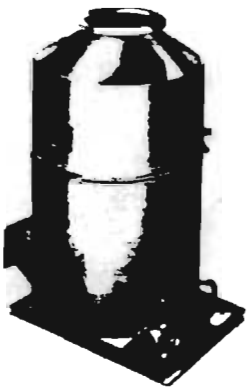
Our Double Pack Fume Scrubbers offer all the advantages of the Single Pack units as well as the broadest range of applications.

All Duall Fume Scrubbers can be modified for custom installation with multiple packs or extended depth packs. Multiple modular units are available for capacities larger than standard.

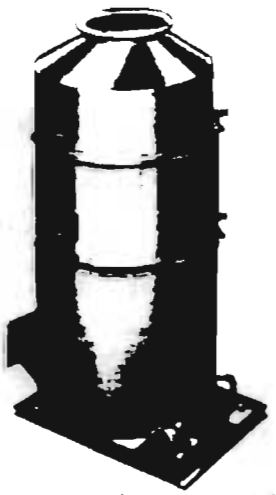
See page 6 for complete specs and performance data.

PT-500 SERIES

Single Pack



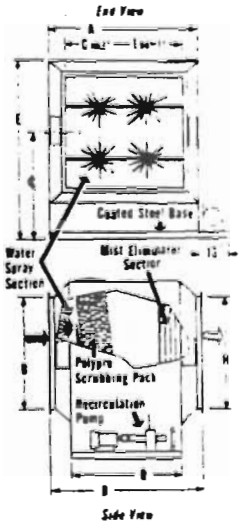
Double Pack



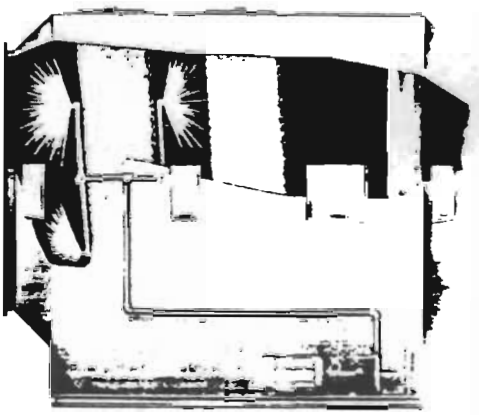
F-101 HORIZONTAL SINGLE FILTER PACK

Being our most popular scrubber design, this compact 100% corrosion resistant P.V.C. unit has proven its efficiency nationwide. The Duall F-101 incorporates high efficiency, low maintenance filter media and the open orifice type spray nozzles, for the assurance of a thoroughly saturated collection chamber. Our mist eliminator outlet section gives four air direction changes to properly remove the entrained moisture. Where a horizontal installation is preferred, the F-101 should be your choice.

CFM in 000's	DIMENSIONS IN INCHES A	B	C	D	E	H	I	Q	℄	CFM in 000's	A	B	C	D	E	H	I	Q	℄
0.5	18	10	10	49	30	10	10	37	21	20	88	61	72	66	87	61	72	46	52½
1	22	14	14	50	34	14	14	38	23	22	97	61	81	66	87	61	81	46	52½
2	28	20	20	50	40	20	20	38	26	24	104	61	88	66	87	61	88	46	52½
3	32	24	24	51	44	24	24	39	28	26	112	61	96	66	87	61	96	46	52½
4	37	29	29	52	49	29	29	40	30½	28	123	61	107	66	87	61	107	46	52½
5	41	33	33	52	53	33	33	40	32½	30	135	61	119	66	87	61	119	46	52½
6	45	37	37	53	58	37	37	41	35½	35	157	61	141	66	87	61	141	46	52½
8	52	44	44	54	65	44	44	42	39	40	179	61	163	66	87	61	163	46	52½
10	58	46	46	59	71	46	46	43	42	45	102	61	186	66	87	61	186	46	52½
12	64	52	52	60	77	52	52	44	45	50	224	61	208	66	87	61	208	46	52½
14	69	57	57	60	82	57	57	44	47½	55	247	61	231	66	87	61	231	46	52½
16	74	62	62	61	87	62	62	45	50	60	269	61	253	66	87	61	253	46	52½
18	81	65	69	61	91	65	69	45	52½	ø	Larger sizes on request.								

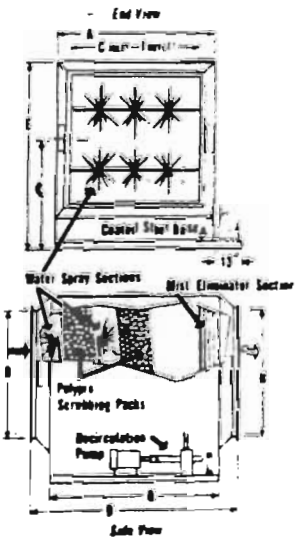


F-101D HORIZONTAL DOUBLE FILTER PACK



An extra heavy duty scrubber for real "tuffies". It incorporates *two* filter packs with *two* sets of sprays for more thorough scrubbing . . . plus an effective mist eliminator at the air outlet. Serious concentrations of rough fumes, such as nitric, hydrofluoric, and hydrochloric acid are double scrubbed through six stages for maximum efficiency. Use this high efficiency fume scrubber, at only a small increase in price.

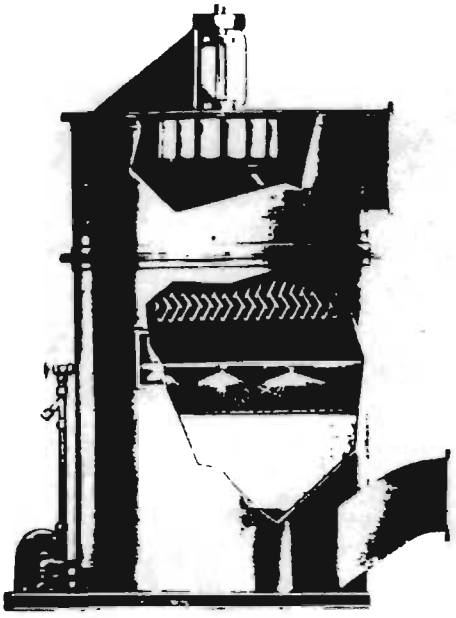
CFM in 000's	DIMENSIONS IN INCHES A	B	C	D	E	H	I	Q	℄	CFM in 000's	A	B	C	D	E	H	I	Q	℄
0.5	18	10	10	70	30	10	10	58	21	20	88	61	72	87	91	61	72	67	52½
1	22	14	14	71	34	14	14	59	23	22	97	61	81	87	91	61	81	67	52½
2	28	20	20	71	40	20	20	59	26	24	104	61	88	87	91	61	88	67	52½
3	32	24	24	72	44	24	24	60	28	26	112	61	96	87	91	61	96	67	52½
4	37	29	29	73	49	29	29	61	30½	28	123	61	107	87	91	61	107	67	52½
5	41	33	33	73	53	33	33	61	32½	30	135	61	119	87	91	61	119	67	52½
6	45	37	37	74	58	37	37	62	35½	35	157	61	141	87	91	61	141	67	52½
8	52	44	44	75	65	44	44	63	39	40	179	61	163	87	91	61	163	67	52½
10	58	46	46	80	71	46	46	64	42	45	202	61	186	87	91	61	186	67	52½
12	64	52	52	81	77	52	52	65	45	50	224	61	208	87	91	61	208	67	52½
14	69	57	57	81	82	57	57	65	47½	55	247	61	231	87	91	61	231	67	52½
16	74	62	62	82	87	62	62	66	50	60	269	61	253	87	91	61	253	67	52½
18	81	65	69	82	91	65	69	66	52½	ø	Larger sizes on request.								



Duall INDUSTRIES

PVC Constructed, 100% Corrosion Free

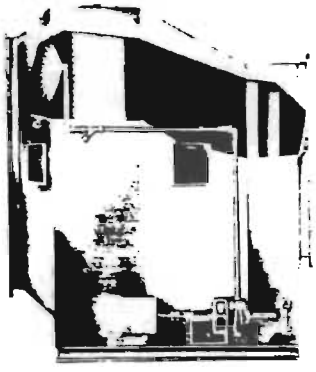
FUME SCRUBBERS



FW-300 Vertical Pack with Blower

500 TO 12,000 C.F.M. . . *plus multiple installations*

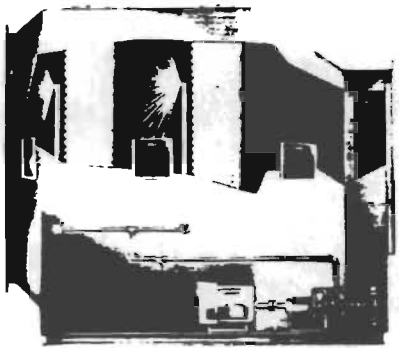
This packed tower type scrubber is not only a space saver, it's also a true economy model. It incorporates a built-in rugged fan with convenient exterior, belt driven, TEFCBB motor. During installation, the horizontal air discharge can be swivelled 360° before sealing into permanent position. Efficiency is equal to the F-101 and the PT-500. Compactness and versatility make it an unusually popular model. This FW-300 saves three ways . . . in initial cost, installation, and in space. Also available with double pack.



F-101 Horizontal Single Filter Pack

500 TO OVER 60,000 C.F.M. . . *plus multiple installations*

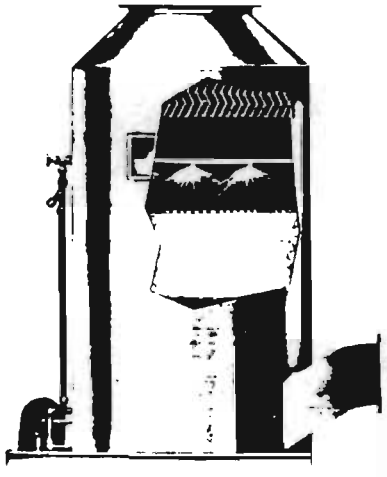
Being our most popular scrubber design, this compact 100% corrosion resistant P.V.C. unit has proven its efficiency in 46 states. The Duall F-101 incorporates high efficiency, low maintenance filter media and the open orifice type spray nozzles, for the assurance of a thoroughly saturated collection chamber. Our mist eliminator outlet section gives four air direction changes to properly remove the entrained moisture. Where a horizontal installation is preferred, the F-101 should be your choice.



F-101-D Horizontal Double Filter Pack

500 TO OVER 60,000 C.F.M. . . *plus multiple installations*

An extra heavy duty scrubber for real "tuffies". It incorporates two filter packs with two sets of sprays for more thorough scrubbing . . . plus an effective mist eliminator at the air outlet. Serious concentrations of rough fumes, such as nitric, hydrofluoric, and hydrochloric acid are double scrubbed through six stages for maximum efficiency. For such problems in your plant, use this high efficiency fume scrubber, at only a small increase in price.



PT-500 Vertical Pack

500 TO OVER 30,000 C.F.M. . . *plus multiple installations*

The upright PT-500 is the space saver. This scrubber is a vertical packed tower type designed to fit into restricted spaces where floor space is at a premium. Its efficiency is equal to the F-101, and also 100% corrosion-free. Air flow is up through a thoroughly water saturated bed of filter media. The mist eliminator pack near the top outlet assures properly dried air. If space is your problem, take a good look at the PT-500. Also available with double pack.

Duall INDUSTRIES INC.
770 South McMillan St
Owosso, Michigan 48867
Telephone (517) 725-8184
Telex 228-532
P O Box 1000
Forest City N C 2804
Telephone (704- 24

Duall FUME SCRUBBERS

SPECIFICATIONS and PERFORMANCE DATA

DESCRIPTIONS

F-101. Horizontal (cross-flow), four stage, wet scrubber. This model has maximum efficiency on water soluble contaminants and odors, but is also effective on low soluble contaminants with the use of chemical neutralizers.

F-101D. Horizontal (cross-flow), six stage, wet scrubber. The F-101D is especially designed for use on stubborn low solubility contaminants or where extremely high scrubbing efficiency is required on normal contaminants.

FW-300. Vertical (counter-flow), four stage, wet scrubber with integral blower. Efficency is equal to the F-101.

FW-300D. Vertical (counter-flow), six stage, wet scrubber with integral blower. Efficiency is equal to the F-101D.

PT-500. Vertical (counter-flow), four stage, wet scrubber. Efficiency is equal to the F-101.

PT-500D. Vertical (counter-flow), six stage, wet scrubber. Efficiency is equal to the F-101D.

All Duall Fume Scrubbers are constructed of P.V.C. and Polypropylene corrosion resistant materials and include a rugged coated steel base with lifting luggs. All above units are available with extended depth packing.

SCRUBBING PRINCIPLES

Contaminant removal is accomplished by first slowing the fumes to a velocity below 500 fpm and then passing the fumes through two scrubbing stages in the single pack models and four stages in the double pack types. The fumes first pass through a water spray or curtain during which a percentage of the larger contaminant particles drop out and the remaining fumes are saturated. The second stage consists of a 12" deep pack of polypropylene high surface, non-clogging, spherical plate packing media* which is continuously wetted by the spray nozzles. The saturated fumes are impinged upon the packing and the contaminants are absorbed and carried away in the wash water. The first and second stages are repeated in the double pack fume scrubbers.

*Several types of alternate packing media are available on request.

MIST ELIMINATION

After passing through the scrubbing sections, the air is moisture laden and must pass through a two stage gravity mist eliminator section. This final stage of P.V.C. eliminator blades provides four 30° changes in direction and eliminates entrained water.

WATER SUPPLY

All Duall Fume Scrubbers may be supplied with water either directly from your supply or from an integral or remote recirculation system supplied with the scrubber. It is generally recommended that a recirculation system be used to conserve water except on very low cfm units. **The actual fresh water consumption on the single pack series with recirculation is only 0.05 to 0.15 gpm/1000 cfm depending on the contaminant involved.** On the double pack models, water consumption ranges from 0.1 to 0.3 gpm/1000 cfm. This represents 5% of the water being recirculated. Duall scrubbers are self-draining and may be installed out-doors in sub-zero conditons without freeze-up. If these conditions exsist, a remote recirculation system should be specified for placement in a heated area.

All Duall Scrubbers come complete with fittings for the additon of chemical neutralizers, if required. A complete chemical metering and pumping system is available upon request.

MATERIALS

Every Duall Fume Scrubber is shipped complete with an integral coated steel base. No special mounting is required. Simply connect the duct, the water and power supply, and the unit is ready for operation. Complete installation and operating instructions are supplied with all Duall Scrubbers.

PRESSURE DROP

The following pressure drops are applicable for Scrubbers operated at design CFM:

F-101*	2.0" w.g.	FW-300D	3.0" w.g.
F-101D	3.0" w.g.	PT-500	2.0" w.g.
FW-300	2.0" w.g.	PT-500D	3.0" w.g.

On the FW-300 series, the blower is designed for 2.0" external static pressure.

FW-300 BLOWER SECTION

The top section of the FW-300 Fume Scrubber consists of a Duall P.V.C. centrifugal blower complete with motor and OSHA belt guard and shaft cover. The blower section may be rotated through 360° to obtain any desired angle between scrubber inlet and blower outlet. This blower section is same low maintenance, guaranteed corrosion resistant blower described in Duall Brochure No. CI-131, and NH-151.

MAINTENANCE

All Duall Fume Scrubbers incorporate low maintenance components from front to back, including the packing, plumbing system and eliminators. Quick opening inspection doors are at all critical points.

DUALL FUME SCRUBBERS
Typical Average Fume Removal Efficiencies

MODELS ▶ / CONTAMINATES ▼	Single Pack Series: F-101 PT-500 FW-300	Double Pack Series: F-101D PT-500D FW-300D	Single Pack Series: with added Chemical Neutralizer (pH Control)	Double Pack Series: with added Chemical Neutralizer (pH Control)
Acetic Acid	95-98	98-99	—	—
Alkaline Cleaners	96-99	98-99	—	—
Aluminum Bright Dip*	80-85	85-90	—	—
Anodizing	96-99	98-99	—	—
Aqua Regia	80-85	85-90	85-90	90-95
Boric Acid	85-90	90-95	—	—
Caustic Cleaners	98-99	99	—	—
Caustic Soda	98-99	99	—	—
Chlorine	80-85	85-90	85-90	90-95
Chromic Acid	98-99	99	—	—
Copper Chloride	75-80	80-85	85-90	90-95
Cyanide Solutions	98-99	99	—	—
Ferric Chloride	80-85	83-88	—	—
Ferric Nitrate	96-98	98-99	—	—
Ferrous Chloride	90-95	95-98	—	—
Ferrous Sulfate	95-97	96-98	—	—
Fluosilicic Acid	95-98	98-99	—	—
Hydrochloric Acid	80-85	85-90	90-95	95-98
Hydrogen Cyanide	85-90	90-95	—	—
Hydrofluoric Acid	90-93	95-98	—	—
Hydrofluosilicic Acid	95-98	98-99	—	—
Hydrogen Peroxide	90-95	95-99	—	—
Hydrogen Sulfide	70-75	75-80	85-90	95-98
Nickel Chloride	80-85	85-90	90-95	95-98
Nickel Sulfate	80-85	85-90	90-95	95-98
Nitric Acid	75-80	85-90	—	—
Nitrogen Dioxide (NO_2)	45-50	50-60	65-70	70-75
Nitric — HF Acid	75-80	85-90	—	—
Perchloric Acid	95-98	96-99	—	—
Phosphoric Acid	96-99	98-99	—	—
Potassium Dichromate	96-98	98-99	—	—
Selenium Sulfide	96-98	98-99	—	—
Sodium Chloride	96-98	98-99	—	—
Sodium Fluoride	90-95	95-98	—	—
Sodium Glutenate	96-98	98-99	—	—
Sodium Hydroxide	98-99	99	—	—
Sulfur Dioxide	70-75	75-80	80-85	85-90
Sulfuric Acid	96-98	98-99	—	—
Tin Chlorides	75-80	80-85	85-90	90-95
Zinc Chloride	75-80	80-85	—	—
Zinc Nitrate	96-98	98-99	—	—
Zinc Sulfate	96-98	98-99	—	—

* These efficiencies are for the combined nitric and phosphoric fume. The efficiency for the NO_2 portion of the fume only will be as listed above.

● The above efficiencies are intended as guide representing average values. Specific combinations and concentrations of fumes may result in a significant variation from the above.

TECHNICAL BULLETIN

Duall Industries

No. 121-9

Duall Industries, Inc. 700 South McMillan St., Owosso, Michigan, 48867 Area Code 517/ 725-8184

DUALL SCRUBBERS
INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

1. AIR FLOW
Units are normally designed to be on the suction side of the fan. Air flow through units must be in the direction indicated. Too large a deviation from the design flow (CFM) will affect the efficiency of the scrubber.

2. SUPPORTING THE UNIT
The scrubber rests on a steel channel base making the unit self-supporting. This steel base may be suspended from overhead structure or rest on any media suitable to support the unit's weight.

3. CONNECTION TO VENTILATION DUCT
To eliminate the possibility of water running down the duct, there should be a minimum of 4 ft. of horizontal duct before the scrubber transition. This should be sloped slightly towards the bottom of the scrubber. The flanges should be field drilled on approximately 4"-5" centers. A soft foam type chemically compatible gasket material is recommended between the scrubber flange and the duct flange.

4. ELECTRICAL CONNECTION
Proper electrical connection complying with local codes should be made to the pump motor.

5. UNITS WITH INTERNAL RECIRCULATION SYSTEM
Units should be installed in heated areas or protected from freezing. Fresh water must be supplied by connecting the supply line to the flowmeter provided. This flowmeter is mounted on the side of the scrubber. The make-up water line should be valved to provide a maximum of 5% of the recirculation rate as shown on the side of the scrubber. The scrubber drain is connected to customer's waste drain line. If this line must go to a sump, it must be submerged 6"-8" below the lowest expected level, or a plumber's "P" trap should be installed. This will prevent air from flowing into the drain line and interfering with proper drainage of the scrubber. Liquid build-up in the scrubber can interfere seriously with the proper operation of the scrubber.

BEFORE START-UP, INSPECT THE INSIDE OF THE SCRUBBER AND REMOVE ANY FOREIGN MATERIAL FROM THE UNIT. SHUT THE WASTE DRAIN VALVE AND FILL THE SCRUBBER BASE SUMP WITH WATER UNTIL WATER FLOWS FROM THE OVERFLOW DRAIN. WATER IS INTRODUCED THRU THE FLOWMETER AND CAN ALSO BE INTRODUCED BY A HOSE PLACED THRU THE INSPECTION DOORS. When the water reaches the overflow level, the pump and fan may be started.

6. UNITS DESIGNED WITH REMOTE RECIRCULATION TANK AND PUMP

All units designed for remote recirculation require a separate recirculation tank with an adequately sized overflow and waste drain. The use of the remote recirculation tank will permit the installation of self-draining scrubber outside the building and the recirculation tank inside the building. The scrubber must be elevated for proper drain return to the recirculation tank. The scrubber drain pipe must be submerged 6" to 8" below the lowest expected liquid level in the tank and on the opposite side from the pump suction. The pipe end should be cut on a 60° angle with the long opening facing the tank side. For information on start-up and make-up water, please refer to Section 5 above. Make-up water may be introduced into the recirculation tank through the separate flowmeter provided for installation into water line.

7. PUMPS

Pumps should be operated in accordance with the enclosed manufacturer's instructions. Pumps with mechanical seals should be given particularly special attention to assure operation as directed. Pump motor should be electrically bumped to check for proper rotation. Motors and pumps are aligned and checked for proper operation before shipment. Customer is cautioned that misalignment may occur during shipment. Check for misalignment by manually rotating the shaft while observing coupling alignment using a straight edge or a dial indicator. Pumps provided with a packing gland are pre-adjusted to drip approximately 30 drops per minute. Drain fittings are provided on the pump or on a collection pan which should be plumbed to the waste drain. Pump motor should be interlocked with fan to provide approximately two (2) minutes pump operation before fan may be started. Pumps should not be started until the scrubber base or remote recirculation tank are filled to the overflow level. During the early break-in period, the pump packing gland should be checked for proper weeping. If incorrect, check pump manufacturer's instructions for correction procedure.

8. CHEMICAL ADDITIONS

In some cases, liquid caustic (sodium hydroxide solution) or an acid solution may be metered into the recirculation system to increase scrubber efficiency. A threaded coupling is provided in the side of the self-contained recirculation scrubbers for introduction of this chemical addition. Chemical addition for scrubbers provided with remote recirculation tanks is made by adding the solution to the recirculation tank. When using solid caustic, care should be taken in mixing to assure that no solid material is pumped into the scrubber or recirculation tank which may cause a build-up. The pH of the recirculation tank should be maintained in a range that will achieve the desired scrubber efficiency while preventing the appearance of a build-up on the packing. A pH control package may be purchased from Duall to provide a chemical feed pump and pH control to maintain the recirculation solution in the satisfactory range.

Duall Industries, Inc. 700 South McMillan St., Owosso, Michigan, 48867 Area Code 517/725-8184

DUALL SCRUBBERS
INSTALLATION, OPERATION & MAINTENANCE INSTRUCTIONS

9. PERIODIC MAINTENANCE SCHEDULE

Inspection doors are provided in all scrubber units for periodic inspection. While it is not expected that maintenance will be required, periodic inspection on a monthly basis is suggested. This inspection should include the following:

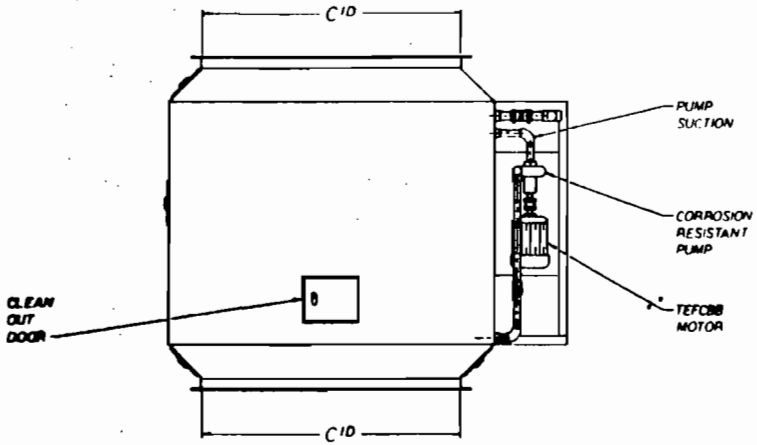
A. Check spray nozzles with the pump and fan in operation. All nozzles should produce a full 360° spray pattern. If any nozzles are found to be spraying incorrectly, the pump should be stopped, the header pipe removed, and each nozzle cleaned individually. When the cleaned header system has been replaced, the pump may be restarted.

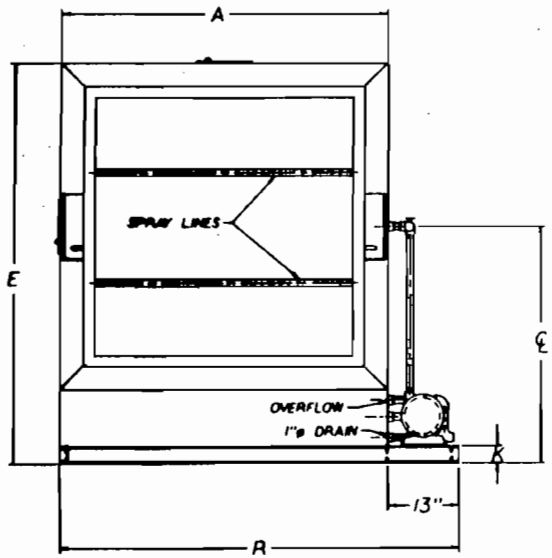
B. Check the face of the scrubber and the spray nozzles for any indication of a build-up of solids. If a surface build-up has occurred, it may be removed by spraying the pack with high pressure water, by chemical treatment of the scrubbing solution to dissolve the scale, or by manually removing the surface build-up. An analysis of the material build-up can be made to determine its nature. A dissolving additive, compatible with P.V.C. then could be added to the recycling reservoir for closed loop cleaning. During this type of cleaning, the drain and make-up water valves should be closed. During this operation, someone should frequently check the operation of the nozzles, and solution level to prevent pump damage. Prior to putting the system back in service, the cleaning solution should be drained and the scrubber refilled with fresh water. Steam should not be used to clean the scrubber.

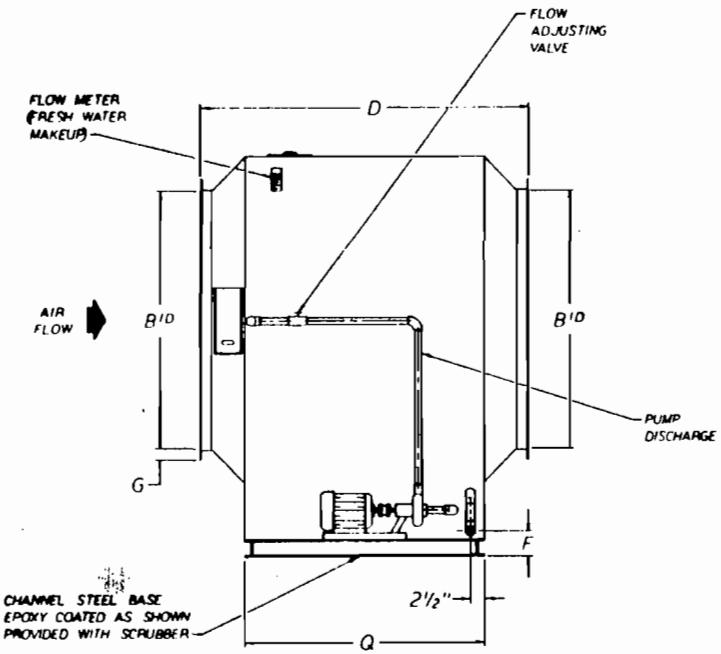
C. Check the water level in the scrubber. While the scrubber is in operation, it should maintain a solution of approximately 3"-6" in the bottom of the scrubber on a remote recirculation system and to the overflow on others.

CFM	05	1	2	3	4	5	6	8	10	12	14	16	18	20	22	24	26	28	30	35	40	45	50	55	60
A	18	22	28	32	37	41	45	52	58	64	69	74	81	88	97	104	112	123	135	157	179	202	224	247	269
B	10	14	20	24	29	33	37	44	46	52	57	62	65	61	61	61	61	61	61	61	61	61	61	61	61
C	10	14	20	24	29	33	37	44	46	52	57	62	69	72	81	88	96	107	119	141	163	186	208	231	253
D	49	50	50	51	52	52	53	54	59	60	60	61	61	66	66	66	66	66	66	66	66	66	66	66	66
F	30	34	40	44	49	53	58	65	71	77	82	87	91	91	91	91	91	91	91	91	91	91	91	91	91
F	3½	3½	3½	3½	3½	3½	4½	4½	4½	4½	4½	4½	5½	5½	5½	5½	5½	5½	5½	5½	5½	5½	5½	5½	5½
G	1½	1½	1½	1½	1½	1½	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
K	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4
Q	37	38	38	39	40	40	41	42	43	44	44	45	45	46	46	46	46	46	46	46	46	46	46	46	46
R	31	35	41	45	50	54	58	65	71	77	82	87	94	101	110	117	125	136	148	170	192	215	237	260	282
℄	21	23	26	28	30½	32½	35½	39	42	45	47½	50	52½	52½	52½	52½	52½	52½	52½	52½	52½	52½	52½	52½	52½
OVERFLOW	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
PUMP SUCTION	1	1	1	1	1	1	1	1¼	1¼	1½	1½	2	2	2	2	2	3	3	3	3	3	3	3	3	3
PUMP DISCHARGE	¾	¾	¾	¾	¾	¾	1	1	1	1¼	1¼	1¼	1½	1½	1½	2	2	2	2	2	3	3	3	3	3
LIQUID RATE GPM	15	3	6	9	12	15	18	24	30	36	42	48	54	60	66	72	78	84	90	105	120	135	150	165	180

NOTE CFM IN THOUSANDS







F-101 FUME SCRUBBER

WITH SELF CONTAINED RECIRCULATION

DUALL INDUSTRIES, INC OWOSSO, MI

DATE	DUALL JOB NO	
PURCHASER		
PURCHASER PO NO		
PURCHASER LOCATION		
JOB NAME		
JOB LOCATION		
SPECIFICATION NO	ITEM NO.	
CAPACITY		CFM
PRESSURE DROP		W.G.
LIQUID RECIRCULATION RATE		GPM
LIQUID PRESSURE		TDH
MAKEUP RATE		GPM
RECIRCULATION PUMP		
PUMP CAPACITY	GPM	TDH
PUMP HP		
PUMP VOLTAGE	V PH.	HZ.

TAG:

D-101-1015

F-101 FUME SCRUBBER WITH SELF CONTAINED RECIRCULATION	DRAWN D.L.
	CHECKED J.F.
SCALE	DATE
DUALL INDUSTRIES Inc. Owosso, Mich.	APPROVED M.H.

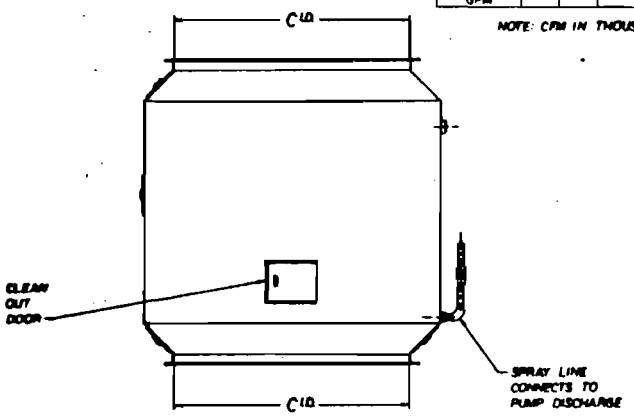
D-101-1017

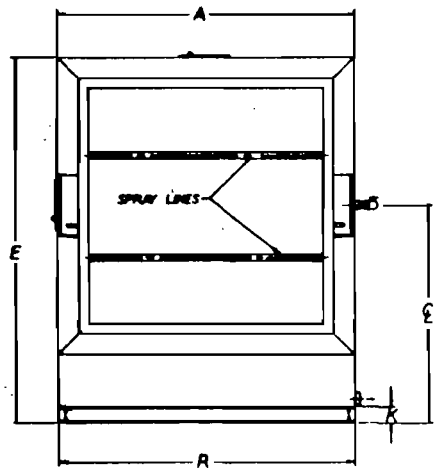
F101 FUME SCRUBBER
WITH REMOTE RECIRCULATION

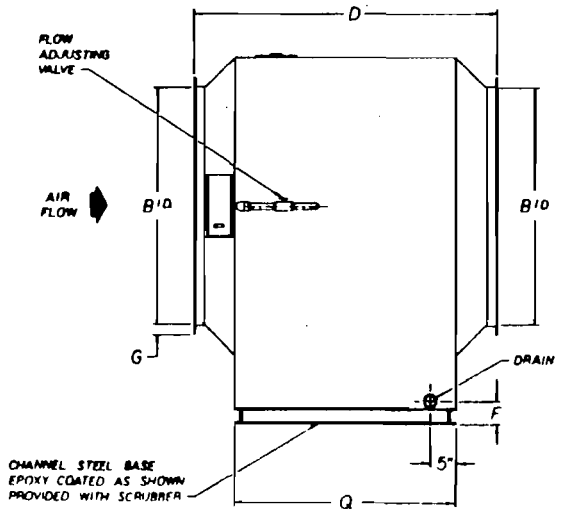
DUALL INDUSTRIES Inc. Owosso, MICH.

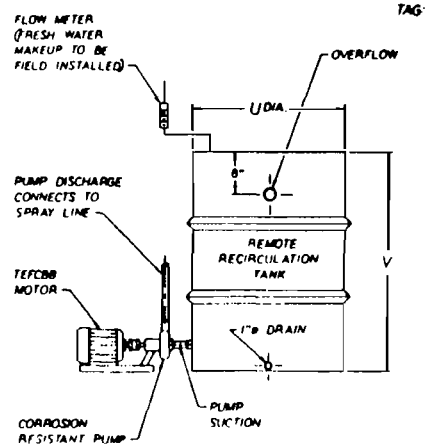
CFM	0.5	1	2	3	4	5	6	8	10	12	14	16	18	20	22	24	26	28	30	35	40	45	50	55	60
A	18	22	28	32	37	41	45	52	58	64	69	74	81	88	97	104	112	123	135	157	179	202	224	247	269
B I.D.	10	14	20	24	29	33	37	44	46	52	57	62	65	61	61	61	61	61	61	61	61	61	61	61	61
C I.D.	10	14	20	24	29	33	37	44	46	52	57	62	69	72	81	88	96	107	119	141	163	186	208	231	253
D	49	50	50	51	52	52	53	54	59	60	60	61	61	66	66	66	66	66	66	66	66	66	66	66	66
E	30	34	40	44	49	53	58	65	71	77	82	87	91	91	91	91	91	91	91	91	91	91	91	91	91
F	3½	3½	3½	3½	3½	3½	4½	4½	4½	4½	4½	4½	5½	5½	5½	5½	5½	5½	5½	5½	5½	5½	5½	5½	5½
G	1½	1½	1½	1½	1½	1½	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
K	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4
Q	37	38	38	39	40	40	41	42	43	44	44	45	45	46	46	46	46	46	46	46	46	46	46	46	46
R	18	22	28	32	37	41	45	52	58	64	69	74	81	88	97	104	112	123	135	157	179	202	224	247	269
U DIA	15½	15½	22½	22½	22½	22½	22½	30	30	30	30	30	30	30	30	30	36	36	36	36	36	36	36	36	36
V	42	42	42	42	42	42	42	42	42	42	42	54	54	54	54	54	66	66	66	66	66	66	66	66	66
℄	21	23	26	28	30½	32½	35½	39	42	45	47½	50	52½	52½	52½	52½	52½	52½	52½	52½	52½	52½	52½	52½	52½
OVERFLOW DRAIN	1½	1½	1½	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4
PUMP SUCTION	1	1	1	1	1	1	1	1¼	1¼	1½	1½	2	2	2	2	2	3	3	3	3	3	3	3	3	3
PUMP DISCHARGE	¾	¾	¾	¾	¾	1	1	1	1¼	1¼	1¼	1½	1½	2	2	2	2	2	2	3	3	3	3	3	3
LIQUID RATE GPM	1.5	3	6	9	12	15	18	24	30	36	42	48	54	60	66	72	78	84	90	105	120	135	150	165	180

NOTE: CFM IN THOUSANDS







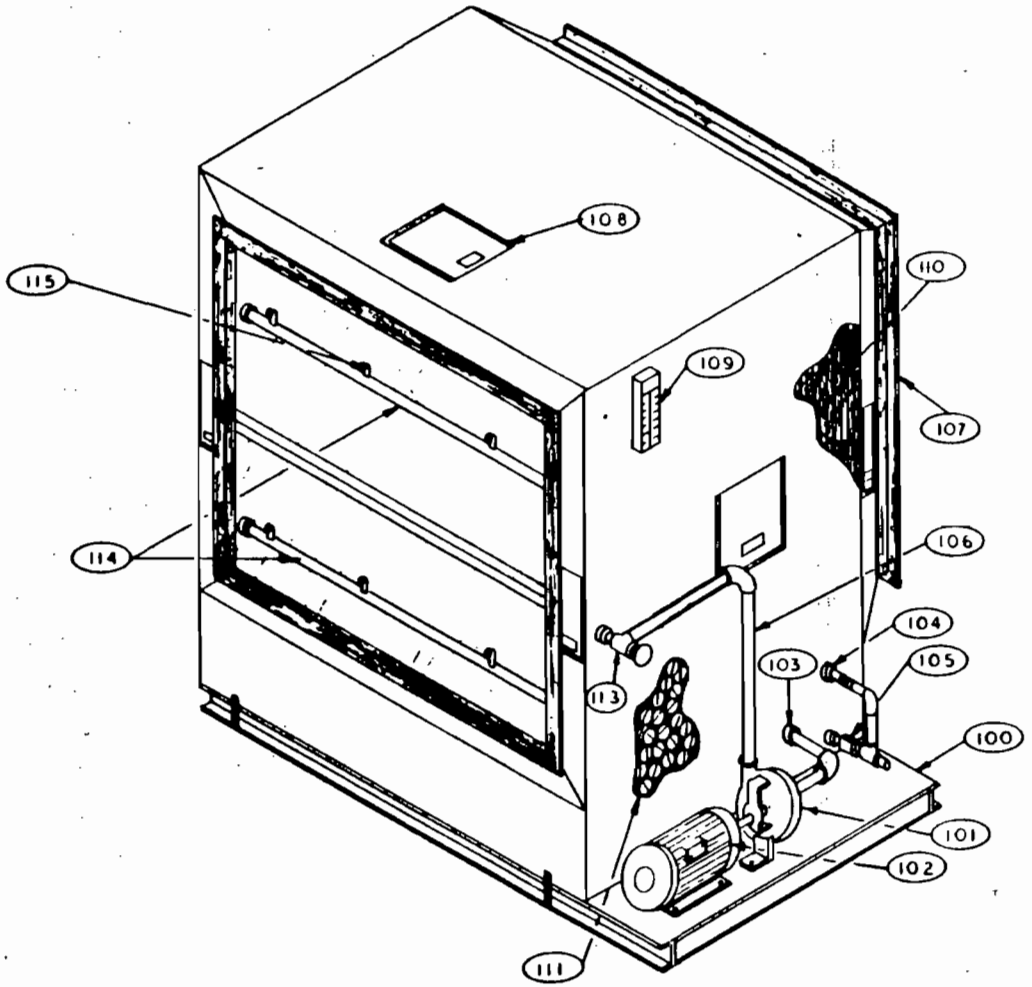


F-101 FUME SCRUBBER
WITH REMOTE RECIRCULATION

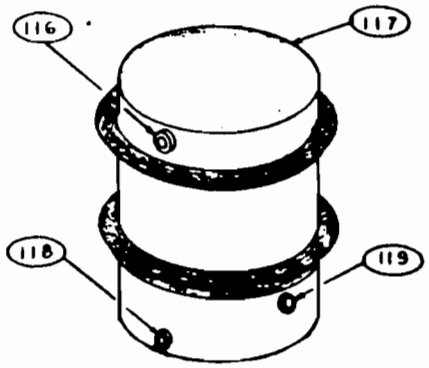
DUALL INDUSTRIES, INC. OWOSSO, MI.

DATE	DUALL JOB NO		
PURCHASER			
PURCHASER P.O. NO.			
PURCHASER LOCATION			
JOB NAME			
JOB LOCATION			
SPECIFICATION NO.	ITEM NO.		
CAPACITY			CFM
PRESSURE DROP			W.G.
LIQUID RECIRCULATION RATE			GPM
LIQUID PRESSURE			TDH
MAKEUP RATE			GPM
RECIRCULATION PUMP			
PUMP CAPACITY	GPM		TDH
PUMP HP			
PUMP VOLTAGE	V	PH.	HZ.

TAG

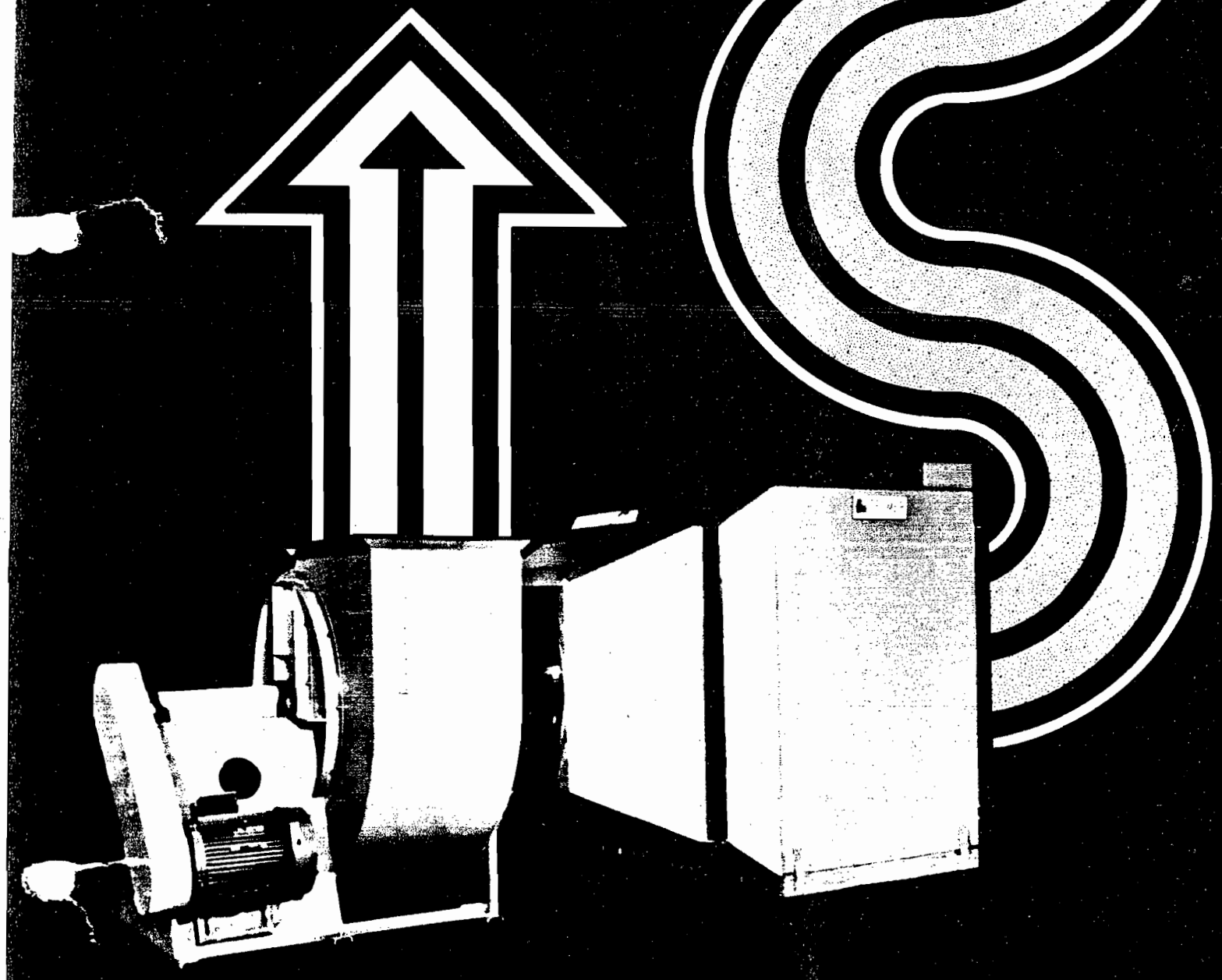


DUALL F-101 FUME SCRUBBER PARTS LIST	
NO:	**PART**
100	EPOXY COATED STEEL BASE
101	CORROSION RESISTANT PUMP
102	TEFCBB MOTOR ___ ___V./ PH./ ___CY. ___H.P. ___R.P.M.
103	PUMP SUCTION COUPLING (P.V.C.)
104	OVERFLOW COUPLING (P.V.C.)
105	DRAIN VALVE (P.V.C.)
106	PUMP DISCHARGE LINE (P.V.C.)
107	FLANGE (P.V.C.)
108	CLEAR OR P.V.C. CLEANOUT DOORS
109	FLOW METER ___ ___ ___.
110	ELIMINATOR SECTION (P.V.C.)
111	POLYPROPYLENE PACKING
113	SPRAY HEADER VALVE (P.V.C.)
114	SPRAY HEADER (P.V.C.)
115	SPRAY NOZZLES



PARTS LIST FOR REMOTE RECIRCULATION TANK	
116	OVERFLOW (P.V.C.)
117	REMOTE TANK (P.V.C.)
118	DRAIN (P.V.C.)
119	PUMP SUCTION COUPLING (P.V.C.)

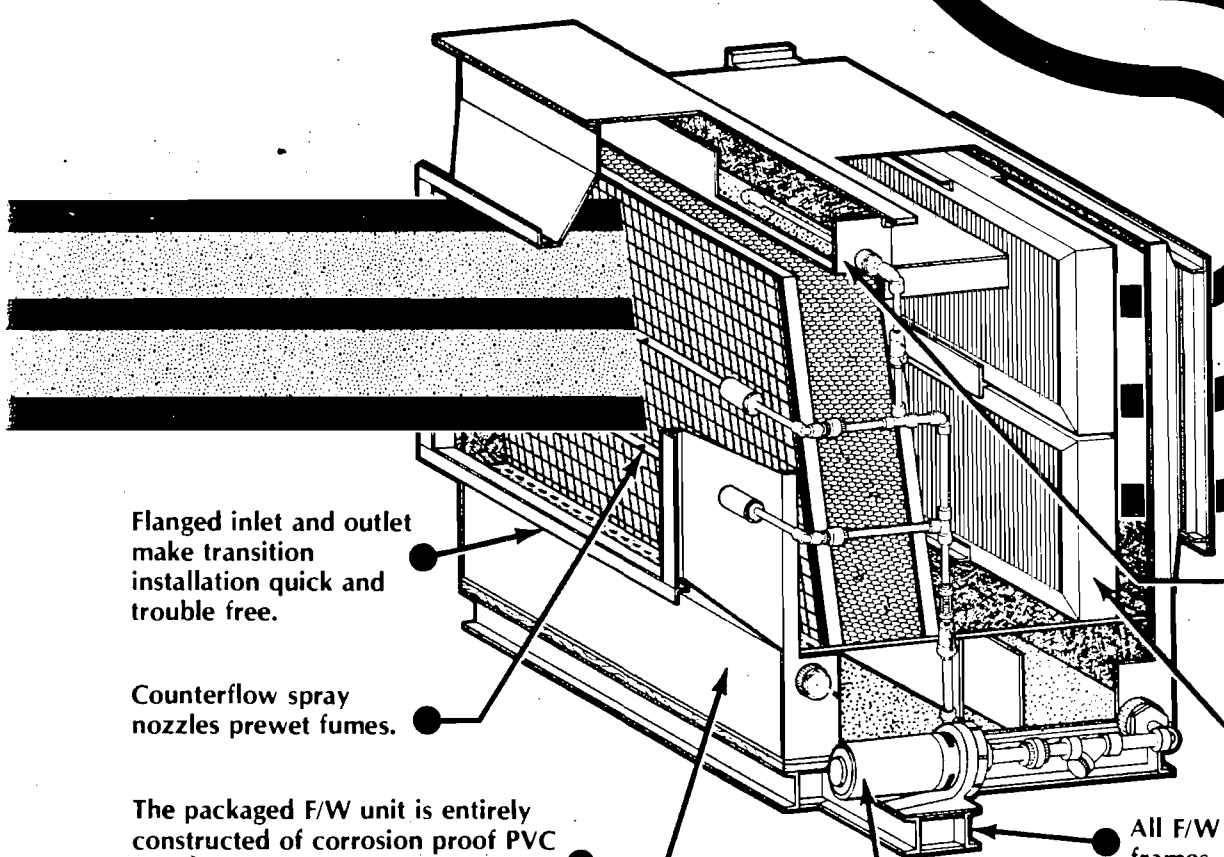
The Tri-Mer Fume Washer



Designers and Manufacturers of Corrosion Control Systems

Design Features of the Tri-Mer Fume Washer

TRI-MER fume washers offer an efficient economically packaged solution to your corrosive fume problems. Couple this unit to a TRI-MER all PVC fan, or use your existing fan, and you're ready for operation. A simple inexpensive installation.



Flanged inlet and outlet make transition installation quick and trouble free.

Counterflow spray nozzles prewet fumes.

The packaged F/W unit is entirely constructed of corrosion proof PVC with polypropylene filter and mist eliminator packs.

An overflow weir keeps the polypropylene filter pack flooded with water.

Downstream mist eliminator packs pull excess moisture from the air stream.

All F/W units come with self supporting frames.

Units through Model F/W-9 are available with integral recirculation tank and pump as shown.

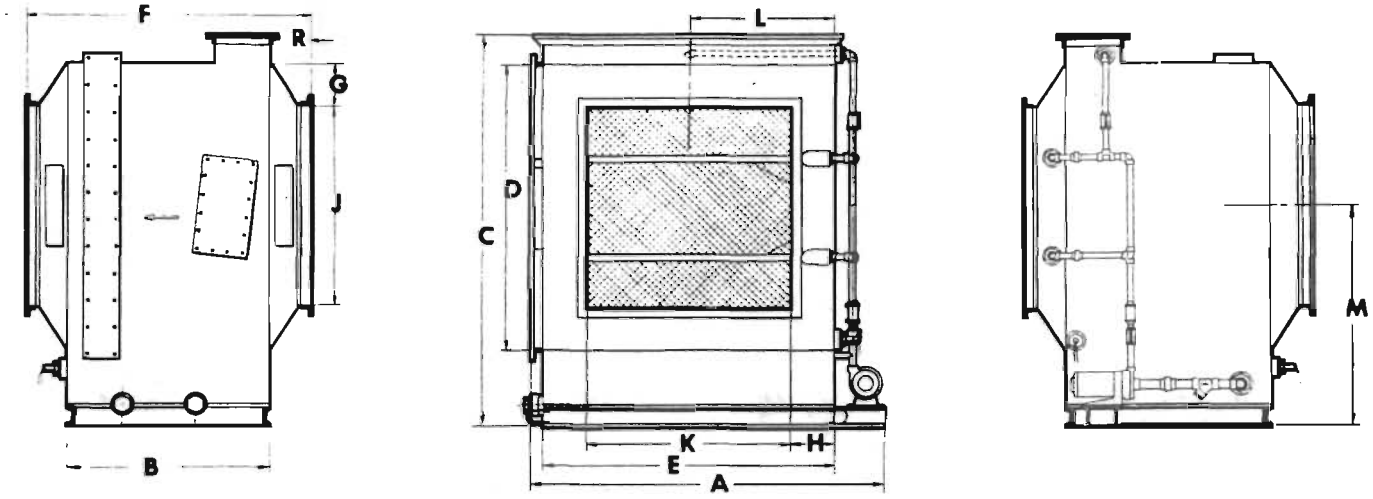
NOTE — Models F/W-10 through F/W-16 require remote recirculation tanks per manufacturers suggestion.

F/W with integral recirculation tank. F.W without integral recirculation tank

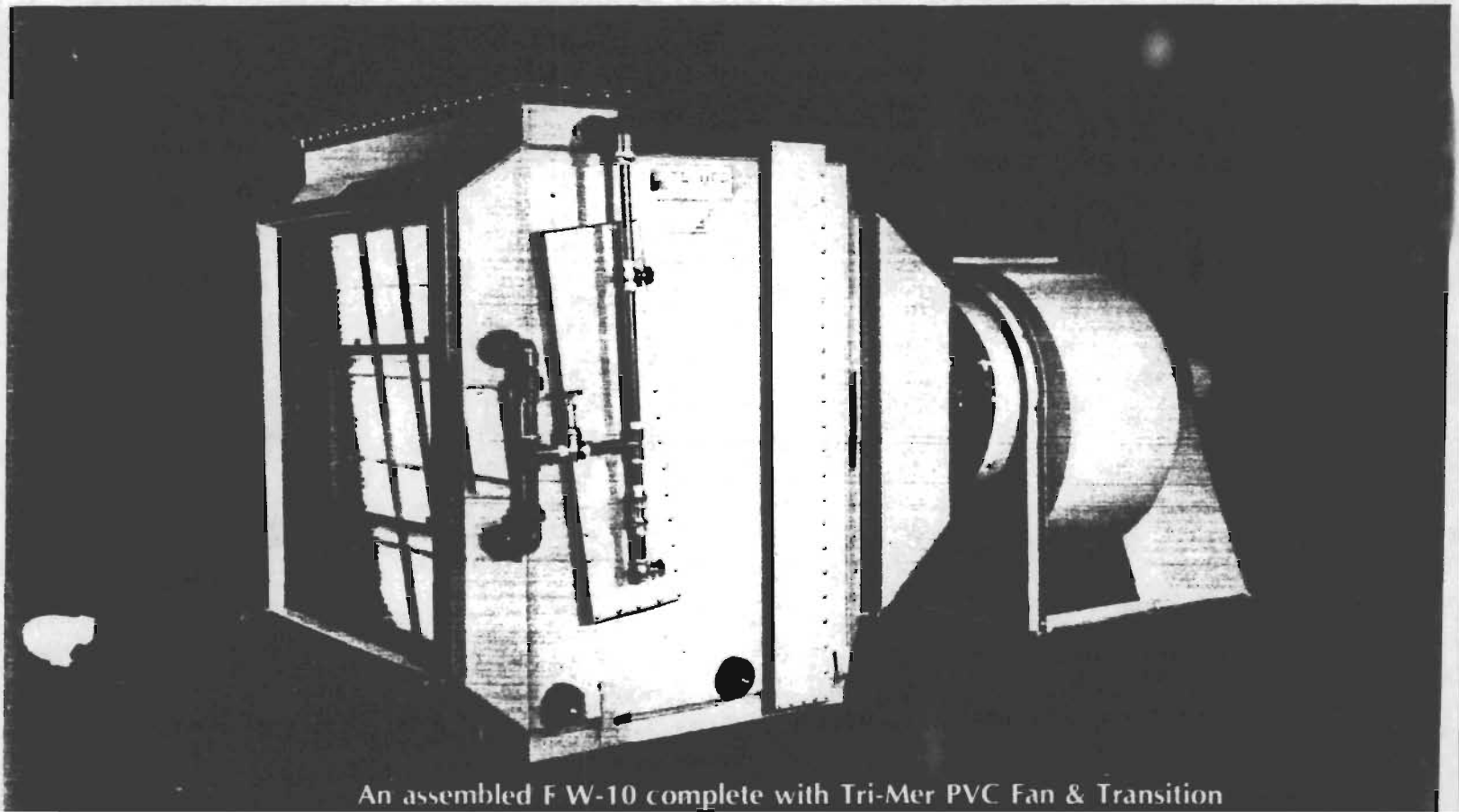
F-W	A	B	C	D	E	F	G	H	J	K	L	M	R	CHANNEL	ANGLE	DRAIN	G.P.M.	No. OF HEADERS	PIPE	CFM CAPACITY
1	3'-11½"	4'-4½"	3'-6"	4'-3"	5'-3"	3'-4"	3'-4"	4'-10"	6"	6"	28"	28"	1'-8"	2'-0¾"	3'-0¾"	8"	4"@5.4#	1½"x1½"x3/16"	3"	8	2	¾"	3,000 to 5,500
2	4'-3½"	4'-8½"	3'-10"	4'-6¾"	5'-6¾"	3'-8"	3'-4"	5'-2"	4½"	4½"	35"	35"	1'-10"	2'-2¾"	3'-2¾"	8"	4"@5.4#	1½"x1½"x3/16"	3"	9	2	¾"	5,500 to 7,000
3	5'-0½"	5'-5½"	3'-6"	5'-3¾"	6'-3¾"	4'-5"	4'-5"	4'-10"	8"	8"	37"	37"	2'-4½"	2'-7½"	3'-7½"	8"	4"@5.4#	1½"x1½"x3/16"	3"	12	2	¾"	7,000 to 9,500
4	5'-6"	5'-11"	4'-0"	5'-8¾"	6'-8¾"	4'-10"	4'-10"	5'-6"	6½"	6½"	45"	45"	2'-5"	2'-9¾"	3'-9¾"	9"	4"@5.4#	2"x2"x¼"	3"	14	2	¾"	9,500 to 11,500
5	6'-0"	6'-5"	3'-8½"	6'-2¾"	7'-2¾"	5'-4"	5'-4"	5'-2½"	9½"	9½"	45"	45"	2'-8"	3'-0¾"	4'-0¾"	9"	4"@5.4#	2"x2"x¼"	3"	16	2	¾"	11,500 to 14,000
6	6'-8"	7'-1"	4'-1½"	6'-10¾"	7'-10¾"	6'-0"	6'-0"	6'-1½"	11"	11"	50"	50"	3'-0"	3'-4¾"	4'-4¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	19	2	¾"	14,000 to 17,000
7	6'-11"	7'-5"	3'-10¾"	7'-3"	8'-3"	6'-4"	6'-4"	5'-10¾"	11"	11"	54"	54"	3'-2"	3'-6½"	4'-6¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	22	2	¾"	17,000 to 20,000
8	7'-8"	8'-1"	4'-3"	7'-10¾"	8'-10¾"	7'-0"	7'-0"	6'-3"	1'-0½"	1'-0½"	59"	59"	3'-6"	3'-9¾"	3'-9¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	28	2	¾"	20,000 to 24,000
9	8'-5"	9'-0"	4'-0¾"	8'-8"	9'-8"	7'-9"	7'-9"	6'-0¾"	1'-1½"	1'-1½"	66"	66"	3'-10½"	4'-2¾"	5'-2¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	34	3	¾"	24,000 to 30,000
10	9'-7"		4'-5"	9'-11¾"		8'-11"	8'-11"	6'-5"	1'-3½"	1'-3½"	76"	76"	4'-5½"	5'-0¼"		1'-0"	6"@8.2#	2"x2"x¼"	3"	44	3	1"	30,000 to 40,000
11	12'-1"		4'-2½"	9'-9¾"		8'-9"	11'-5"	6'-2½"	10"	2'-2"	85"	85"	5'-8"	4'-11¼"		1'-0"	6"@8.2#	2"x2"x¼"	3"	56	3	1"	40,000 to 50,000
12	14'-5"		4'-5½"	9'-9¾"		8'-9"	13'-9"	8'-5½"	10"	2'-7½"	85"	102"	6'-10½"	4'-11¼"		2'-0"	6"@8.2#	2"x2"x¼"	3"	66	3	1"	50,000 to 60,000
14	17'-9"		4'-5½"	9'-9¾"		8'-9"	17'-1"	8'-5½"	10"	3'-2½"	85"	128"	8'-5½"	4'-11¼"		2'-0"	6"@8.2#	2"x2"x¼"	3"	81	3	1"	60,000 to 75,000
15	20'-8"		4'-2½"	9'-9¾"		8'-9"	19'-10"	8'-2½"	10"	3'-9½"	85"	147"	9'-11"	4'-11¼"		2'-0"	6"@8.2#	2"x2"x¼"	3"	93	3	1½"	75,000 to 87,000
16	20'-8"		4'-7"	11'-0¾"		10'-0"	20'-0"	8'-7"	1'-5½"	3'-0"	85"	240"	10'-0"	5'-6¾"		2'-0"	6"@8.2#	2"x2"x¼"	3"	106	3	1½"	87,000 to 100,000

* NOTE — For exact unit weight check with manufacturers.

* NOTE — Double pack models are available where particularly heavy loadings exist. Check with manufacturer for dimensional changes.



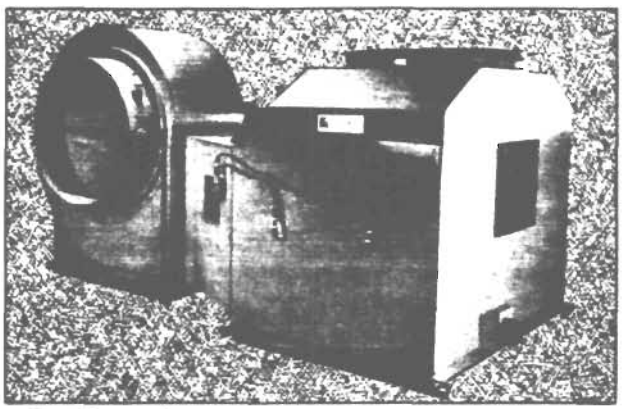
Typical three view drawing of units with integral recirculation tanks.



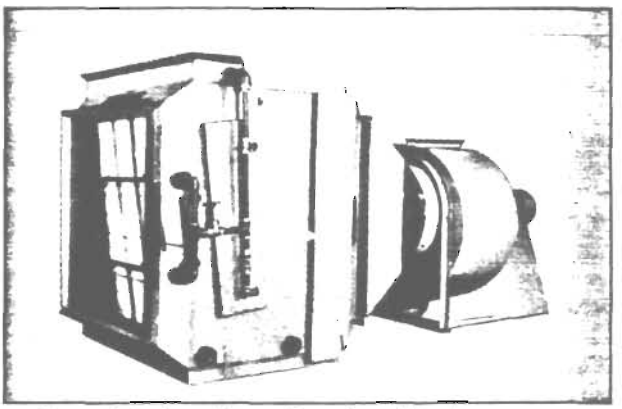
An assembled F W-10 complete with Tri-Mer PVC Fan & Transition

Other TRI-MER PVC Equipment

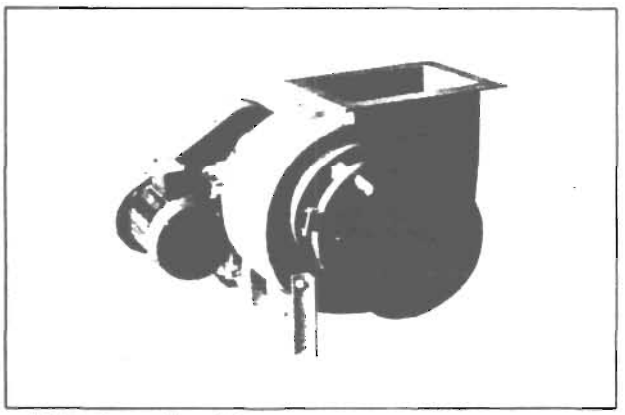
As long time specialists in designing corrosive fume control systems, TRI-MER offers a complete line of PVC air movers and associated equipment. This includes the patented fan/separator (fume scrubber), fume washers (crossflow scrubbers), PVC centrifugal fans, an *all PVC* stack fan, as well as PVC hoods and duct. Special fabrications such as consoles, tanks, and small plating lines are available.



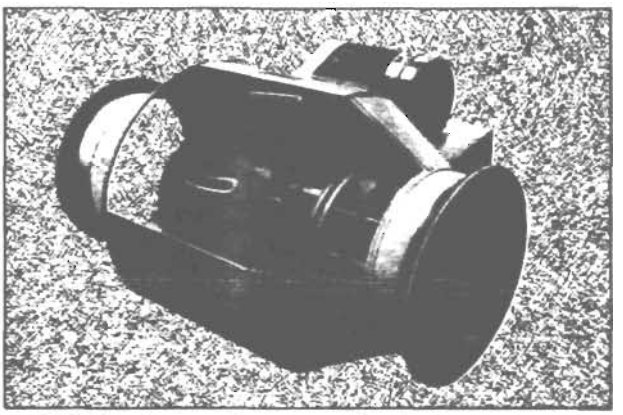
Fan/Separator



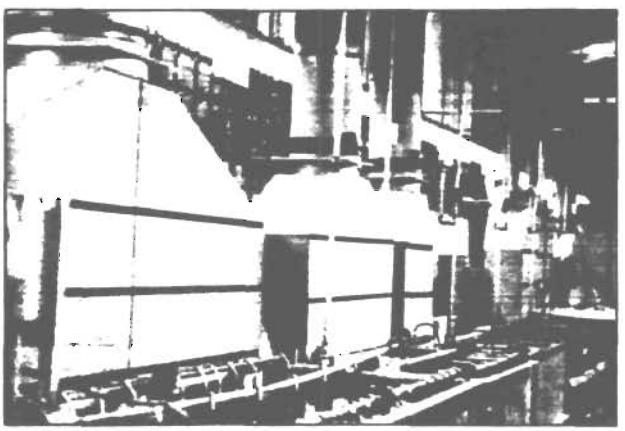
Fume/Washer (Crossflow Scrubber)



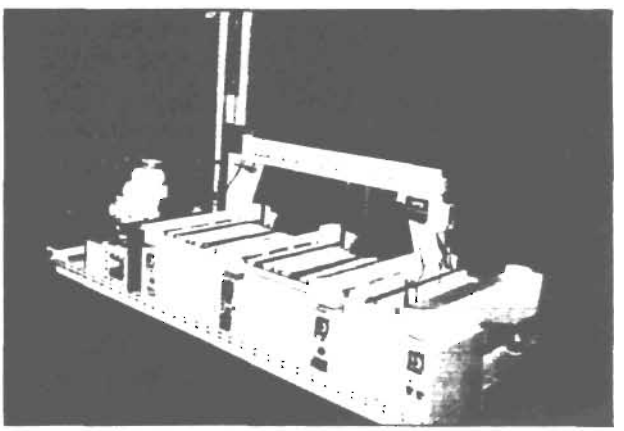
PVC Centrifugal Fan



PVC Stack Fan (Cutaway View)



PVC Hoods & Duct



Special Fabrications

Tri-Mer Corporation
Factory and Main Offices
1400 Monroe, Owosso, Michigan 48867
Phone (517) 723-7838 Telex 228545

Tri-Mer Corporation
California Sales Offices
P.O. Box 1152, Costa Mesa, California 92626
Phone (714) 548-5853

EUROPEAN REPRESENTATIVE
JAEGER K. G.
D BRAUNSCHWEIG, WEST GERMANY

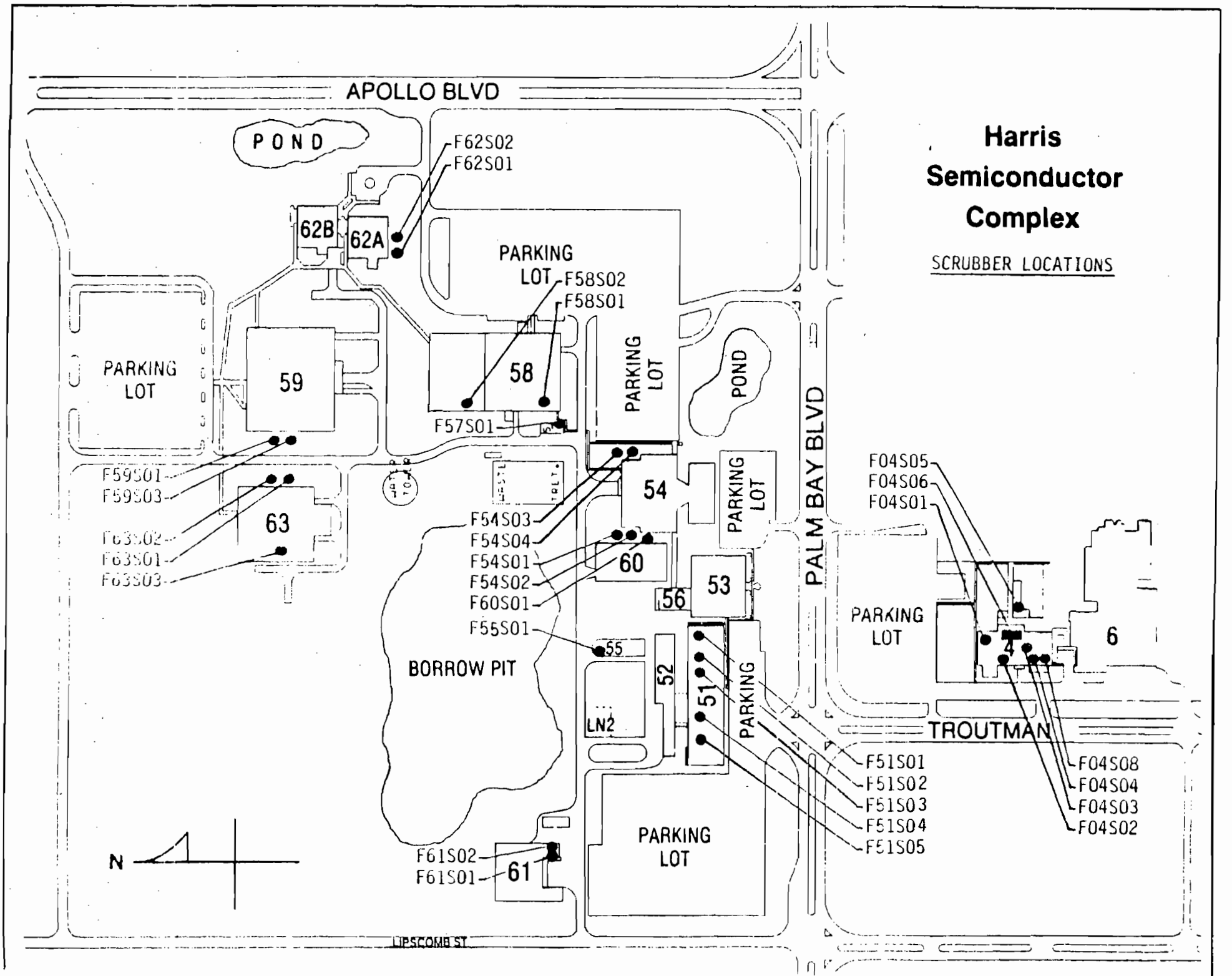
Litho in U.S.A.

HARRIS SEMICONDUCTOR

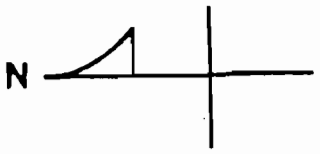
AIR PERMIT – BUILDING 51

ATTACHMENT E

SITE LOCATION MAPS

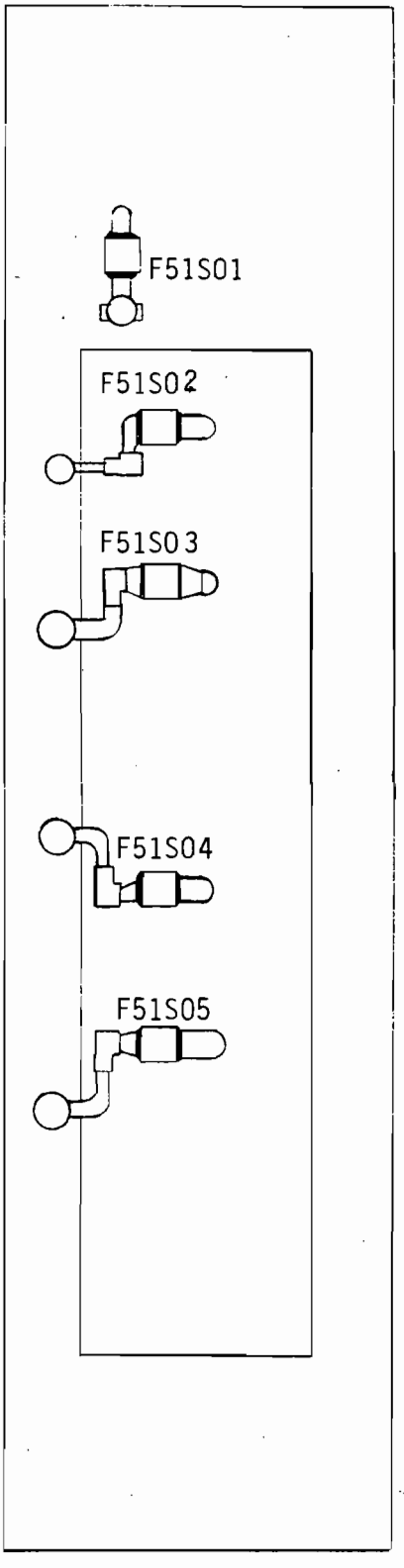

Harris
Semiconductor
Complex
SCRUBBER LOCATIONS
APOLLO BLVD
POND
F62S02
F62S01
62B
62A
PARKING
LOT
F58S02
F58S01
58
59
PARKING
LOT
F57S01
PARKING
LOT
POND
PALM BAY BLVD
F59S01
F59S03
63
F63S02
F63S01
F63S03
F54S03
F54S04
F54S01
F54S02
F60S01
F55S01
54
60
56
53
PARKING
LOT
F04S05
F04S06
F04S01
PARKING
LOT
4
6
BORROW PIT
55
52
51
LN2
PARKING
TROUTMAN
F51S01
F51S02
F51S03
F51S04
F51S05
F04S08
F04S04
F04S03
F04S02
N
F61S02
F61S01
61
PARKING
LOT
LIPSCOMB ST

HARRIS SEMICONDUCTOR
SCRUBBER LOCATIONS
BUILDING 51



LEGEND

- Horizontal Scrubber
- Vertical Scrubber
- Exhaust Stack
- Exhaust Fan
- Stack mounted on fan
- Epitaxial Scrubber



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1-17-89

DEPARTMENT OF ENVIRONMENTAL REGULATION

AC05-159484

WIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301-8241

RECEIVED
JAN 17 1989
DER-BAQM

BOB GRAHAM
GOVERNOR
VICTORIA J. TSCHINKEL
SECRETARY

APPLICATION TO OPERATE/CONSTRUCT AIR POLLUTION SOURCES

SOURCE TYPE: Stationary [ ] New[1] [X] Existing[1]

APPLICATION TYPE: [ ] Construction [ ] Operation [X] Modification

COMPANY NAME: Harris Semiconductor COUNTY: Brevard

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) Building 58

SOURCE LOCATION: Street Palm Bay Road City Palm Bay

UTM: East 17-538700 North 17-3100900

Latitude 28 ° 01 ' 20 "N Longitude 80 ° 36 ' 10 "W

APPLICANT NAME AND TITLE: J. R. Kolanek; Manager Environmental Services

APPLICANT ADDRESS: P.O. Box 883, Melbourne, Fl 32901

SECTION I: STATEMENTS BY APPLICANT AND ENGINEER

A. APPLICANT

I am the undersigned owner or authorized representative* of Harris Semiconductor

I certify that the statements made in this application for a modified 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 contro facilities in such a manner as to comply with the provision of Chapter 403, Florid Statutes, and all the rules and regulations of the department and revisions thereof. 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 permitte establishment.

*Attach letter of authorization

Signed: James R. Kolanek

J. R. Kolanek, Manager, Environmental Svc
Name and Title (Please Type)

Date: 1/1/89 Telephone No. (407) 724-7467

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 hav been designed/examined by me and found to be in conformity with modern engineerin principles applicable to the treatment and disposal of pollutants characterized in th permit application. There is reasonable assurance, in my professional judgment, tha

[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 Lawrence R Hutker

Lawrence R. Hutker
Name (Please Type)

Harris Semiconductor
Company Name (Please Type)

P.O. Box 883, Melbourne, Florida 32901
Mailing Address (Please Type)

Florida Registration No. 35972 Date: 1/1/89 Telephone No. (407) 729-4655

SECTION II: GENERAL PROJECT INFORMATION

. 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.

This is a modification and consolidation of existing air permits.

. Schedule of project covered in this application (Construction Permit Application Only)

Start of Construction N/A Completion of Construction

. 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.)

N/A

. Indicate any previous DER permits, orders and notices associated with the emission point, including permit issuance and expiration dates.

AC 05-104521 issued 1/15/86; expires 6/30/86

AC 05-104527 issued 1/15/86; expires 4/01/86

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? No

   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. No

3. Does the State "Prevention of Significant Deterioration" (PSD) requirement apply to this source? If yes, see Sections VI and VII. No

4. Do "Standards of Performance for New Stationary Sources" (NSPS) apply to this source? No

5. Do "National Emission Standards for Hazardous Air Pollutants" (NESHAP) apply to this source? No

H. Do "Reasonably Available Control Technology" (RACT) requirements apply to this source? No

   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		
---SEE ATTACHMENT C ----				

B. Process Rate, if applicable: (See Section V, Item 1)

1. Total Process Input Rate (lbs/hr): not applicable

2. Product Weight (lbs/hr): not applicable

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	
---SEE ATTACHMENT B ----							

[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)
---SEE ATTACHMENT D ---				

E. Fuels

Type (Be Specific)	Consumption*		Maximum Heat Input (MMBTU/hr)
	avg/hr	max./hr	

*Units: Natural Gas--MMCF/hr; Fuel Oils--gallons/hr; Coal, wood, refuse, other--lbs/hr.

Fuel Analysis:

Percent Sulfur: _____ Percent Ash: _____

Density: _____ lbs/gal Typical Percent Nitrogen: _____

Heat Capacity: _____ 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.

Waste water from air scrubbers is discharged to on-site Waste Water Treatment Plant--discharge to deepwell under UIC - Permit #UC05-126519.

--------SEE ATTACHMENT D--------

H. Emission Stack Geometry and Flow Characteristics (Provide data for each stack):

Stack Height: _____ ft. Stack Diameter: _____ ft.

Gas Flow Rate: _____ ACFM _____ DSCFM Gas Exit Temperature: _____ °F.

Water Vapor Content: _____ % Velocity: _____ FPS

SECTION IV: INCINERATOR INFORMATION

not applicable

Type of Waste	Type 0 (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 Diameter: _____ 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 applicabl
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 opera
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. Metaorological 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.

HARRIS SEMICONDUCTOR

AIR PERMIT - BUILDING 58

ATTACHMENT A

PROCESS DESCRIPTION

ATTACHMENT A

The primary manufacturing operations in building 58 are assembly and testing of integrated circuits. In the Assembly and Test areas, a series of processing and quality control steps are incorporated to produce the final product. Wafers are cut (or 'diced') into the individual units (or die) they are comprised of. The die are then put into circuit packages and the wires are ultrasonically bonded. The resulting integrated circuits are tested for a wide variety of parameters including tolerance to temperature and humidity changes, endurance, and electrical conductivity. Exhausted equipment includes saws, soldering stations, degreasers, die wash units, bake ovens, fine leak test systems, compressors, furnaces, chemical cabinets, and wet stations dedicated to the cleaning of product parts.

In addition, the two-story building houses a Brand area, a P.C. board Technology Lab, and a Product Development Lab.

In the Brand area, product information is stamped onto the integrated circuit packages. Exhausted equipment includes wet stations, branders, and chemical storage cabinets.

The P.C. board Technology and Product Development Labs manufacture printed circuit boards. Examples of equipment attached to the exhaust system are coaters, ovens, etchers, and wet stations. Defective products are tested in the Reliablity Lab. Etchers and wet stations are exhausted.

Scrubber number F58S01 treats caustic and corrosive contaminated exhaust from Assembly, Test, Brand, and Reliability Lab areas. Scrubber number F58S02 addresses solvent contaminated air streams from the Analog Product Development Lab. Exhaust fan F58E01 provides exhaust for equipment in Assembly, Test, Brand, and P.C. Board Technology Labs. The scrubbers are located on the roof, and the fan is mounted on the west side of the building at ground level (see attached location maps.)

In a room located on the east side of the building, an automatic abrading machine is used to remove stamped-on labels from semiconductors. The exhaust generated from the process is contaminated with alumina powder. A Torit model TD 486 dust collector is employed to capture the dust. The dust collector resides on the exterior wall of the building. (See process flow diagram and system description in attachments.)

The assembly area houses a fine leak system that utilizes Krypton 85 gas to pressurize electronic components and to detect faulty hermetic seals in circuits. The system has its own exhaust fan, and is permitted under a radioactive materials license by the State of Florida Department of Health and Rehabilitative Services Office of Radiation Control (license number 662-3.)

HARRIS SEMICONDUCTOR

AIR PERMIT - BUILDING 58

ATTACHMENT B

AIR EMISSIONS

SOLVENT MONITORING--BUILDING 58

Solvent monitoring work was performed on the building 58 scrubber systems F58S01 and F58S02 during December of 1986. The test conducted was EPA Method 25A (flame ionization detection.) The results of the testing is included in this application.

FID test results revealed that total accumulative monitored VOC emissions for the building were 3.24 tons/year expressed as propane. This figure is based on a hypothetical production schedule of 8760 hours a year. The following assumptions were made regarding monitoring work on this building:

-VOC values refer to all organic emissions including organic solvents.

-All data was corrected for 2 ppm background noise that is normally present in the ambient air.

-The F.I.D. accumulative emission figure is based on the maximum concentration of VOC's observed during the monitoring time frame.

EPA METHOD 25-A (F.I.D. ANALYSIS) BUILDING 58
VOC EMISSIONS DURING FULL PRODUCTION

TEST DATE	SCRUBBER #	PRODUCTN SCHEDULE (HRS/YR)	VOC EMISSIONS (TON/YR)
12/17/86	F58S01	8760	2.82
12/18/86	F58S02	8760	0.42

TOTAL PROJECTED VOC EMISSIONS FOR BLDG 58 = 3.24 TONS/YEAR

ACID MONITORING--BUILDING 58

Acid monitoring was performed on scrubber F58S01 in August of 1988. Samples were collected using modified EPA method 8 sampling train. The impinger medium consisted of a 0.1 N sodium hydroxide solution. The analytical methodology utilized to determine the ions of highest concentration is as follows:

Chloride ion--EPA Method 325.3
Fluoride ion--EPA Method 340.2
Nitrate, phosphite, and sulfate ions--ion chromatography

All results were in pounds per hour as "X", where "X" represents the acid compound present in highest concentration.

The test results revealed that the total accumulative monitored acid emissions for the building were 0.2803 tons/year expressed as hydrochloric, hydrofluoric, nitric, phosphoric and sulfuric acids. This figure is based on a hypothetical production schedule of 8760 hours a year. The monitoring was performed over an 8 hour time interval when the full production was occurring.

When a resulting acid concentration was expressed as a "less than 'y' " value, where 'y' represents the lowest detectable limit possible using the analytical methodology employed, acid emissions were taken to be equal to this 'y' limit value.

RESULTS OF ACID MONITORING--BUILDING 58
PERFORMED IN AUGUST OF 1988
BASED ON FULL PRODUCTION

Scrubber #	HCl	HF	Nitric Acid	Phos-phoric Acid	Sulfuric Acid	TOTAL (TON/YR)
F58S01 outlet (lb/hr)	0.0530	0.0010	0.0020	0.0020	0.0060	
(ton/yr)	0.2321	0.0044	0.0088	0.0088	0.0263	0.2803

TOTAL ACID EMISSIONS INTO SCRUBBER OUTLET = 0.2803 TONS/YEAR

HARRIS SEMICONDUCTOR

AIR PERMIT - BUILDING 58

ATTACHMENT C

RAW MATERIALS AND CHEMICALS

BUILDING 58 CONSOLIDATED AIR PERMIT
PROCESS SOLVENTS

1,1,1 TRIMETHYL-N-TRIMETHYL ETHER
1-METHOXY-2-PROPANOL ACETATE
2-BUTOXYETHANOL
2-METHYL-4-ISOTHIAZOLIN-3-ONE
4-METHYL-2,4-PENAHNEDIOL
5-CHLORO-2-METHYL-4
ACETONE
ALIPHATIC SOLVENTS
ALIPHATIC PETROLEUM DISTILLATES
ALKYL AMINE
AROMATIC BISAZIDE
BARIUM HYDROXIDE
BUTYL CELLOSOLVE
CELLOSOLVE ACETATE
CHLORODIFLUOROMETHANE
CHLOROPENTAFLUOROETHANE
CHLOROTRIFLUOROMETHANE
CYCLIZED POLYISOPRENE
DICHLORODIFLUOROMETHANE
ETHANOLAMINE
ETHYL ALCOHOL
ETHYLBENZENE
ETHYLENE DIAMINE
ETHYLENE KX 4000000
HYDROXYETHYL ALKYL IMIDAZOLINE
INERT FLUOROCHEMICAL FC-40
INERT FLUOROCHEMICAL FC-43
INERT FLUOROCHEMICAL FC-48
INERT FLUOROCHEMICAL FC-70
INERT FLUOROCHEMICAL FC-71
INERT FLUOROCHEMICAL FC-72
INERT FLUOROCHEMICAL FC-75
INERT FLUOROCHEMICAL FC-77
INERT FLUOROCHEMICAL FC-78
INERT FLUOROCHEMICAL FC-84
GLYCERINE
HYDROCARBON PROPELLANT
ISOBUTANE PROPELLANT
ISOPARRAFFINIC HYDROCARBONS
ISOPROPYL ALCOHOL
KEROSINE
LAKTANE
METHANOL
METHOXYSILANE
METHYL ETHYL KETONE
METHYL TRIMETHOXYSILANE
METHYLENE CHLORIDE
MINERAL SPIRITS
MONOETHANOLAMINE
N,N-DIMETHYL FORMAMIDE
NITROMETHANE
(CONTINUED)

BUILDING 58 CONSOLIDATED AIR PERMIT
PROCESS SOLVENTS (CONT.)

N-BUTYL ACETATE
ORGANIC ACID
ORGANIC SALTS
OXTYLPHENOL POLYETHOXYLATE
PETROLATUM
PHENOL
POLYALKLENE GLYCOL
POLYETHYLENE GLYCOL
POTASSIUM HYDROXIDE
PROPYLENE GLYCOL METHYL ETHER ACETATE
STODDARD SOLVENT
TELOMER OF TETRAFLUOROETHANE
TELOMER OF TETRAFLUOROETHYLENE
TERTIARY AMINE SOLVENT
TETRAFLUOROMETHANE
TOLUENE
TRICHLOROETHANE
TRICHLOROETHYLENE
TRICHLOROFLUOROETHANE
TRICHLOROFLUOROMETHANE
TRICHLOROTRIFLUOROETHANE
TRICHLOROTRIFLUOROMETHANE
TRIETHYLENE GLYCOL MONOMETHYL ETHER
TURPENTINE
XYLENE

BUILDING 58 CONSOLIDATED AIR PERMIT
PROCESS CHEMICALS ※

2,6-DI-TERT-BUTYL-P-CRESOL
ACETIC ACID
ACRYLIC POLYMER
ALIPHATIC PETROLEUM DISTILLATES
ALKANOLMINE
ALUMINA POWDER
AMINE SALT
AMINO ACID CHLORIDE
AMMONIA
AMMONIUM CHLORIDE
AMMONIUM FLUORIDE
AMMONIUM OXALATE
ARGON
BENZOIC ACID
BORIC ACID
CALCIUM CARBONATE
CALCIUM CHLORIDE
CALCIUM HYDROXIDE
CALCIUM HYPOCHLORITE
CARAMIDE
CARBON
CARBON DISULFIDE
CARBOXYLIC ACID
CERIC SULFATE
CORROSION INHIBITOR
CRESOL
CUPRIC NITRATE
CUPRIC SULFATE
DIAMOND POWDER
DIATOMACEOUS EARTH
EPOXY RESIN
ETHOXYLATED TALL OIL FATTY ACIDS
FATTY ACIDS
FORMIC ACID
FUEL OIL #2
GLUTAMATE POLYMER ACTIVATOR
GLUTAMATE POLYMER HYDROCHLORIDE
GLYCERINE
GUM RESIN
HEAVY AROMATIC NAPTHA
HYDROCARBON PROPELLANT
HYDROCHLORIC ACID
HYDROFLUORIC ACID
IODENE COMPLEX
ISOBUTANE PROPELLANT
ISOPARAFFINIC HYDROCARBONS
LAKTANE
LEAD
LEAD NITRATE
LEAD OXIDE
MODIFIED N-ALKYL DIMETHYL AMMONIUM SALTS
(CONTINUED)

BUILDING 58 CONSOLIDATED AIR PERMIT
PROCESS CHEMICALS (CONT.)

MOLYBDENUM DISULFIDE
NAPTHENIC OIL
NITRIC ACID
NITROGEN
N-ALKYL DIMETHYL BENZYL AMMONIUM SALTS
N-ALKYL DIMETHYL ETHYLBENZYL AMMONIUM SALTS
ORGANIC SALTS
PARRAFFINIC GREASE
PETROLEUM OIL
PHOSPHORIC ACID
PINENE RESIN
POLYAKLYLENE GLYCOL
POLYFUNCTIONAL ACID
POTASSIUM BIFLUORIDE
POTASSIUM CYANIDE
POTASSIUM NITRATE
POTASSIUM PENTABORATE
POTASSIUM SOAP
POTASSIUM TETRABORATE
ROSIN
SILANAMINE
SILICONE
SILVER
SILVER CHLORIDE
SODIUM CARBONATE
SODIUM CHLORIDE
SODIUM DICHROMATE
SODIUM DODECYLSULFATE
SODIUM HYPOCHLORITE
SODIUM NITRATE
SODIUM PERSULFATE
STANNOUS SULFATE
STEARIC ACID
SULFURIC ACID
TERPENE RESIN
THIOUREA
TIN
WHITE OIL
ZINC CHLORIDE
ZINC DIALKYLDITHIOPHOSPHATE

BUILDING 58 CONSOLIDATED AIR PERMIT
PROCESS GASES

ACETYLENE
AMMONIA
ARGON
CARBON DIOXIDE & PROPELLANT
HELIUM
HYDROGEN
KRYPTON 85
NITROGEN
OXYGEN
PROPANE

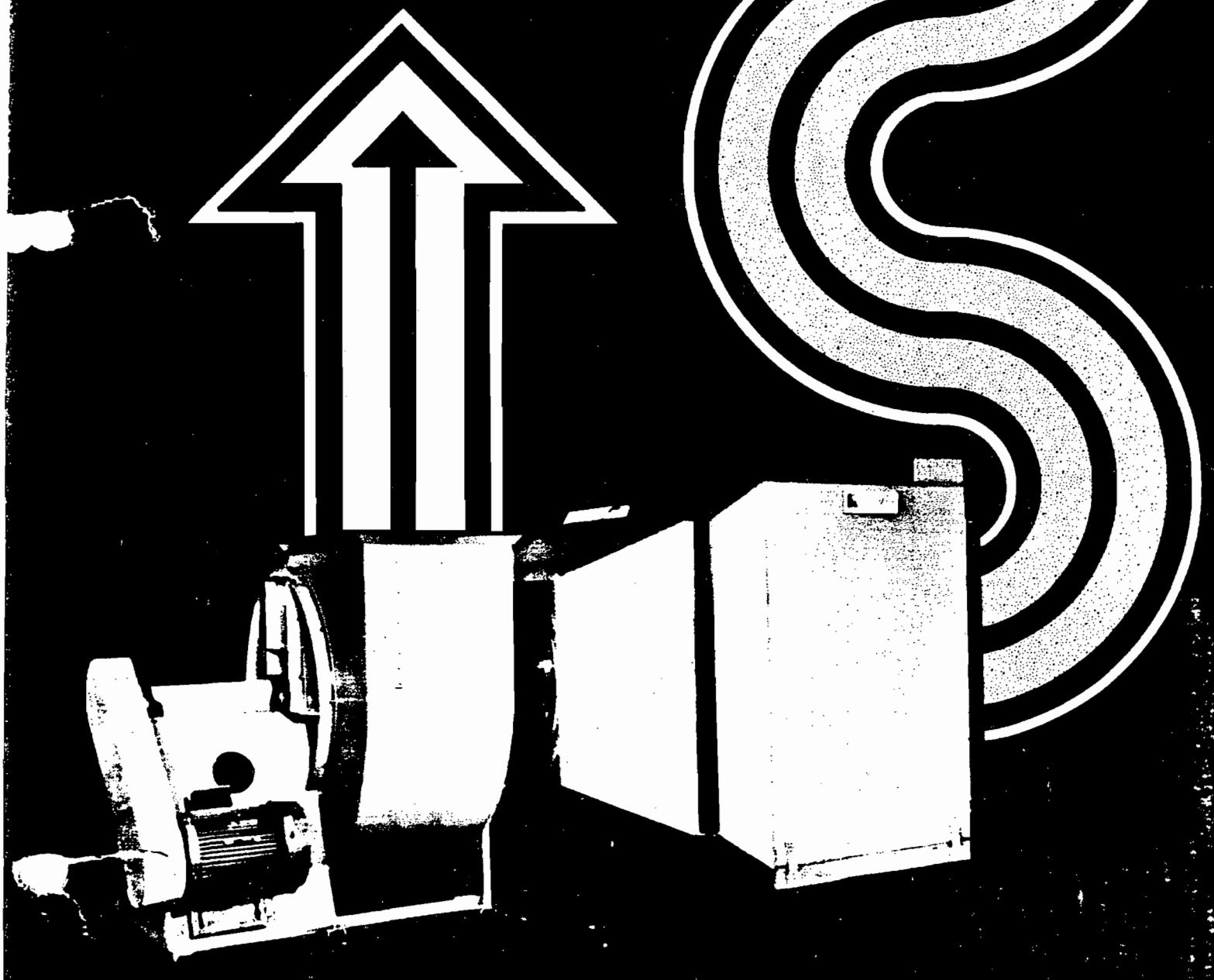
HARRIS SEMICONDUCTOR

AIR PERMIT - BUILDING 58

ATTACHMENT D

CONTROL EQUIPMENT

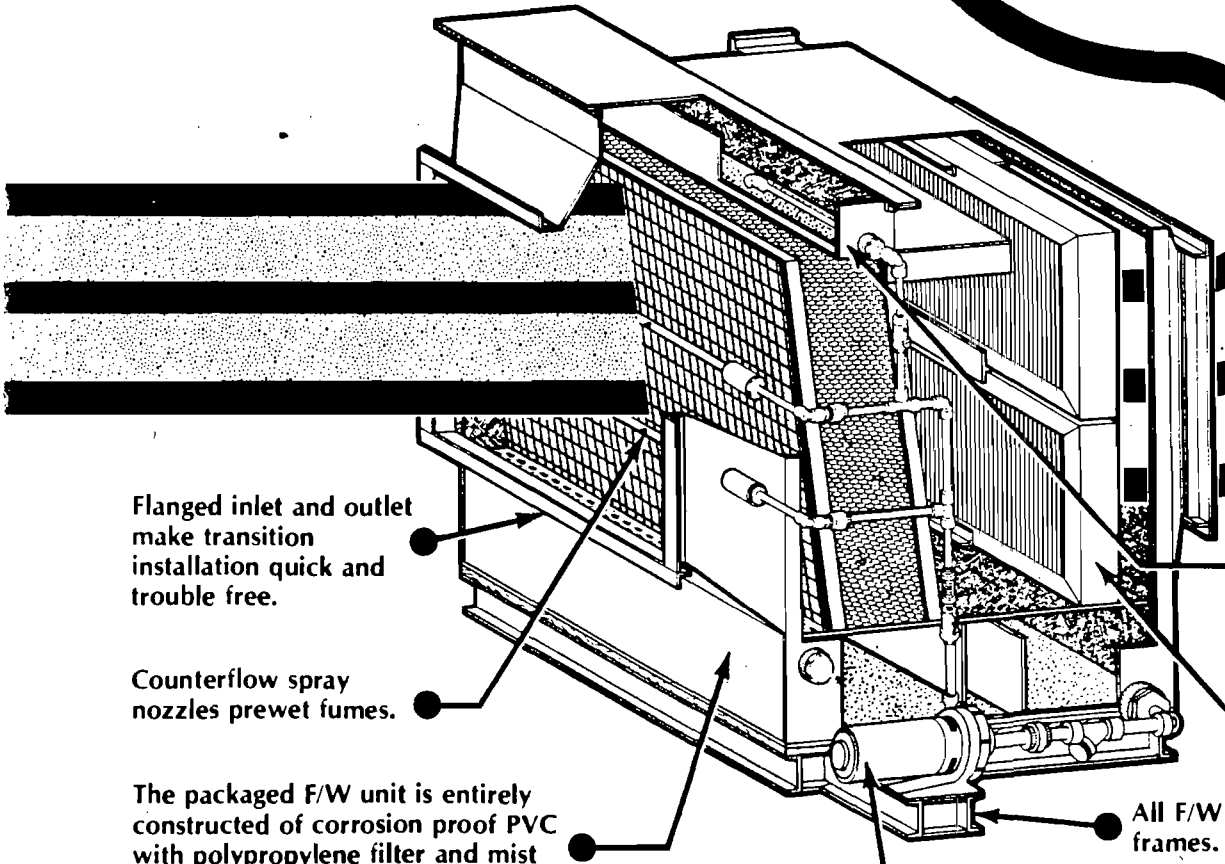
The Tri-Mer Fume Washer



Designers and Manufacturers of Corrosion Control Systems

Design Features of the Tri-Mer Fume Washer

TRI-MER fume washers offer an efficient economically packaged solution to your corrosive fume problems. Couple this unit to a TRI-MER all PVC fan, or use your existing fan, and you're ready for operation. A simple inexpensive installation.



Flanged inlet and outlet make transition installation quick and trouble free.

Counterflow spray nozzles prewet fumes.

The packaged F/W unit is entirely constructed of corrosion proof PVC with polypropylene filter and mist eliminator packs.

An overflow weir keeps th polypropylene filter pack flooded with water.

Downstream mist eliminat packs pull excess moisture from the air stream.

All F/W units come with self supportin frames.

Units through Model F/W-9 are available with integral recirculation tank and pump as shown.

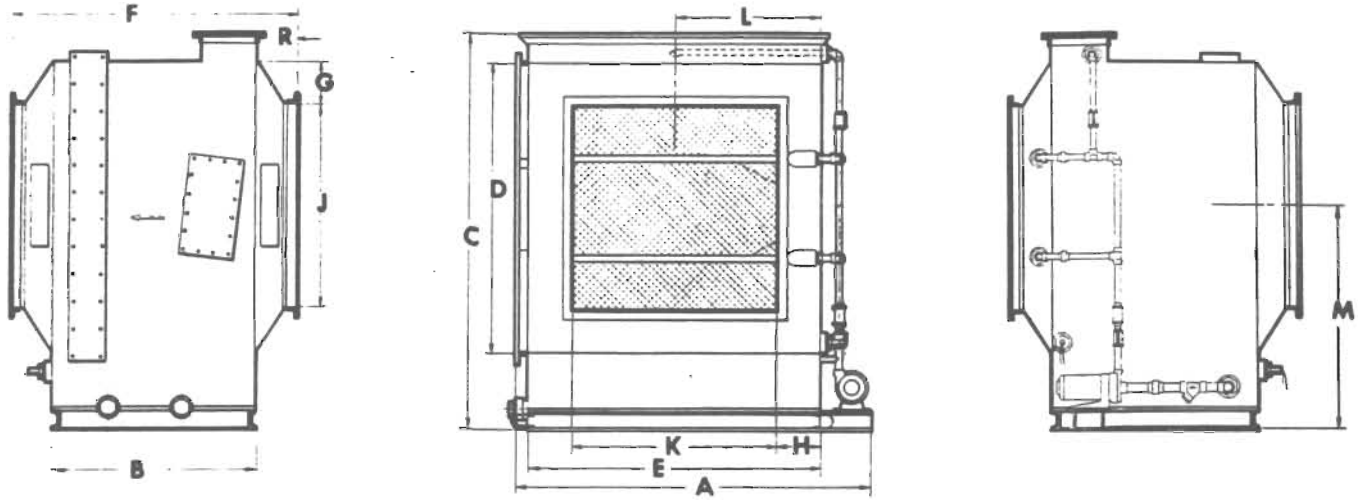
NOTE — Models F/W-10 through F/W-16 require remote recirculation tanks per manufacturers suggestion.

F/W with integral recirculation tank. F W without integral recirculation tank

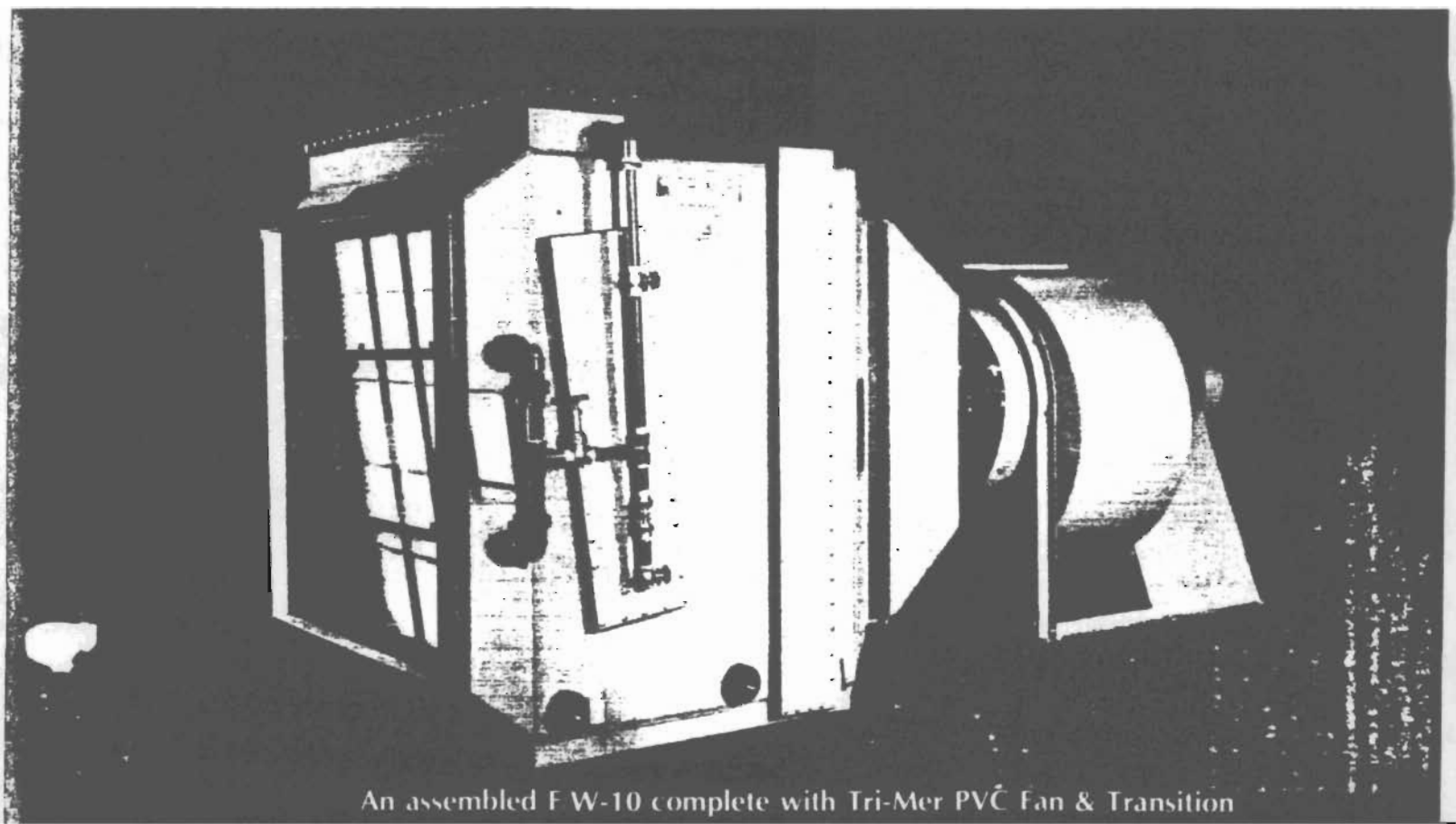
F/W	A		B	C		D	E	F	G	H	J	K	L	M		R	CHANNEL	ANGLE	DRAIN	G P M	No. OF HEADERS	PIPE	CFM CAPACITY
1	3'-11½"	4'-4½"	3'-6"	4'-3"	5'-3"	3'-4"	3'-4"	4'-10"	6"	6"	28"	28"	1'-8"	2'-0¾"	3'-0¾"	8"	4"@5.4#	1½"x1½"x3/16"	3"	8	2	¾"	3,000 to 5,500
2	4'-3½"	4'-8½"	3'-10"	4'-6¾"	5'-6¾"	3'-8"	3'-4"	5'-2"	4½"	4½"	35"	35"	1'-10"	2'-2¾"	3'-2¾"	8"	4"@5.4#	1½"x1½"x3/16"	3"	9	2	¾"	5,500 to 7,000
3	5'-0½"	5'-5½"	3'-6"	5'-3¾"	6'-3¾"	4'-5"	4'-5"	4'-10"	8"	8"	37"	37"	2'-4½"	2'-7¼"	3'-7¼"	8"	4"@5.4#	1½"x1½"x3/16"	3"	12	2	¾"	7,000 to 9,500
4	5'-6"	5'-11"	4'-0"	5'-8¾"	6'-8¾"	4'-10"	4'-10"	5'-6"	6½"	6½"	45"	45"	2'-5"	2'-9¾"	3'-9¾"	9"	4"@5.4#	2"x2"x¼"	3"	14	2	¾"	9,500 to 11,500
5	6'-0"	6'-5"	3'-8½"	6'-2⅝"	7'-2⅝"	5'-4"	5'-4"	5'-2⅛"	9½"	9½"	45"	45"	2'-8"	3'-0⅜"	4'-0⅜"	9"	4"@5.4#	2"x2"x¼"	3"	16	2	¾"	11,500 to 14,000
6	6'-8"	7'-1"	4'-1½"	6'-10⅜"	7'-10⅜"	6'-0"	6'-0"	6'-1½"	11"	11"	50"	50"	3'-0"	3'-4¾"	4'-4¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	19	2	¾"	14,000 to 17,000
7	6'-11"	7'-5"	3'-10¾"	7'-3"	8'-3"	6'-4"	6'-4"	5'-10¾"	11"	11"	54"	54"	3'-2"	3'-6¾"	4'-6¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	22	2	¾"	17,000 to 20,000
8	7'-8"	8'-1"	4'-3"	7'-10⅜"	8'-10⅜"	7'-0"	7'-0"	6'-3"	1'-0½"	1'-0½"	59"	59"	3'-6"	3'-9¾"	3'-9¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	28	2	¾"	20,000 to 24,000
9	8'-5"	9'-0"	4'-0⅝"	8'-8"	9'-8"	7'-9"	7'-9"	6'-0⅝"	1'-1½"	1'-1½"	66"	66"	3'-10½"	4'-2¾"	5'-2¾"	1'-0"	4"@5.4#	2"x2"x¼"	3"	34	3	¾"	24,000 to 30,000
10	9'-7"		4'-5"	9'-11¾"		8'-11"	8'-11"	6'-5"	1'-3½"	1'-3½"	76"	76"	4'-5½"	5'-0¼"		1'-0"	6"@8.2#	2"x2"x¼"	3"	44	3	1"	30,000 to 40,000
11	12'-1"		4'-2½"	9'-9¾"		8'-9"	11'-5"	6'-2½"	10"	2'-2"	85"	85"	5'-8"	4'-11¼"		1'-0"	6"@8.2#	2"x2"x¼"	3"	56	3	1"	40,000 to 50,000
12	14'-5"		4'-5½"	9'-9¾"		8'-9"	13'-9"	8'-5½"	10"	2'-7½"	85"	102"	6'-10½"	4'-11¼"		2'-0"	6"@8.2#	2"x2"x¼"	3"	66	3	1"	50,000 to 60,000
14	17'-9"		4'-5½"	9'-9¾"		8'-9"	17'-1"	8'-5½"	10"	3'-2½"	85"	128"	8'-5½"	4'-11¼"		2'-0"	6"@8.2#	2"x2"x¼"	3"	81	3	1"	60,000 to 75,000
15	20'-8"		4'-2½"	9'-9¾"		8'-9"	19'-10"	8'-2½"	10"	3'-9½"	85"	147"	9'-11"	4'-11¼"		2'-0"	6"@8.2#	2"x2"x¼"	3"	93	3	1½"	75,000 to 87,000
16	20'-8"		4'-7"	11'-0¾"		10'-0"	20'-0"	8'-7"	1'-5½"	3'-0"	85"	240"	10'-0"	5'-6¾"		2'-0"	6"@8.2#	2"x2"x¼"	3"	106	3	1½"	87,000 to 100,000

* NOTE — For exact unit weight check with manufacturers.

* NOTE — Double pack models are available where particularly heavy loadings exist. Check with manufacturer for dimensional changes.



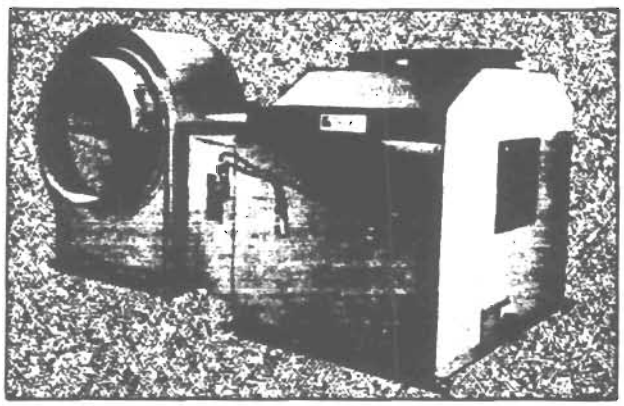
Typical three view drawing of units with integral recirculation tanks.



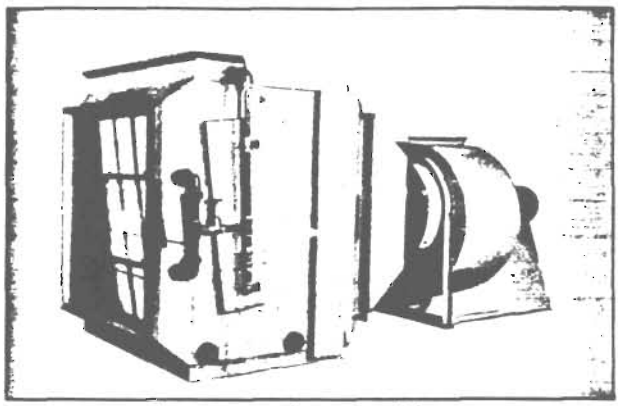
An assembled F W-10 complete with Tri-Mer PVC Fan & Transition

Other TRI-MER PVC Equipment

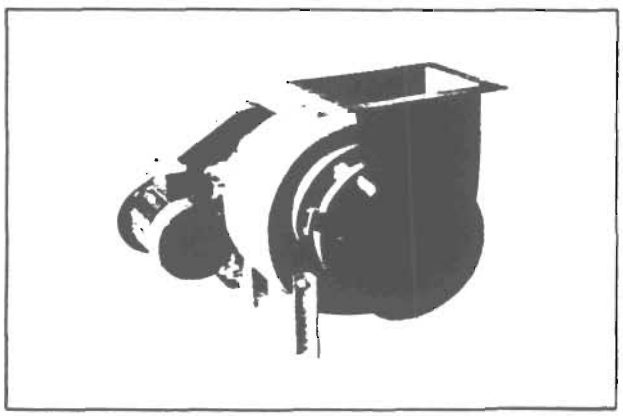
As long time specialists in designing corrosive fume control systems, TRI-MER offers a complete line of PVC air movers and associated equipment. This includes the patented fan/separator (fume scrubber), fume washers (crossflow scrubbers), PVC centrifugal fans, an *all PVC* stack fan, as well as PVC hoods and duct. Special fabrications such as consoles, tanks, and small plating lines are available.



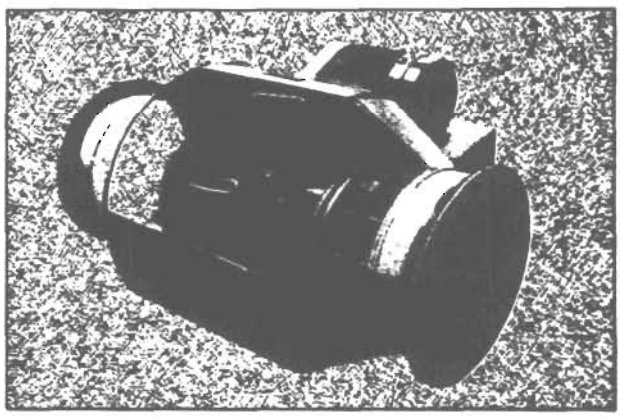
Fan/Separator



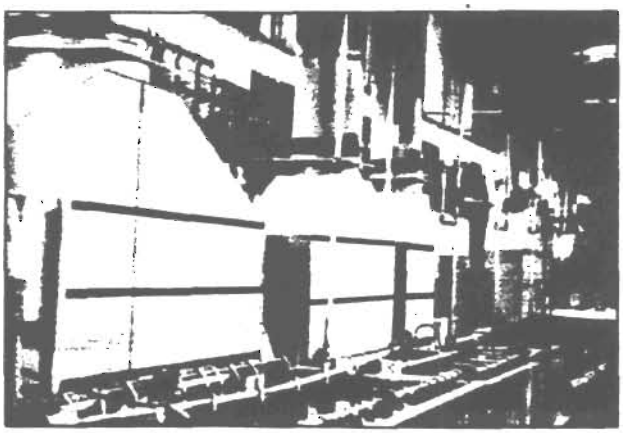
Fume/Washer (Crossflow Scrubber)



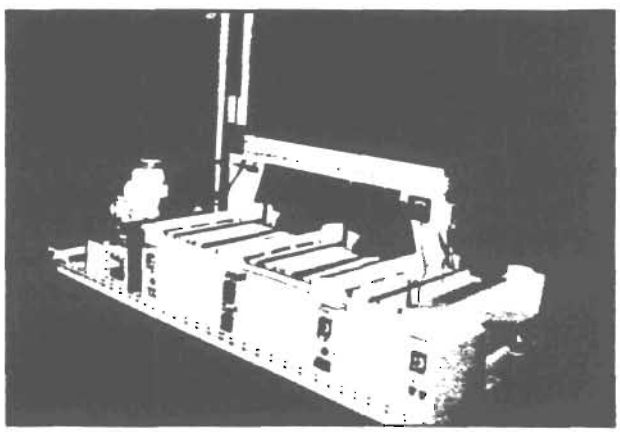
PVC Centrifugal Fan



PVC Stack Fan (Cutaway View)



PVC Hoods & Duct



Special Fabrications

Tri-Mer Corporation
Factory and Main Offices
1400 Monroe, Owosso, Michigan 48867
Phone (517) 723-7838 Telex 228545

Tri-Mer Corporation
California Sales Offices
P.O. Box 1152, Costa Mesa, California 92626
Phone: (714) 548-5853

EUROPEAN REPRESENTATIVE
JAEGER K. G.
D BRAUNSCHWEIG, WEST GERMANY

CAPACITY TABLES

TRI-MER CORPORATION
Air Pollution Control Systems

SIZE 30

Wheel Diameter = 30"
Wheel Circumference = 7.85'

Inlet Diameter = 33⅛"
Fan Outlet Area = 5.17 sq. ft.

Safe RPM = 1530
Maximum BHP = $5.25\left(\frac{RPM}{1000}\right)^3$

CFM	OV	¼" SP		⅜" SP		½" SP		⅝" SP		¾" SP		1" SP		2" SP		3" SP		4" SP		5" SP		6" SP	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
[illegible]	[illegible]	300	.32	435	.42	467	.53	496	.64	[illegible]	.75	[illegible]	[illegible]										
[illegible]	[illegible]	332	.39	[illegible]	.51	[illegible]	.63	523	.75	[illegible]	.87	[illegible]	1.13	735	[illegible]								
[illegible]	1000	355	.38	497	.61	[illegible]	.74	562	.87	577	1.01	[illegible]	1.23	797	[illegible]								
[illegible]	[illegible]	438	.57	[illegible]	[illegible]	[illegible]	.86	542	1.01	607	1.15	631	1.45	[illegible]	[illegible]	902	[illegible]						
[illegible]	[illegible]	532	.69	561	.84	578	1.02	[illegible]	1.15	595	1.32	[illegible]	[illegible]	[illegible]	[illegible]	372	4.55	[illegible]	[illegible]				
[illegible]	[illegible]	566	.82	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	637	1.49	[illegible]	[illegible]	[illegible]	3.07	987	4.88	1113	5.69				
[illegible]	[illegible]	592	.97	628	1.15	[illegible]	1.33	[illegible]	[illegible]	[illegible]	1.39	[illegible]	2.37	[illegible]	2.38	[illegible]	[illegible]	1121	7.07	[illegible]	[illegible]		
[illegible]	[illegible]	638	1.14	662	1.33	[illegible]	1.52	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.51	[illegible]	[illegible]	1027	[illegible]	1130	7.62	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	675	1.34	697	1.53	730	1.73	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.87	724	4.25	[illegible]	5.35	1133	7.87	[illegible]	10.1	1263	12.3
[illegible]	[illegible]	749	1.81	769	2.01	738	2.22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3.15	[illegible]	[illegible]	1099	6.48	1192	9.07	[illegible]	11.2	1390	13.5
[illegible]	[illegible]	824	2.47	842	2.59	860	2.63	[illegible]	[illegible]	[illegible]	3.31	[illegible]	3.54	[illegible]	[illegible]	[illegible]	[illegible]	1250	10.3	[illegible]	12.5	[illegible]	15.1
[illegible]	[illegible]	900	3.05	916	3.29	931	3.54	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1212	[illegible]	1304	11.6	[illegible]	14.1	1469	16.6
[illegible]	[illegible]	973	3.91	991	4.14	1005	4.38	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	8.05	1272	10.5	1359	13.1	[illegible]	15.7	1518	13.4
[illegible]	[illegible]	1055	[illegible]	1066	5.09	1079	5.37	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1335	12.1	1419	14.3	[illegible]	17.5		
[illegible]	[illegible]	1132	[illegible]	1144	[illegible]	1155	6.53	[illegible]	6.35	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1396	13.5	1479	15.5				
[illegible]	[illegible]	1210	7.27	1220	7.54	1332	7.87	[illegible]	8.15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12.2	[illegible]	15.3						
[illegible]	[illegible]	1288	8.73	1297	9.02	1303	9.36	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13.9	[illegible]	[illegible]						
17573	[illegible]	1366	10.1	1375	10.7	1385	11.1	[illegible]	11.4	[illegible]	11.7	[illegible]	[illegible]	[illegible]	[illegible]								

BHP shown does not include belt drive loss.

TRI-MER CORPORATION
Air Pollution Control Systems

SIZE 33

Wheel Diameter = 33"
Wheel Circumference = 8.63'

Inlet Diameter = 36⅝"
Fan Outlet Area = 6.26 sq. ft.

Safe RPM = 1390
Maximum BHP = $8.54\left(\frac{RPM}{1000}\right)^3$

CFM	OV	¼" SP		⅜" SP		½" SP		⅝" SP		¾" SP		1" SP		2" SP		3" SP		4" SP		5" SP		6" SP	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
[illegible]	800	348	.35	330	.47	410	.59	438	.72	466	.85	518	1.12										
[illegible]	900	375	.43	405	.56	434	.71	460	.84	485	.98	534	1.27										
[illegible]	1000	403	.52	432	.67	459	.82	483	.97	507	1.12	553	1.44	717	2.84								
[illegible]	1100	432	.61	459	.79	484	.96	508	1.12	531	1.29	574	1.62	723	3.11								
7512	1200	461	.75	486	.93	510	1.11	533	1.29	555	1.36	596	1.83	742	3.37	876	5.14						
8138	1300	492	.91	515	1.09	538	1.23	560	1.47	581	1.66	621	2.06	750	[illegible]	886	5.51	1005	7.55				
8764	1400	522	1.08	544	1.27	566	1.46	587	1.67	607	1.88	645	2.29	773	4.02	899	5.91	1012	7.99				
9390	1500	554	1.27	574	1.47	594	1.68	614	1.89	634	2.11	671	2.56	790	4.29	914	6.34	1023	8.48	1126	10.8		
10016	1600	585	1.48	604	1.59	624	1.91	643	2.14	661	2.37	697	2.85	821	4.77	932	6.81	1036	9.01	1126	11.4	1231	[illegible]
11268	1800	650	2.01	667	2.22	684	2.46	700	2.71	717	2.95	[illegible]	3.48	[illegible]	5.63	971	7.34	1069	10.2	1150	12.7	1248	15.3
12520	2000	716	2.54	730	2.37	743	3.12	761	3.39	775	3.67	806	[illegible]	817	[illegible]	1015	9.02	1105	11.5	1191	14.1	1275	16.9
13772	2200	783	3.42	795	3.66	803	3.92	822	4.22	835	4.19	864	[illegible]	[illegible]	7.85	1062	10.3	1147	13.1	1228	15.8	1306	18.6
15024	2400	849	4.32	860	4.61	873	4.91	885	[illegible]	898	5.51	[illegible]	[illegible]	[illegible]	[illegible]	1112	11.8	1193	14.5	1270	17.6	1345	20.7
16276	2600	916	5.53	927	5.71	937	5.39	[illegible]	6.31	[illegible]	6.61	[illegible]	[illegible]	[illegible]	[illegible]	1162	13.3	1240	16.4	1315	19.6	1385	22.3
17529	2800	983	6.56	993	6.96	1003	7.27	1013	7.61	1024	7.93	1035	[illegible]	[illegible]	[illegible]	1214	15.1	1291	18.4	1362	21.3		
18780	3000	1050	8.11	1060	8.42	1069	8.75	1073	9.09	[illegible]	9.44	1103	[illegible]	[illegible]	[illegible]	[illegible]	16.9	1342	20.5				
20032	3200	1119	9.77	1127	10.1	1136	10.4	1144	10.8	1153	11.1	[illegible]	11.9	[illegible]	[illegible]	[illegible]	18.9						
21284	3400	1186	11.5	1195	12.1	1203	12.3	1212	12.7	1219	13.1	1226	13.9	[illegible]	[illegible]	1273	21.2						

BHP shown does not include belt drive loss.

TRI-MER CORPORATION
Air Pollution Control Systems

SIZE 36

Wheel Diameter = 36½"
Wheel Circumference = 9.55'

Inlet Diameter = 40⅞"
Fan Outlet Area = 7.66 sq. ft.

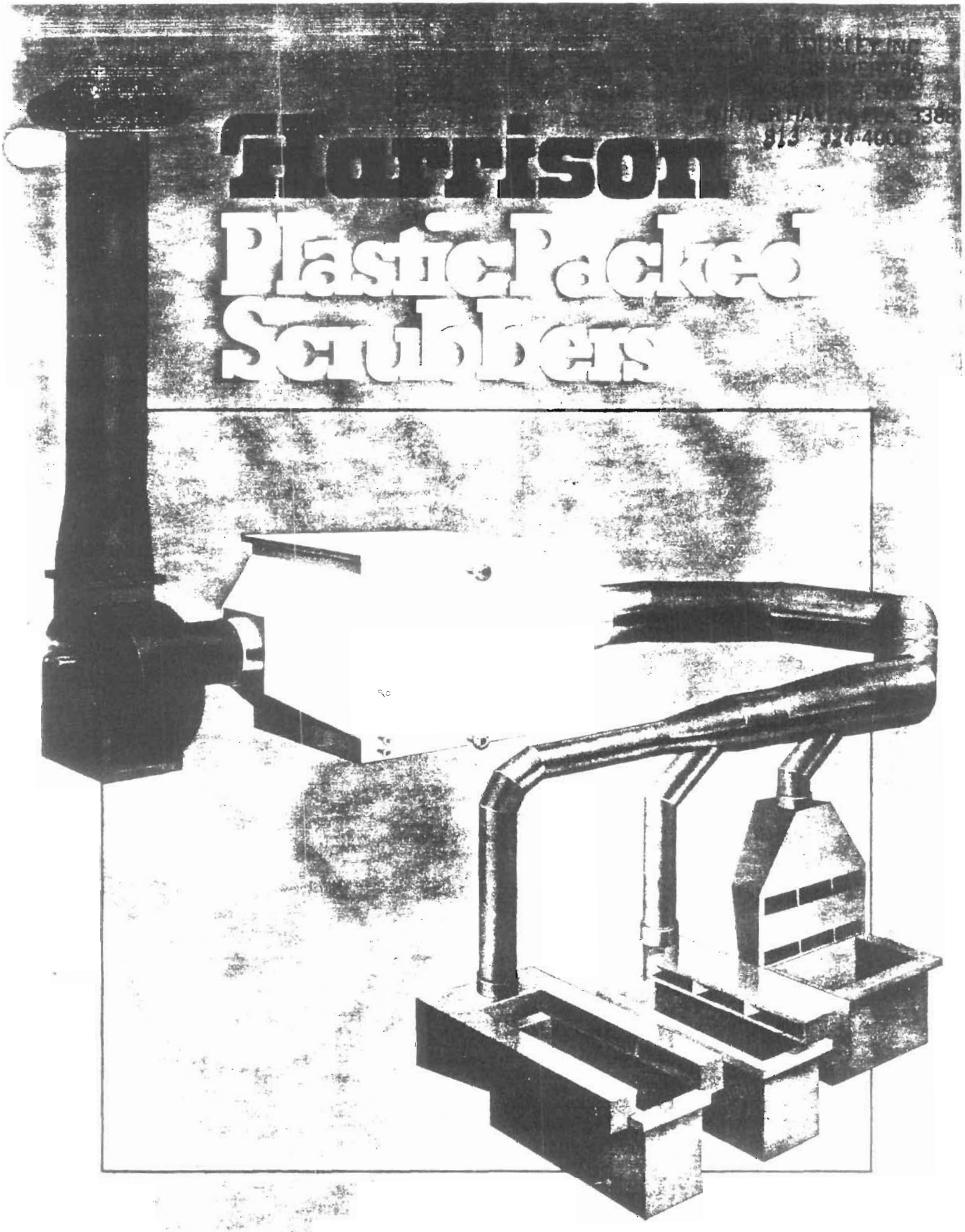
Safe RPM = 1255
Maximum BHP = $15.3\left(\frac{RPM}{1000}\right)^3$

CFM	OV	¼" SP		⅜" SP		½" SP		⅝" SP		¾" SP		1" SP		2" SP		3" SP		4" SP		5" SP		6" SP	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
5128	800	300	.41	330	.55	356	.69	382	.83	407	.99	455	1.33										
5894	900	324	.51	351	.66	376	.81	399	.97	422	1.14	466	1.49	629	3.19								
7560	1000	348	.61	374	.78	397	.95	419	1.13	440	1.31	481	1.67	633	3.41								
8426	1100	373	.73	397	.93	419	1.11	440	1.31	460	1.49	498	1.38	640	3.67	770	5.85						
9192	1200	398	.88	422	1.09	442	1.29	462	1.51	481	1.71	517	2.12	650	3.97	774	6.18						
9958	1300	424	1.04	446	1.28	466	1.49	485	1.71	503	1.94	537	2.38	663	4.31	780	6.55	890	9.13				
10724	1400	451	1.23	472	1.48	491	1.72	508	1.96	526	2.19	559	2.67	679	4.59	789	6.98	894	9.67				
11490	1500	478	1.45	497	1.71	515	1.96	533	2.22	549	2.47	580	2.98	695	5.09	801	7.45	901	10.1	997	13.1		
12256	1600	505	1.69	524	1.97	541	2.24	557	2.51	572	2.77	603	3.32	713	5.53	814	7.97	910	10.7	1001	13.5	1091	16.9
13788	1800	560	2.25	577	2.57	593	2.87	607	3.16	621	3.46	650	4.08	753	6.54	846	9.14	933	11.9	1018	14.9	1101	18.3
15320	2000	616	2.94	632	3.31	646	3.63	659	3.96	672	4.29	699	4.97	794	7.65	882	10.5	963	13.4	1041	16.5	1118	19.9
16852	2200	673	3.78	688	4.19	700	4.54	712	4.39	724	5.25	748	5.97	838	8.94	921	12.1	997	15.1	1071	18.4	1142	21.8
18384	2400	730	4.78	744	5.21	755	5.61	767	5.99	773	6.38	800	7.18	884	10.4	963	13.7	1035	17.1	1104	20.4	1171	24.1
19916	2600	788	5.94	800	6.42	811	6.85	822	7.26	832	7.67	853	8.62	932	12.1	1006	15.5	1075	19.1	1140	22.7	1205	26.5
21448	2800	845	7.28	857	7.83	867	8.25	876	8.58	886	9.13	906	10.1	981	13.9	1051	17.5	1117	21.3	1180	25.2	1240	29.2
22980	3000	903	8.81	915	9.41	924	9.88	933	10.4	942	10.8	960	11.9	1031	15.8	1098	19.8	1161	23.8	1222	28.1		
24512	3200	961	10.6	973	11.3	981	11.8	989	12.2	998	12.7	1015	13.7	1081	17.9	1145	22.2	1205	26.5				
26044	3400	1019	12.5	1031	13.3	1038	13.8	1046	14.3	1054	14.9	1070	15.9	1133	20.4	1193	24.8	1252	29.4				

BHP shown does not include belt drive loss.

Harrison

Plastic Packed Scrubbers



THE HARRISON SYSTEM

Harrison is a prime designer and producer of complete plastic exhaust systems, custom engineered scrubbing systems, as well as duct and fittings, tanks, and hoods. As a result of this capability and experience, design and manufacture of standard, pre-engineered fume scrubbers is a natural extension.

MATERIALS

Self-supporting or fiberglass armored PVC and Polypropylene, fiberglass armored Kynar, and solid fiberglass construction offers a wide range of resistance to acids, alkalis, solvents, and other corrosives at operating temperatures to approximately 250°F. Harrison systems do not use any metal in contact with the process stream.

PRE-ENGINEERING

Pre-engineered design reduces cost by eliminating the necessity to re-invent each item ordered. It results in more reliable service thru improved workmanship achieved by repetitive production control, and speeds quotations and approval drawings because costs and designs are immediately available. In addition to significant savings in approval and order time, Harrison reduces delivery time by stocking scrubber components including packing, support grids, distributor plates, nozzles, duct reducers, and sheet stock.

SCRUBBER CONFIGURATION

Most fume removal applications can be served by the two scrubber designs shown in this catalog. Vertical Counter Current style directs liquid down vertically, and unwanted fumes upward in the opposite direction. Horizontal Cross Flow unit directs liquid down vertically, but unwanted fumes are driven horizontally at 90° to the liquid. In both designs, liquid and fumes are inter-mixed in the packed bed section of the scrubber where fumes are removed by chemical reaction or water solubility. Scrubber shape does not affect performance. Horizontal design presents a low profile and is suitable where head room is limited. Verticals require more head room, but use only minimum floor space.

SCRUBBER DESIGN AND OPERATION

Highest scrubber efficiency (volumetric % of contaminate removed) is obtained by having the proper amount of contact surface area (packing) wetted by sufficient liquid (recirculated liquid rate) for an optimum residence time (packing depth) to allow unwanted fumes to take a treacherous path thru the wetted packing to permit their maximum removal from the carrier air stream by chemical reaction or water solubility. Air stream resistance encountered in the packing (static pressure loss) is a function of air velocity, cross-sectional packing area, and packing depth. Harrison scrubbers utilize proven packing depth to achieve efficiencies approaching 99+%, when operated within recommendations.

LIQUID DISTRIBUTION AND MIST ELIMINATION

Simple liquid distribution is achieved thru a main header pipe feeding perforated laterals, without use of troublesome spray nozzles. Nozzles are subject to plugging, and produce a difficult-to-remove atomized mist carryover. In the Harrison design, any large droplets of liquid caught in the upward moving air stream are easily and efficiently removed by a short bed of dry packing located above the liquid distributor.

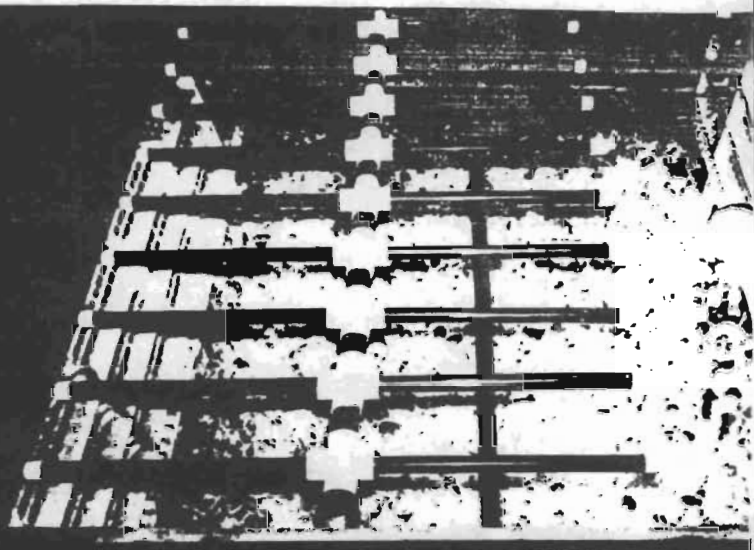
STATIC PRESSURE LOSS

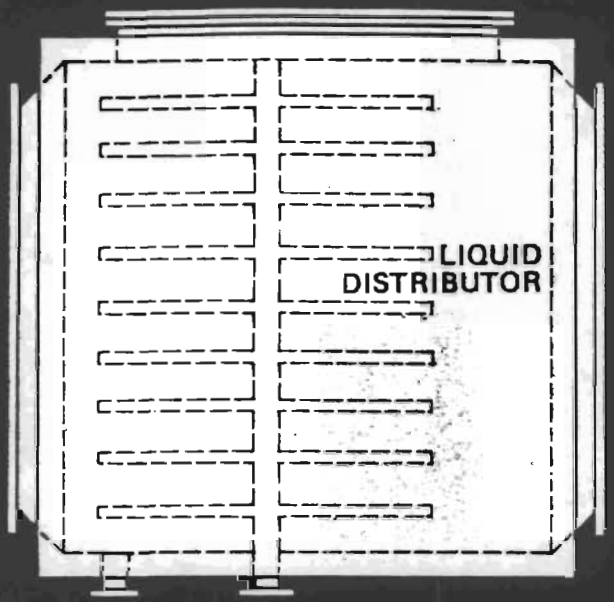
Use of high-surface-area, low-pressure-drop plastic saddles in a balanced design result in low static pressure loss of only 0.4 inches H_2O (w.g.) per foot of packed depth in Vertical Counter Current scrubbers, and 0.33 in Horizontal Cross Flow units. At the same time, sufficient irrigation rates constantly keep saddles clear of potential sludge buildup. Thereby, continuous, non-clogging operation at a proper rate of intermixing turbulence between liquid and fumes is achieved for 99+% efficiency.

LIQUID SUMP OPERATION

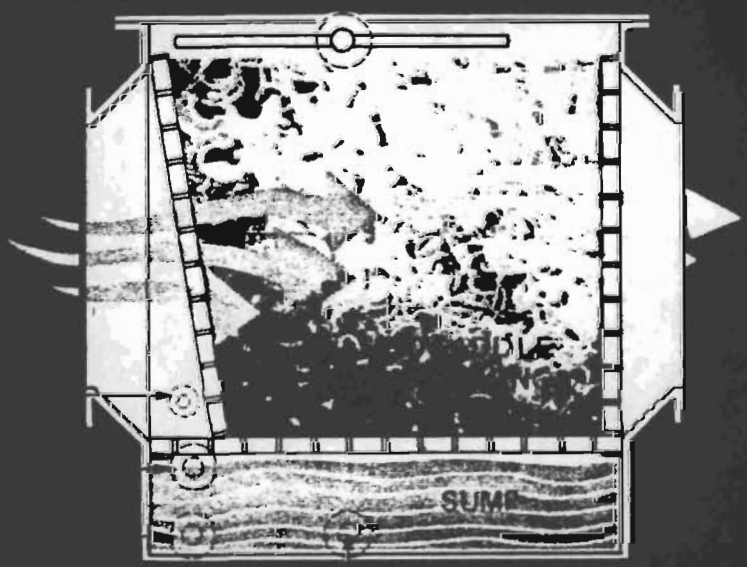
Harrison scrubbers employ an integral liquid recirculating sump which reduces amount of liquid consumption required by 90 to 95% in most applications. Therefore, considerably less effluent must be handled and treated. The sump reservoir is contained within the scrubber itself. Harrison recommends optimum rate of effluent removal. When effluent is acidic only, additional liquid conservation can be obtained with either scrubber design with the simple optional recovery system shown with the vertical scrubber drawing on page 4. If central treating facilities exist, no sump, recirculation, or independent recovery is needed. In this case, treated liquid would be directed over the packing in a single pass, then treated, then returned to the scrubber, etc. In both instances where effluent is treated, liquid consumption would be reduced to only that amount lost by evaporation.

Harrison
Box 184 Aurora Ohio 44202/216-562-9545

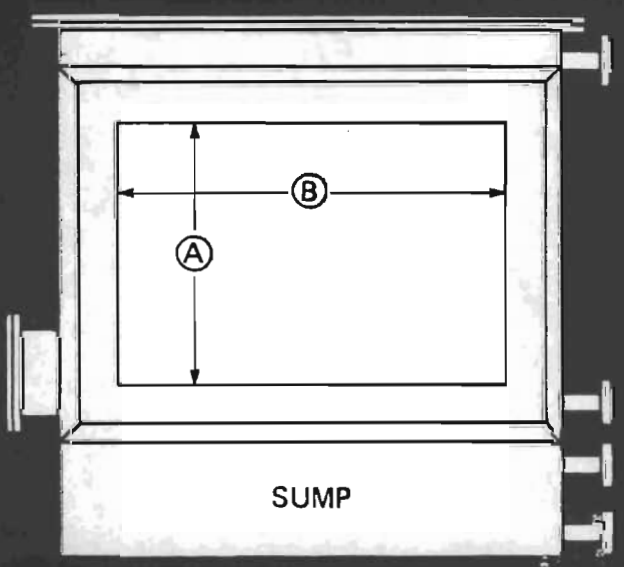




TOP VIEW



SIDE VIEW (CUT-A-WAY)



INLET SIDE VIEW

HORIZONTAL CROSS-FLOW

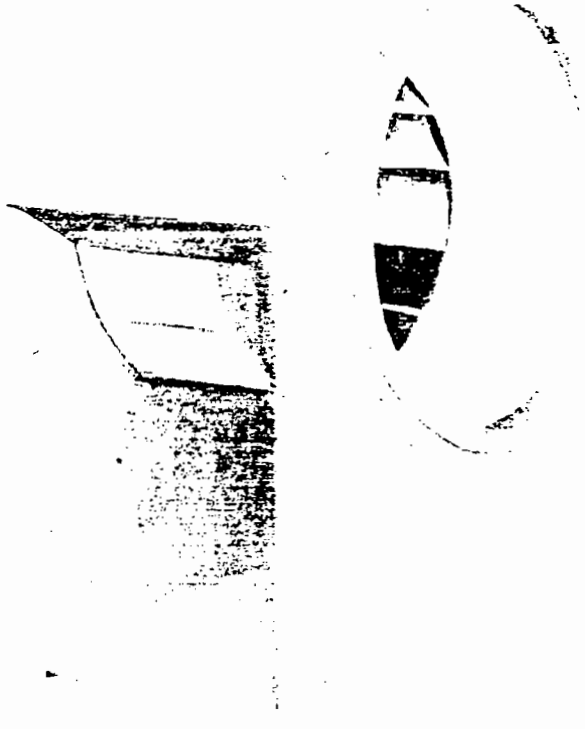
Model	CFM	Inlet & Outlet A x B In.	Length L Ft.	Width W In.	C In.	D In.	E In.	F In.	G In.	Sump Capacity Gal.	Rec. Liquid GPM	Overall Height In.	Ship* Wt. Lbs.	Operating Wt. Lbs.
HF-8	800	11x11	6	17	¾	1	1	1¼	1	58	17	35	182	646
HF-12	1,200	14x14	6	20	¾	1	1	1¼	1	69	21	38	224	781
HF-17	1,700	18x18	6	24	¾	1	1	1½	1¼	82	24	42	275	926
HF-21	2,100	21x21	6	27	¾	1	1	1½	1¼	92	28	45	316	1028
HF-25	2,500	24x24	6	30	¾	1½	1½	1½	1¼	102	32	48	357	1166
HF-30	3													
HF-31	3,100	27x27	6	33	¾	1½	1½	1½	1¼	113	35	51	419	1313
HF-37	3,700	30x30	6	36	¾	1½	1½	1½	1¼	125	39	54	481	1445
HF-45	4,500	33x33	6	39	¾	1½	1½	1½	1¼	134	42	57	563	1669
HF-50	5,000	36x36	6	42	¾	1½	1½	1½	1¼	144	45	5.0 ft.	615	1733
HF-67	6,700	36x36	6	48	1	2	2	1½	1¼	165	51	5.5	690	1980
HF-85	8,500	42x42	6	54	1	2	2	2	1½	186	56	6.0	824	2276
HF-105	10,500	48x48	6	60	1	2	2	2	1½	206	60	6.5	1035	2639
HF-126	12,600	54x54	6	66	1	2	2	2	1½	228	68	7.0	1242	2990
HF-150	15,000	60x60	6	72	1	2	2	2½	2	247	74	7.5	1545	3460
HF-176	17,600	66x66	6	78	1	2	2	2½	2	268	80	8.0	1751	3803
HF-190	19,000	66x72	6	84	1	2	2	2½	2	300	86	8.0	1957	4161
HF-220	22,000	66x84	6	96	1	2	2	2½	2	330	98	8.0	2266	4770
HF-245	24,500	66x96	6	108	1½	2	2	3	3	371	112	8.0	2524	5328
HF-273	27,300	66x108	6	120	1½	2	2	3	3	412	123	8.0	2835	5980
HF-300	30,000	66x120	6	132	1½	2	2	3	3	454	136	8.0	3180	6684
HF-327	32,700	66x132	6	144	1½	2	2	3	3	495	147	8.0	3490	7398

PVC

UNPLASTICIZED POLYVINYL CHLORI

NON-OVERLOADING BLOWEI

(BACKWARD INCLINED BLADES)



® Tri-Mer® Corporation

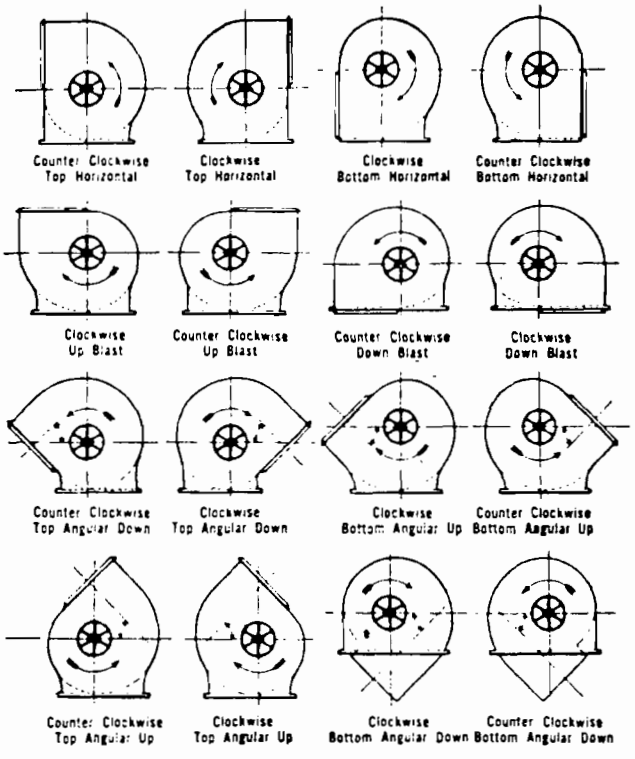
Air Pollution Control Systems

DESIGN • ENGINEERING • MANUFACTURING

1400 Monroe Street • Owosso, Michigan 48867 • 517-723/5124 • Telex 228545

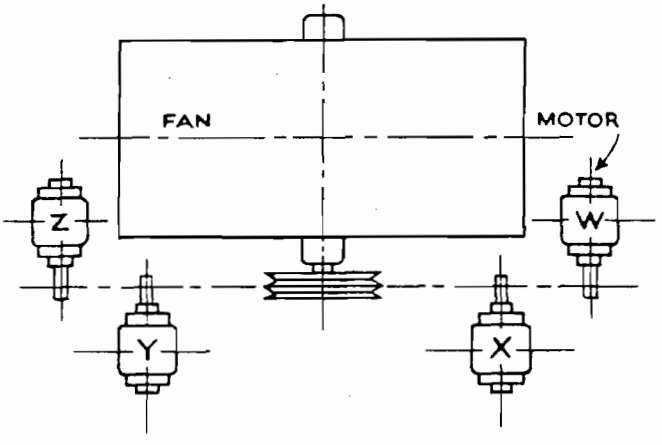
STANDARD NOMENCLATURE

Direction of Rotation and Discharge



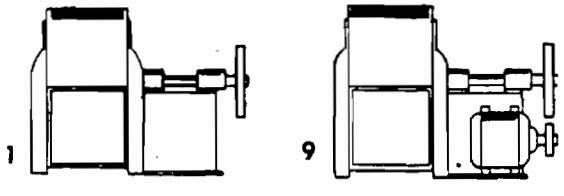
Direction of rotation is determined from the drive side. On single inlet fans, drive side is considered as opposite inlet, regardless of actual drive location.

STANDARD MOTOR POSITIONS



The location of motor is determined from plan view of the blower, designating the motor position by letters W, X, Y and Z as the case may be.

ARRANGEMENTS OF DRIVE



ARRANGEMENT No. 1, SWSI

For belt drive or direct connection. Wheel overhung. Two bearings on base. Furnished in sizes 122 to 600 inclusive. Single inlet only.

ARRANGEMENT No. 9, SWSI

For belt drive. Arrangement No. 1 designed for mounting prime mover on side of base. Furnished in sizes 122 to 600 inclusive. Single inlet only.

SWSI – Class II

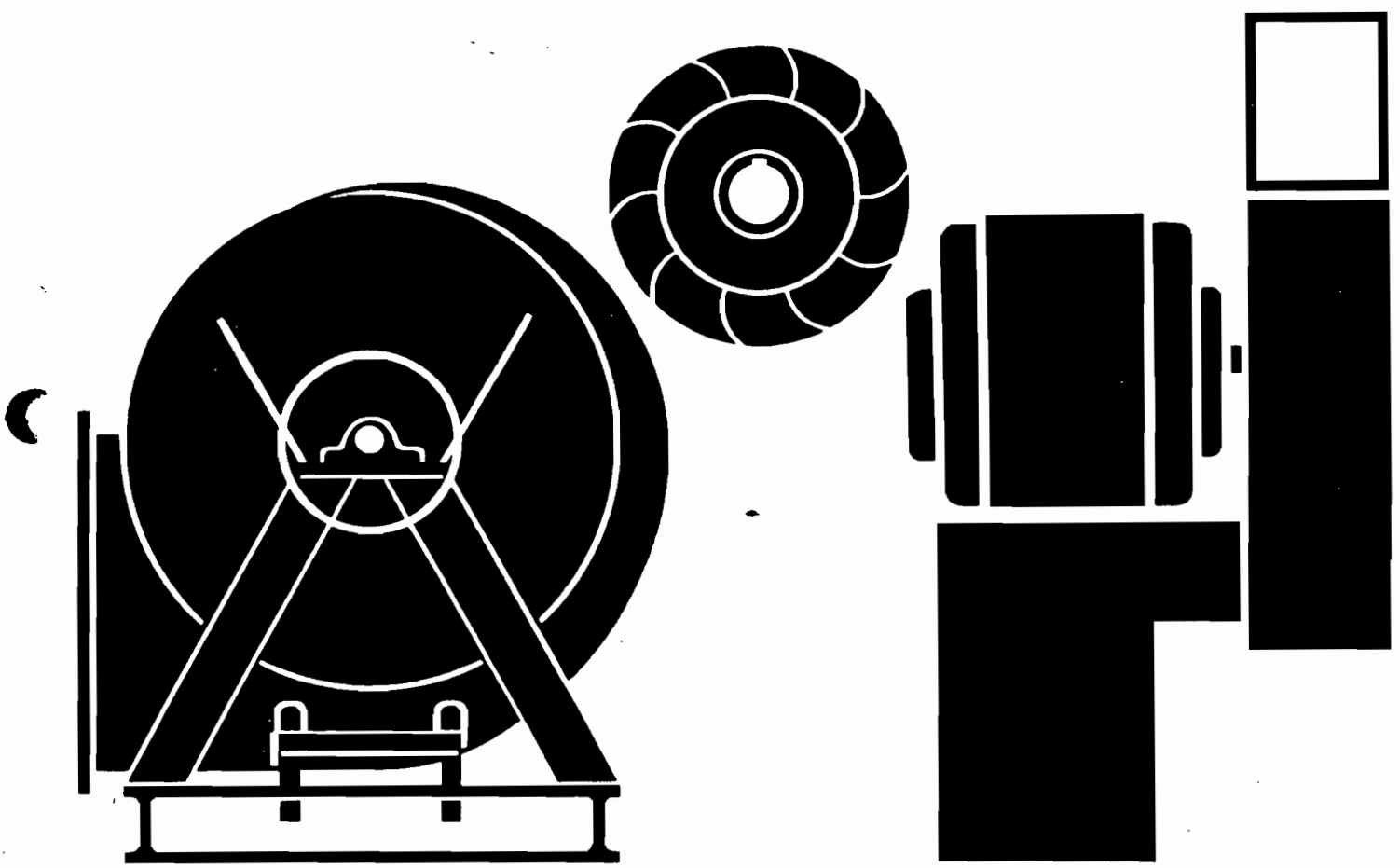
Heavier design than Class I. A one piece intermediate stiffening ring is also welded into each blade. Tip speed limit approximately 13000 FPM and 6 inches total pressure.

CONSTRUCTION FEATURES

- **HOUSING—All P.V.C.**
- **WHEEL—P.V.C. and Coated Steel**
- **INLET—1½" P.V.C. Angle Flange**
- **OUTLET—1½" P.V.C. Angle Flange**
- **DRAIN—2" P.V.C. Flanged**
- **CLEANOUT DOOR—P.V.C. Bolted**
- **STEEL FRAME—Epoxy Coated**

Blowers are very rugged with heavy angle iron bracing, over capacity shaft and bearings. Formed P.V.C. venturi inlets give streamlined flow into the wheel with its own matching cone for very high efficiency and quiet operation. OPERATING TEMPERATURES UP TO 155°F.

Fibe trifugal B rs



H TZ L

Hartzell Fan, Division of Castle Hills Corporation, Piqua, Ohio

Construction Features

A variety of corrosion problems plague industry today. Fans and blowers made of coated steel or metals such as stainless and monel can handle some problem areas. However, reinforced fiberglass and resin construction will meet even the most challenging demands.

Fiberglass centrifugal blowers can be used in most applications where corrosive elements exist in fume and vapor form at temperatures less than 200° F. The resistance to corrosive elements is a major advantage, but the physical properties of fiberglass equipment offer these additional advantages.

- Fiberglass equipment weighs 25% less than comparable equipment made of carbon steel.
- Fiberglass has an extremely high strength-to-weight ratio, stronger than steel on a per-pound basis.
- Dimensional stability of fiberglass is excellent. Fiberglass air moving equipment will not become brittle at low temperatures and at 0° F. the laminated fiberglass will be stronger than at room temperature.
- Fiberglass equipment offers a distinct advantage in price over stainless and monel (as much as ⅓ in original cost) and offers longer service life and requires less maintenance.

Hartzell fiberglass equipment is identical, except for part thickness, in design, overall specs and performance to our standard lines. The following are standard Hartzell fiberglass construction features:

- Special corrosive resistant polyester resin having a Class I flame spread rate of 25 or less.
- All structural parts in the airstream are fiberglass and resin. All taped joints inside the shell or body are three layers of two ounce material. All internal surfaces are protected with a 10 mil thickness of chemical resistant, flame retardant gel coat and all external surfaces have a heavy coating of resin applied before assembly.
- Internal hardware is 300 series stainless steel. Shafts are type 304; bolts and screws are type 316. Monel shafting and hardware are available as an extra-cost option for applications such as hydrochloric, hydrofluoric, or sulfuric acids, which attack stainless.

Where metal is subject to attack by the corrosive elements being handled, all metal parts can be resin-coated after assembly.

- A fiberglass and neoprene shaft seal is placed where the shaft leaves the housing along with a neoprene shaft slinger between the seal and wheel on belt drive units. (Seal is not gas tight.)
- All fiberglass radial and backward curved wheels are of multi-piece construction bonded together with resin and fiberglass material.

  Maximum temperature limitation is 200° F. on all centrifugal blowers.
- All internal mounting hardware is encapsulated with a layer of fiberglass and resin.

This bulletin lists Hartzell's complete line of fiberglass centrifugal blowers and accessories. More than 70 Hartzell offices can provide specific performance and installation data to meet your requirements. Call your nearest Hartzell representative for competent technical help.

Air Movement and Control Association Seal

Hartzell Propeller Fan Company certifies that the centrifugal blowers shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests made in accordance with AMCA Standard 210 and comply with the requirements of the AMCA Certified Ratings Program.

Selection Guide

HARTZELL
MODEL CODE 41-33GO3

Blower Series No.
Wheel Diameter, Inches
Wheel Type
Horsepower Code
Motor RPM/Phase

3 Phase
3 = 1750

1 Phase
C = 1750

How To Use Capacity Tables

(1) Select size, RPM and BHP for a given air delivery and pressure of a centrifugal blower from rating tables, pages 10 through 21. Performance ratings are based on standard air conditions, sea level 70°F. and 29.92 inches barometric pressure giving an air density of .075 lbs. per cubic foot. The specific gravity of air equals 1.00 at these conditions.

(2) If non-standard temperature or altitude is involved, correct to standard air density (see Table 1).

(3) For speeds above ratings consult factory.

How to use Hartzell Model Code

EXAMPLE:
Assume the required performance to be 16,276 CFM at 3" SP standard air. Reading across the 33" Rating Table, page 13, we find a blower RPM of 1306 and brake horsepower of 14.5. Motor horsepower required is 15; therefore, horsepower code is "O". Type specification would be "GO3". The complete blower specification would read: Series 41-33-GO3.

Horsepower Code

Horsepower	¼	⅓	½	¾	1	1½	2	3	5	7½	10	15	20	25	30	40	50	60	75	100
Code Letter	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W

Altitude – Temperature Correction

Temperatures above or below 70° at sea level (0 ft.) are read vertically between the double lines, giving the proper correction factors. Altitudes above sea level at a constant 70°F. temperature are read horizontally between the double lines giving those factors. Any other factors are obtained by reading down to the desired temperature, then across to the desired altitude.

Example:

Assume the required performance to be 12,520 CFM at 6.15" SP, 175° F. and 2000 feet altitude.

1. Table 1 gives a factor of 1.30.
2. 6.15" SP × 1.30 = 8.0" SP for 70° F. at sea level.
3. A backward curved centrifugal blower, size 33", selected from the rating tables for the new condition shows 12,520 CFM at 8.0" SP, 1537 RPM and 23.9 BHP.
4. Correct the horsepower and static pressure in Item 3 to non-standard performance by dividing by the factor:
   8.0" SP ÷ 1.30 = 6.15 SP
   23.9 BHP ÷ 1.30 = 18.38 BHP
5. Final performance of this size 33" backward curved centrifugal blower at assumed conditions:
   12,520 CFM at 6.15" SP, 1537 RPM, 18.38 BHP. 175° F. and 2000 Ft.

Table 1 – Combined Altitude - Temperature Correction Factors

°F. TEMP. \ ALT. FT.	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
−50	0.77	0.80	0.83	0.86	0.89	0.92	0.96	1.00	1.04	1.08	1.12	1.16	1.21
−25	0.82	0.85	0.89	0.92	0.95	0.98	1.03	1.07	1.11	1.15	1.20	1.24	1.29
0	0.87	0.90	0.94	0.97	1.01	1.04	1.09	1.13	1.17	1.22	1.27	1.31	1.37
25	0.91	0.95	0.98	1.02	1.06	1.09	1.14	1.18	1.23	1.27	1.33	1.37	1.43
50	0.96	1.00	1.04	1.08	1.11	1.15	1.20	1.25	1.30	1.34	1.40	1.45	1.51
70	1.00	1.04	1.08	1.12	1.16	1.20	1.25	1.30	1.35	1.40	1.46	1.51	1.57
100	1.06	1.10	1.14	1.19	1.23	1.27	1.33	1.38	1.43	1.48	1.55	1.60	1.66
125	1.10	1.14	1.19	1.23	1.28	1.32	1.38	1.43	1.49	1.54	1.61	1.66	1.73
150	1.15	1.20	1.24	1.29	1.33	1.38	1.44	1.50	1.55	1.61	1.68	1.74	1.81
175	1.20	1.25	1.30	1.34	1.39	1.44	1.50	1.56	1.62	1.68	1.75	1.81	1.88
200	1.25	1.30	1.35	1.40	1.45	1.50	1.56	1.63	1.69	1.75	1.83	1.89	1.96
250	1.34	1.39	1.45	1.50	1.55	1.61	1.68	1.74	1.81	1.88	1.96	2.02	2.10
300	1.43	1.49	1.54	1.60	1.66	1.72	1.79	1.86	1.93	2.00	2.09	2.16	2.25
350	1.53	1.59	1.65	1.71	1.77	1.84	1.91	1.99	2.07	2.14	2.23	2.31	2.40
400	1.62	1.69	1.75	1.82	1.89	1.96	2.04	2.12	2.20	2.27	2.35	2.45	2.55
450	1.72	1.79	1.86	1.93	2.00	2.08	2.16	2.24	2.33	2.41	2.50	2.60	2.70
500	1.81	1.88	1.96	2.03	2.11	2.19	2.28	2.36	2.46	2.54	2.62	2.74	2.85
550	1.91	1.98	2.06	2.14	2.22	2.30	2.40	2.49	2.58	2.68	2.77	2.89	3.00
600	2.00	2.08	2.16	2.24	2.33	2.42	2.50	2.61	2.71	2.80	2.90	3.03	3.14

NOTE: Above table has inverted values. Actual density is the *reciprocal* of the above values.

Abrasive/Erosive Atmospheres

HartKoate is an abrasive/erosive resistant coating developed by Hartzell for application in environments where abrasive/erosive conditions may exist. HartKoate helps prevent premature deterioration of equipment in environments where uncoated fans may fail.

Impact resistant HartKoate is applied to a 50-60 mil thickness suitable for temperatures to 200°F.

HartKoate is particularly appropriate for use when water mist and/or abrasive particles exist in the air stream.

Contact your Hartzell representative for further details concerning the application of HartKoate coating to fiberglass fans in corrosive atmospheres.

Installation Weights-Bearing/Shaft Sizes

Series 41

Size	Type	Net Wt. (lbs.)	Shaft/ Bearing Sizes
15"	GH3	526	1 7/16"
	GI3	526	1 7/16"
	GJ3	529	1 7/16"
	GK3	529	1 7/16"
	GL3	549	1 7/16"
	GM3	554	1 7/16"
22"	GH3	772	1 11/16"
	GI3	772	1 11/16"
	GJ3	776	1 11/16"
	GK3	776	1 11/16"
	GL3	806	1 11/16"
	GM3	813	1 11/16"
	GN3	854	1 11/16"
	GO3	865	1 11/16"
	GP3	926	1 11/16"
27"	GI3	954	1 15/16"
	GJ3	959	1 15/16"
	GK3	959	1 15/16"
	GL3	996	1 15/16"
	GM3	1004	1 15/16"
	GN3	1054	1 15/16"
	GO3	1069	1 15/16"
	GP3	1144	1 15/16"
	GQ3	1164	1 15/16"
	GR3	1190	1 15/16"
33"	GI3	1355	2 3/16"
	GJ3	1355	2 3/16"
	GK3	1382	2 3/16"
	GL3	1397	2 3/16"
	GM3	1454	2 3/16"
	GN3	1482	2 3/16"
	GO3	1514	2 3/16"
	GP3	1544	2 3/16"
	GQ3	1594	2 3/16"
	GR3	1644	2 3/16"
40"	GI3	1885	2 7/16"
	GJ3	1885	2 7/16"
	GK3	1912	2 7/16"
	GL3	1932	2 7/16"
	GM3	1972	2 7/16"
	GN3	1987	2 7/16"
	GO3	2047	2 7/16"
	GP3	2077	2 7/16"
	GQ3	2127	2 7/16"
	GR3	2177	2 7/16"
	GS3	2277	2 7/16"
	GT3	2327	2 7/16"
49"	GL3	2415	2 15/16"
	GM3	2465	2 15/16"
	GN3	2483	2 15/16"
	GO3	2558	2 15/16"
	GP3	2596	2 15/16"
	GQ3	2658	2 15/16"
	GR3	2721	2 15/16"
	GS3	2846	2 15/16"
	GT3	2908	2 15/16"
	GU3	2958	2 15/16"
	GV3	3063	2 15/16"
	GW3	3123	2 15/16"

Series 43

Size	Type	Net Wt. (lbs.)	Shaft/ Bearing Sizes
16"	FH3	302	1 3/16"
	FI3	302	1 3/16"
	FJ3	302	1 3/16"
	FK3	338	1 3/16"
	FL3	358	1 3/16"
	FM3	361	1 3/16"
	FN3	380	1 3/16"
	FO3	431	1 3/16"
	FP3	460	1 3/16"
19"	FI3	372	1 7/16"
	FJ3	372	1 7/16"
	FK3	399	1 7/16"
	FL3	444	1 7/16"
	FM3	447	1 7/16"
	FN3	466	1 7/16"
	FO3	517	1 7/16"
	FP3	547	1 7/16"
	FQ3	587	1 7/16"
	FR3	667	1 7/16"
23"	FJ3	404	1 11/16"
	FK3	431	1 11/16"
	FL3	451	1 11/16"
	FM3	496	1 11/16"
	FN3	516	1 11/16"
	FO3	535	1 11/16"
	FP3	565	1 11/16"
	FQ3	605	1 11/16"
	FR3	695	1 11/16"
	FS3	735	1 11/16"
26"	FK3	489	1 11/16"
	FL3	509	1 11/16"
	FM3	555	1 11/16"
	FN3	574	1 11/16"
	FO3	625	1 11/16"
	FP3	655	1 11/16"
	FQ3	715	1 11/16"
	FR3	805	1 11/16"
	FS3	845	1 11/16"
	FT3	940	1 11/16"
30"	FL3	626	1 15/16"
	FM3	629	1 15/16"
	FN3	649	1 15/16"
	FO3	709	1 15/16"
	FP3	739	1 15/16"
	FQ3	779	1 15/16"
	FR3	869	1 15/16"
	FS3	909	1 15/16"
	FT3	1004	1 15/16"
	*FU3	529	1 15/16"
33"	FL3	692	1 15/16"
	FM3	695	1 15/16"
	FN3	705	1 15/16"
	FO3	775	1 15/16"
	FP3	805	1 15/16"
	FQ3	855	1 15/16"
	FR3	945	1 15/16"
	FS3	985	1 15/16"
	FT3	1075	1 15/16"
	*FU3	600	1 15/16"
	*FV3	600	1 15/16"
	*FW3	600	1 15/16"

Series 42

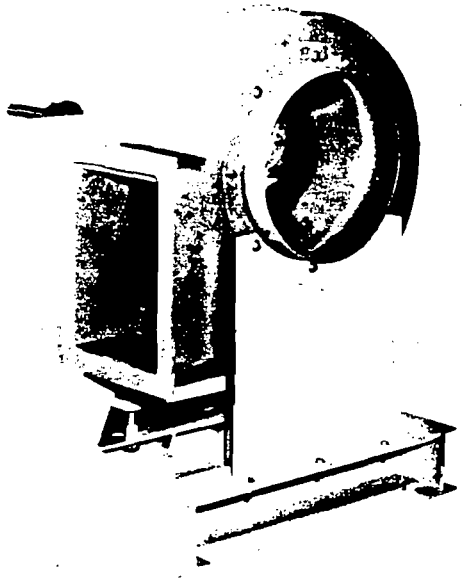
Size	Type	Net Wt. (lbs.)	Shaft/ Bearing Sizes
10"	FC3	63	
12"	FF3	78	
14"	FG3	96	

*Net installation weights are for Arrangement 1. (Less motor & drive.)

Metric Conversion Table

FROM	TO	MULTIPLY BY
Inches (in.)	Millimeter (mm)	25.400
Feet (ft.)	Meter (m)	0.3048
Velocity (ft./min.)	Meter/Second (m/s)	0.00508
Volume Flow (cfm)	Cubic Meter/Second (m^3/s)	0.00047195
Pressure (in. w.g.)	Pascal (N/m^2)	248.36
Density ($lb./ft.^3$)	Kilogram /Cubic Meter (Kg/m^3)	16.018
Power (hp)	Watt (w)	745.70
Square Foot ($ft.^2$)	Square Meter (m^2)	0.09290
Square Inch ($in.^2$)	Square Meter (m^2)	0.0006451

Backward Curved Blower (Belt Drive)



Arrangement #10 Shown.

Series 41

Blowers available in SWSI only

The belt drive airfoil backward curved centrifugal blower offers non-overloading efficiency and economy in corrosive atmospheres at static pressures up to 12". The wheel and housing are constructed with a special corrosive resistant polyester resin having a Class I flame spread rate of 25 or less. No metal parts are exposed in the airstream. All internal hardware is 300 series stainless steel encapsulated with fiberglass.

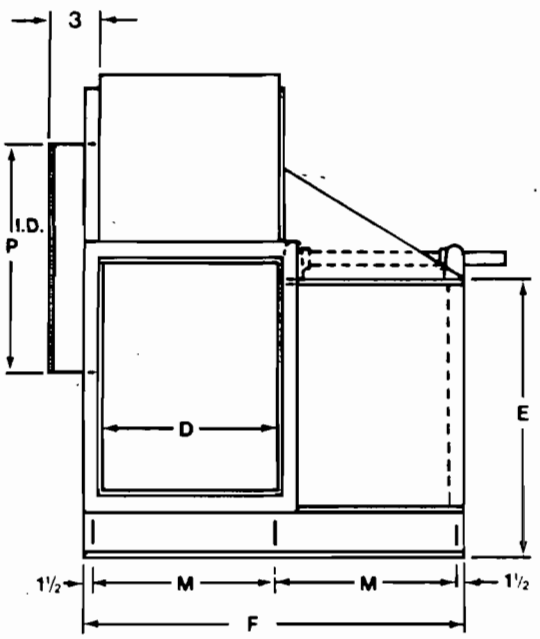
Features

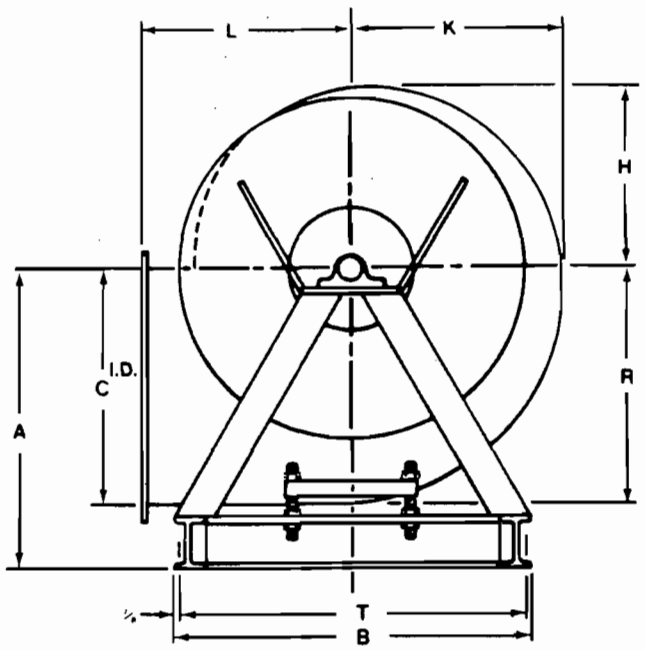
- **Sizes** — 15", 22", 27", 33", 40", 49" wheel diameters.
- **Arrangements** — available in Arrangements #1, #9 or #10.
- **Rotation — clockwise** and **counter clockwise rotation. Rotatable in field.**
- **Discharges** — available discharges shown on page 9.
- **Packaged unit** — motor and drive mounted by factory.
- **Easy installation and maintenance** — motor, drive and bearings are readily accessible for ease in wiring, installation, adjustment and lubrication.
- **Wheel** — a true airfoil type of multi-piece, solid fiberglass construction bonded together with resin and fiberglass material. Airfoil backwardly inclined blades offer greater versatility for industrial applications. Wheel has non-overloading horsepower characteristics in that brake horsepower levels off at a point that prevents motor overload if system changes occur. Wheel Type G.
- **Motors** — open end drip proof are standard. Totally enclosed fan cooled and other special motors are available upon request.
- **Variable pitch drives** are standard on all units up to 10 HP.
- **Flanged outlets are standard.** Inlet flanges are optional. Drilling of flanges is optional. (Position of drilled holes must be specified by customer.)
- **All units are test run** and **electronically balanced** before shipment.
- **Heavy Duty Design** suitable for service up to and including Class III.
- **Bearings** — heavy duty, self-aligning, double row spherical roller type pillow block bearings are standard and are furnished with extended lubrication lines. Bearings have floating labyrinth seals. (See page 7 for Bearing/Shaft sizes.)
- **Shafts** are 304 stainless steel as standard. Monel available at extra cost.
- **Bases** — heavy gauge hot rolled steel, epoxy coated.
- **Maximum Temperature:** 200° F.
- **Maximum tip speed:** 16,000 FPM
- **Accessories** —
  See pages 22 and 23.

Principal Dimensions

Size	Wheel Dia.	A	B	C	D	E	F	H	K	L	M	P	R	T	Max. Motor Frame Size	
															ODP	TEFC
15	15⅝	30⅛	33¼	16⅛	11¹¹⁄₁₆	30¼	41	12¹³⁄₁₆	16⅛	16¾	19	16	16⁷⁄₁₆	31¾	326T	286T
22	22⁹⁄₁₆	32½	33½	23⅝	17⅛	30¼	46	18⁷⁄₁₆	21³⁄₁₆	21⅛	21½	23	23¹⁵⁄₁₆	31¾	326T	286T
27	27¾	38¼	43	29	21	35⅞	51	22¾	26⅛	24	24	28	29½	41¼	326T	286T
33	33¹³⁄₁₆	43¼	50	35⁷⁄₁₆	25¹¹⁄₁₆	40⅝	56	27¹¹⁄₁₆	31¹³⁄₁₆	29⁵⁄₁₆	26½	34¼	35¹⁵⁄₁₆	48¼	326T	286T
40	41½	51¼	59	43⁵⁄₁₆	31⅜	48⅜	62	33¹³⁄₁₆	38¹³⁄₁₆	35⅞	29½	41⅞	43⅞	57¼	326T	286T
49	50⁵⁄₁₆	61⅜	73	52⅝	38⅛	58	92	41	47⅛	40	44½	50¹³⁄₁₆	53¼	71¼	447T	447T

NOTES: ON 15 AND 22 SIZES WITH 254T FR. AND LARGER MOTORS, BASE DIMENSIONS MUST BE CERTIFIED BY THE FACTORY. DIMENSIONS AND SPECIFICATIONS ARE SUBJECT TO CHANGE. CERTIFIED PRINTS ARE AVAILABLE.



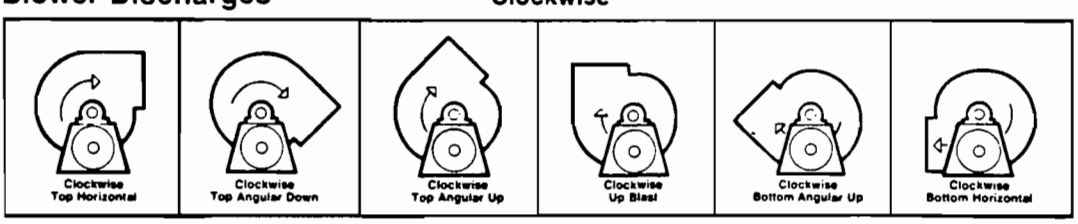


Material Specifications — Inches

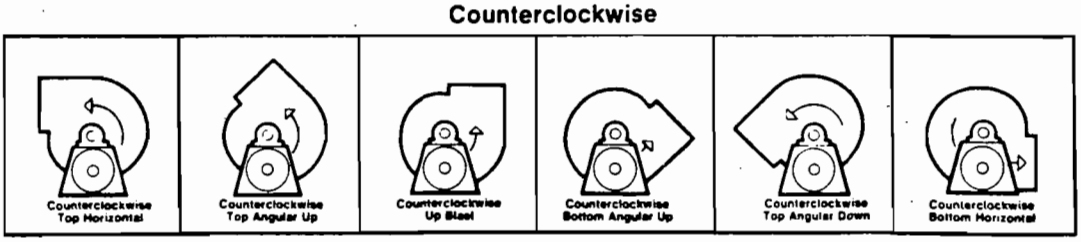
Size	HOUSING (Thickness)				(H.R.S.) FAN STAND			WHEEL (Thickness)		
	Scroll	Inlet Cone	Flanges		Back Plate	H-Beam	Channel	Blade	Back Plate	Outer Panel
			Inlet	Outlet						
15	5⁄16	5⁄16	3⁄16	5⁄16	½	6 × 4	4	¼	½	½
22	5⁄16	7⁄16	¼	5⁄16	½	6 × 4	4	¼	5⁄8	5⁄8
27	½	½	5⁄16	½	½	6 × 4	4	5⁄16	¾	¾
33	½	5⁄8	⅜	½	½	6 × 4	4	⅜	⅞	⅞
40	9⁄16	¾	7⁄16	9⁄16	½	6 × 4	4	7⁄16	1	1
49	5⁄8	15⁄16	9⁄16	5⁄8	½	6 × 4	4	1	1⅜	1⅜

Blower Discharges

Clockwise



Counterclockwise



15

Inlet diameter: 16" I.D. **Wheel diameter: 15.625"**
Outlet area: 1.305 sq. ft. inside **Wheel circumference: 3.894 ft.**

3000 CFM @ 3" SP

	OV	½" SP		1" SP		1½" SP		2" SP		2½" SP		3" SP		3½" SP		4" SP		5" SP	
CFM	FPM	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1044	800			1405	.32	1606	.47	1781	.62	1936	.80	2083	1.00	2224	1.19	2357	1.41	2597	1.85
1175	900			1475	.37	1664	.52	1835	.70	1989	.88	2132	1.07	2270	1.29	2397	1.51	2634	1.97
1305	1000	1319	.26	1545	.42	1725	.58	1897	.77	2046	.96	2186	1.16	2316	1.39	2440	1.61	2675	2.10
1436	1100	1405	.31	1616	.48	1803	.66	1958	.85	2112	1.06	2247	1.28	2375	1.51	2494	1.74	2720	2.24
1566	1200	1496	.38	1691	.54	1881	.76	2036	.96	2175	1.17	2312	1.40	2434	1.63	2556	1.88	2771	2.39
1697	1300	1583	.43	1782	.63	1952	.83	2107	1.06	2246	1.28	2375	1.52	2497	1.76	2614	2.02	2831	2.56
1827	1400	1675	.52	1863	.72	2030	.94	2175	1.16	2313	1.40	2438	1.65	2565	1.91	2675	2.17	2891	2.73
1958	1500	1764	.60	1947	.81	2109	1.05	2254	1.29	2385	1.53	2513	1.80	2631	2.07	2741	2.34	2954	2.91
2088	1600	1860	.70	2035	.93	2189	1.17	2328	1.42	2459	1.68	2586	1.95	2698	2.22	2807	2.51	3019	3.12
2219	1700	1956	.81	2119	1.05	2269	1.30	2401	1.55	2536	1.84	2655	2.11	2764	2.40	2880	2.70	3085	3.32
2349	1800	2042	.92	2205	1.18	2350	1.44	2486	1.72	2614	2.00	2727	2.30	2840	2.59	2950	2.90	3151	3.54
2480	1900	2143	1.07	2300	1.33	2438	1.60	2575	1.89	2693	2.19	2807	2.49	2919	2.80	3026	3.14	3221	3.79
2610	2000	2236	1.21	2383	1.48	2527	1.78	2656	2.08	2770	2.38	2888	2.70	2997	3.03	3104	3.37	3290	4.03
2871	2200	2425	1.53	2575	1.86	2704	2.17	2825	2.50	2943	2.83	3053	3.18	3162	3.54	3254	3.88	3439	4.59
3132	2400	2626	1.95	2760	2.28	2889	2.64	3002	2.98	3116	3.35	3222	3.72	3317	4.08	3413	4.45	3594	5.22
3393	2600	2819	2.40	2943	2.76	3061	3.12	3181	3.53	3283	3.91	3385	4.30	3482	4.70	3575	5.08	3733	5.83
3654	2800	3011	2.91	3138	3.34	3246	3.72	3352	4.12	3456	4.54	3557	4.97	3646	5.37	3727	5.75		
3915	3000	3215	3.56	3324	3.96	3432	4.39	3542	4.85	3636	5.27	3725	5.70	3810	6.12				
4176	3200	3398	4.19	3514	4.67	3620	5.14	3717	5.59	3809	6.04								
4437	3400	3611	5.03	3715	5.51	3809	5.97												
4698	3600	3810	5.90																

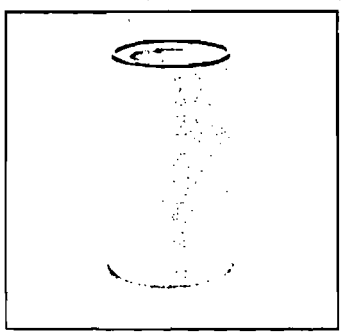
	OV	6" SP		7" SP		8" SP		9" SP		10" SP	
CFM	FPM	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
1044	800	2824	2.35	3032	2.87	3226	3.40				
1175	900	2857	2.48	3063	3.02	3252	3.56	3434	4.14	3608	4.75
1305	1000	2893	2.62	3092	3.17	3282	3.73	3459	4.32	3632	4.95
1436	1100	2935	2.77	3130	3.34	3315	3.92	3493	4.53	3661	5.17
1566	1200	2983	2.95	3175	3.52	3354	4.11	3530	4.75	3700	5.43
1697	1300	3032	3.12	3222	3.72	3399	4.33	3575	4.99	3736	5.67
1827	1400	3087	3.31	3269	3.92	3446	4.55	3618	5.24	3775	5.92
1958	1500	3150	3.53	3329	4.16	3500	4.80	3668	5.50	3824	6.20
2088	1600	3210	3.74	3387	4.40	3555	5.06	3718	5.76		
2219	1700	3268	3.95	3446	4.63	3611	5.33	3769	6.03		
2349	1800	3332	4.20	3507	4.90	3670	5.61	3825	6.32		
2480	1900	3403	4.47	3575	5.18	3734	5.90				
2610	2000	3470	4.74	3635	5.45	3793	6.19				
2871	2200	3610	5.33	3766	6.06						
3132	2400	3746	5.92								

Performance shown is with inlet and outlet ducts.
RPM shown is nominal and performance is based on actual speed of test.
BHP includes belt drive losses.

DUST COLLECTORS

NEW FILTRATION TECHNOLOGY

The new TD 486 is based on a unique combination of technologies. It involves the application of cartridge-type filters to a continuous-duty dust collection system. It offers you many advantages for treating large volumes of dust-laden air on a continuing basis: highly efficient filtration; increased filtering area for lower air-to-media ratios; increased ease of maintenance and operation; and substantially decreased collector headroom.

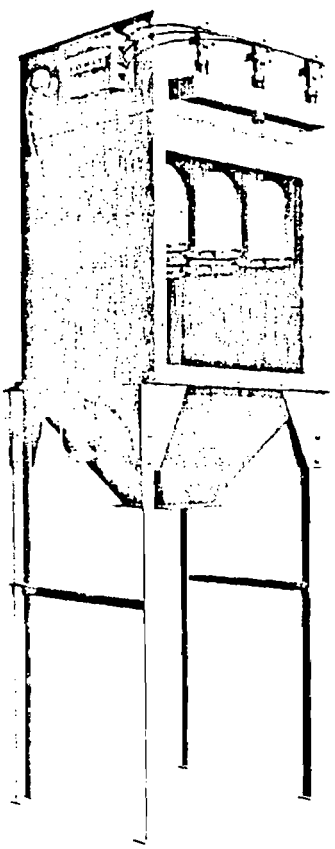


EFFECTIVE FINE PARTICLE CONTROL

The use of pleated, non-woven filter media is the key to the TD 486's filtering efficiency. Dust-laden air enters through the inlet of the collector—heavy particles fall immediately into the hopper bottom. As the air is drawn in through the filter cartridges, dust is deposited on the outside of the filtering media. With 9 filter cartridges, the system has 486 square feet of filter area, almost *four times* as much as a conventional collector of the same size. The generous filter area means low filtration velocity and high efficiency when handling submicron particulate.

CONTINUOUS PULSE-JET CLEANING

The TD 486's filter cartridges are cleaned automatically and continually—the system remains on-line at all times. Continuous filtration means full-time pollution control, better product quality, and longer machinery life. A mounted solid state timer controls the cycle time. Solenoid valves introduce jets of high-pressure air into each filter cartridge in turn, through the venturi opening above it. The resulting reverse air flow cleans the filter cartridges. Dust removed from the filters settles to the bottom of the collector. As each trio of cartridges is cleaned in succession, the remaining 6 continue their operation. Extremely high dust loadings are handled easily.



EASY-TO-HANDLE FLEXIBILITY

The TD 486 requires up to 25% less headroom than conventional collectors—the highly efficient filter cartridges are 16″ long, instead of standard 96″ cloth tubes. Its compact size gives you great flexibility in location. Also, the TD 486 does the job with 9 cartridges.

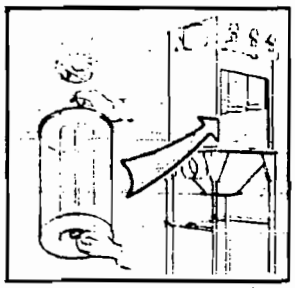
The TD 486 is delivered to you in major assemblies. The system is available with different blower pack combinations for single-unit or multiple-unit applications. Its hopper can be fitted for a 55-gallon drum, or for a rotary airlock adapter. The TD is made with the same high quality TORIT puts into all its dust collection systems: air-tight all-steel construction, sealed seams, and gasketed doors and fittings. The TD 486 filter cartridge system is a major innovation in effective air pollution control, from TORIT.

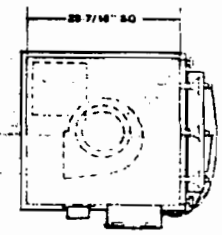
torit

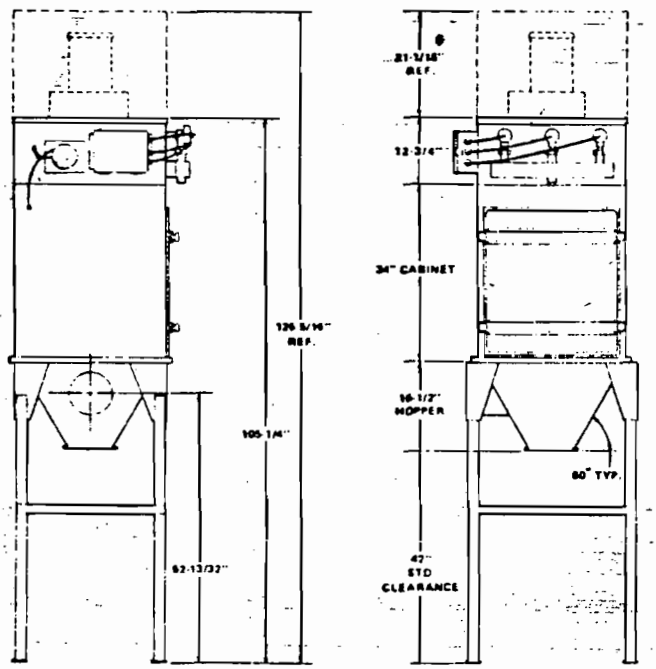
DUST COLLECTORS

FILTER CARTRIDGE SYSTEMS/TD 486

Quick-change feature allows fast cartridge removal and installation







SPECIFICATIONS

Actual Filter Area	486 sq. ft.
Number of Valves	3
Number of Filter Cartridges	9
Filter Cartridge Dimensions	7⅞" OD x 3½" ID x 16" long
Number of Hopper Outlets	1
Hopper Outlet Size	8" square
Hopper Size	3.5 cu. ft.
Shipping Weight	est. 500 lbs.
Wind Load Rating	100 m.p.h.
Seismic Rating	Zone 3

Specifications subject to change without notice.

NOTES

- ☐ Standard 7" inlet. Inlet also available with 5" and 6" ID reducers. (All sides)
- ☐ Standard legs provide 42" clearance under the hopper flange. Bolt-on legs for special height requirements are available.
- ☐ TD systems must be attached to 90-100 PSIG in-plant compressed air supply for cleaning mechanism to function.
- ☐ Valves and control system operate on 120v, 60-cycle power.
- ☐ Exterior Gray is standard finish.

OPTIONAL EQUIPMENT

- ☐ Blower pack options include 3HP, 5HP or remote exhausters as required. Please state in-plant line voltage when ordering.
- ☐ Sound attenuator packages.
- ☐ Explosion vents.
- ☐ Rotary airlock and adapter.

PERFORMANCE TESTED

Performance ratings and A-scale sound level readings are available on each TD collector-power pack combination. These ratings are read and verified under standard test conditions in TORIT's laboratories.

SWAM-D MARK 2

SANDBLASTER

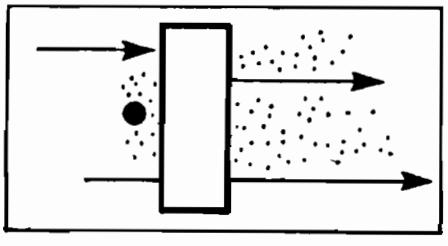
torit

5745

JOHN SWAN
CRYSTAL
918 240 7520

LEADERS IN CONTROL OF IN-PLANT AIR POLLUTION

Let's assume that we have one air filter and 101 spherical particles of the same density in the air. These 101 particles consist of one large, 10 micron particle and 100 small, 1 micron particles. Now let's assume that as these particles enter the filter, the one large particle is removed from the air, but the 100 smaller ones are allowed to pass through. Here is the action visually.



Each particle's weight can be equated to its diameter cubed. The 10 micron particle will weigh 1000 units, while the 100 one micron particles will have a total weight of 100 units. So...

METHODS FOR EVALUATING FILTER PERFORMANCE

ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) Standard 52-76, a recognized test standard in the air cleaner industry, defines three interrelated measurements of air cleaner performance—weight arrestance, dust-spot efficiency, and dust-holding capacity.

WEIGHT ARRESTANCE

ASHRAE Synthetic Dust consisting of: 72% Standardized Air Cleaner Dust—Fine; 23% by weight Molocco Black; and 5% by weight No. 7 cotton linters ground in a Wiley mill with a 4mm screen is fed at 2 grams per 1000 cubic feet of air. Concentration of dust leaving the filter is determined by measuring the weight gain of a high-efficiency after filter.

$$\text{Arrestance} = 100 \times \left[1 - \frac{\text{weight gain of after filter}}{\text{weight of dust fed}}\right]$$

$$\left(\frac{1{,}000}{1{,}000 + 100}\right) \times 100 = 91\% \text{ ARRESTANCE (Efficiency by Weight)}$$

Conclusion: Since 91% of the weight of the particles is removed, this test is meaningful if you are interested in filtering large, heavy particles.

DONALDSON'S ULTRA-WEB™ FILTER CARTRIDGES PROVIDE 100% AVERAGE DUST WEIGHT ARRESTANCE!

Each particle's staining ability can be equated to its diameter squared. Therefore, the one 10 micron particle will have a staining value of $10^2 = 100$. The 100 one micron particles will have a staining value of 100×1^2 and cast a shadow equal to their total values of 100. So...

DUST SPOT EFFICIENCY

Untreated atmospheric dust is the contaminant. Samples are drawn upstream and downstream of the filter at equal flow rates through identical targets of glass fiber filter paper. The atmospheric dust stains the target filters. The opacity of both upstream and downstream filters is measured and used to calculate the dust spot efficiency (ASHRAE efficiency).

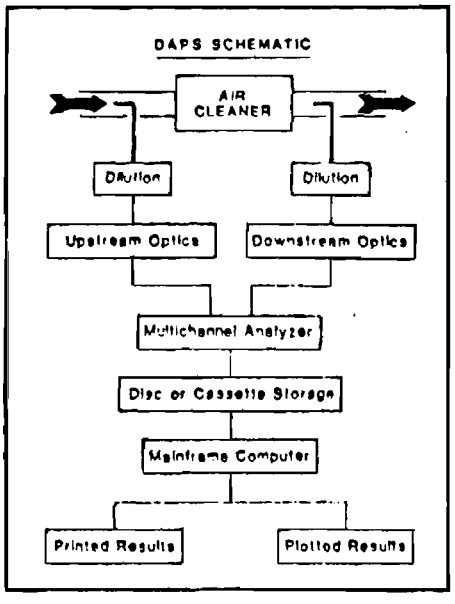
$$\left(\frac{100}{100 + 100}\right) \times 100 = 50\% \text{ AREA EFFICIENCY}$$

Conclusion: Area relates to how much staining ability the filter eliminates. At 50% efficiency, this filter is significantly effective.

DONALDSON'S ULTRA-WEB™ FILTER CARTRIDGES PROVIDE 93% AVERAGE DUST SPOT EFFICIENCY!

DUST HOLDING CAPACITY

This value is important when filters must be changed because of high pressure drop. A filter that holds more dust before changeout means reduced maintenance. Since the Donaldson system maintains a low filter pressure drop through automatic on line filter cleaning, this value is no longer applicable.



COUNT EFFICIENCY

The most stringent filter efficiency test method relies on the actual number of dust particles passing through the filter. Sophisticated data acquisition and processing equipment reduce the task to routine laboratory procedures at Donaldson.

Recent advances in optical and computer technology have made is possible to obtain quantitative data on initial efficiency and fractional efficiency. Fractional efficiency is the efficiency, on a particle count basis, of discrete particle size intervals. When these values are plotted (see Fractional Efficiency Graph, page 5.1.7) a fractional efficiency curve is generated. It is now possible to continuously monitor the amount and size of dust particles penetrating an air filter throughout the test. This information is shedding new light on air filter design and application and is allowing better judgment when deciding on optimum configuration for various applications.

The Donaldson Airborne Particle System (DAPS) shown schematically at the left, can be used to test filter media in the flat sheet or to test an air filter. Provisions are made for isokinetic sampling upstream and downstream of the filter and for dilution of the sample (if necessary) before it reaches the optics. Dilution involves mixing the sample with clean air to limit the particle concentration entering the optics.

The optical detectors form an intense light on a small volume through which the particles must pass. As they pass through light is scattered in several directions. The scattered light is collected by an elliptical mirror and focused on a photomultiplier tube. The amplitude of the photomultiplier output is proportional to the size of the particle. Several particles in the volume at the same time would cause what is called coincidence error. This is the reason for dilution of the sample.

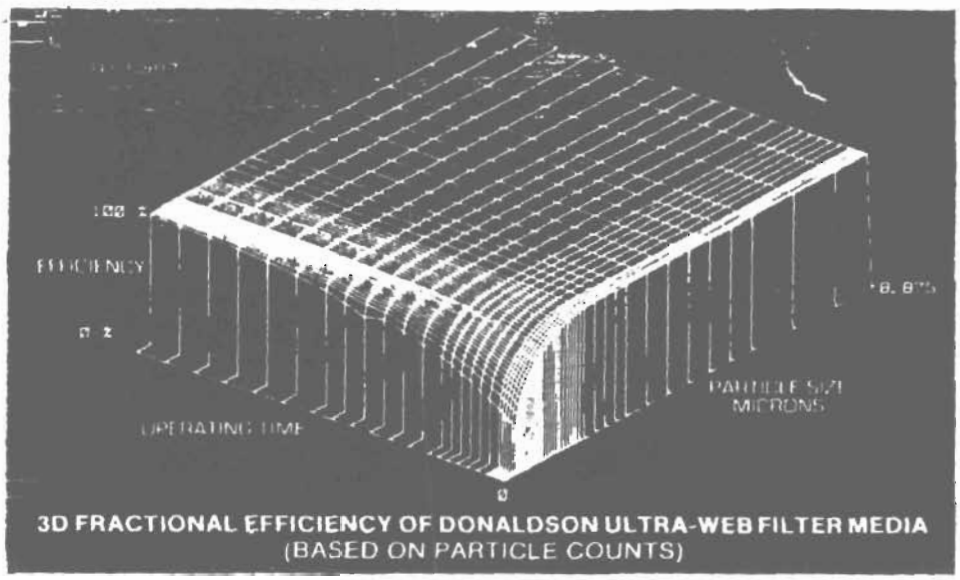
The photomultiplier output goes to a multichannel analyzer (MCA) which counts the particles in each of 1024 different size ranges. The MCA accumulates particle counts for a predetermined period of time. At the end of each time increment the accumulated data are stored on magnetic disk or tape for later processing and the acquisition starts over again.

The preceeding filter example illustrated efficiency determined by ASHRAE 52-76 test methods. Using the same example, the particle count efficiency reveals a very low filtration efficiency. Example: on a count basis the ratio of particles is 100—1. So...

$$\left(\frac{1}{1 + 100} \right) \times 100 = 0.99\% \text{ COUNT EFFICIENCY}$$

Conclusion: Count efficiency illustrates a filters ability to remove contaminants throughout a complete size distribution.

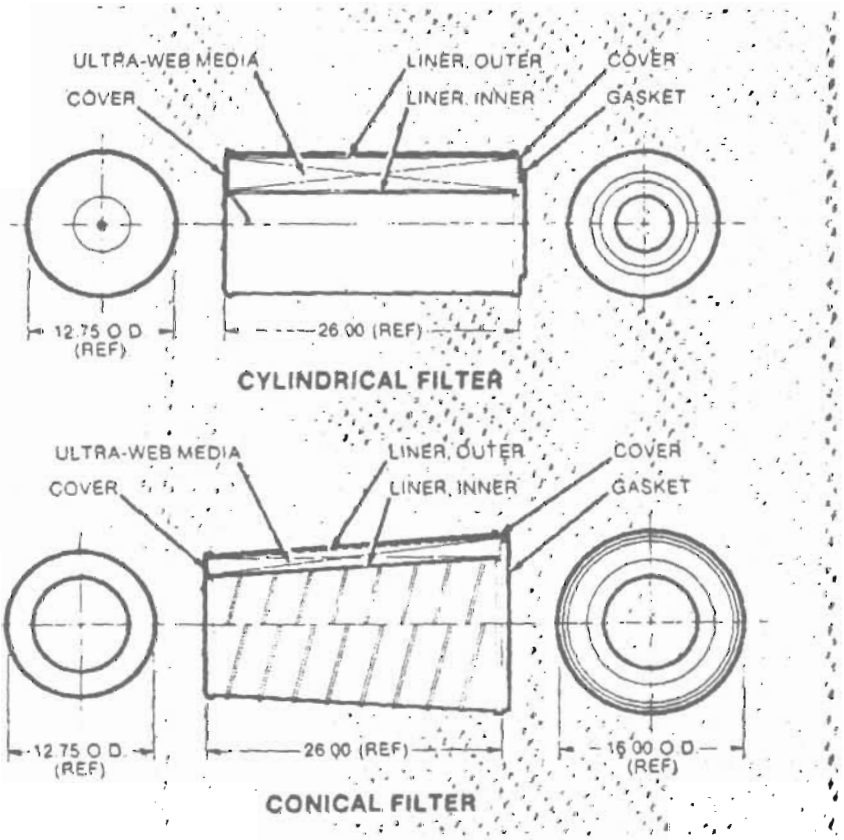
ULTRA-WEB™ IS EVALUATED BASED ON COUNT EFFICIENCY. SINCE ULTRA-WEB™ IS INVISIBLE TO THE NAKED EYE, A COUNT EFFICIENCY TEST SYSTEM WAS INSTALLED IN THE DONALDSON PRODUCTION FACILITY TO ENSURE PROCESS SPECIFICATIONS ARE MAINTAINED.



3D FRACTIONAL EFFICIENCY OF DONALDSON ULTRA-WEB FILTER MEDIA
(BASED ON PARTICLE COUNTS)

Fractional efficiency can be easily visualized using a 3-dimensional graph. Operating time is plotted against particle size. This graph illustrates increasing efficiency as the dust cake is building with increased operating time. Overall Ultra-Web media efficiency can reach 99.99% after a stable dust cake has been developed. Under normal operating conditions extremely high efficiencies are reached within days of initial start-up.

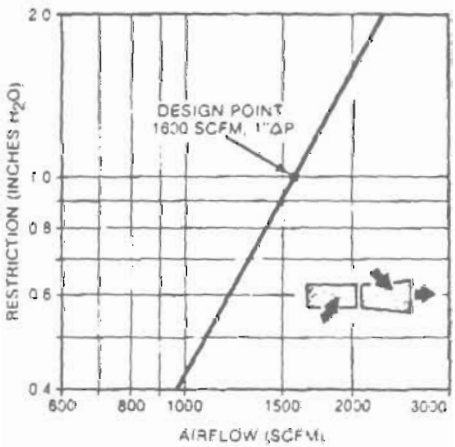
FILTER DETAILS/DIMENSIONS



FILTER PRESSURE DROP

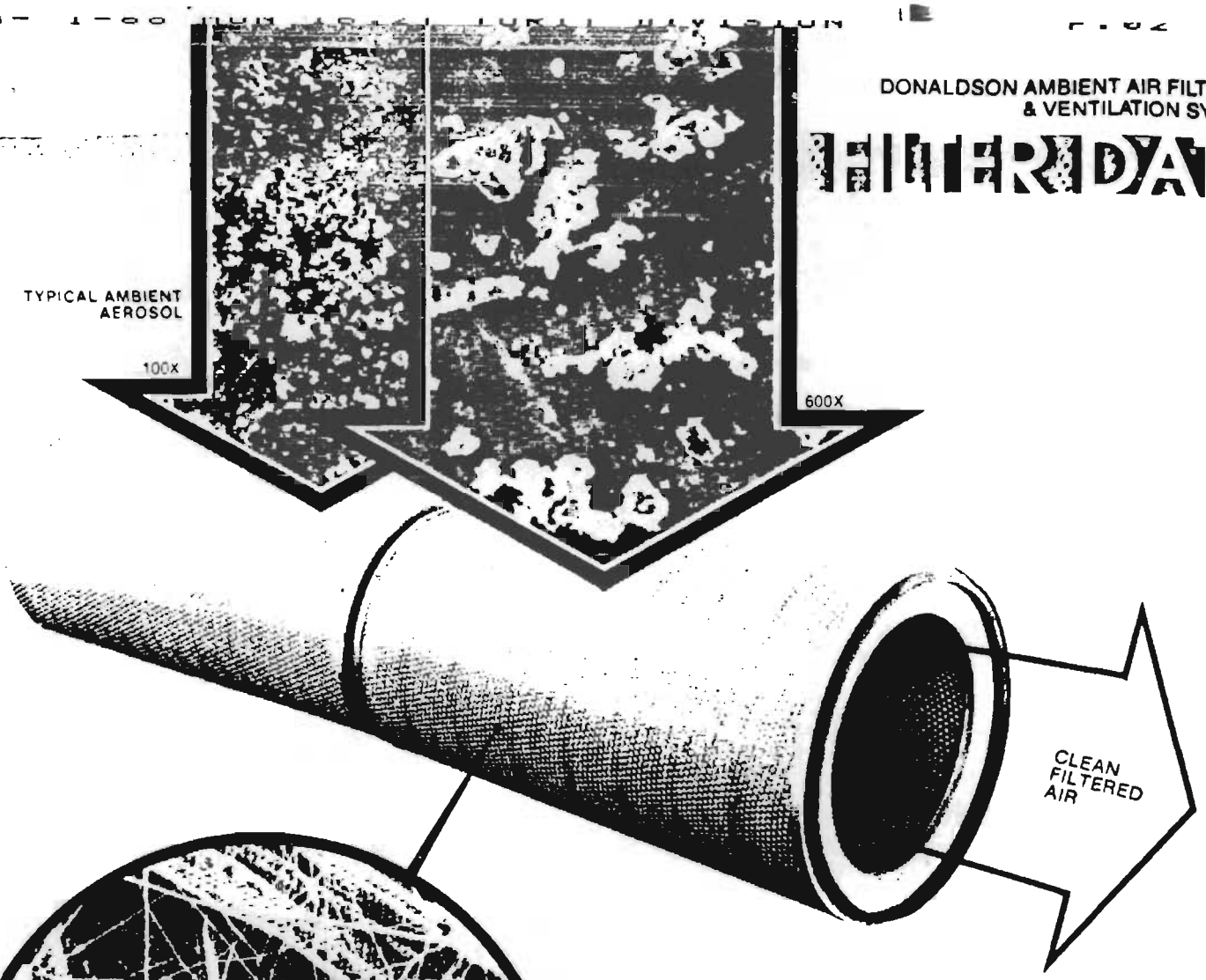
Equipment design often revolves around determining the total resistance to moving air through the system. With clean filters the accompanying curve can be used to assist in determining operating static pressure.

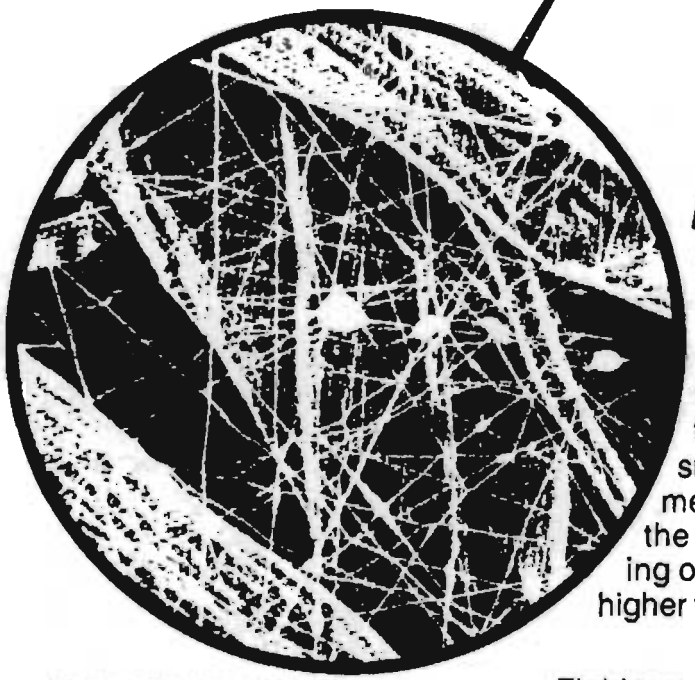
NOTE: With an automatic pulse cleaned system add 1.5-2.0 in w.g. to the initial filter pressure drop to arrive at a stable operating design condition.



FILTER RESTRICTION (ONE PAIR OF CONICAL/CYLINDRICAL FILTERS)

FILTER DATA





Microscopic view of Ultra-Web at 600X magnification

*Donaldson's exclusive **Ultra-Web™** filter media is standard in all our ambient air filtration and ventilation systems.*

Ultra-Web is produced through a proprietary process in which a surface treatment of miscroscopic fibers is applied to the conventional media substrate. This allows even extremely small dust particles to be collected on the outer surface of the media, rather than penetrating and becoming trapped within the media. This performance characteristic minimizes blinding of the media and leads to operating advantages including higher filtration efficiency, lower system costs, and longer filter life.

Field tests have shown that Ultra-Web is particularly advantageous for filtering extremely small particles in large air volumes.

Ultra-Web cartridges are competitively priced, especially on the basis of total life-cycle system costs compared to conventional cartridges.

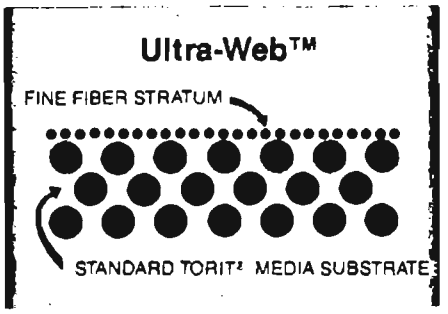
Ultra-Web™ DESCRIPTION

When Donaldson Company, Inc. designed Ultra-Web, filter media engineers theoretically analyzed media concepts that would produce the ultimate filter performance. The process took nearly ten years to perfect, and the result is impressive.

A primary self-cleaning media performance criteria is matching the media structure (inter-fiber space) with the size of the contaminant to be filtered. This consideration determines the dust cake architecture and media cleanability. After initial system start-up and seasoning, a self-cleaning system operates with the dust cake providing the predominant filtration structure. The cleaning operation should remove enough of the dust cake to reduce the pressure drop to satisfactory steady state levels. Optimized self-cleaning media performance will then require the efficient capture of particles in a surface location that allows for easy removal to obtain the desired steady state system pressure drop.

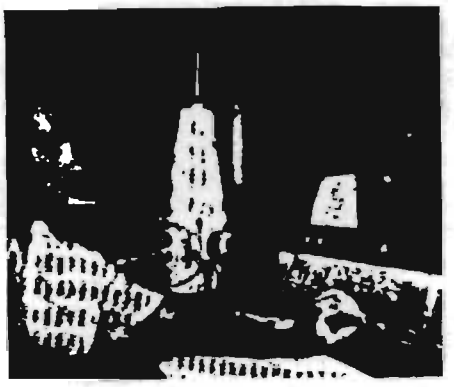
Particle size is a key filtration performance criteria since the mechanisms of particle collection are strong functions of particle diameter. For small particles less than one micron, collection is achieved by diffusion and direct interception, while for particles greater than one micron, direct interception and inertial deposition dominate. Conventional filtration media use large fiber diameters with corresponding large inter-fiber spaces. For conventional media, during system start-up, immediately after cleaning and throughout much of the cake building mode, particles less than one micron in diameter are collected in the depth of the media. Depth collection results in short system life, since particles cannot be easily removed from the depth of the media. Media cleanability requires a cake structure that can be fractured and removed in large agglomerates. Conventional filter materials have inter-fiber spaces larger than 20-60 microns. Therefore, in general, contaminants significantly smaller than the inter-fiber space can and will penetrate into the media causing inefficient cleaning and short system life between bag or cartridge replacements. The smaller the contaminant, the greater the problem.

Ultra-Web media was developed to address the aforementioned problems of using conventional filter media for small particles. Ultra-Web uses sub-micron diameter fibers at low solidity and layer thickness providing small inter-fiber spaces and negligible pressure drop. Ultra-Web is pictured schematically as:



illustrating a tight surface structure of submicron fibers bonded to a more open substrate. The submicron fibers provide the foundation for surface cake filtration and minimize penetration of submicron particles, while the substrate provides physical structure and support for the fine fiber layer and dust cake. During initial system start-up and immediately after cleaning, the fine fiber layer collects particles by diffusion and direct interception on the media surface. The fine fiber layer is only 1 or 2 microns thick. The initial efficiency of Ultra-Web is up to 10 times greater than conventional filter media at the same conditions. The high initial efficiency of Ultra-Web on submicron particles yields a fast surface cake build-up which minimizes seasoning time and media bleed through. The surface cake created by the fine fiber layer yields a cake structure that is easily and efficiently removed during cleaning cycles.

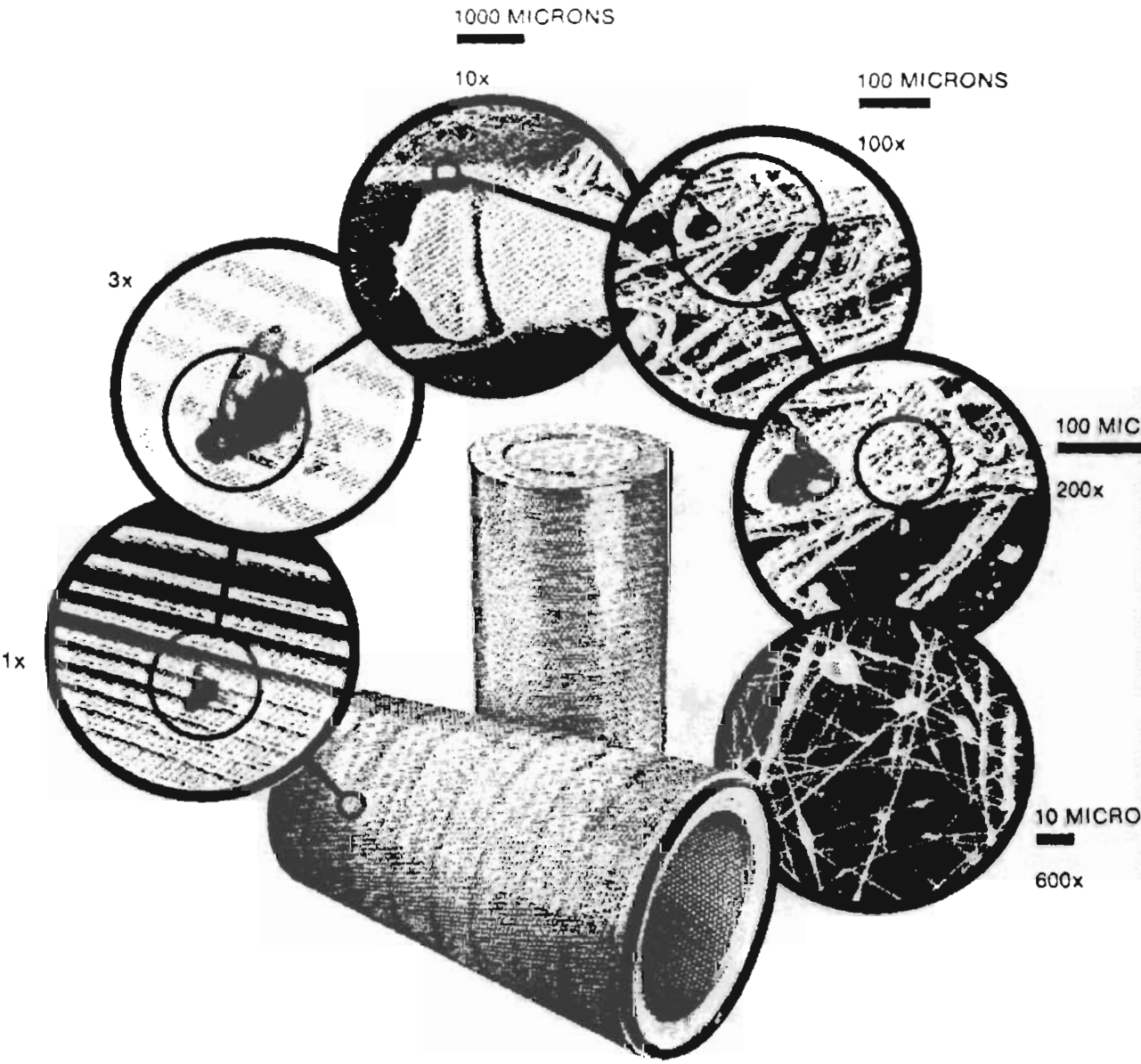
Ultra-Web is a surface loading media that minimizes depth penetration and maximizes system throughput at low pressure drop. It provides high levels of efficiency extending to submicron particle diameters ideally suited for ventilation systems.



Sophisticated laboratory equipment such as this scanning electron microscope is helping Donaldson researchers probe deep into the nature of particles.

*Take a look through the microscope at **Ultra-Web™**!*

Ultra-Web utilizes a layer of fine fibers applied to a substrate of standard filter cartric media. The depth of the fine fiber layer is 100 to 200 times less than that of the substra The space between the fibers is up to 100 times smaller than that of the substrate fibe Therefore, nearly all particles are caught on the surface of the media and depth load is minimized.

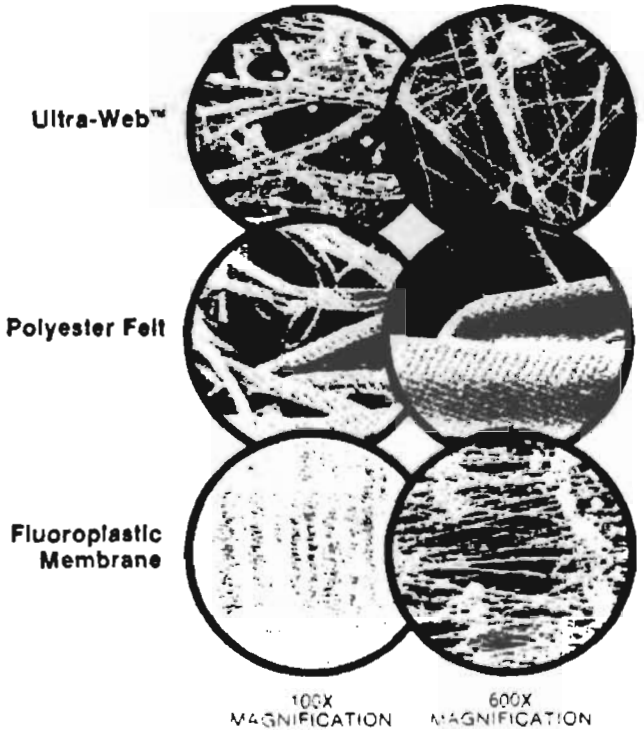


*Compare **Ultra-Web™** to other filter media!*

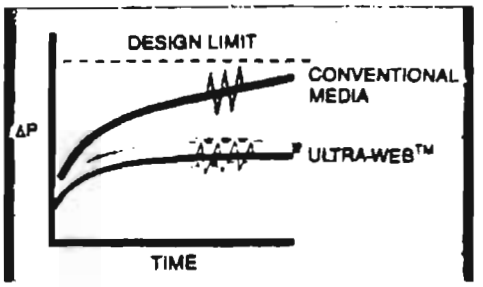
Polyester felt is used to form a very thick filter media—between 1/8 and 1/2 inch in depth—used for filter bags in continuous-duty dust collectors. The fibers are approximately 25 to 60 microns apart. Many particles not caught on the surface of the media are caught inside, since the particles must follow a long tortuous path to get through the felt. Because of this "depth loading", polyester felt filters require a large amount of energy to pulse the entrained particles out of the media. Failure to thoroughly clean the media results in high pressure drop. Smaller particles may penetrate the media, especially during the period immediately following the pulse cleaning operation.

Fluoroplastic Membrane
Fluoroplastic membranes are typically laminated on the surface of conventional filter medias such as polyester felt. The membrane provides a dense mat of submicron surface fibers. Since the membrane is generated by processing a solid sheet of fluoroplastic, it has a relatively high solidity and layer thickness. The high solidity creates resistance to airflow and a corresponding increased filter pressure drop above the supporting substrate.

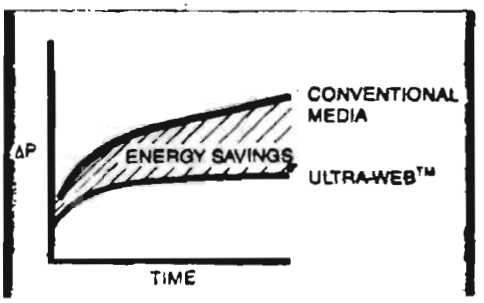
Fluoroplastics provide advantages over other materials in aggressive chemical environments as well as elevated temperatures.



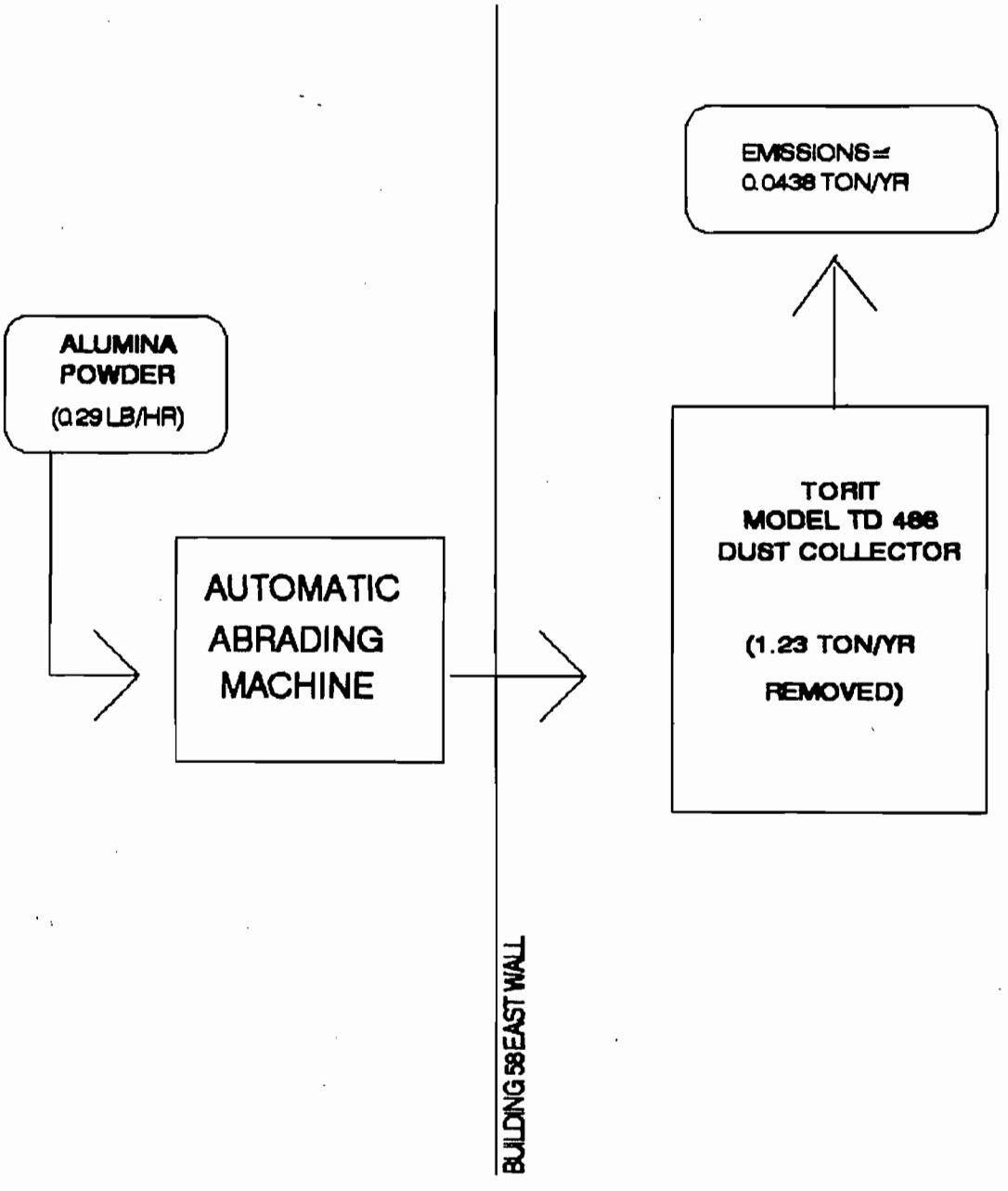
Ultra-Web = Better Cleaning
Better surface loading results in easier particle release during the cleaning cycle and minimizes the restriction of air flow at design conditions.



Ultra-Web =Lower Energy Costs
Electricity is a significant cost to be considered in the operation of any ventilation system. Since system costs vary directly with pressure drop and flow rate, the advantages of Ultra-Web translate directly into energy savings of 25 percent or more.



PROCESS FLOW DIAGRAM
ABRADING MACHINE WITH
DUST COLLECTOR SYSTEM



HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 58
PERMIT NUMBER: AC 05-104521
PERMIT TYPE : CONSTRUCTION

DATE ISSUED : 01/15/86
RENEWAL DATE: 04/01/86
DATE EXPIRES: 06/30/86

AREA SERVED:
PROCESS DESCRIPTION: CHEMICAL VAPOR SCRUBBER

PERMIT LIMITS

VOL. RATE (SCFM): 12,500
ACID MIST (LB/HR): <0.0002
SOLVENTS (LB/HR): 0.1672
VOCS (LB/HR): --
OPER. (HRS/YEAR): 2112

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT :
NOTIFICATION OF VE TEST :
ANNUAL VIS EMISSION TEST:

EQUIPMENT INFORMATION

MANUFACTURER : TRI-MER CORP.
LOCATION : B58 ROOF WESTSIDE
HARRIS ID NUMBER : F58S01
VOLUME FLOW RATE (CFM): 12,500
RECIRCULATION RATE (GPM): 40
MAKEUP WATER RATE (GPM): 2.0

MODEL NUMBER : F/W 5
STACK HEIGHT (FT): 12
STACK DIAMETER (IN): 27
STACK VELOCITY (FPM):
DUCT MATERIAL :

PERMIT HISTORY

PERMIT NUMBER: AC 05-104521
DATE EXPIRED : 06/30/86

PERMIT NUMBER:
DATE EXPIRED :

PERMIT NUMBER:
DATE EXPIRED :

SCRUBBER INFORMATION

HARRIS ID # : F58S01
MANUFACTURER : TRI-MER CORP. MODEL NUMBER : F/W 5
SERIAL NUMBER: 7031 MATERIAL : PVC
DESCRIPTION : HORIZONTAL COUNTER-FLOW, MIST ELIMINATOR
WHITE POLYPRO FILTER PACK, DWG. 1000-667 (1/81)

DESIGN DATA
VOLUME FLOW RATE (CFM): 14,000 PRESSURE DROP (IN):
RECIRCULATION RATE (GPM): 40 MAKE UP RATE (GPM): 2.0

ACTUAL DATA
VOLUME FLOW RATE (CFM): 10,386 PRESSURE DROP (IN): DATE: 12/17/86
RECIRCULATION RATE (GPM): 40 MAKE UP RATE (GPM): 2 DATE: 01/16/87

RECIRCULATION PUMP INFORMATION

MANUFACTURER : FLOTEC MODEL NUMBER : C7P8-1194V
SERIAL NUMBER: HP : 1 RPM : 3450
BRKR LOCATION: NEXT TO UNIT FED FROM MCC : PP 28

FAN INFORMATION

HARRIS ID # : F58E11
MANUFACTURER : TRI-MER CORP. MODEL NUMBER: 30 UB
SERIAL NUMBER: 5407 MATERIAL : PVC
DESCRIPTION : CENTRIFUGAL BLOWER. BACKWARD INCLINED BLADES

DESIGN DATA
VOLUME FLOW RATE (CFM): 12.500 STATIC PRESS (IN): 4"

ACTUAL DATA SPEED (RPM): DATE:
VOLUME FLOW RATE (CFM): 10,386 STATIC PRESS (IN): DATE: 12/17/86

FAN MOTOR INFORMATION

MANUFACTURER : LINCOLN TEFC MODEL NUMBER : FRAME 256
SERIAL NUMBER: N/A HP : 20 RPM : 1750
BRKR LOCATION: NEXT TO UNIT FED FROM MCC : PP 28

Attachment :

HARRIS SEMICONDUCTOR -- AIR PERMIT INFORMATION

CURRENT PERMIT

BUILDING: 58
PERMIT NUMBER: AC 05-104527
PERMIT TYPE : CONSTRUCTION

DATE ISSUED : 01/15/86
RENEWAL DATE: 04/01/86
DATE EXPIRES: 06/30/86

AREA SERVED:
PROCESS DESCRIPTION: VOC/SOLVENT SCRUBBER

PERMIT LIMITS

VOL. RATE (SCFM): 3.000
ACID MIST (LB/HR): --
SOLVENTS (LB/HR): 0.002
VOCS (LB/HR): --
OPER. (HRS/YEAR): 2112

SPECIFIC CONDITIONS

ANNUAL OPERATING REPORT :
NOTIFICATION OF VE TEST :
ANNUAL VIS EMISSION TEST:

EQUIPMENT INFORMATION

MANUFACTURER : HARRISON
MODEL NUMBER : HF-30
LOCATION : B58A ROOF NORTHWEST SIDE
HARRIS ID NUMBER : F58S02
VOLUME FLOW RATE (CFM): 3,000
RECIRCULATION RATE (GPM): 20
MAKEUP WATER RATE (GPM): 2.0
STACK HEIGHT (FT): 6
STACK DIAMETER (IN): 12
STACK VELOCITY (FPM):
DUCT MATERIAL :

PERMIT HISTORY

PERMIT NUMBER: AC 05-104527
DATE EXPIRED : 06/30/86

PERMIT NUMBER:
DATE EXPIRED :

PERMIT NUMBER:
DATE EXPIRED :

SCRUBBER INFORMATION

HARRIS ID # : F58S02
MANUFACTURER : HARRISON MODEL NUMBER : HF-30
SERIAL NUMBER: N/A MATERIAL : POLYPRO
DESCRIPTION : HORIZONTAL CROSS-FLOW, PLASTIC SADDLE PACKING, LIQUID DISTRIBUTION THROUGH MAIN HEADER, NO SPRAY NOZZLES, DWG HPS 402H

DESIGN DATA
VOLUME FLOW RATE (CFM): 3,000 PRESSURE DROP (IN):
RECIRCULATION RATE (GPM): 20 MAKE UP RATE (GPM): 2.0

ACTUAL DATA
VOLUME FLOW RATE (CFM): 2,275 PRESSURE DROP (IN): DATE: 12/18/86
RECIRCULATION RATE (GPM): 20 MAKE UP RATE (GPM): 2 DATE: 01/16/87

RECIRCULATION PUMP INFORMATION

MANUFACTURER : FILTER PUMP IND. MODEL NUMBER : 110217-00
SERIAL NUMBER: HP : 3/4 RPM : 3450/2850
BRKR LOCATION: FED FROM MCC :

FAN INFORMATION

HARRIS ID # : F58E13
MANUFACTURER : HARTZELL MODEL NUMBER: 41-15-GL3
SERIAL NUMBER: 51059 MATERIAL : FIBERGLASS
DESCRIPTION : CENTRIFUGAL BLOWER, BACKWARD CURVED BLADES

DESIGN DATA
VOLUME FLOW RATE (CFM): 3,000 STATIC PRESS (IN):

ACTUAL DATA SPEED (RPM): DATE:
VOLUME FLOW RATE (CFM): 2,275 STATIC PRESS (IN): DATE: 12/18/86

FAN MOTOR INFORMATION

MANUFACTURER : MODEL NUMBER :
SERIAL NUMBER: HP : 5 RPM : 1725
BRKR LOCATION: FED FROM MCC :

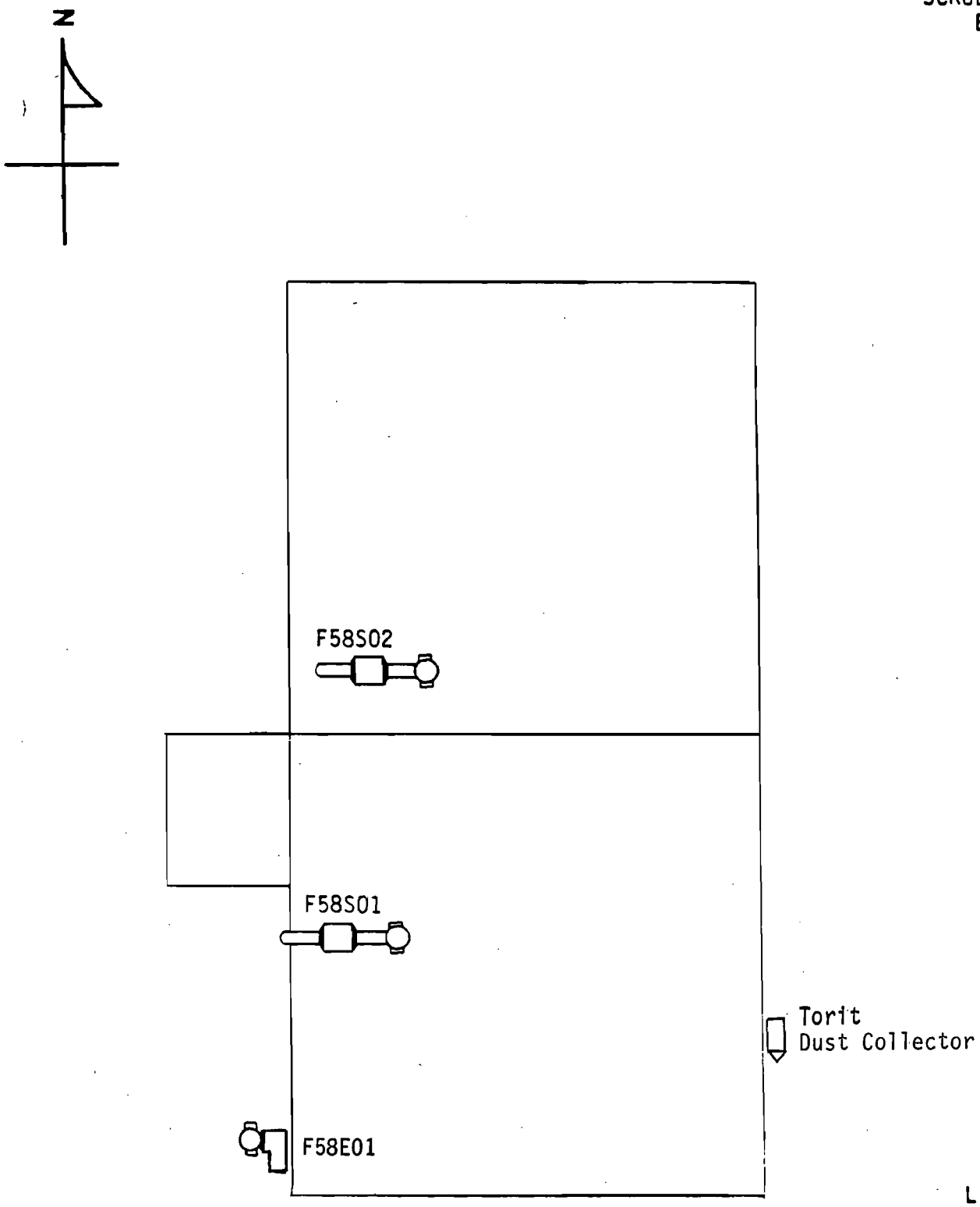
HARRIS SEMICONDUCTOR

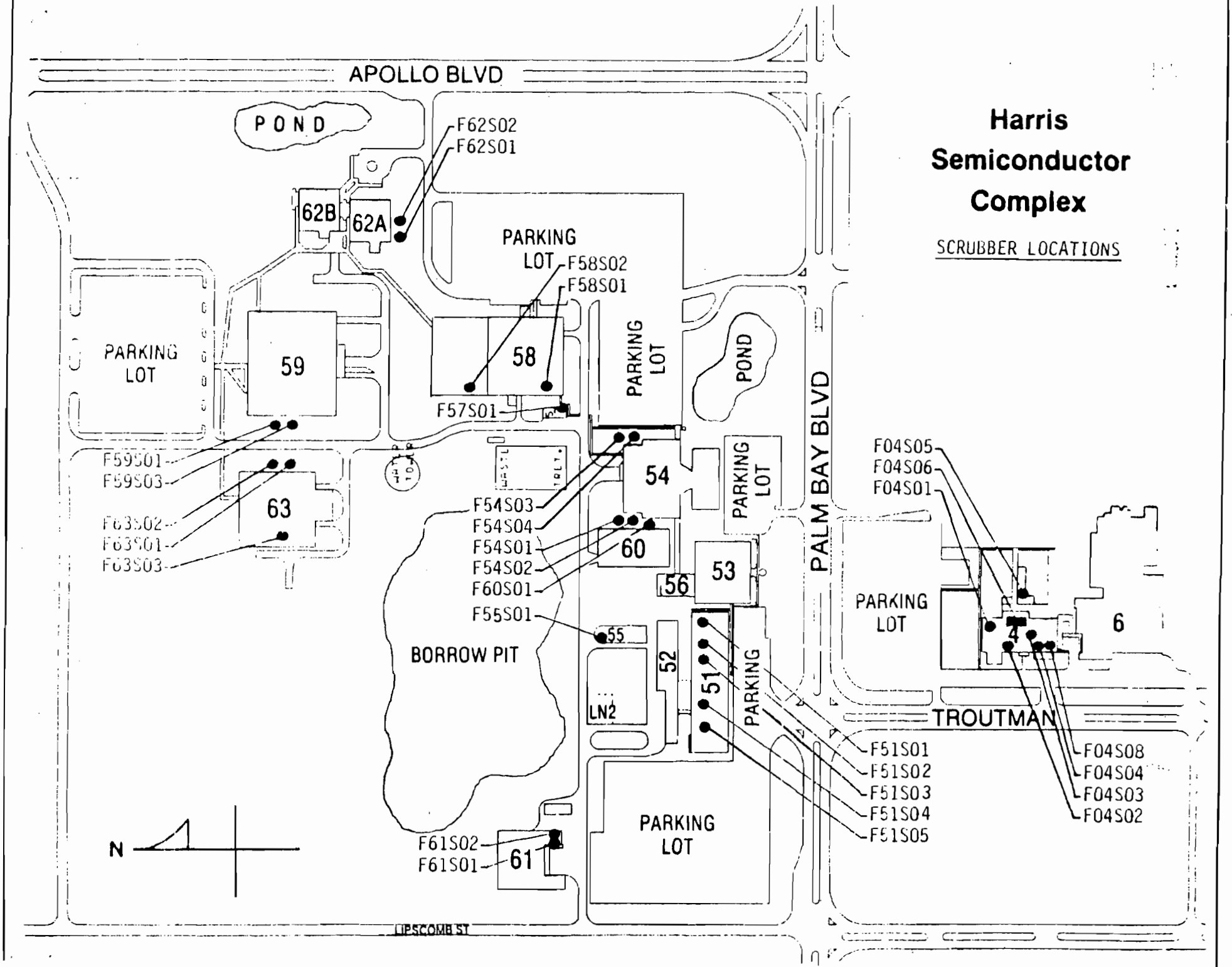
AIR PERMIT - BUILDING 58

ATTACHMENT E

SITE LOCATION MAPS

HARRIS SEMICONDUCTOR
SCRUBBER LOCATIONS
BUILDING 58




Harris
Semiconductor
Complex
SCRUBBER LOCATIONS
APOLLO BLVD
POND
F62S02
F62S01
62B
62A
PARKING
LOT
F58S02
F58S01
PARKING
LOT
59
58
PARKING
LOT
POND
F57S01
PALM BAY BLVD
F59S01
F59S03
F63S02
F63S01
F63S03
63
54
F54S03
F54S04
F54S01
F54S02
F60S01
F55S01
60
56
53
PARKING
LOT
F04S05
F04S06
F04S01
PARKING
LOT
4
6
55
BORROW PIT
52
51
PARKING
LN2
TROUTMAN
F51S01
F51S02
F51S03
F51S04
F51S05
F04S08
F04S04
F04S03
F04S02
N
F61S02
F61S01
61
PARKING
LOT
UPSCOMB ST