

Application Routing and Transmittal Sheet

Air Permitting Supervisor - Required Information for Project Setup by Admin

| | | |
|---|----------------------|---|
| Owner/(Facility Name, if needed): Charlotte Pipe and Foundry Company | | Facility ID No.: 1190030 |
| New Facility (Y/N): n | Relocatable (Y/N): n | Project Description: Polyvinyl Chloride (PVC) pipe manufacturing facility |
| Project Name: Operating permit | | |
| Type/Subtype: ao/00 | Received: 10/24/2003 | |
| Fee Submitted: <input checked="" type="checkbox"/> correct <input type="checkbox"/> incorrect <input type="checkbox"/> na Should Be \$ 1000 | | Override Reason (if needed): |
| Fee Checked By: Jim | | Submitted \$ 1000 |
| Date: 10/28/2003 | | Needed/Refund \$ 0 |

Admin - Project Setup Information

| | | |
|------------------|---|------------------|
| Project No.: 004 | Initial ARMS Entry (Initials & Date): KJ 10/24/02 | Virus Scan Date: |
|------------------|---|------------------|

Air Permitting Supervisor - Application Information

| | |
|---|------------------|
| Application Assigned To: JZ | Date: 10-30-03 |
| No. of Hardcopies: 2 | No. of Disks: na |
| Confidential Information (Y/N): N | |
| Application Distribution (hardcopy/disk): DEP Engineer: 2 County: na Other: | |

Air Permitting - Permit Transmittal (add initials & date completed)

| | | | |
|-------------------------------|--------------|------------|----------------|
| Permit No.: 1190030-004-AO | Intent/Draft | Final | Day 30/60/90 |
| Project No.: 1190030-004-AO | | | 3/30/04 |
| Engineer → permit supervisor | | 11/5/04 JZ | C/E Review Y/N |
| Permit supervisor → DAPA | | 2/2/04 JW | y |
| DAPA → clerk/engineer | | 2/9/04 JW | |
| Permit Package Mailed/Emailed | | 2/9/04 JW | |
| ARMS Events Entry | | | |

4/8 2/9/04
 EW 001 002,
 004-006
 10-28-03 Jim
 Permit Supervisor
 send E-mail to
 Bob + Sheila
 AT TIME OF ASSIGNING
 PERMIT ENGINEER

Air Permitting Supervisor - Data Fields for Access System (add at final issuance)

| | | |
|--|--|--------------|
| Permit No.: 1190030-004-AO | Issue Date: 2/9/04 | Engineer: JZ |
| Facility Description: Other (see comments) | Source Description: Other (see comments) | |
| 296: | MACT: | NSPS: |
| Fuels: | Control Equipment: Baghouse | |
| Project Description/Comments: Polyvinyl Chloride (PVC) Pipe Extruding Operation PM Source | | |

Air Permitting - System Updates (add initials & date completed)

| | |
|---|---|
| Engineer - Final Permit Copied (read only) to Air Common/Permits/PermitXX | 1190030-004-AO Charlotte Pipe and Foundry |
| Permitting Supervisor - Permit to be posted on DARM website? (Y/N) | y Posted by/date: |
| Engineer - ARMS Inventory Data Entry: | 2/26/04 JZ |
| Permitting Clerk - Permit List Data Entry (Access): | |
| Permitting Supervisor - Send permit to compliance section? (Y/N) | y |
| Permitting Supervisor - Copy of transmittal sheet to Nancy Knight (new facility)? (Y/N) | n |
| Permitting Supervisor - Copy of Permit/Intent to Party of Interest? (Y/N) | n |

Oracle Developer Forms Runtime - Web

Query Coll Rpts Rfnd Exit CRA Window

Cash Receiving Application - Collection Point Log Remittance

Collection Point Log Remittance

AREA **SWD** Tot **CRAF006A**
\$1,000.00

Remittance **540668** Type **CF** Recvd Date **10/24/2003** Status **RECEIVED**
 SYSSRCPT **434856** PNR Check # **0000173847** Amount **1,000.00**
 SSN/FEI# Name **CHARLOTTE PIPE AND FOUNDRY COMPANY**
 First Middle Title Suf
 Address1 **PO BOX 35430** Short Comments
 Address2 S-AIR **1190030-004**
 City **CHARLOTTE** ST **NC** Zip **28235** Country

PAYMENT(S)

| Payment# | Distr CL | Object Code/Description | Payment Amount | Reference# | Applic/ Fund | status |
|----------|----------|-------------------------|----------------|------------|--------------|----------|
| 586744 | SWD | 002223 AIR OPERATE | \$1,000.00 | | ARM PFTF | COMPLETE |
| | | | | | | |
| | | | | | | |
| | | | | | | |

COMMIT FREQUENTLY **\$1,000.00** Payment total

Press <TAB> to accept Collection Point or enter F&A.

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Oracle Developer Forms Runtime - Web

Permits Events Payment Site Facility Party Lcd Help Exit Window

Permitting Application - Permit Detail and Log Permit

ARMS Facility

POINT AIRS ID **1190030** STATUS **C** OFFICE **SWD** SW-TAMPA
 SITE NAME **CHARLOTTE PIPE & FOUNDRY/PLASTIC DIV** COUNTY **SUMTER**
 OWNER/COMPANY **CHARLOTTE PIPE AND FOUNDRY CO/PLASTIC DI**

Project

AIR Permit# Project # **004** CRA Reference # **163663**
 Permit Office **SWD (DISTRICT)** Agency Action **Pending**
 Project Name **OPERATING PERMIT** Desc **polyvinyl chloride (PVC) pipe manufacturing facility**
 Type/Sub/Des **AO / 00** Multiple Sources per Application Logged **10/29/2003**
 Received **10/24/2003** Issued Expires OGC
 Fee **1000.00** Fee Recd **1000.00** Dele Override **MULTIPLE SOURCE**

Related Party

Role **APPLICANT** Begin **10/29/2003** End
 Name **NEUBAUER, JAMES** Company **AWARE ENVIRONMENTAL, INC**
 Address **9305 MONROE ROAD, SUITE J**
 City **CHARLOTTE** State **NC** Zip **28270** Country **U.S.A.**
 Phone **704-345-1686** Fax **704-345-1759**

Processors

Processor **MCDONALD_J** Active **10/29/2003** Inactive **/** Events

Enter Project Name

start Inbox - Micro... 4 Internet... Document1-... 2:05 PM

Permitting Application - Events

Events Scheduled

51 of 90

AIRS ID: 1190030 Site Name: CHARLOTTE PIPE & FOUNDRY/PLASTIC DIV
 Permit #: 1190030-004-AO Type/Subtype: AO / 00 Received: 10/24/2003
 Project #: 004 Project Name: (OPERATING PERMIT)

> Receive Request: Done

| Event | Begin Date | Period | Due Date | Rmn | Status | End Date |
|---------------------------------|------------|--------|------------|-----|----------------|------------|
| Receive Request | 10/24/2003 | 1 | 10/26/2003 | | Done | 10/24/2003 |
| Fee Verification | 10/24/2003 | 2 | 10/26/2003 | | Sufficient Fee | 10/26/2003 |
| Completeness Review | 10/24/2003 | 30 | 11/23/2003 | | Incomplete | 11/14/2003 |
| RESET CLOCK | 11/14/2003 | 1 | 11/15/2003 | | Done | 11/14/2003 |
| Awaiting Additional Information | 11/14/2003 | 45 | 12/29/2003 | | Received | 12/31/2003 |
| Completeness Review | 12/31/2003 | 30 | 01/30/2004 | | Complete | 12/31/2003 |
| Determine Agency Action | 12/31/2003 | 90 | 03/30/2004 | | Issue | 02/09/2004 |
| Issue Final Permit | 02/09/2004 | 14 | 02/23/2004 | | Issued | 02/09/2004 |
| ISSUE PERMIT | 02/09/2004 | 1 | 02/10/2004 | | Issued | 02/09/2004 |
| STOP CLOCK | 02/09/2004 | 1 | 02/10/2004 | | Done | 02/09/2004 |
| ARMS Data Entry | 02/09/2004 | 40 | 03/20/2004 | 40 | Pending | |

| Permitting Application - Permit Detail and Log Permit | | | | | | | | | | |
|---|---------------------------|--|----------|----------------------------------|---------------|--|------------|-----------------|----------|--------------------------|
| ARMS Facility | | | | | | | | | | |
| POINT | AIRS ID | 1190030 | STATUS | C | OFFICE | SWD | SW: TAMPA | | | |
| SITE NAME | | CHARLOTTE PIPE & FOUNDRY/PLASTIC DIV | | | COUNTY | SUMTER | | | | |
| OWNER/COMPANY | | CHARLOTTE PIPE AND FOUNDRY CO/PLASTIC DI | | | | | | | | |
| Project | | | | | | | | | | |
| AIR Permit # | 1190030 | - | 004 | - | AO | Project # | 004 | CRA Reference # | 163663 | |
| Permit Office | SWD (DISTRICT) | | | | Agency Action | Issued | | | | |
| Project Name | OPERATING PERMIT | | | | Desc | polyvinyl chloride (PVC) pipe manufacturing facility | | | | |
| Type/Sub/Des | AO | / | 00 | Multiple Sources per Application | | | Logged | 10/29/2003 | | |
| Received | 10/24/2003 | | Issued | 02/09/2004 | | Expires | 02/09/2009 | | OGC | <input type="checkbox"/> |
| Fee | 1000.00 | | Fee Recd | 1000.00 | | Date | | | Override | MULTIPLE SOURCE |
| Related Party | | | | | | | | | | |
| Role | APPLICANT | | | | Begin | 10/29/2003 | | End | | |
| Name | NEUBAUER, JAMES | | | | Company | AWARE ENVIRONMENTAL, INC | | | | |
| Address | 9305 MONROE ROAD, SUITE J | | | | | | | | | |
| City | CHARLOTTE | | | State | NC | Zip | 28270 | | Country | U.S.A. |
| Phone | 704-815-1686 | | Fax | 704-845-1759 | | | | | | |
| Processors | | | | | | | | | | |
| Processor | ZORNITTA_J | | | Y | Active | 10/31/2003 | | Inactive | | |
| Events | | | | | | | | | | |

Emission Unit Details

| EU No | Description |
|-------|-----------------------------------|
| 001 | PVC RR UNLOAD CENT RECEIV |
| 002 | PVC/CPV STORAGE SILOS (8) |
| 004 | 18 HOPPER-RECEIVERS FEEDI |
| 005 | 3 WSTE GRINDERS/2 WSTE HO |
| 006 | HOPPERS, RECEIVERS, MIXER, COOLER |
| | |
| | |
| | |
| | |
| | |

[DARM Home](#) [Requery New AirSID](#) [Help Menu](#) [Delete Record](#)

Air Resource Management

Update Permit Application Summary Information Non-TitleV

Arms Permit
Number: 1190030004AO

Airs ID: 1190030

Date Appl
Received: 10/24/2003Last Update: 02/09/2004
05:08:55

➡ Required Fields

➡ Permit Status: FINAL

EPA SIC: 3084

File
Name: 1190030.004.AO.F.ZIPPost
Date: 02/09/2004[Copy File](#)

Description: PVC PIPE MFG.

Owner: CHARLOTTE PIPE AND FOUNDRY
CO/PLASTIC DISite Name: CHARLOTTE PIPE & FOUNDRY/PLASTIC
DIV

Street: COUNTY RD 124 A

City: WILDWOOD, FL

State: FLORIDA

Zip5: 34785

Zip4:

[Requery New AirSID](#)[Submit](#)[Reset](#)

Events Scheduled

51 of 90

AIRS ID 1190030

Site Name CHARLOTTE PIPE & FOUNDRY/PLASTIC DIV

Permit # 1190030-004-AO

Type/Subtype AO / 00

Received 10/24/2003

Project # 004

Project Name (OPERATING PERMIT)

> Receive Request: Done

| Event | Begin Date | Period | Due Date | Rmn | Status | End Date |
|---------------------------------|------------|--------|------------|-----|----------------|------------|
| Receive Request | 10/24/2003 | 1 | 10/26/2003 | | Done | 10/24/2003 |
| Fee Verification | 10/24/2003 | 2 | 10/26/2003 | | Sufficient Fee | 10/26/2003 |
| Completeness Review | 10/24/2003 | 30 | 11/23/2003 | | Incomplete | 11/14/2003 |
| RESET CLOCK | 11/14/2003 | 1 | 11/15/2003 | | Done | 11/14/2003 |
| Awaiting Additional Information | 11/14/2003 | 45 | 12/29/2003 | | Received | 12/31/2003 |
| Completeness Review | 12/31/2003 | 30 | 01/30/2004 | | Complete | 12/31/2003 |
| Determine Agency Action | 12/31/2003 | 90 | 03/30/2004 | | Issue | 02/09/2004 |
| Issue Final Permit | 02/09/2004 | 14 | 02/23/2004 | | Issued | 02/09/2004 |
| ISSUE PERMIT | 02/09/2004 | 1 | 02/10/2004 | | Issued | 02/09/2004 |
| STOP CLOCK | 02/09/2004 | 1 | 02/10/2004 | | Done | 02/09/2004 |
| ARMS Data Entry | 02/09/2004 | 40 | 03/20/2004 | 23 | Pending Done | 2/26/04 JZ |

entered
2/27/04

Permitting Application - Events

Events Scheduled

51 of 90

AIRS ID: 1190030 Site Name: CHARLOTTE PIPE & FOUNDRY/PLASTIC DIV

Permit #: 1190030-004-AO Type/Subtype: AO / 00 Received: 10/24/2003

Project #: 004 Project Name: (OPERATING PERMIT)

> ARMS Data Entry: Done

| Event | Begin Date | Period | Due Date | Rmn | Status | End Date |
|---------------------------------|------------|--------|------------|-----|----------------|------------|
| Receive Request | 10/24/2003 | 1 | 10/25/2003 | | Done | 10/24/2003 |
| Fee Verification | 10/24/2003 | 2 | 10/26/2003 | | Sufficient Fee | 10/26/2003 |
| Completeness Review | 10/24/2003 | 30 | 11/23/2003 | | Incomplete | 11/14/2003 |
| RESET CLOCK | 11/14/2003 | 1 | 11/15/2003 | | Done | 11/14/2003 |
| Awaiting Additional Information | 11/14/2003 | 45 | 12/29/2003 | | Received | 12/31/2003 |
| Completeness Review | 12/31/2003 | 30 | 01/30/2004 | | Complete | 12/31/2003 |
| Determine Agency Action | 12/31/2003 | 90 | 03/30/2004 | | Issue | 02/09/2004 |
| Issue Final Permit | 02/09/2004 | 14 | 02/23/2004 | | Issued | 02/09/2004 |
| ISSUE PERMIT | 02/09/2004 | 1 | 02/10/2004 | | Issued | 02/09/2004 |
| STOP CLOCK | 02/09/2004 | 1 | 02/10/2004 | | Done | 02/09/2004 |
| ARMS Data Entry | 02/09/2004 | 40 | 03/20/2004 | | Done | 02/26/2004 |

MEMORANDUM

TO: Jerry Kissel, P.E.
District Air Program Administrator

DATE: 01/15/2004

Through: Jason Waters, Air Permit Supervisor

FROM: Jose G. Zornitta *JGZ*
Air Permit Engineer

SUBJECT: Company: Charlotte Pipe and Foundry Company
Permit No: 1190030-004-AO
County: Sumter
Project: Initial Operation Permit
Day 90: 03/30/2004

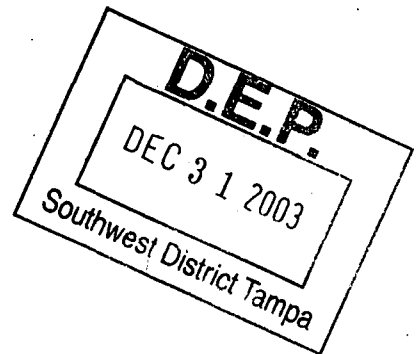
I recommend the issuance of the Initial Operating Permit No. 1190030-004-AO for the *pipe mfg*, ~~synthetically limited minor source recreational vehicle service and painting facility currently~~ located at County Road 124A, Wildwood, Sumter County, FL 34785.

The operation permit content does contain some minor changes from the construction permit to reflect updated rule quotes and language. The style has also been changed to conform to our current permit writing pattern.

VIA FEDEX

December 30, 2003

Mr. Jose G. Zornitta
Florida Department of Environmental Protection
Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619



RE: Charlotte Pipe and Foundry Company – Wildwood, Florida
Reference Permit No. 1190030-004-AO
DEP File No. 1190030

Dear Mr. Zornitta:

On behalf of Charlotte Pipe and Foundry Company (CPFC), Aware Environmental[®] Inc. (AEI) is submitting the following information required to continue processing the current Air Operating Permit Application for the CPFC Wildwood, Florida facility.

CPFC received a Request For Additional Information (RAI) from your office dated November 14, 2003. The RAI requested that CPFC resubmit an updated Attachment A of the original Air Operating Permit Application so that it includes updated facility emissions information. The following emissions information has been updated and included in Attachment A that follows:

- Attachment A of the Air Operating Permit Application previously stated that the emission factor(s) utilized by CPFC to quantify emissions from their material transfer stations and storage silos were obtained from Table 8.10-1 from the USEPA's AP-42. Attachment A has been revised to state that the emission factor(s) utilized by the facility to quantify emissions from their material transfer stations and storage silos were obtained from Table 11.12-2 from the USEPA's AP-42;
- The emission factors and reference material previously used to quantify particulate matter emissions from CPFC's material transfer stations and storage silos came from the USEPA's AP-42. These emission factors have since been updated and the updated emission factors and calculations, along with all related documents have been included in Attachment A; and
- The emission factor used to quantify emissions from CPFC's material recycling activities was previously obtained from an older version of the USEPA's Factor Retrieval Information System (FIRE). The emission factor has been replaced using an updated emission factor from Table 8.12-3 from the USEPA's AP-42, and the updated emission factor and calculations, along with all related documents have been included in Attachment A.

CPFC and AEI greatly appreciate your time in reviewing the attached information. If you have any questions, or need any additional information, please call me at (704) 815-1686 or Mr. Reese Sumrall of CPFC at (704) 291-3211.

Sincerely,

AWARE Environmental ® Inc.

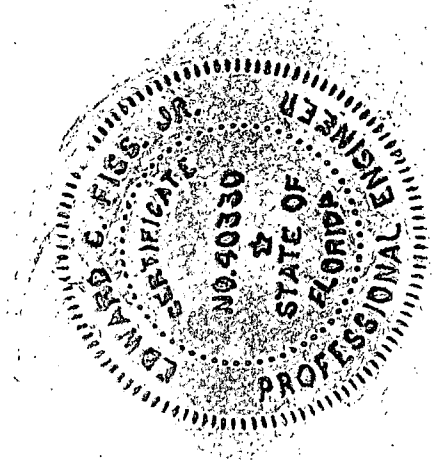


James Neubauer
Scientist

Approved by:

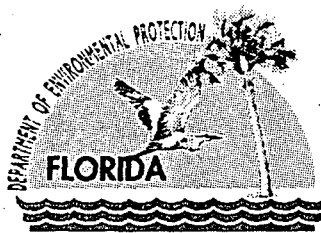


Edward C. Fiss, Jr., P.E.



cc: File
R. Sumrall, CPFC
Z. Young, CPFC
N. Fiss, AWARE
M. Smith, AWARE

188531004



Jeb Bush
Governor

Department of Environmental Protection

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

David B. Struhs
Secretary

November 14, 2003

Mr. James Neubauer, Scientist
Aware Environmental[®], Incorporated
9305 Monroe Road, Suite J
Charlotte, NC 28270

Dear Mr. Neubauer:

Re: Application dated October 24, 2003 (Charlotte Pipe and Foundry Company)
Reference Permit No. 1190030-004-AO
DEP File No. 1190030

On October 24th, the Department received your air operating permit application for Charlotte Pipe and Foundry Company. In order to continue processing the application, the Department will need the following additional information pursuant to Rules 62-4.55 and 62-4.070(1), F.A.C.:

- **PM Emission Factor(s): Material Transfer Stations and Storage Silos**
 - Attachment A (Emission Calculations and Emission Factor Selection) of the application states the emission factor(s) utilized by the facility to quantify emissions for their material transfer stations and storage silos were obtained from Table 8.10-1 of the USEPA's AP-42, *Compilation of Air Pollutant Emission Factors* for concrete batching operations. Table 8.10-1 relates to Sulfur Dioxide Emission Factors for Sulfuric Acid Plants and not concrete batching operations as stated in the attachment. As part of your documentation for using the concrete batching plant emission factor(s) developed in AP-42, you submitted a copy of Table 11.12-2 (Emission Factors for Concrete Batching) which is the appropriate table reference. The Department assumes that you actually meant to quote Table 11.12-2 instead of Table 8.10-1.
 - Emission factors for concrete batching found in the USEPA's AP-42 reference manual have been revised (10/01) [the most recent version of AP-42 can be found at <http://www.epa.gov/ttn/chief/software/airchief/index.html> - a copy of Section 11.12 Concrete Batching has been attached for your reference]. The emission factors and reference material used to quantify your facility's emissions come from an older version of AP-42 (1995). Please resubmit Attachment A [including all related documents] incorporating the updated emission factors.

"More Protection, Less Process"

Printed on recycled paper.

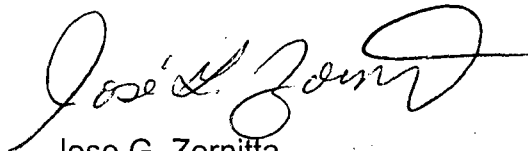
- **PM Emission Factor(s): Sodium Carbonate**

- Attachment A (Emission Calculations and Emission Factor Selection) of the application states the emission factor utilized to quantify emissions from CPFC's material recycling activities was obtained from USEPA's Factor Information Retrieval System (FIRE). It appears that the emission factor used comes from an older version of FIRE. The most recent version of FIRE can be found at <http://www.epa.gov/ttn/chief/software/fire/index.html>. Please ensure that the most up-to-date emission factor is being utilized to quantify the facility's emission(s). Resubmit data, including calculations, to reflect the most current emission factor.

NOTE – Rule 62-4.050(3), F.A.C. requires applications of this type must be certified by a professional engineer registered in the State of Florida. This requirement also applies to responses to Department requests for additional information of an engineering nature. Therefore, your response to the above requests should be certified by a professional engineer. Please note that per Rule 62-4.055(1), F.A.C.: "The applicant shall have ninety (90) days after the Department mails a timely request for additional information to submit that information to the Department. Failure of an applicant to provide the timely requested information by the applicable date shall result in denial of the application."

Your response should be submitted by February 14, 2004. If you have any questions please contact me at (813) 744-6100 extension 117.

Sincerely,



Jose G. Zornitta
Air Permitting Engineer

JZ\

Attachments

cc: Mr. Reese Sumrall, Jr., Owner/Authorized Representative, Charlotte Pipe and Foundry Company – Plastics Division, 4210 Old Charlotte Highway, Monroe, NC 28110

" More Protection, Less Process "

Printed on recycled paper.

11.12 CONCRETE BATCHING

11.12-1 Process Description¹⁻⁵

Concrete is composed essentially of water, cement, sand (fine aggregate) and coarse aggregate. Coarse aggregate may consist of gravel, crushed stone or iron blast furnace slag. Some specialty aggregate products could be either heavyweight aggregate (of barite, magnetite, limonite, ilmenite, iron or steel) or lightweight aggregate (with sintered clay, shale, slate, diatomaceous shale, perlite, vermiculite, slag, pumice, cinders, or sintered fly ash). Supplementary cementing materials, also called mineral admixtures or pozzolan materials may be added to make the concrete mixtures more economical, reduce permeability, increase strength, or influence other concrete properties. Typical examples are natural pozzolans, fly ash, ground granulated blast-furnace slag, and silica fume, which can be used individually with portland or blended cement or in different combinations. Chemical admixtures are usually liquid ingredients that are added to concrete to entrain air, reduce the water required to reach a required slump, retard or accelerate the setting rate, to make the concrete more flowable or other more specialized functions.

Approximately 75 percent of the U. S. concrete manufactured is produced at plants that store, convey, measure and discharge these constituents into trucks for transport to a job site. At most of these plants, sand, aggregate, cement and water are all gravity fed from the weigh hopper into the mixer trucks. The concrete is mixed on the way to the site where the concrete is to be poured. At some of these plants, the concrete may also be manufactured in a central mix drum and transferred to a transport truck. Most of the remaining concrete manufactured are products cast in a factory setting. Precast products range from concrete bricks and paving stones to bridge girders, structural components, and panels for cladding. Concrete masonry, another type of manufactured concrete, may be best known for its conventional 8 x 8 x 16-inch block. In a few cases, concrete is dry batched or prepared at a building construction site. Figure 11.12-1 is a generalized process diagram for concrete batching.

The raw materials can be delivered to a plant by rail, truck or barge. The cement is transferred to elevated storage silos pneumatically or by bucket elevator. The sand and coarse aggregate are transferred to elevated bins by front end loader, clam shell crane, belt conveyor, or bucket elevator. From these elevated bins, the constituents are fed by gravity or screw conveyor to weigh hoppers, which combine the proper amounts of each material.

11.12-2 Emissions and Controls⁶⁻⁸

Particulate matter, consisting primarily of cement and pozzolan dust but including some aggregate and sand dust emissions, is the primary pollutant of concern. In addition, there are emissions of metals that are associated with this particulate matter. All but one of the emission points are fugitive in nature. The only point sources are the transfer of cement and pozzolan material to silos, and these are usually vented to a fabric filter or "sock". Fugitive sources include the transfer of sand and aggregate, truck loading, mixer loading, vehicle traffic, and wind erosion from sand and aggregate storage piles. The amount of fugitive emissions generated during the transfer of sand and aggregate depends primarily on the surface moisture content of these materials. The extent of fugitive emission control varies widely from plant to plant. Particulate emission factors for concrete batching are given in Tables 11.12-1 and 11.12-2. Particulate emission factors per yard of concrete for an average batch formulation at a typical facility are given in Tables 11.12-3 and 11.12-4. Metals emission factors for concrete batching are given in Tables 11.12-5 and 11.12-6.

Types of controls used may include water sprays, enclosures, hoods, curtains, shrouds, movable and telescoping chutes, and the like. A major source of potential emissions, the movement of heavy trucks over unpaved or dusty surfaces in and around the plant, can be controlled by good maintenance and wetting of the road surface.

Predictive equations that allow for emission factor adjustment based on plant specific conditions are given in Chapter 13. Whenever plant specific data are available, they should be used in lieu of the fugitive emission factors presented in Table 11.12-1 through 11.12-4.

Figure 11.12-1. Typical Concrete Batching Process.

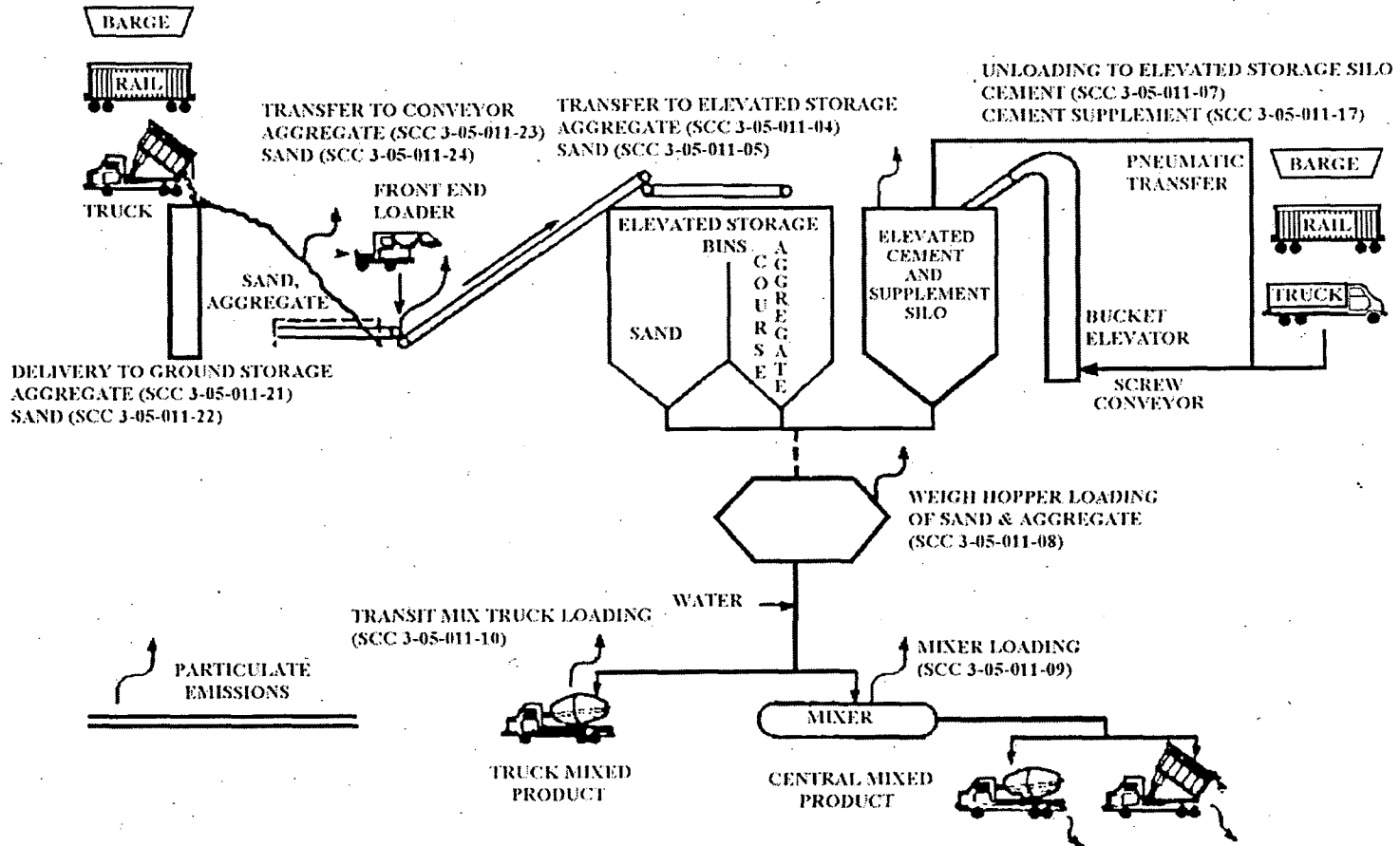


TABLE 11.12-1 (METRIC UNITS)
EMISSION FACTORS FOR CONCRETE BATCHING ^a

| Source (SCC) | Uncontrolled | | | | Controlled | | | |
|---|--------------------------|------------------------------|----------------|------------------------------|-------------|------------------------------|----------------|------------------------------|
| | Total PM | EMISSION FACTOR RATING | Total PM-10 | EMISSION FACTOR RATING | Total PM | EMISSION FACTOR RATING | Total PM-10 | EMISSION FACTOR RATING |
| Aggregate transfer ^b (3-05-011-04, -21, 23) | 0.0035 | D | 0.0017 | D | ND | | ND | |
| Sand transfer ^b (3-05-011-05, -22, -24) | 0.0011 | D | 0.00051 | D | ND | | ND | |
| Cement unloading to elevated storage silo (pneumatic) ^c (3-05-011-07) | 0.36 | E | 0.23 | E | 0.00050 | D | 0.00017 | D |
| Cement supplement unloading to elevated storage silo (pneumatic) ^d (3-05-011-17) | 1.57 | E | 0.65 | E | 0.0045 | D | 0.0024 | E |
| Weigh hopper loading ^e (3-05-011-08) | 0.0026 | D | 0.0013 | D | ND | | ND | |
| Mixer loading (central mix) ^f (3-05-011-09) | 0.11 | E | 0.039 | E | 0.0056 | E | 0.0019 | E |
| Truck loading (truck mix) ^g (3-05-011-10) | 0.31 | D | 0.075 | D | 0.10 | D | 0.025 | D |
| Vehicle traffic (paved roads) | See AP-42 Section 13.2.1 | | | | | | | |
| Vehicle traffic (unpaved roads) | See AP-42 Section 13.2.2 | | | | | | | |
| Wind erosion from aggregate and sand storage piles | See AP-42 Section 13.2.5 | | | | | | | |

ND = No data.

- ^a All emission factors are in kg of pollutant per Mg of material loaded unless noted otherwise. Loaded material includes course aggregate, sand, cement, cement supplement and the surface moisture associated with these materials. The average material composition of concrete batches presented in references 9 and 10 was 846 kg course aggregate, 648 kg sand, 223 kg cement and 33 kg cement supplement. Approximately 75 liters of water was added to this solid material to produce 1826 kg of concrete.
- ^b Reference 9 and 10. Emission factors are based upon an equation from AP-42, Section 13.2.2, with $k_{PM-10} = .35$, $k_{PM} = .74$, $U = 10$ mph, $M_{aggregate} = 1.77\%$, and $M_{sand} = 4.17\%$. The moisture contents of the materials ($M_{aggregate}$ and M_{sand}) are the averages of the values obtained from Reference 9 and Reference 10.
- ^c The uncontrolled PM & PM-10 emission factors were developed from Reference 9. The controlled emission factor for PM was developed from References 9, 10, 11 and 12. The controlled emission factor for PM-10 was developed from References 9 and 10.
- ^d The controlled PM emission factor was developed from Reference 10 and Reference 12, whereas the controlled PM-10 emission factor was developed from only Reference 10.
- ^e Emission factors were developed by using the Aggregate and Sand Transfer Emission Factors in conjunction with the ratio of aggregate and sand used in an average yard³ of concrete. The unit for these emission factors is kg of pollutant per Mg of aggregate and sand.
- ^f Reference 9. The emission factor units are kg of pollutant per Mg of cement and cement supplement. Emission factors were developed from a typical central mix operation. The average estimate of the percent of emissions captured during each test run is 94%.
- ^g Reference 9 and 10. The emission factor units are kg of pollutant per Mg of cement and cement supplement. Emission factors were developed from two typical truck mix loading operations. Based upon visual observations of every loading operation during the two test programs, the average capture efficiency during the testing was 71%.

TABLE 11.12-2 (ENGLISH UNITS)
EMISSION FACTORS FOR CONCRETE BATCHING ^a

| Source (SCC) | Uncontrolled | | | | Controlled | | | |
|---|--------------------------|------------------------------|----------------|------------------------------|-------------|------------------------------|----------------|------------------------------|
| | Total PM | EMISSION FACTOR RATING | Total PM-10 | EMISSION FACTOR RATING | Total PM | EMISSION FACTOR RATING | Total PM-10 | EMISSION FACTOR RATING |
| Aggregate transfer ^b (3-05-011-04, 21, 23) | 0.0069 | D | 0.0033 | D | ND | | ND | |
| Sand transfer ^b (3-05-011-05, 22, 24) | 0.0021 | D | 0.00099 | D | ND | | ND | |
| Cement unloading to elevated storage silo (pneumatic) ^c (3-05-011-07) | 0.72 | E | 0.46 | E | 0.00099 | D | 0.00034 | D |
| Cement supplement unloading to elevated storage silo (pneumatic) ^d (3-05-011-17) | 3.14 | E | 1.10 | E | 0.0089 | D | 0.0049 | E |
| Weigh hopper loading ^e (3-05-011-08) | 0.0051 | D | 0.0024 | D | ND | | ND | |
| Mixer loading (central mix) ^f (3-05-011-09) | 0.22 | E | 0.078 | E | 0.011 | E | 0.0038 | E |
| Truck loading (truck mix) ^g (3-05-011-10) | 0.61 | D | 0.15 | D | 0.21 | D | 0.051 | D |
| Vehicle traffic (paved roads) | See AP-42 Section 13.2.1 | | | | | | | |
| Vehicle traffic (unpaved roads) | See AP-42 Section 13.2.2 | | | | | | | |
| Wind erosion from aggregate and sand storage piles | See AP-42 Section 13.2.5 | | | | | | | |

ND = No data.

- ^a All emission factors are in lb of pollutant per ton of material loaded unless noted otherwise. Loaded material includes course aggregate, sand, cement, cement supplement and the surface moisture associated with these materials. The average material composition of concrete batches presented in references 9 and 10 was 1865 lbs course aggregate, 1428 lbs sand, 491 lbs cement and 73 lbs cement supplement. Approximately 20 gallons of water was added to this solid material to produce 4024 lbs (one cubic yard) of concrete.
- ^b Reference 9 and 10. Emission factors are based upon an equation from AP-42 Section 13.2.2, with $k_{PM-10} = .35$, $k_{PM} = .74$, $U = 10$ mph, $M_{aggregate} = 1.77\%$, and $M_{sand} = 4.17\%$. The moisture contents of the materials ($M_{aggregate}$ and M_{sand}) are the averages of the values obtained from Reference 9 and Reference 10.
- ^c The uncontrolled PM & PM-10 emission factors were developed from Reference 9. The controlled emission factor for PM was developed from References 9, 10, 11 & 12. The controlled emission factor for PM-10 was developed from References 9 and 10.
- ^d The controlled PM emission factor was developed from Reference 10 and Reference 12, whereas the controlled PM-10 emission factor was developed from only Reference 10.
- ^e Emission factors were developed by using the Aggregate and Sand Transfer Emission Factors in conjunction with the ratio of aggregate and sand used in an average yard³ of concrete. The unit for these emission factors is lb of pollutant per ton of aggregate and sand.
- ^f Reference 9. The unit for the emission factors are lb of pollutant per ton of cement and cement supplement. Emission factors were developed from a typical central mix operation. The average of the estimates of the percent of emissions captured during each test run is 94%.
- ^g Reference 9 and 10. The emission factor units are lb of pollutant per ton of cement and cement supplement. Emission factors were developed from two typical truck mix loading operations. Based upon visual observations of every loading operation during the two test programs, the average capture efficiency during the testing was 71%.

TABLE 11.12-3 (ENGLISH UNITS)
PLANT WIDE EMISSION FACTORS PER YARD OF TRUCK MIX CONCRETE ^a

| | Uncontrolled | | Controlled | |
|---|-----------------------------|--------------------------------|-----------------------------|--------------------------------|
| | PM (lb/yd ³) | PM-10 (lb/yd ³) | PM (lb/yd ³) | PM-10 (lb/yd ³) |
| Aggregate delivery to ground storage (3-05-011-21) | 0.0064 | 0.0031 | 0.0064 | 0.0031 |
| Sand delivery to ground storage (3-05-011-22) | 0.0015 | 0.0007 | 0.0015 | 0.0007 |
| Aggregate transfer to conveyor (3-05-011-23) | 0.0064 | 0.0031 | 0.0064 | 0.0031 |
| Sand transfer to conveyor (3-05-011-24) | 0.0015 | 0.0007 | 0.0015 | 0.0007 |
| Aggregate transfer to elevated storage (3-05-011-04) | 0.0064 | 0.0031 | 0.0064 | 0.0031 |
| Sand transfer to elevated storage (3-05-011-05) | 0.0015 | 0.0007 | 0.0015 | 0.0007 |
| Cement delivery to Silo (3-05-011-07 controlled) | 0.0002 | 0.0001 | 0.0002 | 0.0001 |
| Cement supplement delivery to Silo (3-05-011-17 controlled) | 0.0003 | 0.0002 | 0.0003 | 0.0002 |
| Weigh hopper loading (3-05-011-08) | 0.0079 | 0.0038 | 0.0079 | 0.0038 |
| Truck mix loading (3-05-011-10) | 0.17 | 0.042 | 0.058 | 0.014 |
| Total Facility (3-05-011-01) | 0.20 | 0.058 | 0.090 | 0.030 |

TABLE 11.12-4 (ENGLISH UNITS)
PLANT WIDE EMISSION FACTORS PER YARD OF CENTRAL MIX CONCRETE ^a

| | Uncontrolled | | Controlled | |
|---|-----------------------------|--------------------------------|-----------------------------|--------------------------------|
| | PM (lb/yd ³) | PM-10 (lb/yd ³) | PM (lb/yd ³) | PM-10 (lb/yd ³) |
| Aggregate delivery to ground storage (3-05-011-21) | 0.0064 | 0.0031 | 0.0064 | 0.0031 |
| Sand delivery to ground storage (3-05-011-22) | 0.0015 | 0.0007 | 0.0015 | 0.0007 |
| Aggregate transfer to conveyor (3-05-011-23) | 0.0064 | 0.0031 | 0.0064 | 0.0031 |
| Sand transfer to conveyor (3-05-011-24) | 0.0015 | 0.0007 | 0.0015 | 0.0007 |
| Aggregate transfer to elevated storage (3-05-011-04) | 0.0064 | 0.0031 | 0.0064 | 0.0031 |
| Sand transfer to elevated storage (3-05-011-05) | 0.0015 | 0.0007 | 0.0015 | 0.0007 |
| Cement delivery to Silo (3-05-011-07 controlled) | 0.0002 | 0.0001 | 0.0002 | 0.0001 |
| Cement supplement delivery to Silo (3-05-011-17 controlled) | 0.0003 | 0.0002 | 0.0003 | 0.0002 |
| Weigh hopper loading (3-05-011-08) | 0.0079 | 0.0038 | 0.0079 | 0.0038 |
| Central mix loading (3-05-011-09) | 0.063 | 0.022 | 0.0031 | 0.0011 |
| Total Facility (3-05-011-01) | 0.095 | 0.037 | 0.036 | 0.017 |

^a Total facility emissions do not include road dust and wind blown dust. Based upon emission factors presented in Table 11.12-2 and the following composition of one yard of concrete

| | |
|-------------------|--------------|
| Coarse Aggregate | 1865. pounds |
| Sand | 1428. pounds |
| Cement | 491. pounds |
| Cement Supplement | 73. pounds |
| Water | 20. gallons |

TABLE 11.12-5 (METRIC UNITS)
CONCRETE BATCH PLANT METAL EMISSION FACTORS ^a

| | Arsenic | Beryllium | Cadmium | Chromium | Lead | Manganese | Nickel | Phosphorus | Selenium | EMISSION FACTOR RATING |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------------------|
| Cement Silo Filling ^b (SCC 3-05-011-07) w/ Fabric Filter | 8.38e-07 2.12e-09 | 8.97e-09 2.43e-10 | 1.17e-07 2.43e-10 | 1.26e-07 1.45e-08 | 3.68e-07 5.46e-09 | 1.01e-04 5.87e-08 | 8.83e-06 2.09e-08 | 5.88e-05 ND | ND ND | E E |
| Cement Supplement Silo Filling ^c (SCC 3-05-011-17) w/ Fabric Filter | ND 5.02e-07 | ND 4.52e-08 | ND 9.92e-09 | ND 6.10e-07 | ND 2.60e-07 | ND 1.28e-07 | ND 1.14e-06 | ND 1.77e-06 | ND 3.62e-08 | E E |
| Central Mix Batching ^c (SCC 3-05-011-09) w/ Fabric Filter | 1.16e-07 9.35e-09 | ND ND | 5.92e-09 3.55e-10 | 7.11e-07 6.34e-08 | 1.91e-07 1.83e-08 | 3.06e-05 1.89e-06 | 1.64e-06 1.24e-07 | 1.01e-05 6.04e-07 | ND ND | E E |
| Truck Loading ^g (SCC 3-05-011-10) w/ Fabric Filter | 1.52e-06 5.80e-07 | 1.22e-07 5.18e-08 | 1.71e-08 4.53e-09 | 5.71e-06 2.05e-06 | 1.81e-06 7.67e-07 | 3.06e-05 1.04e-05 | 5.99e-06 2.39e-06 | 1.92e-05 6.16e-06 | 1.31e-06 5.64e-08 | E E |

ND = No data.

^a All emission factors are in kg of pollutant per Mg of material loaded unless noted otherwise. The average solid material composition of concrete batches presented in references 9 and 10 was 846 kg course aggregate, 648 kg sand, 223 kg cement and 33 kg cement supplement. Approximately 75 liters of water was added to this solid material to produce 1826 kg of concrete.

^b The uncontrolled emission factors were developed from Reference 8. The controlled emission factors were developed from Reference 9 and 10. Although controlled emissions of phosphorous compounds were below detection, it is reasonable to assume that the effectiveness is comparable to the average effectiveness (98%) for the other metals.

^c Reference 10.

^d Reference 9. The emission factor units are kg of pollutant per Mg of cement and cement supplement. Emission factors were developed from a typical central mix operation. The average estimate of the percent of emissions captured during each test run is 94%.

^e Reference 9 and 10. The emission factor units are kg of pollutant per Mg of cement and cement supplement. Emission factors were developed from two typical truck mix loading operations. Based upon visual observations of every loading operation during the two test programs, the average capture efficiency during the testing was 71%.

TABLE 11.12-6 (ENGLISH UNITS)
CONCRETE BATCH PLANT METAL EMISSION FACTORS^a

| | Arsenic | Beryllium | Cadmium | Chromium | Lead | Manganese | Nickel | Phosphorus | Selenium | EMISSION FACTOR RATING |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------------------------------|
| Cement Silo Filling ^b (SCC 3-05-011-07) w/ Fabric Filter | 1.68e-06 4.24e-09 | 1.79e-08 4.86e-10 | 2.34e-07 4.86e-10 | 2.52e-07 2.90e-08 | 7.36e-07 1.09e-08 | 2.02e-04 1.17e-07 | 1.76e-05 4.18e-08 | 1.18e-05 ND | ND ND | E E |
| Cement Supplement Silo Filling ^c (SCC 3-05-011-17) w/ Fabric Filter | ND 1.00e-06 | ND 9.04e-08 | ND 1.98e-08 | ND 1.22e-06 | ND 5.20e-07 | ND 2.56e-07 | ND 2.28e-06 | ND 3.54e-06 | ND 7.24e-08 | E E |
| Central Mix Batching ^d (SCC 3-05-011-09) w/ Fabric Filter | 2.32e-07 1.87e-08 | ND ND | 1.18e-08 7.10e-10 | 1.42e-06 1.27e-07 | 3.82e-07 3.66e-08 | 6.12e-05 3.78e-06 | 3.28e-06 2.48e-07 | 2.02e-05 1.20e-06 | ND ND | E E |
| Truck Loading ^e (SCC 3-05-011-10) w/ Fabric Filter | 3.04e-06 1.16e-06 | 2.44e-07 1.04e-07 | 3.42e-08 9.06e-09 | 1.14e-05 4.10e-06 | 3.62e-06 1.53e-06 | 6.12e-05 2.08e-05 | 1.19e-05 4.78e-06 | 3.84e-05 1.23e-05 | 2.62e-06 1.13e-07 | E E |

ND = No data.

^a All emission factors are in lb of pollutant per ton of material loaded unless noted otherwise. The average material composition of concrete batches presented in references 9 and 10 was 1865 lbs course aggregate, 1428 lbs sand, 491 lbs cement and 73 lbs cement supplement.

Approximately 20 gallons of water was added to this solid material to produce 4024 lbs (one cubic yard) of concrete.

^b The uncontrolled emission factors were developed from Reference 8. The controlled emission factors were developed from Reference 9 and 10. Although controlled emissions of phosphorous compounds were below detection, it is reasonable to assume that the effectiveness is comparable to the average effectiveness (98%) for the other metals.

^c Reference 10.

^d Reference 9. The unit for the emission factors are lb of pollutant per ton of cement and cement supplement. Emission factors were developed from a typical central mix operation. The average of the estimates of the percent of emissions captured during each test run is 94%.

^e Reference 9 and 10. The emission factor units are lb of pollutant per ton of cement and cement supplement. Emission factors were developed from two typical truck mix loading operations. Based upon visual observations of every loading operation during the two test programs, the average capture efficiency during the testing was 71%.

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