AP42 Section:	4.4
Related:	17
Title:	Composites Open Molding Emission Factor Consensus Process Canvasse and Ballot signed by Ron Ryan Apr-03

will soon be
CFA ACMA
American Composites Manufacturers Association
Strengthening the Voice of Composites

April 21, 2003

Ron Ryan
US EPA
D205-01
Research Triangle Park, NC 27711

Dear Ron;

I am writing to determine if you are interested in participating in a new consensus process for managing the composites open molding emission factor database.

As you may know, EPA's AP-42 emission factors long served as the best source of information about emissions from composites manufacturing operations. However, starting in 1997, new information developed by EPA and industry revealed that the AP-42 factors for open molding may not have provided accurate emission estimates for many open molding processes, and in March, 1998, EPA withdrew the AP-42 factors for open molding.

Since that time, regulators and industry have relied on ACMA's (formerly CFA) Unified Emission Factors to estimate emissions from the composites open molding industry. The UEF are based on a large number of carefully controlled studies, and have been extensively verified by comparison to actual stack tests. The UEF system is comprised of procedures for emission testing and data analysis, as well as the database of emission factors.

ACMA recently decided to propose the UEF system for approval as an American National Standard (ANS). The proposed UEF ANS would be subjected to a "consensus process" accredited by the American National Standards Institute. Using an ANSI-accredited consensus process to manage the UEF will increase the openness and transparency of the UEF system, and make the UEF more acceptable for use in many regulatory contexts. The consensus process would utilize the ANSI-approved consensus procedures of the International Cast Polymer Alliance (ICPA) of the ACMA. The resultant document would be entitled "Standard for Unified Emission Factors for Reinforced Plastics/Composites Manufacturing."

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Visit our Web Site at: www.cfa-hq.org

We are starting the process of gaining consensus approval of the existing UEF system. The process will work as follows:

1. The first step will be to assemble a list of "interested canvassees," comprised of a balance of regulators, composite molders, material/equipment suppliers, consultants and other interested parties.
2. Upon receipt of the list of potential canvassees, ANSI shall announce the initiation of the canvass in *Standards Action* to elicit additional canvassees.
3. The secretariat of the consensus process (a member of the ACMA technical staff) will send the current UEF system to the canvassees for ballot. This will include the procedures used for emission tests, the data analysis procedures, and the existing emission factor database.
4. The canvassees will review the materials and vote to approve, approve with comments, abstain or disapprove, with reasons, the proposed standard..
5. The ACMA technical staff will review the comments, and work with the canvassees and any commentors from the ANSI public review to address any identified shortcomings with the current UEF system.
6. Once all issues have been addressed, the UEF system with the current factors will be submitted to ANSI for approval as an American National Standard.
7. Proposed revisions to the UEF will be handled in the same manner

Please consider helping us manage the UEF system by serving as a canvassee. You can indicate your willingness to serve by completing the form below and returning it as directed.

Thank you for your consideration of this request. Please do not hesitate to call me should you have any questions or comments.

Sincerely,

John Schweitzer

John Schweitzer
Senior Director of Government Affairs
734.622.0162 - jschweitzer@acmanet.org

I agree to serve as a canvassee for the composites open molding emission factor consensus process.

Name: Ronald Ryan

Organization: USEPA

Mailing address: D205-01

Research Triangle Park, NC 27711

Phone: 919-541-4330

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Classification (check one): Molder; Material/Equipment Supplier;

✓ ~~Government~~ Regulator; Other

Signature: Ronald Ryan

Date: 5-29-2003

Please suggest other potential canvassees:

Name:

Organization:

Mailing address:

Phone:

Fax:

E-mail:

Return this form to Larry Craigie, ACMA, fax 703.525.0743, or provide the requested information by email to ~~lcraigie@acmanet.org~~.

5/30/03 9:53am

PROPOSED STANDARD

ACMA Ballot # 04-01

Closing Date: April 5, 2004
Date Mailed: February 20, 2004

To: Canvassees of the ACMA Standard for Estimating Emission from Open Molding Composite Processes

Item: Definitions used in the standard for Estimating Emissions from Open Molding Processes

Attachments:

The following documents are available at www.acmanet.org/ga/ansi.cfm
BSR/ACMA/ICPA/UEF-1 Ballot (Revised standard (Revision 2.0)).
Original proposed standard BSR/ACMA/ICPA/UEF-1 (for reference only (Revision 1.0)) and attachments
Comments received from ballot 03-01and responses to the comments

Staff Note: The ACMA ballot 03-01 was approved with 14 approved and 11 approved with comment. Other than a few comments to make editorial changes, all of the comments concerned the definitions. There were some duplicates, some were missing, and others needed to be changed. To address these comments, substantive changes were made. The new document will need to be considered.

1) Vote
- [✓] Approved
- [] Approved with comments
- [] Not approved with reason – Comments Required
- [] Abstain with reason – Comments Required

2) Comments

3) Signature Ronald Ryan Date Signed 4-5-2004

Print Name Ronald Ryan

4) Return Ballot to:

Larry Craigie, CCT
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1.0 Introduction

From 1996 through 1998, the American Composites Manufacturers Association, (ACMA) formerly named the Composites Fabricators Association (CFA), conducted styrene emissions testing. The ACMA testing program consisted of three test phases, which investigated the effects of process parameters on the styrene emissions from the open molding of composites. The test protocol used in the ACMA testing is described in the November 18, 1998 ACMA report entitled "*Styrene Emissions Test Protocol & Facility Certification Procedures, Revision 2.1.*" The results of the ACMA Phase I testing are detailed in the September, 1996 CFA report entitled "*Phase I - Baseline Study; Hand Lay-up, Gel Coating, Spray Lay-up including Optimization Study.*" The results of the ACMA Phase II and III testing are detailed in the report "*Technical Discussion of the Unified Emission Factors for Open Molding of Composites.*"

On February 28, 1998, Engineering Environmental Consulting Services (EECS) released a report entitled "*CFA Emission Models for the Reinforced Plastics Industries*" that details a set of equations developed from the ACMA test data. These equations predicted the styrene emission rates from typical lamination processes employed by the reinforced plastics industry. The report was subsequently posted on the EPA CHIEF web site as a possible replacement for the obsolete AP-42 factors for reinforced plastics.

In 1997, the National Marine Manufacturers Association (NMMA) also conducted styrene emission testing using the CFA test protocol. The results of this testing are described in the August 1997 NMMA report entitled "*Baseline Characterization of Emissions from Fiberglass Boat Manufacturing.*" The NMMA report was also posted on the EPA CHIEF web site as part of the AP-42 replacement process.

In November 1998, the CFA and NMMA agreed to merge the data from their respective test programs. The merged data sets were used to develop a new set of equations and factors that unify the methodology employed by boat builders and non-boat builders for estimating the VOC and HAP emissions from the open molding of composite parts. These new emission factors have been named the "Unified Emission Factors" (UEF).

The United Emission Factor Table is the base data for this standard.

2.0 Terms and Definitions

2.1 Atomized

Atomized spray is any kind of spray application that is not non-atomized spray, but typically includes Conventional Air Atomizing, High Pressure Airless, Air-Assisted Airless, and High Volume Low Pressure applicators.

2.2 Controlled Spray

Controlled Spray is a specific set of three work practices that can be used to reduce material usage, worker exposures, and emissions. The three work practices included in a Controlled Spray program are spray gun set-up and pressure calibration, training in proper spray techniques, and mold-perimeter containment flanges. A full program description and training materials for Controlled Spray can be obtained from the technical resources section at www.acmanet.org.

2.3 Covered Cure

Covered cure means the use of vacuum bagging or other technology where a plastic sheet is use to cover the mold after resin is applied. Covered cure techniques are typically used where higher physical properties of the product are required. Vacuum infusion and other processes where the mold is covered before resin is applied are not considered to be open molding processes.

2.4 Filament Application

Filament application is an open molding process for fabricating composites in which reinforcements are fed through a resin bath and wound onto a rotating mandrel. The materials on the mandrel may be rolled out or worked by using manual tools prior to curing. Resin application to the reinforcement on the mandrel by means other than a resin bath, such as spray guns, pressure-fed rollers, flow coaters, or brushes is not considered filament application.

2.5 Gel Coat Application

Gel Coat Application is a process where a clear or pigmented formulated resin is applied to the mold by mechanical applicators. The gel coat will become the visible side of the composite part. If the gel coat resin is applied using a manual application method, the resin is no longer considered a gel coat for emission calculations purposes and emissions should be calculated using the manual application factors.

2.6 Gel Coat Non-Atomized Application

Mechanical non-atomized application means (a) or (b)

(a) the use of a device for applying gel coat that a) has been provided by the device manufacturer with documentation showing that use of the device results in HAP emissions that are no greater than the emissions predicted by the applicable non-atomized application equation(s) in Table 1 to Subpart WWWW of Part 63 [the MACT rule]; and b) is operated according to the manufacturer's directions, including instructions to prevent the operation of the device at excessive spray pressures. Non-atomized application equipment includes flow coaters, flow choppers, low tip pressure spray applicators, and pressure-fed rollers.

(b) any spray application that meets the non-atomized definition in SCAQMD Rule 1162, the Indiana Styrene rule, or the US EPA MACT rule. Non-atomized spray includes both an equipment design requirement and certain essential work practice

requirements. The gun supplier and the applicable regulations specify the required work practices.

2.7 Manual

Manual (application) is any non-mechanical application (without pumps or pressurized material flow), and includes bucket-and-brush and bucket-and-roller.

2.8 Mechanical

Mechanical (application) means the use of pumps to deliver a pressurized stream of resin or gel coat to a mold through some kind of application device. Spray and non-spray are the two types of mechanical application.

2.9 Mechanical Atomized

Mechanical Atomized (application) means application of resin or gel coat with spray equipment that separates the liquid into a fine mist. This fine mist may be created by forcing the liquid under high pressure through an elliptical orifice, bombarding a liquid stream with directed air jets, or a combination of these techniques

2.10 Mechanical Atomized Control Spray

Mechanical Atomized Control Spray is the use of an atomized spray gun in combination with a Controlled Spray program

2.11 Mechanical non-atomized

Mechanical non-atomized (application) means (a) or (b)

(b) the use of a device for applying resin that a) has been provided by the device manufacturer with documentation showing that use of the device results in HAP emissions that are no greater than the emissions predicted by the applicable non-atomized application equation(s) in Table 1 to Subpart WWWW of Part 63 [the MACT rule]; and b) is operated according to the manufacturer's directions, including instructions to prevent the operation of the device at excessive spray pressures. Non-atomized application equipment includes flow coaters, flow choppers, low tip pressure spray applicators, and pressure-fed rollers.

(b) any spray application that meets the non-atomized definition in SCAQMD Rule 1162, the Indiana Styrene rule, or the US EPA MACT rule. Non-atomized spray includes both an equipment design requirement and certain essential work practice requirements. The gun supplier and the applicable regulations specify the required work practices.

2.12 Open Molding

Open molding is manual resin application, mechanical resin application, filament winding, and gel coat application. Resin Transfer molding (or other processes where resin is delivered in a closed or covered mold, pultrusion and compression molding are not open molding processes.

2.13 Roll-Out

Roll-out is the process used to compact and remove entrapped air from a laminate after the resin and reinforcement has been applied to a mold.

2.14 Spray

Spray means any material flow moving through the air to be deposited on a mold. Spray can be atomized or non-atomized.

2.15 Styrene Content

The styrene content of a resin or gel coat is the styrene content as applied, including any styrene added by the user. For non-gel coat resins the styrene content is calculated before any fillers or other non-styrene materials are added.

2.16 Vapor Suppressant

Vapor suppressant is an additive, typically a wax that migrates to the surface of the resin during curing and forms a barrier to seal in the styrene and reduce styrene emissions.

2.17 Vapor Suppressed Resin, VSR

VSR is a resin containing a vapor suppressant added for the purpose of reducing styrene emissions during curing

2.18 Vapor Suppressed Resin Reduction Factor

The VSR Reduction Factor is a measure of the efficiency of a suppressant with a resin. It is determined by testing each resin/suppressant formulation according to the test method found in The US EPA MACT rule, Appendix A to Subpart WWWW--Test M.

3.0 Instructions and Examples for the Emission Factor Table

A simple tabular format has been developed to encapsulate the new Emission Factor information on one sheet of paper. This tabular format is called the "EF Table 1."

This section contains instructions for using EF Table 1 to find the proper emission factor for a specific resin or gel coat material and application process.

3.1 How to find the proper emission factor using EF Table 1

Before using EF Table 1, the following information must be obtained:

a ***Styrene content of the resin/gel coat material***

The styrene content of the resin/gel coat materials can be obtained from the associated MSDS information, the Q/A certification sheet sent with most bulk resin shipments, or by calling the resin supplier or manufacturer. Occasionally, the MSDS will specify a broad range for the styrene content, such as 20 to 50% styrene by weight. This is a short-cut used by the resin supplier to avoid listing more specific information for each resin formulation. The average value for such a broad range (average 35% for the example above) should not be used. Instead, the resin supplier should be asked to provide more precise estimates of the actual monomer contents for each material.

b ***Application process used to apply the material***

The correct application process must be identified from the following major types; Manual, Mechanical Atomized, Mechanical Non-Atomized, Filament, or Gel coat Spraying.

c ***Vapor-suppressant data - the VSR reduction factor*** (if used)

Determine if vapor suppressant is added to the resin formulation. If so, the VSR reduction factor for that specific resin/suppressant mixture must be obtained from the resin supplier, or must be determined at the plant according to procedures detailed in the *Vapor Suppressant Effectiveness Test* (this test protocol can be found in Appendix A to Subpart WWWW – Test Method for Determining Vapor Suppressant Effectiveness, Federal Register Volume 68, No. 76.

d ***Special pollution prevention techniques*** (if used)

Determine if Controlled Spraying and/or Covered-Cure are used with any of the application processes.

e) With this information refer to EF Table 1.

1 Find the correct application process in the left-most column of EF Table 1.

2 Find the correct styrene content across the top row of EF Table 1.

3 *Locate the* cell at the intersection of the selected row and column. This cell contains the correct emission factor that corresponds to the application process and styrene content resin or gel coat selected. If the styrene content is below 33 percent, use the equation in the left-most column to compute emission factors. If the styrene content is above 50 percent, use the equation on the far right column to compute emission factors. For both equations the styrene content value should be expressed as a decimal fraction, i.e. where the equation calls for "52%" use "0.52".

4 (For vapor-suppressed resins) If a vapor suppressed resin is used, first determine the factor as if the resin was non-suppressed. Then the VSR reduction factor for the specific resin/suppressant mixture and the corresponding non-vapor suppressed emission factor are inserted into the equation in EF Table 1.

5 (For non-suppressed resins that use the covered-cure technique) The appropriate covered-cure factor depends on whether the covering is placed after the wet laminate is rolled out or whether the covering is applied directly to the wet laminate without any rolling taking place. The covered cure factor is multiplied by the corresponding non-vapor suppressed resin application process emission factor as shown in EF Table 1. Vapor suppressants are not used in conjunction with covered-cure because the impervious cover takes the place of the film formed by the suppressant.