

DARM-PER-32

SUBJECT: Guidance on the Use of Styrene Emission Factors for Certain
Polyester Resin Plastics Product Fabrication Processes

DATE: March 1, 2000

On March 18, 1998, Section 4.4 of AP-42 was removed from the AP-42 web site (<http://www.epa.gov/ttn/chief/ap42c4.html>), because the emission factors presented in that section appear to underpredict styrene emissions from most polyester resin operations. A number of individual site tests and studies performed over the past few years have led to this conclusion. These recent reports address only the open molding processes of hand layup, spray-up, filament winding, and gel coating. At this time, the USEPA has no reason to question the validity of the emission factors presented in the old AP-42 section for continuous lamination, pultrusion, and closed molding operations. The USEPA is drafting a replacement AP-42 section based largely on two of these reports; the National Marine Manufacturers Association's (NMMA) "Baseline Characterization of Emissions from Fiberglass Boat Manufacturing" and the Composites Fabricators Association's (CFA) "CFA Emission Models for the Reinforced Plastics Industries."

The emission factors generated from these two documents, as well as emission factors from EPA/RTI, are shown in the USEPA Region 4 letter and "Summary of Emission Data Results" dated March 3, 1998. In this "Summary of Emission Data Results," USEPA Region 4 established (draft) minimum emission factors by averaging the NMMA results and the CFA results. In addition, the USEPA supplied an emission factor equation based on gel time, styrene content, air flow velocity, thickness of part, and standard deviation.

However, since EPA has not published "final" emission factors, this "Summary of Emission Data Results" has been used as a starting point to develop new "interim" styrene emission factors for certain polyester resin plastics product fabrication processes. We are going to define the "interim" styrene emission factors as shown in the following Table 1 and Table 2.

Table 1. Interim Styrene Emission Factors for Boat Manufacturing

	NVS <u>Monomer-35%</u>	NVS <u>Monomer-38%</u>	NVS <u>Monomer-42%</u>
Resin Non-Spray Layup	11	11	12
Resin Spray Layup	16	18	20
Gel Coat	48	51	54

NVS = non-vapor suppressed
Emission factors as a percent (%) of Available Monomer

Table 2. Interim Styrene Emission Factors for Reinforced Plastics

	NVS <u>Monomer-35%</u>	NVS <u>Monomer-38%</u>	NVS <u>Monomer-42%</u>
Resin Non-Spray Layup	13	15	16
Resin Spray Layup	19	25	30
Gel Coat	49	51	53

NVS = non-vapor suppressed
Emission factors as a percent (%) of Available Monomer

These interim emission factors for boat manufacturing were calculated by taking the low-rounded average of the NMMA emission factor range for each category as shown in Region 4's "Summary of Emission Data Results". Likewise, the interim emission factors for reinforced plastics manufacturing were calculated by taking the low-rounded (truncated) average of the CFA emission factor range for each category.

These interim styrene emission factors should be used instead of AP-42 for applicable construction permit and FESOP applications received on or after June 1, 1998. For permit applications received prior to June 1, 1998, you may continue to use the old AP-42 emission factors. As always, methods other than AP-42 factors or these interim factors may also be used to calculate emissions.

Annual Operating Reports (AORs) should be prepared using the same emission factors that their permit allowables are based upon, because use of the new emission

factors, when the current permit allowable is based on the old emission factors, is likely to show an exceedance of a permitted allowable in the ARMS database.

Don't forget that our air toxics program is now based upon only NESHAPS, rather than NESHAPS and modeling.

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