



VOC's of UV/EB Curable Products

INTRODUCTION

UV/EB technology is widely recognized as an effective measure for reducing air pollution from Volatile Organic Compounds (VOC's) used in the coating and printing industries. Northwest Coating's UV/EB curable products do not contain any added solvent, and are designed to have all components incorporated into the film upon curing. In spite of the fact that VOC emissions from UV/EB products are quite low, some regulatory agencies still require information for reporting purposes. This Technical Bulletin provides a discussion of the issues involved in determining VOC levels for UV/EB curable products.

BACKGROUND

For many years the U.S. Environmental Protection Agency (EPA) imposed Method 24 as the standard method for the determination of Volatile Organic Compounds (VOC's) for all types of coatings. During 1991, the trade association, RadTech International embarked on a mission to amend Method 24, as it was not a suitable test for radiation cured products. RadTech's contention was that UV/EB products should actually be cured before performing the heating step that Method 24 requires to determine the volatile content. Following a significant effort, ASTM method D 5403-93 was developed for UV/EB materials. This method prescribes that UV/EB films be cured before heating the sample at 110° C for 60 minutes.

BACKGROUND (cont.)

EPA incorporated method D 5403 into Method 24; however, they found that this test method was only appropriate for "non-thin film" coatings¹. When thin films are tested, erroneously high VOC levels may be found. Thin films were defined as films less than 0.2 grams per 35 square inches. Most films applied by methods such as gravure, flexo, rollcoat, letterpress, offset and screen in the graphic arts industry are thin films. The following conversions are provided to help define a thin film.

ASTM D 5403-93 THIN FILM DEFINITION

grams per 35 square inches	= 0.2
grams per square foot	= 0.823
grams per 1000 square inches	= 5.7
grams per square meter	= 8.86
pounds per 1000 square feet	= 1.81
pounds per ream (3000 ft ²)	= 5.43
mils	= 0.34
microns	= 8.5
square feet per gallon	= 4680

The absence of an appropriate test method was discussed with a law firm that specializes in environmental regulations. Keller and Heckman LLP has been retained by RadTech to provide this type of information. They have acknowledged that there are no known EPA-recognized test methods for UV/EB thin film materials.

(overleaf)



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UV/EB ADHESIVES & COATINGS

Keller and Heckman has referenced the National Emissions Standards for Hazardous Air Pollutants (NESHAP) for the Printing and Publishing Industry.² The NESHAP final rule describes a formulation data method for determining VOC levels in coatings.³

The formulation data method involves calculating VOCs for formulated products using information provided by raw material suppliers.

CONCLUSIONS

The VOC emissions you are getting with Northwest Coatings UV/EB curable products are likely to be very low. The actual amount will depend on your process conditions including degree of cure and heat exposure. Unfortunately we cannot provide measured VOC values until a new test method for UV/EB thin films is developed. In the mean time Northwest Coatings can provide calculated VOC levels based on information obtained from our raw material suppliers.

Please contact Northwest Coatings if you have additional questions regarding this subject.

REFERENCES

1. 60 Fed. Reg. 47,095 (Sept. 11, 1995)
2. 61 Fed. Reg. 27,132 (May 30, 1996)
3. 61 Fed. Reg. at 27,136-37 and 27,151

