

EXHIBIT VIII

BFG TECHNICAL DOCUMENT

A PHYSICAL MODEL FOR THE DIFFUSION OF VINYL CHLORIDE MONOMER FROM PVC UNDER VARIOUS CONDITIONS OF STORAGE

by
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Abstract

An empirical model, based on large scale laboratory experimental data, has been developed to show the relationship between the amount of residual vinyl chloride monomer (RVCM) in PVC resin and the concentration of atmospheric vinyl chloride monomer (AVCM) under various conditions of storage. The variables studied in the experimental work leading to the development of this model include temperature, time, ventilation rate, RVCM content of the resin, mass/volume ratio and resin type (varying in porosity).

The results obtained from a statistically designed series of 24 experiments show the interactions of all the variables and permit (1) the effects of the variables to be established and (2) the derivation of a model which permits the AVCM levels to be predicted for any combination of the variables.

The developed model has been used to predict the AVCM level in BFG warehouses at Avon Lake, Louisville and Pedricktown. We have found excellent agreement between predicted and measured AVCM levels at these three locations and under a variety of storage conditions.

Additionally, the model has been used to show that under less than the most severe storage conditions, the OSHA action level will not be exceeded (500 ppb AVCM) when the RVCM content of the stored resin does not exceed 18 ppm. Even under the most extreme storage conditions the OSHA action level is not exceeded when the RVCM content of the resin is 8.5 ppm or less.

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I. Technical Objectives

Our major objective in this work was to develop a physical model for the diffusion of vinyl chloride monomer (VCM) from PVC resins and compounds under various conditions of exposure during storage and shipment. The critical variables included in the modeling study are:

- (1) residence time
- (2) temperature
- (3) ventilation rate
- (4) resin mass/storage volume ratio
- (5) RVCM content of the resin or compound
- (6) resin or compound type (varying in porosity)

The developed model should be based on a statistically significant number of large scale diffusion experiments so as to show the interaction of all the above variables and to allow the prediction of AVCM levels for any combination of the variables.

II. Introduction

At temperatures above the glass transition (T_g) point of PVC the solubility of vinyl chloride monomer (VCM) accurately follows Henry's law behavior for VCM contents up to 4000 ppm. This observation⁽¹⁾ has lead to a rapid, simple gas chromatographic method for the determination of VCM in PVC from an analysis of the vapor phase (head space) over PVC powders in a closed container. The time required for equilibration between the vapor and PVC phases can be estimated based on recently reported diffusion data⁽²⁾.

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