

PREMIERE POLYMERS
Louisville, Kentucky

INDUSTRIAL HYGIENE SURVEY

June 26, 1990

Survey conducted by: Kenneth R. Troutman, CIH
and
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INTRODUCTION

An industrial hygiene study was conducted at Premiere Polymers, Louisville, Kentucky. The purpose of the study was to assess emissions from a proposed plastic compounding operation. The chemicals in question were vinyl chloride, styrene, acrylonitrile and organic tin. The survey was conducted on the second shift, June 26, 1990. The surveyors were Kenneth Troutman, CIH and Walter Alexander.

The purpose of the survey was to assess employee exposure to the various agents encountered at each work station. Some air samples were also taken to determine worst case information on chemical emissions. Several boxes of product were also tested for vinyl chloride contaminants in the head space of the box.

METHODS OF SAMPLING AND ANALYSIS

All of the organic vapors of interest were collected on charcoal tubes. VCM was collected using two tubes in series. Air flow was provided by SKC personal sampling pumps. The pumps were calibrated before and after sampling. The tubes were capped and sent to the Analytics Laboratory of Richmond, Virginia for analysis by gas chromatography.

The head space tests were conducted in the following manner. Three boxes of TRIAX CBE/1 art grey product manufactured 6-14-90 run T07961 were stored in the warehouse. Charcoal tubes were inserted into the head space (approximately 8 cubic feet). A flow rate of 1.0 liters per minute (lpm) was provided by duPont sampling pumps. Care was taken to minimize disturbance of the head space. Sample time was 1.0 liter per minute for 5 minutes. The purpose of this test was to assure that vinyl chloride monomer was not being released during storage conditions.

Organic tin was collected on special tubes and filters provided by Clayton Environmental of Novi, Michigan. The tubes and filter were returned to the laboratory for analysis by atomic absorption.

The Analytics Laboratory and Clayton Environmental Laboratory are accredited by the American Industrial Hygiene Association (AIHA). The laboratories also participate successfully in the Proficiency Analytical Testing program sponsored by AIHA and the Center for Disease Control. Gas chromatography and atomic are two of the analysis techniques tested by the PAT program.

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CRITERIA AND STANDARDS

There are two major sources of industrial hygiene health risk criteria used in the United States. They are the Occupational Safety and Health Administration (OSHA) Permissible Exposure Levels (PELs) and the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs). The OSHA PELs have the force of law. The ACGIH TLVs are reviewed annually and are sometimes based on more recent information. OSHA adopted many of the 1987/88 TLVs in rule making finalized in 1989.

These criteria can be further divided into two types of exposure categories. There are two different sets of values that can be appropriate for a particular industrial operation. They are the eight-hour time-weighted average (eight-hour TWA) and the short term exposure level (STEL). The eight-hour TWA TLV deals with the average exposure throughout a working day to which practically all workers can be repeatedly exposed without suffering deleterious health effects. This is the proper method of assessing the potential for chronic health effects. The STEL is the concentration to which workers can be exposed for a short period of time without suffering from irritation, chronic or irreversible tissue damage, or narcosis. Thus, the STEL deals with acute health effects. The parameter of most interest for these compounds is the eight-hour TWA. The probability of exceeding the STELs is considered very small. Each result is expressed as a time-weighted average during a process run. Thus, dilution by "down time" is not a factor and the results show the actual exposures found while the process is running.

The OSHA PELs and ACGIH TLVs are shown below and are also shown at the bottom of the result tables.

Compound	1989 OSHA PELs (ppm)			1989/90 ACGIH TLVs (ppm)	
	Action Level	TWA	STEL (ppm)	TWA	STEL
Vinyl Chloride (A1)	0.5	1	5	5	none
Styrene	none	50	100	50	100
Acrylonitrile (A2)	1	2	10 (ceiling)	2	none

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A1 and A2 refer to the carcinogenicity classifications of ACGIH.

The action level is listed above to show eight-hour TWA concentrations where specific actions such as employee education, medical monitoring, exposure measurement, etc., are required by OSHA.

The OSHA PEL for organic tin and the ACGIH TLV are 0.1mg/m3. This is an eight-hour time-weighted average.

RESULTS AND DISCUSSION

The results of this survey did not find detectable amounts of any of the contaminants. These results and those of the previous study (Jan 18, 1990) shows that excessive exposure to these contaminants is unlikely. Observation of the work tasks of the employees involved in this operation also indicated that excessive exposure is unlikely. The results are shown in the attached tables. Table 1,2 and 3 show the results of the personal monitoring. These results are key in predicting employee health risk and determining OSHA compliance requirements.

The results are quite positive in that the exposures were extremely low. None of the health risk criteria were exceeded nor was any action level exceeded.

The head space tests showed that essentially no vinyl chloride monomer was released during normal storage conditions. Please note that this test was conducted in the summer where heat would be expected to release the most VCM.

Organic Tin - The results shown in Table 3 indicate that no organic tin was found in the personal exposure of the blender operator. Based upon the description of the process and this measurement, it is unlikely that an overexposure to organic tin would occur. However, this conclusion is based upon only one sample. Organic tin, as well as the other materials in use, have very low exposure levels. Caution is warranted in such cases.

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CONCLUSIONS

An air sampling survey was conducted at Premiere Polymers, Louisville, Kentucky on June 26, 1990. The survey found no detectable amount of vinyl chloride, acrylonitrile, or organic tin. These results expanded a previous study performed on January 18, 1990. Based on the results of these studies, this process and product does not appear to offer a detectable health hazard from these agents.

RECOMMENDATIONS

- 1) Inform the employees of the sampling results and their meaning as part of the PP HAZCOM program. The tables can be used for this purpose.
- 2) Due to the low PELs of the substances involved in this process, a regular monitoring program should be implemented. The data obtained from both surveys indicated that very little emission of these substances occurred. Due to the physical layout of the line and the duties of the employees, personal exposures are anticipated to remain low. However, the seriousness of the health affects associated with vinyl chloride, acrylonitrile and organic tin are such, that documentation of exposure levels should be continued.

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TABLE 1

Vinyl Chloride Exposures

<u>Employee/Location</u>	<u>Exposure Level (ppm)</u>
FCM Roll Mill	None detected (<0.03)
Jim Gibson	None detected (<0.04)
Ray Bailey	None detected (<0.03)

The OSHA Permissible Exposure Level for vinyl chloride is an 8 hour time-weighted average of 1 ppm.

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TABLE 2

Acrylonitrile Exposures

<u>Employee/Location</u>	<u>Exposure Level (ppm)</u>
FCM Roll Mill Area	None detected (<0.02)
Jim Gibson	None detected (<0.02)
Ray Bailey	None detected (<0.02)

The OSHA Permissible Exposure Level for acrylonitrile is an 8-hour Time Weighted Average (TWA) of 2 ppm.

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TABLE 3

Organic Tin Exposure

<u>Employee/Location</u>	<u>Exposure Level (mg/M³)</u>
Joe Reynolds	None detected (<0.006)

The OSHA PEL for organic tin is an 8-hour time weighted average (TWA) of 0.1 mg/M³.

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TABLE 4

Product Box Head Space Test
TRIAx CBE/1 art grey 13794
Run T07961

Vinyl Chloride Concentrations

<u>Location</u>	<u>Concentration (ppm)</u>
Box 5	none detected (<0.4)
Box 2	none detected (<0.4)
Box 3	none detected (<0.4)

Approximately 8 cubic feet of head space in each box.