

HEALTH HAZARD EVALUATION REPORT 71-28-6
HAZARD EVALUATION SERVICES BRANCH
DIVISION OF TECHNICAL SERVICES

Establishment: Magee Carpet Company
Bloomsburg, Pennsylvania

Report Prepared By: Henry Ramos, Industrial Hygienist
Hazard Evaluation Services Branch
May 1972

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
Cincinnati, Ohio 45202

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SUMMARY DETERMINATION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 699(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health (NIOSH) received such a request from an authorized representative of employees regarding exposures to "Dykem Steel Blue" in the Storeroom, Building T, at Magee Carpet Company, Bloomsburg, Pennsylvania.

Dykem Steel Blue was found to contain a mixture of butyl acetate (Standard of 150 parts per million [ppm]), ethyl acetate (Standard of 400 ppm), and ethyl alcohol (Standard of 1000 ppm). [REDACTED]

Both personnel breathing zone and general room air concentrations of these solvents were measured in Building T. Although the measured concentrations of all the air samples were less than 20 ppm which is well below the established standards for individual agents as well as the mixture (Federal Register, Part II, §1910.93, Table G-3) promulgated by the U.S. Department of Labor, this does not preclude occasions when concentrations of the Dykem Steel Blue products could be much higher than those collected at the time of this study. As many as ten employees (inspectors, dispatchers and tufting machine fixers) may be inadvertently exposed to airborne paint mist. A symptomatic history of occasional eye irritation was obtained in a number of employee interviews. Therefore, recommendations have been suggested to management to obviate the potential hazard to affected personnel.

Copies of this Summary Determination as well as the Full Report of the evaluation are available from the Hazard Evaluation Services Branch, NIOSH, 550 Main Street, Cincinnati, Ohio 45202. Copies of both have been sent to:

- a) Magee Carpet Company, Bloomsburg, Pennsylvania
- b) Authorized representative of employees
- c) U.S. Department of Labor - Region III
- d) Occupational Health Program, State of Pennsylvania

For purposes of informing "affected employees," the employer will either (1) "post" the Summary Determination in a prominent place near where affected employees work for a period of 30 days or (2) provide a copy of the determination to each affected employee.

I. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 699(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The National Institute for Occupational Safety and Health (NIOSH) received such a request from an authorized representative of employees regarding exposure to Dykem Steel Blue, DX-100, at the Magee Carpet Company, Bloomsburg, Pennsylvania.

II. BACKGROUND HAZARD INFORMATION

A. Standards

Dykem Steel Blue contains a mixture of butyl acetate, ethyl acetate and ethyl alcohol. The occupational health standards as promulgated by the U.S. Department of Labor (Federal Register, Part II, §1910.93, Table G-3) applicable to these substances of this evaluation are as follows:

Butyl Acetate	150 PPM*
Ethyl Acetate	400 PPM
Ethyl Alcohol	1000 PPM
Value for Mixture of the Solvents	██████ PPM

Exposure to these substances may cause irritation to the eyes and respiratory passages and produce mild narcosis.

B. Toxic Effects

The following physiological effects have been reported for excessive exposures to solvents in Dykem Steel Blue. Studies on man exposures to ethyl alcohol have indicated that inhalation of 1000 parts per million (ppm) may cause slight symptoms of poisoning and that 5000 ppm may cause strong stupor and morbid sleepiness. The inhalation of alcohol vapors causes local irritating effects on the eyes, headaches, sensation of heat, intraocular tension, stupor, fatigue and a great need for sleep. Irritation of the eyes and upper respiratory tract are not noted at concentrations below 5000 ppm and at 1000 ppm the odor of the ethyl alcohol is about threshold.

Ethyl acetate is considered a mild narcotic and has the reputation of being one of the less toxic of the volatile organic solvents. However, unacclimated subjects have found the odor objectionably strong at 200 ppm and mild eye, nose and throat irritation to occur at 400 ppm.

*Parts of vapor per million parts of contaminated air at 25°C and 760 mm Hg. pressure.

The established threshold limit of 400 ppm is believed to be a safety level from the standpoint of health but may cause mild irritation to some workers unaccustomed to the exposure.

Butyl acetate is considered to possess narcotic properties 1.7 times those of ethyl acetate. Studies have revealed throat irritation in human subjects at 200 ppm, which became quite severe at 300 ppm. It has also been reported that the toxicities, irritant and narcotic actions of aliphatic increase with increasing molecular weight. The threshold limit of 150 ppm is recommended to prevent significant irritation of the eyes and respiratory passages.

III. HEALTH HAZARD EVALUATION

A. Observational Survey

A health hazard evaluation survey of the Storeroom, Magee Carpet Company was made on March 1, 1972, by NIOSH representatives Messrs. Henry Ramos and Richard J. Lewis. The function of the National Institute for Occupational Safety and Health and its relation to Section 20(a)(6) of the Occupational Safety and Health Act of 1970 and the purpose of the visit were explained to [REDACTED], Plans Engineer, [REDACTED] Assistant Plans Engineer and [REDACTED] Personnel Director. The National Surveillance Network questionnaire, Part I, was completed with their assistance.

The following representatives of management were present during the observational and environmental surveys: [REDACTED] and [REDACTED] President Local 1700, Textile Workers Union of America was the employees representative.

Dykem Steel Blue is used in the storeroom when slats are spray-painted. The operation involving application of Dykem Steel Blue is very irregular and is not considered a daily routine operation. Dykem Steel Blue is usually used once a month. The duration of exposure operation is 15 minutes to one hour. Approximately three gallons of Dykem Steel Blue has been used during the past six months. The slats are painted to facilitate marking patterns that are cut to provide the desired carpet design. Two storeroom employees are directly exposed to the paint mist when the slats are spray-painted. These employees do not use any type of protective equipment. As many as ten employees (inspectors, dispatchers, and tufting machine fixers) may be inadvertently exposed to airborne paint mist. The employees work in areas adjacent to the storeroom.

B. Environmental Survey

A health hazard survey was then made to determine environmental exposures to solvents in Dykem Steel Blue. Breathing zone air samples were collected, using charcoal tubes for absorption of solvents, both during and after the application of the paint. The sampler airflow was maintained at 1.0 liters per minute by the use of a MSA Model G battery operated vacuum pump. General room air samples were obtained at adjacent work stations and at a designated rest area. The general room air samples were collected identically to breathing zone samples except that the air samplers were located in a specific location in the workroom and adjacent areas. Sample volumes were 10 to 20 liters.

Results:

The air samples were analyzed by the Division of Laboratories and Criteria Development, NIOSH, Cincinnati, Ohio. A bulk sample of Dykem Steel Blue was submitted to the laboratory for confirmation on the composition of the material. The composition of the bulk sample differed from what was originally reported in the literature. Dykem Steel Blue was reported to contain ethyl acetate and methyl acetate, however, chemical analysis indicated the presence of butyl acetate, ethyl acetate and ethyl alcohol.

Results of the air sample analyses are enclosed in the attached table. As shown in the table, the air samples collected in charcoal tubes were evaluated for ethyl acetate, ethyl alcohol and butyl acetate. The concentration for analyzed contaminants are all well below the Federal Register, Part II, §1910.93, Table G-3, standards.

Summary:

Although the concentrations of solvents in the air samples collected here are less than the standards, this does not preclude occasions when air concentrations of the chemicals in Dykem Steel Blue could be much higher due to alteration of possible mechanical application and/or changes in material composition.

Private interviews were conducted with a number of employees having (occasional, continuous) contact with this substance in which some employees noted intermittent symptoms such as burning sensation in the eyes. This symptom is consistent with irritating qualities of ethyl acetate, butyl acetate and ethyl alcohol when the concentration levels of these substances are at least 400 ppm, 150 ppm and 1000 ppm respectively, thus indicating occasional exposures to threshold limit levels. Controls, therefore, should be instituted to avoid unnecessary exposures.

IV. RECOMMENDATIONS

Paint spraying of Dykem Steel Blue should not be accomplished in an uncontrolled open area inside the building. Because air concentrations and length of exposures to Dykem Steel Blue may vary, the following controls should be instituted:

1. A paint spray booth equipped with a mechanical exhaust ventilation system should be made available if this operation is to continue in its present site.
2. Should this operation be transferred to another location, a ventilation system capable of exhausting solvent fumes should be provided.
3. If the paint spraying is accomplished in an isolated area, the operator should wear Bureau of Mines approved respirator for organic solvents.

TABLE 1
 SUMMARY OF SOLVENT CONCENTRATIONS IN AIR SAMPLES COLLECTED IN
 BUILDING T STOREROOM

<u>Sample No.</u>	<u>Location</u>	<u>Concentration (PPM)*</u>		
		Butyl Acetate	Ethyl Acetate	Ethyl Alcohol
1	Paint Spray Work Bench	<15	<15	N.D.**
2	Work Bench Center of Storeroom	<20	<15	<15
3	Rest Area Across the Aisle	N.D.	N.D.	N.D.
4	On Shelves Outside of the Storeroom	N.D.	N.D.	N.D.
5	Work Bench Near Drill Press	<15	<15	<15
6	Work Bench Center of Storeroom	N.D.	N.D.	<15
7	Paint Spray Table (10 min. after paint application)	N.D.	N.D.	N.D.
8	On Shelf Outside of the Storeroom	N.D.	N.D.	N.D.
9	Work Bench Near Drill Press (20 min. after paint application)	N.D.	N.D.	N.D.
10	Rest Area Across the Aisle	N.D.	N.D.	N.D.

* Average concentration in parts of vapor per million parts of contaminated air by volume at 25°C and 760 mm Hg. pressure during 10 minute application period.

** N.D. - None Detected, that is, less than 1/20 of the standard for each individual chemical substance.