

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202
HEALTH HAZARD EVALUATION DETERMINATION

REPORT NO. 73-10-79

BAKAN PLASTICS
DIVISION OF COOKE CHEMICAL COMPANY
LEE'S SUMMIT, MISSOURI
OCTOBER 1973

I. TOXICITY DETERMINATION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(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 to evaluate the potential hazards associated with the alleged exposure to formaldehyde which is produced from certain resinous material used in the manufacture of plastic parts by an injection mold machine at the Bakan Plastics Company, Lee's Summit, Missouri.

It has been determined through environmental evaluation, employee interviews, and professional judgement, that no health hazard exists from this exposure to formaldehyde during this process.

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this report will be available upon request from the Hazard Evaluation Service Branch, NIOSH, U.S. Post Office Building, Room 508, Fifth and Walnut Streets, Cincinnati, Ohio 45202. Copies of this Determination Report have been sent to:

- (a) Bakan Plastics Company, Lee's Summit, Missouri
- (b) Authorized representative of employees
- (c) U.S. Department of Labor, Region VII
- (d) NIOSH - Region VII

For purposes of informing the approximately 100 exposed employees, the employer will promptly "post" the Determination Report in a prominent place(s) near where affected employees work, for a period of 30 calendar days.

III. HEALTH HAZARD EVALUATION

A. Plant Process - Conditions of Use

Bakan Plastics is engaged in the manufacture of plastic sprayers and dispensers. In the area where the hazard evaluation request was made, plastic parts for these sprayers and dispensers are molded utilizing machines which heat the resin material and inject it into molds under hydraulic pressure. There are a total of 18 injection mold machines in the molding department and each machine has one operator. Operators are rotated to a different machine everyday.

There is only one resin which is used that is acknowledged by the manufacture to produce formaldehyde when it is heated. This resin is manufactured by Celanese Corporation, and is an acetal resin called "Celcon M9014" by the manufacturer. This resin is only used in one or two of the molding machines for the production of certain plastic parts.

The entire plant is airconditioned and large man-cooling fans have recently been installed around the molding department to circulate the conditioned air. Two 48" diameter exhaust fans are being installed in the ceilings over the molding department to exhaust the hot air and plastic fumes generated at the top of the molding machines.

B. Evaluation Methods and Results

Indicator tubes for formaldehyde were used to sample the air in the breathing zone of the operators and in the area of the injection mold machines where Celcon resin was being used. All of the air samples indicated that there was less than 2 mg/M³ of formaldehyde in the breathing zones of the operators. A sample collected immediately above the mold in the machine indicated that formaldehyde was present, however, no workers are exposed at this location.

Smoke tubes were used to determine airflow in and around the injection mold machine. These tests indicated that the airflow was toward the machine, away from the operator, and upward as a result of thermal air currents generated by the hot mold.

Nine mold machine operators were interviewed to determine if they felt that they have any health problems associated with their work. All gave negative responses.

C. Evaluation Criteria

The OSHA Standard for formaldehyde in air is taken from Part 1910 of Title 29 of the Code of Federal Regulations, Section 1910.93, Table G-2.

Material	8-hour time weighted average	Acceptable ceiling concentration	Acceptable maximum peak above the acceptable ceiling concentrations for an 8-hour shift.	
			Concentration	Maximum duration
Formaldehyde (Z37.16-1967)	3 p.p.m.	5 p.p.m.	10 p.p.m.	30 minutes

The Threshold Limit Value for formaldehyde adopted by the American Conference of Governmental Industrial Hygienists recommend a ceiling level for formaldehyde of 2 p.p.m. of air by volume.

D. Evaluation Discussion

According to the literature, formaldehyde has a pungent, characteristically sharp irritating odor. Concentrations of 20 p.p.m. cause irritation of the eyes and upper respiratory tract, however, there are reports in the literature of eye irritation at concentrations as low as 5 p.p.m. occurring in "unacclimated" persons exposed. There have also been complaints of annoying odor, prickling irritation of the mucous membranes, and disturbed sleep, by workers exposed to concentrations of formaldehyde from 0.3 to 2.7 p.p.m.

During the entire course of the survey of this operation neither one of the investigators experienced any irritation or unusual odors around the molding machines using the Celcon resin. Therefore, based on the results of the indicator tube samples, employee interviews, existing ventilation systems, and professional judgement, it appears that no health hazard exists at this time.

IV. REFERENCES

1. Johnstone and Miller: Occupational Diseases and Industrial Medicine, P. 125-126.
2. ACGIH Documentation of the Threshold Limit Values: Third Edition, 1971, p. 118-119.

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