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

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 73-140-145

READ PLASTICS, INCORPORATED
ROCKVILLE, MARYLAND

OCTOBER 1974

1. TOXICITY DETERMINATION

It has been determined that plastic dust generated in the cutting area of the first floor stockroom is not toxic to employees at the concentrations measured during an evaluation of the workplace conducted on March 14, 1974. This determination is based on analysis of the plastic material, measured airborne plastic dust concentrations, results of non-directed employee interviews, and observation of work practices.

The acrylic plastic material in use was found to contain less than 1% free silica or quartz. In the absence of evidence to the contrary, acrylic plastic dust in this case was treated as an inert or nuisance dust. Measured respirable mass concentrations of airborne acrylic plastic dust were well below occupational health standards established for respirable inert or nuisance airborne dusts. Breathing zone respirable dust concentrations ranged from 0.18 to 2.2 mg/M^3. Employees did not report significant symptomatology and exposures were intermittent.

Employee exposures to solvents associated with repackaging operations conducted on the second floor could not be evaluated due to the sporadic nature of the operation (3-4 hours per month). It is recommended that personal protective equipment (impervious gloves and approved respirators) and/or local exhaust ventilation be made available to protect against a potential health hazard from solvent spillage, leakage, and subsequent evaporation.

During both the October 12, 1973 and the March 14, 1974 visits, noise levels produced by the plastic sawing and routing operations were evaluated. Although noise levels were observed to vary according to the material being processed, all measured levels were in excess of 95 dBA re $2(10^{-5})$ N/M^2.

Due to the intermittent nature of these operations, noise exposures were judged to present a potential hazard to hearing. However, should operations require increased sawing and routing resulting in longer noise exposures, a definite hazard to hearing would exist. In keeping with good industrial hygiene practice, it is recommended that hearing protection devices (plugs or muffs) be provided for employees to wear during sawing and routing and that an effort be made to reduce the noise generated by these processes. Furthermore the Standard Advisory Committee on Noise has recommended to OSHA that medical surveillance, under the supervision of a licensed physician, in the form of audiometric testing shall be provided annually by the employer if:

a) the daily noise dose equals or exceeds 0.5 as determined by the formula in Table G-16 "Permissible Noise Exposure" (see page 4)

b) for all employees whose occupational noise exposure is controlled by personal protective equipment.

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this Determination Report are available upon request from the Hazard Evaluation Services Branch, NIOSH, U. S. Post Office Building, Room 508, 5th and Walnut Streets, Cincinnati, Ohio, 45202.

Copies have been sent to:

a) Read Plastics Incorporated
b) Authorized Representative of Employees
c) U. S. Department of Labor - Region III
d) NIOSH - Region III

For the purposes of informing the approximately 10 "affected employees" the employer will promptly "post" the Determination Report in a prominent place near where affected employees work for a period of 30 calendar days.

III. INTRODUCTION

Section 20 (a) (6) of the Occupational Safety and Health Act of 1970, 29 U. S. Code 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.

III. INTRODUCTION (Cont')

The National Institute for Occupational Safety and Health (NIOSH) received such a request from an authorized representative of employees regarding exposures to noise and dust when sawing or routing plastics and solvent vapors while repackaging solvents in small containers from 55 gallon drums.

IV. HEALTH HAZARD EVALUATION

A. Description of Process - Conditions of Use

Plastics sheets, rods and tubes are received in quantity from various manufacturers and sold to the wholesale and retail trade. About 75 to 85 percent of the plastics are acrylic.

The principle operation is sawing large sheets to customer specification. About 10 percent of the work involves custom machining (sawing, trimming, routing and engraving). Three employees are directly exposed to dust and noise while sawing and routing. Seven men work in or near the forming area while making up orders.

Solvents (acetone, methyl ethyl ketone and a commercial solvent, Partall No. 10 whose major ingredients are Amsco 190 and normal butyl alcohol) and which compound's threshold limit value is 100 parts or greater per million parts of air are handled. The material is received in 55 gallon drums and repackaged into smaller containers. Other solvents and adhesives are repackaged from 1 and 5 gallon containers. The repackaging operation is an intermittant operation involving about 55 gallons of solvent per month. One man and a helper are engaged in repackaging solvents.

B. EVALUATION PROGRESS

An initial survey of Read Plastics, Inc. was conducted by Mr. Albert A. Maier, NIOSH, Region III, Industrial Hygienist on October 12, 1973. A follow-up environmental survey was conducted by Mr. Walter Chrostek, NIOSH, Region III, Industrial Hygienist, on March 14, 1974.

C. EVALUATION METHODS

Employee exposures to airborne plastic dust were evaluated using personal air sampling equipment. Breathing zone samples were collected on pre-weighed PVC filters following a cyclone pre-sampler which removed non-respirable particles. Respirable dust concentrations were calculated from results of filter gravimetric analysis.

C. EVALUATION METHODS (Cont.)

A bulk sample of the acrylic plastic being processed was obtained and analyzed for free silica content using the colorimetric method of Hyslop and Talvitie [1].

Noise levels (dBA re $2(10^{-5})$ N/M^2) were determined using a General Radio Model 1565B sound level meter.

D. EVALUATION CRITERIA

The Occupational Health Standards relevant to this evaluation as promulgated by the U. S. Department of Labor (Federal Register, October 18, 1972, page 22142 and 22158, are as follows:

1. Inert or Nuisance Dust:

   Respirable Fraction - 5 milligrams per cubic meter of air

2. Table G-16, "Permissible Noise Exposures"

Duration per day, hours	Sound Level dBA slow response
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

"When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions: C1/T1+C2/T2+ Cn/Tn exceeds unity, then, the mixed exposure should be considered to exceed the limit value. Cn indicates the total time of exposure at a specified noise level, and Tn indicates the total time of exposure permitted at that level."

"Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level."

E. EVALUATION RESULTS AND DISCUSSION

Three breathing zone respirable dust samples were collected and gravimetrically analyzed. The calculated dust concentrations

E. EVALUATION RESULTS AND DISCUSSION (Cont.)

are contained in Table 1. As can be seen, dust concentrations were well below the occupational health standard for respirable inert or nuisance dust.

Table II shows the results of noise level measurements made in association with the sawing and routing operations. Referring to the table of "Permissible Noise Exposures" above it can be seen that only short periods of exposure to the measured noise levels are permitted without the use of hearing protection devices.

Quantitative evaluation of employee exposure to solvents in the repackaging operation could not be performed since management was unable to predict when repackaging would be conducted.

V. REFERENCES

1. Talvitie, N. A., and Frances Hyslop, "Colorimeteric Determination of Siliceous Atmospheric Contaminants, "Amer. Ind. Hyg.Assoc. J., 19:54 (1958).

VI. AUTHORSHIP

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Region III, Industrial Hygienist

Originating Office: Jerome P. Flesch, Chief
Hazard Evaluation Services Branch

TABLE I

Atmospheric Exposures to Acrylic Dust.

Sample Number	Job Description	Air Volume Meter ^{3}	Quartz Content***	Respirable Dust Concentration	TLV *
1	Operator's exposure	.64	less than 1 percent	.18 mg/M^3**	5 mg/M^3
2	Operator's exposure	.63	less than 1 percent	.32 mg/M^3	5 mg/M^3
3	Operator's exposure	.60	less than 1 percent	2.17 mg/M^3	5 mg/M^3

* TLV-OSHA permissible level for inert or nuisance dust

** Milligram per cubic meter of air

*** As determined from analysis of bulk material.

TABLE II

Noise Exposure Levels

Operation	Noise Levels-Decibels-dBA*	Duration
October 12, 1973		
Sawing	102-104	1-2 hours/day
Routing	95-96	1 hour/day
March 14, 1974		
Sawing	95	1-2 hours/day

* A - Weighted sound pressure level, in decibels, having a reference level of 0.0002 N/M^2.