

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
CENTER FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45226

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 78-40-558

LANDALITE INC.
FORT COLLINS, COLORADO

JANUARY 1979

I. TOXICITY DETERMINATION

A health hazard evaluation was conducted by the National Institute for Occupational Safety and Health (NIOSH) at Landalite Inc., Fort Collins, Colorado, on May 4 and August 15, 1978. At the time of this evaluation breathing zone and general room air samples were taken on workers for methyl ethyl ketone (MEK), toluene, and methyl isobutyl ketone (MIBK). High exposures to MEK were found on May 4, 1978. On August 15, 1978, MEK and toluene exposures were well within the evaluation criteria. The owner and his two employees were interviewed on May 4, 1978. Complaints were compatible with overexposures to MEK. On August 15, 1978, concentrations of MEK and toluene were low and employees were not complaining of exposures. A health hazard does not exist when the ventilation is working properly. It would be hard to document a time weighted average (TWA) overexposure since the workers are exposed for only a maximum of three hours.

II. DISTRIBUTION AND AVAILABILITY

Copies of this determination report are currently available upon request from NIOSH, Division of Technical Services, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia. Information regarding its availability through NTIS can be obtained from NIOSH, Publications Office, at the Cincinnati address.

Copies of this report have been sent to:

1. Landalite Inc.
2. U.S. Department of Labor/OSHA - Region VIII
3. Colorado Department of Health
4. NIOSH - Region VIII

For the purpose of informing three employees, a copy of this report shall be posted in a prominent place accessible to the employees 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.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.

NIOSH received such a request from the owner of Landalite Inc., Fort Collins, Colorado, to evaluate potential exposures associated with solvents, paints, and glues used throughout the plant.

IV. HEALTH HAZARD EVALUATION

A. Processes Evaluated

Landalite manufactures foam rubber wrestling mats. The foam rubber core is covered on all sides and edges with a tough vinyl (see Figure 1). During the process of covering the foam rubber with the vinyl, various paints and glues are applied to the vinyl. The vinyl is moistened with MEK. This slightly dissolves the surface of the vinyl. The vinyl is then rolled onto the foam rubber. The wrestling mat is then painted. Painting may also occur prior to glueing the vinyl onto the foam rubber. Solvents used throughout this process consisted of MEK, MIBK, and toluene. All painting and glueing processes were evaluated for potential exposures to employees.

B. Evaluation Design

All workers were monitored and interviewed with questions directed toward MEK, MIBK, and toluene exposures.

C. Evaluation Methods

MEK, MIBK, and toluene were collected on organic vapor charcoal sampling tubes and analyzed according to NIOSH P&CAM #127 using a gas chromatograph with a flame ionization detector.

D. Criteria for Assessing Concentrations of Air Contaminants

Three sources of criteria are generally used to assess workroom concentrations of air contaminants: (1) recommended Threshold

Limit Values (TLVs) and their supporting documentation as set forth by the American Conference of Governmental Industrial Hygienists (ACGIH), 1978; (2) Occupational Safety and Health Administration (OSHA) standards (29 CFR 2920), January 1976; and (3) NIOSH criteria for recommended standards. NIOSH criteria and ACGIH TLVs represent the most recent and relevant recommendations and are given prominence in this evaluation.

<u>Substances</u>	<u>TLV</u>	<u>Permissible Exposures 8-Hour Time-Weighted Exposures Basis (mg/M3)</u>	
		<u>Current OSHA Standard</u>	<u>NIOSH Criteria For Recommended Standard</u>
MEK.	590.0	590.0	590.0
Toluene.	375.0	750.0	375.0
MIBK	410.0	410.0	-----

mg/M3 = approximate milligrams of substance per cubic meter of air.

Occupational health standards are established at levels designed to protect individuals occupationally exposed to toxic substances on an 8-hour per day, 40-hour per week basis over a normal working lifetime.

E. Toxicology

Methyl Ethyl Ketone (MEK) -- MEK is a widely used industrial solvent. Prolonged exposures above the TLV of 590 mg/M3 may cause mucous membrane irritation, nausea, vomiting, dermatitis, headache, and paresthesias. Workers strongly object to its odor. However, there have been very few reports of serious ill effects.

Toluene -- High concentrations, above TLV of 375 mg/M3, may cause conjunctivitis and corneal burns, produces defatting dermatitis, causes fatigue and weakness, headache, dizziness and irritability. The level required to produce narcosis can exist without eye or respiratory tract irritation. (Reference 1)

Methyl Isobutyl Ketone (MIBK) -- The main route of entry of MIBK is by inhalation. It is a strong irritant to eyes and upper respiratory tract. MIBK exposures may cause headache and nausea. Repeated exposure may produce dermatitis. Adequate

ventilation and face chemical goggles should be used when working directly with MIBK. (Reference 2)

F. Environmental Results and Discussion

Results of the environmental samples and confidential employees interviews showed that workers were overexposed to MEK on May 4, 1978. A number of workers reported symptoms consistent with overexposure to MEK, MIBK, and toluene. These symptoms were burning eyes, nose and irritation of upper respiratory system. TWA exposures would not have exceeded evaluation criteria. However, the extremely high concentrations that were found do pose a health hazard even for short time exposures. If the process should last for eight hours instead of two or three hours, the workers would have been grossly overexposed. On August 15, 1978, all exposures were well within the evaluation criteria. This was due to large doors that were left open and better use of the existing ventilation system.

V. RECOMMENDATIONS

1. Solvents should be placed in safety dispensing cans when used at individual work stations for cleaning and repair.
2. Eating should be prohibited in the work area.
3. The local exhaust ventilation should be placed more directly in line with the glueing and painting operations.

VI. REFERENCES

1. Plunkett, E.R., Handbook of Industrial Toxicology, Chemical Publishing Company, New York, 1976, pp. 412-413.
2. Ibid, p. 272.

VII. AUTHORSHIP AND ACKNOWLEDGMENTS

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TABLE I

Breathing Zone and General Room Air Concentrations of
MEK, MIBK, and Toluene

Landalite, Inc.
Fort Collins, Colorado

May 4, 1978

Sample No.	Job Classification	Sampling Time Minutes	MEK	MIBK (mg/M3)	Toluene
1	Foreman	132	1815	59	190
2	Laborer	170	1000	22	60
3	Laborer	125	845	4	7
4	General Room	166	881	15	37
5	Laborer	105	1953	111	323
6	Laborer	105	784	45	114
		EVALUATION CRITERIA	590	410	375
		LABORATORY LIMIT OF DETECTION (mg/sample tube)	0.002	0.002	0.002

mg/M3 = approximate milligrams of substance per cubic meter of air

TABLE II
Breathing Zone and General Room Air Concentrations of
MEK and Toluene

Landalite Inc.
Fort Collins, Colorado

August 15, 1978

Sample No.	Job Classification	Sampling Time Minutes	MEK (mg/M3)	Toluene (mg/M3)
1	Owner	90	333	4
2	Painter	140	393	24
4	Foreman	140	311	22
5	General Room	140	194	34
6	General Room	140	234	28
7	General Room	140	182	30
8	Laborer	90	177	33
9	Laborer	120	113	35
		EVALUATION CRITERIA	590	375
		LABORATORY LIMIT OF DETECTION (mg/sample)	.01	.01

mg/M3 = approximate milligrams of substance per cubic meter of air

FIGURE 1

