

THE INDUSTRIAL COMMISSION OF OHIO
DIVISION OF SAFETY AND HYGIENE

700 WEST THIRD AVENUE
COLUMBUS, OHIO 43212
469-2570 469-3386



Industrial Commission
H. HOLLAND KERR
Chairman
LEWELLYN A. COLES
Vice Chairman
JOHN P. SHILLMAN
Member

JOHN J. OLLIGAN
Governor

Division of
Safety and Hygiene
THOMAS W. GALLAGHER
Superintendent

August 31, 1972

Mr. Robert Porter
Manager of Engineering
Foseco, Inc.
20200 Shaldon Rd.
Cleveland, Ohio 44142

Dear Mr. Porter:

Enclosed are two copies of a report on the visit made to your company on August 16, and 17, 1972.

It was a pleasure to meet with you and Messrs. Stoff, Adams, Hausman, and Ghose and the courtesy extended was very much appreciated.

If this Division can be of assistance to your company at any time on industrial hygiene or engineering problems relating to safety, please let us know.

Very truly yours,

Robert W. Hursh

Robert W. Hursh, P.E.
Industrial Hygiene Engineer

jkp

FOSECO 2034

"SAFETY DIRECTOR" to all Ohio industry

21

THE INDUSTRIAL COMMISSION OF OHIO
DIVISION OF SAFETY AND HYGIENE

700 WEST THIRD AVENUE
COLUMBUS, OHIO 43212
469-2870 469-3386



Industrial Commission
H. MOLLARD BRISL
Chairman

LITWELLIN A. COLLIS
Vice Chairman

JOHN P. BRILLMAN
Member

JOHN J. OLLIGAN
Governor

Division of
Safety and Hygiene
THOMAS W. GALLAGHER
Superintendent

August 31, 1972

Re: Poceco, Inc.
20200 Sheldon Rd.
Cleveland, Ohio 44142

1. On August 16, and 17, 1972, a visit was made to the above company to investigate possible health hazards from dusts and other materials. This visit had been requested by the company.

2. Those contacted were:

Mr. Robert Porter, Manager of Engineering
Mr. Wayne Stoff, Manager of Industrial Relations
Mr. David Adams, Corporate Personnel and Industrial Relations Manager
Mr. Henry Hausman, Engineering Technician
Mr. Pro Ghose, Engineer

3. The company manufactures hot tops and headings systems for steel ingot molds, and metallurgical chemicals for metal melting and foundry industries.

4. The locations investigated are indicated on a layout of the plant, a copy of which is enclosed.

5. Mineral and fiber material were mixed at Location #3 in a row of vertical cylindrical blenders. Operators worked on a platform about 6 ft. above the floor. To measure asbestos fibers, a sample of air was taken on a 1" Millipore membrane filter with an ejector vacuum pump, for examination with a microscope. The indicated level was 0.1 fibers per milliliter of air, (f/ml), which is well below the present Threshold Limit Value (TLV) of 5 f/ml and the proposed TLV of 2 f/ml.

6. For dust measurement, a sample of air was taken for 68 minutes with a Mines Safety Appliances Co. (MSA) Gravimetric Sampler. This samples respirable particles, having a cyclone which rejects those larger than 10 microns in size. By weight measurement, the indicated concentration was 6.9 milligrams per cubic meter (mg/M³). This is

"SAFETY DIRECTOR" to all Ohio industry

22
FOSECO 2035

888 1 129

below the TLV of 10 mg/M^3 for inert particulates. A suitable sample of settled dust could not be gathered for analysis of free silica content. The formula for TLV of dust containing silica (SiO_2) is

$$\text{TLV} = \frac{10 \text{ mg/M}^3}{\% \text{ SiO}_2 + 10} \text{ for respirable dust in mg/M}^3$$

The formulae in various units are listed on page 18 of the 1970 TLV list, a copy of which is enclosed. As an example, at 100% SiO_2 , the TLV would be 0.098 mg/M^3 .

7. A dust sample was taken in the same location with a midget liquid impinger and later examined with a microscope, a method which has been employed as a standard by this Division. The indicated level was 0.73 million particles per cubic foot (mppcf), which is below the TLV of 30 mppcf for inert particulates. The TLV formula in these units is

$$\text{TLV} = \frac{300}{\% \text{ SiO}_2 + 10} \text{ mppcf}$$

At 100% SiO_2 , the TLV would be 2.7 mppcf. Even if this had been the case, the measured concentration was less than the TLV. With this method, the indicated level was a lower proportion of the TLV than that from the gravimetric sampling. If there had been some material soluble in the isopropyl alcohol used in the impinger method, this might account for some of the difference. However, in recent measurements of mineral dusts at other locations, the gravimetric method has indicated a higher fraction of the TLV. The impinger method does not indicate a hazard at this location in the plant.

8. There was no exhaust system to remove dust from the area of the blenders. The measured 100 feet/minute (fpm) air velocity was from a pedestal fan at the south end of the platform. Most of the dust is released when bags are cut open and the contents charged into the tops of the blenders, the lids having been opened. An exhaust system with ducts connected to the upper back portions of the blenders could assist in drawing dust in through the lid opening of each blender. A useful source of design data is the book "Industrial Ventilation—A Manual of Recommended Practice", available at \$5.00 from the American Conference of Governmental Industrial Hygienists, 1014 Broadway, Cincinnati, Ohio 45202.

9. It was observed that, at the blenders and other dusty areas, the operators used approved respirators.

10. An impinger measurement of dust was made at a machine bagging "Ferrux" exothermic material. Of the two machines at Location #4, this was the machine to the south. The indicated level was 4.0 mppcf, which is below the 30 mppcf TLV. The operator used a respirator. A 5" diameter exhaust duct inlet was about 2' from the stream of flowing granular material. Air velocity at the breathing zone was zero, but was 6000 fpm at the duct inlet. Closer proximity of the exhaust inlet to the flowing material could reduce dust concentration.

11. An impinger measurement was made during the mixing of Ferrux 345 exotherm material in a double-cone mixer at Location #9. The sampling location was about 6' south of the door of the easternmost enclosure. Dust was leaking from this mixer during rotation. The indicated level was 5.6 mppcf, which is below the 30 mppcf TLV for inert particulates. It was stated that workers use respirators when in this area.
12. Measurement was made at the enclosed base of a silo containing ball mill dust at Location #8 for ammonia which might be produced by the aluminum nitride of that mixture in the presence of moisture. Using a Kitigawa indicator tube, there was no indication. A moderate odor resembled that of calcium carbide. This enclosure is not a normal working area. There was no indicated hazard.
13. Measurements were made during the processing of Moldcote material containing zircon, which is zirconium silicate, at Location #7. The dust concentration was 22.8 mppcf, which is somewhat below the TLV of 30 mppcf for inert particulates. The 1971 TLV documentation, of which copies of pages 285 and 286 are enclosed, indicates most zirconium salts to be of very low toxicity, and the metal to be only slightly toxic. The TLV of 5 mg/M³ is based on the metal. Improved local exhaust, in addition to the presently used respirators, could improve the working condition.
14. Solvents including isopropyl alcohol and acetone are also used in the Moldcote material. Alcohol, labeled raw material #493, was being transferred from a drum held by a fork lift truck to a drum on a platform scale. Using an MSA Combustible Gas Indicator, the reading was from 1% to 1.3% of the Lower Explosive Limit (LEL), indicating from 280 to 360 parts per million (ppm). Since this was below the TLV of 400 ppm and the operation is an intermittent one, there was no apparent hazard. The higher TLV of 1000 ppm for acetone indicates that similar handling of that solvent would also not be hazardous.
15. Measurements were made on the operating platform of the pulpers at Location #5 by the procedures described in sections 5, 6, and 7 above. The asbestos fiber count of 0.09 f/ml indicates no hazard. Based on inert particulates, the dust levels of 2.1 mg/M³ and 0.8 mppcf do not appear hazardous. If there should be a significant proportion of respirable free silica, this conclusion would be modified in the case of the gravimetric measurement.
16. An impinger measurement of dust at the Premix preparation at Location #5 indicated 0.32 mppcf. One of the components was "Millwood Certified Silica". The reading was less than the TLV of 2.7 mppcf for 100% respirable silica, if this extreme case had occurred. The operators used respirators. There was no apparent hazard.
17. Double-cone blenders at Location #1 were inspected. Soda ash, which is sodium carbonate, was being charged. This is not considered a toxic material, and it does not appear in the TLV list. It was said

that dust only appears during rotation of a blender in the unusual case of an improperly sealed lid. There did not appear to be any hazard.

18. The Threshold Limit Values refer to airborne concentrations of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect. Because of wide variation in individual susceptibility, however, exposure of an occasional individual at or even below the threshold limit may not prevent discomfort, aggravation of a pre-existing condition, or occupational illness.

19. This investigation was made in accordance with IC-5, Specific Safety Requirements of the Industrial Commission of Ohio Relating to All Workshops and Factories.

20. It is suggested:

- A. Provision of exhaust systems for the pulpers at Locations #2 and #3 could improve working conditions.
- B. Closer proximity of an exhaust inlet to the flowing material at bagging machines at Location #9 would improve working conditions.
- C.. Improved local exhaust for the charging of dry material at the Location #7 Moldcote operation would improve working conditions.

Respectfully submitted,

Robert W. Hursh

Robert W. Hursh, P.E.
Industrial Hygiene Engineer

encl.: TLV list, 1970
Plant layout
Bulletin EH-05-S, Silicosis
pp. 285-6, 1971 TLV Documentation

jkp

FOSECO 2038

25

TABLE 1

Measurements at Fosco, Inc., Cleveland, August 16 and 17, 1972

<u>Location</u>	<u>Evaluation</u>	<u>Evaluation Means</u>	<u>Reading</u>	<u>Unit</u>
Pulpers at location #3	Asbestos fibers	1" Millipore filter and microscope	0.1 f/ml	5 fibers/milliliter (f/ml) less than 5 microns
	Dust	MSA Gravimetric Sampler	6.9 mg/M ³	10 mg/M ³
	Dust	Midget liquid impinger	0.73 mppcf	30 mppcf
	Air velocity on platform	Alnor Velometer	100 fpm from south	—
Begging Ferrux exothermal	Dust	Midget liquid impinger	4.0 mppcf	30 mppcf
	Air velocity	Alnor Velometer	0 at EZ, 600 fpm at exhaust hose inlet	—
Mixing of Ferrux 345 in double cone mixer	Dust	Midget liquid impinger	5.6 mppcf	30 mppcf
At base of silo of ball mill dust at location #8	Ammonia from aluminum nitride and moisture	Kitigawa ammonia indicator tube	None	25 ppm
Moldcote production at location #7	Vapor of isopropyl alcohol	MSA Combustible Gas Indicator	1 to 1.3% LEL 300 to 400 ppm isopropanol	400 ppm
	Dust	Midget Liquid impinger	22.8 mppcf	30 mppcf
Pulpers at location #2	Asbestos fibers	1" Millipore filter and microscope	0.09 f/ml	5 f/ml
	Dust	MSA Gravimetric Sampler	2.1 mg/M ³	10 mg/M ³
	Dust	Midget liquid impinger	0.8 mppcf	30 mppcf

<u>Location</u>	<u>Evaluation</u>	<u>Evaluation Means</u>	<u>Reading</u>	<u>TLV</u>
Premix operation at location #5	Dust	Midget liquid impinger	0.32 mpcf	30 mpcf