

December 17, 1964

Mr. J. A. Osborne, Personnel Manager
The American Standard Company
2620 Cook Street
Cincinnati, Ohio 45214

Dear Mr. Osborne:

We are pleased to submit three signed copies of our report describing the results obtained from the analyses of samples collected in connection with the air pollution survey conducted in your plant on November 11, 1964.

We believe the report is self-explanatory, and trust that it meets your needs. However, if you have any questions concerning any phase of the work, please let us know, and we will do our best to answer them.

Our statement, covering the charges for conducting the survey, analyzing the samples, and writing the report, is also enclosed.

Sincerely yours,

J. Cholak
Director, Division of Industrial
Hygiene Technology

JC:egm

Enclosures

cc: Dr. Robert A. Kehoe
Mr. L. J. Schafer

KE 0005356

N 7315

Plant: American Standard Company, 2620 Cook St.,
Cincinnati, Ohio 45214

Date of Visit: November 11, 1968

Purpose of Visit: To determine the extent of the pollution
of the atmosphere by silica-bearing
particulate matter and by lead

Representative
of Management: J. A. Osborne, Personnel Manager

Plant

The plant is a brass foundry engaged in the casting of plunking fixtures.

Procedures

Samples of particulate matter were removed from the air by the employment of one of two sampling techniques, depending on the anticipated determination. Electrostatic precipitators were used to collect samples to be used for the determination of the quantities of particulate matter and of the concentrations of lead in the air. Air-borne dust to be analyzed for its content of free crystalline silica was removed from the air by Staples High Volume samplers. Samples were returned to the Kettering Laboratory and analyzed by standard methods.

Results

The table lists the levels of the concentration of lead in the air, the numbers of particles in the air in millions of particles per cubic foot of air, and the content

of free crystalline silica in samples of dust collected at a number of locations in the foundry.

Discussion

From the aspect of the potential hazard of silicosis, the threshold limit for particulate matter depends upon its content of quartz, and is calculated from a formula described in the current list of "Threshold Limit Values for 1964," as adopted at the 26th Annual Meeting of the American Conference of Governmental Industrial Hygienists, held April 25-26, 1964, in Philadelphia. The formula is:

millions of particles per cubic foot of air (mppft.³) =

$$\frac{250}{\% \text{ Quartz} + 5} \cdot$$

The content of free crystalline silica (quartz) in the dusts varied from 13 per cent at the sand sifter and cleaning areas to 75 per cent in the molding area. The threshold limit values were calculated as 14 mppft.³, when the dust contained 13 per cent of quartz, 9.6 mppft.³ when the dust contained 21 per cent of quartz, 5.1 mppft.³ when the dust contained 44 per cent of quartz, and 3.1 mppft.³ when the dust contained 75 per cent of quartz. As may be seen from the table, the threshold limits, as calculated, were exceeded at the "table blast" wheelabrator (55.0 as compared to 5.1 mppft.³), at the core sifter (17 as compared to 4.5 or 3.1 mppft.³), at the molding machine (7.4 as compared to 3.1 mppft.³), and at the shake-out operation (23.0 as compared to 3.1 mppft.³). A sample of the dust at the

core muller was not collected for analysis for its content of quartz, but, from observation it was assumed that the dust in the air surrounding this operation was composed, at least, of 50 per cent of pure sand. The numbers of particles per cubic foot of air in the core room and in the cleaning area were well within the limits considered safe in occupational exposure to dust containing 100 per cent of quartz. The concentration of dust in the pattern shop was also very low. A few relatively large and non-respirable fibers of glass were detected in this dust by microscopic examination.

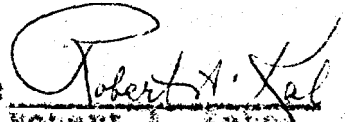
The levels of the concentration of lead in the atmosphere in the areas concerned with the furnace, pouring, and shake-out were in excess of 0.50 milligram per cubic meter of air, which is considered to be satisfactory under the condition of normal operations in the lead-using industries. The concentration of lead in the air of the furnace area, and in that of the area in which castings were being poured, were four to five times higher than the recommended threshold limit value. The concentration of lead in the air decreased as the distance from the furnace and pouring areas increased. At a distance of 30 feet from the furnaces, and 20 feet from the pouring station, the air contained 0.37 milligram of lead per cubic meter of air; in the shake-out area, the concentration of lead was 0.43 milligram of lead per cubic meter of air; in the cleaning room, near the grinding operation, still farther from the furnace area, the concentration of lead had diminished to 0.12 milligram per cubic meter of air.

The findings with respect to the atmospheric pollutants, as reported in the table, are representative only of operations conducted on the day of this survey, and may not be regarded as depicting conditions that may result from changes in operations or rates of production.

From the Kettering Laboratory in the Department of Preventive Medicine and Industrial Health, College of Medicine, University of Cincinnati, Cincinnati, Ohio

Work and Report by:

J. Cholak
James O. Pierce, Sc.D.
L. J. Schafer, D.S.E.(Ch.E.)

Approved: 

Robert A. Kahn, M.D.,
Director

Date: December 17, 1964

Numbers of Particles, Percentages of Free Crystalline Silica in Particles
and Levels of Concentration of Lead in the Atmosphere, at Various Locations
in the Foundry of the American Standard Company, on November 11, 1948

<u>Analysis</u> <u>Number</u>	<u>Location of Sampler</u>	<u>Time of</u> <u>Sampling</u>	<u>Milligrams</u> <u>of Lead</u> <u>Per Cubic</u> <u>Foot of Air</u>	<u>Millions of</u> <u>Particles per</u> <u>Cubic Foot</u> <u>of Air</u> <u>(per ft.³)</u>	<u>Si</u> <u>in</u>
64A-6066	At breathing zone of the operators at the Table Blast Wheelabrator	9:51 a.m.	--	55.0	
64A-6067	Near the Table Blast Wheelabrator	9:30 a.m.	--	**	
64A-6069	At breathing zone of the operator at the core sand muller	10:00 a.m.	--	17.0	
64A-6070	At breathing zone of the operator at the molding sand muller	10:24 a.m.	--	10.0	
64A-6068	Near the molding sand muller	9:41 a.m.	--	**	
64A-6073	At breathing zone of the operator while pressing cores	11:00 a.m.	--	0.7	
64A-6079	At breathing zone of the operators at the core knock-out area, following the baking operation	1:46 p.m.	--	0.7	
64A-6074	At breathing zone of the operator at a machine in the center of the molding area	11:00 a.m.	--	7.4	
64A-6072	In the molding area	10:25 a.m.	--	**	
64A-6071	Thirty feet from the furnace area and 20 feet from the pouring station	11:02 a.m.	--	**	

<u>Analysis Number</u>	<u>Location of Sampler</u>	<u>Time of Sampling</u>	<u>Milligrams of Lead Per Cubic Meter of Air</u>	<u>Millions of Particles Per Cubic Foot of Air (ppft.³)</u>	<u>Si in</u>
64A-6076	At breathing zone of the operator while pouring castings	11:30 a.m.	0.707		
64A-6075	In the center of the furnace area	11:34 a.m.	0.802		
64A-6085	In the center of the furnace area	3:05 p.m.	0.990		
64A-6086	Thirty feet from the furnace area and 20 feet from the pouring station	3:06 p.m.	0.370		
64A-6078	At breathing zone of the operators at the shake-out area	1:12 p.m.	0.430	23.0	
64A-6081	At center of the cleaning area	1:00 p.m.	--	**	
64A-6077	At breathing zone of the operator while grinding castings	1:18 p.m.	0.117	1.8	
64A-6080	Near the Wheelabrators in the cleaning area	1:40 p.m.	--	1.5	
64A-6082	At breathing zone of the operators while knocking out cores	1:58 p.m.	--	1.3	
64A-6083	At center of the pattern shop (east room)	2:35 p.m.	--	0.8***	
64A-6084	At center of the pattern shop (west room); 11 minutes in the center of the room, and 15 minutes near the sanding operation	2:34 p.m.	--	0.7***	

*Calculated from the formula: Threshold Limit ppft.³ = $\frac{250}{5 \text{ Quartz} + 5}$

**Dust in general area collected for determination only of its quartz content.

***Very few fibers were present. The fibers were more than 20 microns in length, in diameter, being too large to be respirable.