

DRAFT

Revised July 19, 1951

INDUSTRIAL HYGIENE SURVEY

I. IMPINGER SAMPLINGA. Equipment SetupUNARCO
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Basically the impinger sampling equipment consists of an impinger assembly unit and a suction pump unit. The impinger assembly of pyrex glass is dimensioned per General Plant Engineering Department Drawing 7237-4. The suction pump unit is equivalent to the Willson #31 Motor driven pump unit with calibrated vacuum gauge and V belt drive.

The impinger assembly in a 500 ml. Erlenmeyer pyrex flask is mounted in a holder on a tripod so as to be in the breathing zone of employees at the operation being studied. A 1/2" ID non-collapsible rubber tubing of suitable length is connected to the exhaust elbow and to the inlet side of the pump. The pump motor operates on alternating (25 and 60 cycle) 110V current and on 220V A.C. with the series resistance. Adjustment of the bleeder valve of pump should be made to maintain vacuum at the appropriate gauge setting.

B. Calibration

The apparatus is set up in the same manner as for sampling. The inlet of the impinger is attached to the outlet tube of a standard wet meter or five-light dry test gas meter. The pump valve is adjusted to a definite gauge reading* and the time for the intake of 1 cubic foot of air is measured by stop watch. Five readings in hundredths of a minute for 1 cubic foot air intake should be taken and averaged. The average time is then divided into 1.00 to give the rate of cubic feet of air per minute for that impinger tube. The impinger should be permanently identified (letter, number, etc.) and the rate recorded. A copy of the impinger ratings in the field record book will prove of value (fig. 1). For example:

*The single line on the Willson pump units.

Impinger Tube	Vacuum Gauge Reading	Cubic Foot of Air per Minute
J	line (2")	1.06
K	line (2")	1.11
L	line (2")	1.03

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Should the cubic foot of air per minute of an impinger be more or less than .15 from 1 cubic foot, a new gauge setting for that impinger should be established, identified and recorded to bring the flow within those limits.

The meter used for calibrating should be frequently checked to insure accuracy.

C. Preparation

The sampling fluid should be comparatively free from suspended matter. If possible, distilled water should be prepared by one of the continuous types of water stills, and, after distillation, allowed to stand for 24 hours, the upper part being drawn off for use. If alcohol is used, it should be redistilled before use.

All glassware should be thoroughly cleaned with a hot cleaning solution, rinsed several times and finally rinsed with the fluid used as sampling medium. Rubber stoppers and corks should be cleaned by scrubbing with a brush in a warm, pure soap (liquid or bar) solution. These should be rinsed thoroughly and rinsed finally in the sampling medium.

250 ml. (approx.) of sampling fluid should be placed in cleaned flasks and the flask stoppered with solid rubber stopper and capped with paper over the top held by a rubber band. Cleaned impinger assemblies should be stoppered and wrapped pending use. Prior to entry into the sampling field, the cleaned stoppered impinger assemblies should be inserted in place of the solid stopper.

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D. Sampling Mediums

Asbestos, Silica, Mineral Dusts. To minimize the solubility of mineral dusts and inhibit bacterial growth, a sampling medium of 75% distilled water and 25% ethyl alcohol U.S.P. should be used.

Lead and Compounds - Dust or Fume. Use 250 cc. distilled water to which has been added 10 cc. concentrated nitric acid. Use all pyrex glass. Transfer sample for shipment to glass stoppered flask or bottle; seal carefully. (Sample must not touch soft glass which contains lead or rubber stoppers.)

Sulfur Dioxide. Use 0.1N Sodium Hydroxide solution as sampling medium. Transfer for shipment to glass stoppered bottle; seal stopper with wax, then with tape to prevent loosening. (4 grams chemically pure sodium hydroxide per liter distilled water yield 0.1N Sodium Hydroxide solution.)

Manganese Acid Compounds - Dust. Use distilled water only.

Cadmium and Compounds - Dust. Use distilled water only.

Refer questions concerning appropriate sampling mediums, equipment or arrangement for these or other dusts, fumes or vapors to CH Safety Engineer.

E. Sample Taking

Sampling stations should be established in the working area at all operations where health hazards are believed to exist. They should be permanently identified (to wit - painted sign on machine "Station 22") and this designation used as the sample number for all samples taken at this location.

The flask and impinger unit should be secured to the tripods and placed in the breathing zone of the employees at the operation being studied. If such placement is not feasible (due to cramped quarters, etc.) the flask and impinger unit may be secured to some object which is in the breathing zone of the employees. b6 315

The impinger outlet elbow is connected by appropriate lengths of rubber hose to the inlet connection of the pump. A 110V A.C. 25 or 60 cycle (220V with resistance) current supply is necessary for the pump motor.

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Start the motor, noting the starting time and adjusting the pump valve to obtain the appropriate gauge reading which will allow a rate closest to 1 cubic foot per minute. This reading should be maintained throughout the sampling.

Generally, the duration of sample should be approximately 30 minutes, producing an air volume of 30 cubic feet. In heavy dust concentration, the time may be shortened to approximately 15 minutes. The cycle of the operation being studied should also be considered in establishing the duration of the sample. A sample which covers only the peak or low of contamination leads, of course, to erroneous conclusion.

Data pertinent to the sampling should be recorded on form 50191-42, sketches or diagrams made as indicated and this record maintained permanently. The sample number should be indicated on the flask.

When the sample has been completed the inlet and exhaust impinger tubes should be stoppered and the flask removed from the sampling area. The impinger assembly should be removed and washed with distilled water into the sample flask. A clean solid rubber stopper should be inserted in the flask and capped with paper and a fairly heavy rubber band or scotch tape.

A flask containing the sampling fluid only should be included with the samples forwarded for analysis.

II. GROSS DUST SAMPLE

Gross or settled dust samples for petrographic analysis should be obtained within the work area from a horizontal surface approximately at the workers' breathing level and placed in a clean envelope.

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Appropriate data (sample station, et al) should be recorded on form 50191-42 and the sealed envelope contained identified.

III. SHIPPING

Flask corks should be secured by Scotch tape or by paper cover held to the flask neck by rubber band. The sample flasks should be individually wrapped in multiple thicknesses of newspaper, placed in the compartments cork-end up and snugly packed with crumpled or shredded paper. The flask cases should be labeled "GLASS", "HANDLE WITH CARE", "THIS SIDE UP" and shipped by the fastest method (usually air express) to -

The Travelers Insurance Companies
700 Main Street
Hartford 15, Connecticut

Attention: Chemical Engineering Laboratory

The appropriate data should be transcribed to the J-M Industrial Hygiene Survey Report (Form 50191-43) in quadruplicate. Indication should be made, i.e., asbestos, lead, formaldehyde, silica, manganese, etc., when other than particle count only is desired. One copy should accompany the flask case. The additional copies are for the plant manager, GH Safety Engineer, and technician's file.

Copies of the laboratory analysis report will be forwarded to the plant manager, technician and GH Safety Engineer.

Issued by GH Safety Section.

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Following is a list of employees transferred to non-dusty departments:

	<u>Dept to which Transferred</u>	<u>Date Transferred</u>	<u>Rate</u>
W. Fairbanks	Maintenance	11-19-36	.57
E. Bogha	"	8-11-37	.40
H. Brown	"	8-11-37	.40
H. King	Packing	11-30-36	.61
T. Martin	"	11-30-36	.57
E. Jones	"	12-7-36	.57
J. Polski	"	12-3-36	.52
*** O. Lewis	"	3-19-40	.52
C. Williamson	Brake Lining	8-15-39	.49
T. Viryalitis	Molded	11-30-36	.60
A. Sharr	"	11-30-36	.64
*** T. Massey	"	8-15-39	.50
*** J. M. Johnston (Apprents)	Maintenance	4-10-40	.55
<i>Ed. C. Gosh.</i>	<i>Refrigeration</i>	<i>Department</i>	
	<i>Maintenance</i>		

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EMPLOYEES TRANSFERRED BY DOCTOR'S ADVICE

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	Entered our employ	Original department	Date transferred	Present department
No C. Fairbanks	6-10-26	Yarn 55	12-7-36 46	Maintenance
No G. Warren	6-24-26	Weaving 8	12-7-36	Insutape
? J. Zirgaitis	9- 2-26	Yarn 60	11-30-36 52	Molded
? H. King -	12-10-26	Weaving 61	11-30-36 57	Packing
ok L. Novak	1-27-27	Yarn 57	11-30-36 57	Packing
No T. Martin	2-17-27	Yarn 53 1/2	11-30-36	Packing
No W. Sharp	8- 1-27	Yarn 65	11-30-36 46	Molded
? E. Jones	7-10-28	Weaving 57	12- 7-36 57	Packing
ok Isabelle Allen	5- 1-30	Yarn 40 1/2	1-15-37 44	Packing
? L. Sojka	10-10-33	Yarn 49 1/2	4-30-35 46	Maintenance
at yd. E. M. Dropka	10-23-33	Yarn 46	5-11-37 46	Maintenance
No F. Quaid	1- 3-35	Yarn 65	12- 8-36	Molded
? C. Williamson	5- 3-37	Yarn 49 1/2	8-15-39 42	Brake Lining
No F. Massey	6-29-37	Pipe Covering	8-15-39 42	Molded

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