

Information Circular 8503

Sampling and Evaluating Respirable Coal Mine Dust

A Training Manual

By Staff, Pittsburgh Field Health Group



UNITED STATES DEPARTMENT OF THE INTERIOR

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SAMPLING AND EVALUATING RESPIRABLE COAL MINE DUST

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by

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I. ABSTRACT

The Federal Coal Mine Health and Safety Act of 1969 requires that each operator of a coal mine shall take accurate samples of the amount of respirable dust in the mine atmosphere to which each miner is exposed, a measure designed to prevent the development of coal workers' pneumoconiosis.

This textbook manual is used in the training of personnel to operate respirable dust sampling devices and to conduct sampling programs. It contains the portions of the act applicable to respirable dust standards, the procedures to be followed to insure compliance with Federal regulations, and descriptions of sampling devices.

II. INTRODUCTION

The inhalation and retention of coal mine dust can result in the development of coal workers' pneumoconiosis. A recent study by the Department of Health, Education, and Welfare revealed that 10 percent of active coal miners and 19 percent of former miners have some form of the disease.

Accurate quantitative detection of respirable coal mine dust is the first step toward prevention of the disease. In January 1970, the Director of the Bureau of Mines instructed the Pittsburgh Field Health Group to prepare a course for presentation to the coal mine industry, the objective of which was to train personnel to operate sampling equipment and to conduct sampling procedures, in accordance with standards set out in the Federal Coal Mine Health and Safety Act of 1969.

This textbook manual is the result of that directive. It contains a brief description of the disease, sections of the Federal Coal Mine Health and Safety Act of 1969 that pertain to sampling of respirable dust, and descriptions of sampling instruments and procedures.

Training sessions run about 2-1/2 days, from Tuesday morning through Thursday afternoon. Courses are conducted by the Pittsburgh Field Health Group and by the Bureau of Mines District Offices in Mt. Hope, W. Va., and Norton, Va.

Because of recent widespread interest in mine health and safety standards, the Bureau of Mines is also publishing this manual in its series of Information Circulars.

References and Suggested Reading

1. Dunmore, J. H., R. J. Hamilton, and D. S. G. Smith. An Instrument for the Sampling of Respirable Dust for Subsequent Gravimetric Assessment. J. Scientific Instruments, No. 41, 1964, pp. 669-672.
2. Gooding, Richard M. (Comp.). Proceedings of the Symposium on Respirable Coal Mine Dust, Washington, D.C., November 3-4, 1969. BuMines Inf. Circ. 8458, 1970, 297 pp.
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4. Jacobson, M., and J. A. Lamonica. Personal Respirable Dust Sampler. BuMines Tech. Prog. Rept. 17, September 1969.
5. Nagelschmidt, G. The Study of Lung Dust and Pneumoconiosis. Am. Ind. Hygiene Assoc. J., v. 26, January-February 1965, pp. 1-7.
6. Schlick, Donald P., and R. G. Peluso. Respirable Dust Sampling Requirements Under the Federal Coal Mine Health and Safety Act of 1969. BuMines Inf. Circ. 8484, 1970, 35 pp.

III. COAL WORKERS' PNEUMOCONIOSIS

A. The Disease

Pneumoconiosis can be defined as the accumulation of dust in the lungs and the reaction of lung tissue to the presence of that dust. Coal workers' pneumoconiosis is caused by inhalation and retention of coal mine dust. The disease can be detected in living persons only by X-ray techniques. In most miners, it requires about 15 years for the disease to progress to a point that permits diagnosis, but some cases show evidence in a shorter time.

In the respiratory system, the air passages leading from the nose and mouth become progressively smaller and finally terminate in small sacs known as the alveoli. In general, the nonrespirable portion of inhaled dust is deposited in the larger air passages. Beating, hairlike cell growths (called cilia) on most of these air passages move a mucous layer, on which dust is deposited, up and eventually out of the respiratory tract. Although the respiratory system is highly effective in removing inhaled dust, fine particles reaching the small air sacs of the lung become deposited and constitute a health hazard. This fraction of the total dust deposited is referred to as "respirable dust."

Since comprehension of the physiological mechanism associated with dust retention in the lungs is limited, the generally accepted criterion for

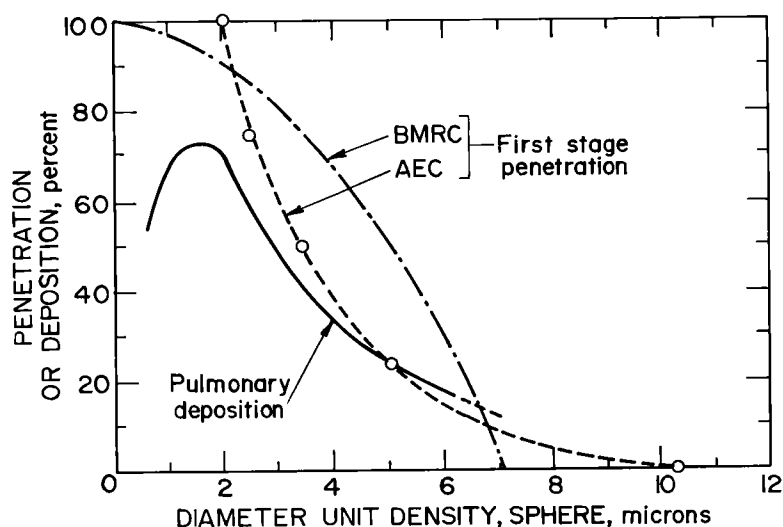


FIGURE 1. - Comparison of Respirable Size Criteria With Pulmonary Deposition Curve.

selecting dust sizes of hygienic significance is the pulmonary deposition curve for dust in the terminal airways of the lungs (3).¹ The mass of dust extracted from the lungs of miners examined in autopsy shows good correlation with severity of pneumoconiosis based on X-ray categorization prior to death (5). Therefore, the mass of dust in the respirable fraction is the parameter of primary interest for hygienic evaluation of dust exposure. Instruments used to evaluate the health hazard in dust atmospheres should simulate the respiratory tract in selection and

retention of the respirable fraction of the dust particles.

B. Respirable Dust Size Concept

At present, two criteria are accepted for defining respirable dust. Both criteria approximate dust deposition in the nonciliated portions of the lung. The first, resulting from work performed by the Atomic Energy Commission, is defined by the curve labeled AEC in figure 1.

The other criterion for the respirable fraction of dust, recommended by the British Medical Research Council and adopted by the Johannesburg Pneumoconiosis Conference in 1959, is defined by the sampling efficiency curve labeled BMRC in figure 1. For comparison, the pulmonary deposition curve is also shown in this figure.

Particle sizes refer to equivalent diameter, which is defined as the diameter of a spherical particle of unit density having the same falling velocity as the particle in question (1). Individual particles of respirable dust are invisible to the naked eye, since the resolving power of the eye is limited to about 40 microns. A micron is equal to about one twenty-five-thousandth of an inch.

To effectively assess respirable dust concentrations encountered in the coal mine environment, two-stage sampling instruments have been developed. Currently, there are two types of respirable dust gravimetric sampling instruments that can be used in coal mines.

¹Underlined numbers in parentheses refer to items in the reading list on page 2.

The Personal Respirable Dust Sampler, developed by the Bureau of Mines (4), is one of these instruments. This samples in accordance with the criterion established by the U.S. Atomic Energy Commission.

Another device, the MRE or Isleworth Gravimetric Dust Sampler (1), developed at the Mining Research Establishment of the National Coal Board, Isleworth, England, samples in accordance with the criterion adopted by the Johannesburg Pneumoconiosis Conference.

Results of extensive laboratory and field tests have shown that a high degree of correlation exists between results obtained with the two instruments. Respirable dust concentrations determined with the Personal Sampler can be converted to equivalent dust concentrations as obtained with the MRE by multiplying by 1.6.

IV. FEDERAL COAL MINE HEALTH AND SAFETY ACT OF 1969 (PUBLIC LAW 91-173)

In this course, only the provisions of the act that pertain to health standards and particularly to allowable dust concentrations are considered. A short summary of the act will aid following and understanding the instructions being presented in the course.

The act requires that detailed instructions for collection of respirable dust samples must be prepared, and that in mining sections where applicable dust standards are exceeded, permits to continue mining operations must be obtained. For reference, copies of Mandatory Health Standards--Underground Coal Mines (30 CFR, Part 70) and an approval schedule (30 CFR, Part 74) of performance requirements for dust sampling devices are included in appendixes B and C, respectively.

A. Purpose of the Act

The purpose of the act is to provide for the protection of the health and safety of persons working in the coal mining industry of the United States. It consists of five titles, as follows:

Title I directs the Secretary of the Interior to--

1. Promulgate safety and health standards.
2. Make inspections and investigations of coal mines.
3. Issue findings, notices, and orders relating to safety and health standards.

Under this title, the Secretary of Health, Education, and Welfare is charged with the responsibility of developing and revising mandatory health standards as may be appropriate.

Title II contains the Interim Mandatory Health Standards. Section 201(b) of this title concisely explains the purpose of the act regarding health

standards, which is to assure that the working areas in each underground coal mine are sufficiently free of respirable dust concentrations in the mine atmosphere, and that every miner has the opportunity to work his entire adult life in the mine without incurring an occupation-related disease, such as coal workers' pneumoconiosis.

Title III contains the Interim Safety Standards for Underground Coal Mines.

Title IV provides for black lung benefits.

Title V provides for administration of the act.

B. Inspections and Administrative Action

Section 103(a) of title I requires frequent inspections in coal mines to insure compliance with mandatory health and safety standards and pertinent notices, orders, or decisions. Inspections are also conducted to collect information relating to health and safety problems.

Federal inspection of each mine is required at least four times a year to determine whether an imminent danger exists or if there is compliance with mandatory health or safety standards.

In addition, frequent spot inspections of the active workings of coal mines are required to determine compliance with mandatory health and safety standards.

Section 104(i) of title I outlines procedures to be followed in determining compliance with respirable dust health standards and action to be taken when a violation occurs. Violation occurs when the applicable concentration limit of respirable dust permitted under the act is exceeded. Violation will be based on samples collected by the company or by an authorized representative of the Secretary of the Interior.

Action to be taken in case of violation is as follows:

The Secretary of the Interior or his authorized representative shall issue a notice fixing a reasonable time for the operator to make such changes as are necessary to lower the respirable dust concentration in the affected area to the applicable limit. Circumstances will dictate the fixing of a "reasonable time." This reasonable time may subsequently be extended. While such notice is in effect, the mine operator shall take respirable dust samples on each production shift in the affected area.

If the authorized representative finds the violation not abated at the end of the fixed time and if the fixed time is not extended, he shall issue an order requiring the operator of the mine to withdraw immediately from the affected area all persons except those engaged in corrective work, public officials whose duties require them to enter the area, and certain representatives of the miners. After an order is issued and upon request of the operator, a

person or team of persons authorized by the Secretary shall be sent to the mine to assist the operator in reducing respirable dust concentration to applicable limits. The order will remain in effect until the operator has made changes that will reduce the respirable dust concentration and maintain it at or below the applicable limit when production is resumed.

C. Health Standards

1. Interim Standards

Section 201(a) of title II provides that the Interim Mandatory Health Standards of title II and the applicable provisions of section 318 of title III shall be applicable to all underground coal mines until superseded by improved Mandatory Health Standards.

Section 202(a) of title II specifies that each operator of a coal mine shall take accurate samples of the amount of respirable dust in the mine atmosphere. To enable the operator to fulfill his obligation, detailed instructions pertaining to dust sampling procedures are prescribed in the Mandatory Health Standards (appendix B). These standards will be discussed at length later in the course.

Section 202(b) of title II establishes allowable limits of dustiness. Dustiness means the average concentration of respirable dust in the mine atmosphere during each shift to which each miner in the active workings of the mine is exposed. Effective June 30, 1970, the dustiness must not exceed 3.0 milligrams of dust per cubic meter of air; effective December 30, 1972, the dustiness must not exceed 2.0 milligrams of dust per cubic meter of air, except where an operator has obtained a permit for noncompliance. The limit of dustiness allowable under a noncompliance permit shall not exceed 4.5 milligrams of dust per cubic meter of air when the 3.0-milligram standard is in effect. The limit of dustiness allowable under a noncompliance permit shall not exceed 3.0 milligrams of dust per cubic meter of air when the 2.0-milligram standard is in effect.

Section 205 of title II directs the Secretary of Health, Education, and Welfare to prescribe an appropriate formula for determining a dust standard for respirable coal mine dust which contains more than 5 percent quartz.

2. Noncompliance Permits

Paragraphs 3 through 6 of subsections (b) and (c) of section 202 outline procedures for obtaining noncompliance permits. Briefly, the procedure is as follows:

The operator must apply to the Interim Compliance Panel (ICP) for a permit. The panel may issue such a permit, provided it has been proven that the operator is unable to comply with the applicable dust standard. Under the rules of the ICP, application for an initial noncompliance permit for a mine working section must be filed with the panel on or before May 15, 1970. No initial permit will be issued for working places starting operations after

June 30, 1970, or for which applications have not been completed on or before August 15, 1970. No initial permit or renewal thereof shall be valid beyond June 30, 1971.

3. Definition of Terms

The terms applicable to Health Standards are defined in the act as follows:

a. Section 70.2(m) defines the "concentration of respirable dust" as the average concentration of respirable dust as measured with an MRE instrument or the equivalent concentration when measured with another device approved by the Secretary of the Interior and the Secretary of Health, Education, and Welfare.

b. Section 70.2(n) defines the "MRE Instrument" as the Gravimetric Dust Sampler with a four-channel horizontal elutriator developed by the Mining Research Establishment of the National Coal Board, London, England.

c. Section 70.2(o) defines "average concentration" as a determination which accurately represents the atmospheric conditions with regard to respirable dust to which each miner in the active workings of a mine is exposed. During the 18-month period following June 30, 1970, the date of enactment of this section of the act, it is to be determined by measurement over a number of continuous production shifts to be prescribed by the Secretary of the Interior and the Secretary of Health, Education, and Welfare. After the 18-month period, it is to be determined by measurement over a single shift, provided the Secretaries find the single-shift measurement to be statistically valid.

d. Section 70.2(a) defines the term "certified" as a person certified or registered by the State in which the coal mine is located to perform duties prescribed by the act. If a State has no certification program or if the program does not meet minimum Federal standards, the Secretary of the Interior shall provide for such certification.

e. Section 70.2(b) defines the term "qualified person" as an individual deemed qualified by the Secretary and designated by the operator to make tests and examinations required by the act.

f. Sections 70.2(d)(e)(f)(g) define other applicable technical terms that are commonly used and understood in the coal mining industry. Definitions of these terms are given as follows:

(1) "Working face" means any place in a coal mine in which the work of extracting coal from its natural deposit in the earth is performed during the mining cycle.

(2) "Working place" means the area of a coal mine in by the last open crosscut.

(3) "Working section" means the areas of the coal mine from the loading point of the section to and including the working faces.

(4) "Active workings" means any place in a coal mine where men are normally required to work or travel.

g. Section 70.2(i) defines "respirable dust" to mean only dust particulates 5 microns or less in size.

4. Miscellaneous

a. Respiratory Equipment

The mandatory health standards require each operator to make approved respiratory equipment available to all employees whenever exposed to concentrations of respirable dust in excess of applicable levels. The use of approved respiratory equipment shall not be substituted for environmental dust control measures in the active workings (section 70.300).

b. Dust From Drilling Rock

Dust resulting from drilling in rock must be controlled by use of permissible dust collectors, or by water or water with a wetting agent, or by ventilation, or by a method or device equally effective and approved by the Secretary of the Interior (section 70.400). The water may be applied through a hollow steel drill or stem or by the flooding of downholes.

V. INSTRUMENTATION FOR DUST ASSESSMENT

A. MRE Sampler

The MRE is a portable gravimetric dust sampler that continuously samples air in a working area and separates the airborne material into respirable and nonrespirable fractions. Separation occurs as the larger particles settle to the floor of the horizontal elutriator sections and are prevented from reaching the filter. Smaller particles having a slower settling rate pass through the elutriator and are deposited on the filter. The instrument consists of a size selector (elutriator), a filter, and an electrically driven pump.

A schematic of the instrument is shown in figure 2. Dust-laden air enters the precision-made four-channel horizontal elutriator (1) at a flow rate of 2.5 liters per minute. The rear of each channel's floor plate is lipped to help prevent nonrespirable dust from accidentally being dislodged from the plates onto the filter. A nose restrictor (2) is fitted at the entrance to minimize the effects of air cross-flow.

Removal of the transfer hood (3), between the filter (4) and the size selector (1), gives access to the size selector for cleaning.

Opening the flat door on the front of the case exposes the battery, counter, and fuse holder. The battery is a DEAC 5/900D or equivalent with an internal limiting resistor. The counter, coupled by gearing to the pump, registers the number of liters of air sampled. The knurled knob is used to reset the counter.

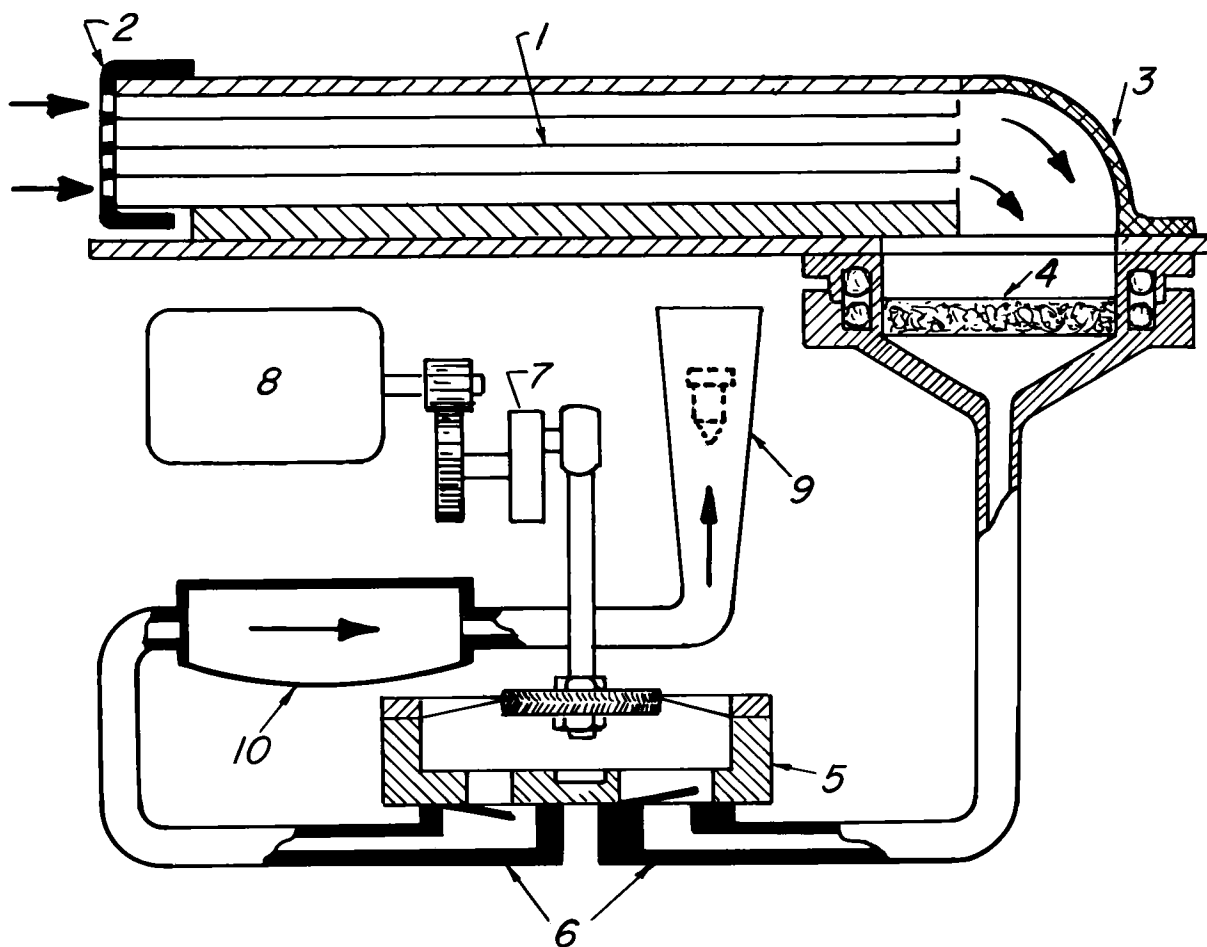


FIGURE 2. - Schematic Diagram of MRE.

A diaphragm pump (5), fitted with flap valves (6) of aluminum-coated polyester film, induces airflow. The pump output is varied by an adjustable crank (7), and the unit is driven through spur gears at half speed by a governed electric motor (8). A flowmeter (9) is connected to the output side of the pump through a diaphragm-type smoothing device (10). The counter and flowmeter are read through small windows fitted in the instrument case. The airflow from the flowmeter exhausts into the instrument chamber, thus maintaining a positive pressure to prevent dust from entering the case. The instrument is intrinsically safe for use in a methane-air mixture. The MRE sampler is shown in figure 3.

The following sections outline procedures for using and checking the operating performance of the sampler.

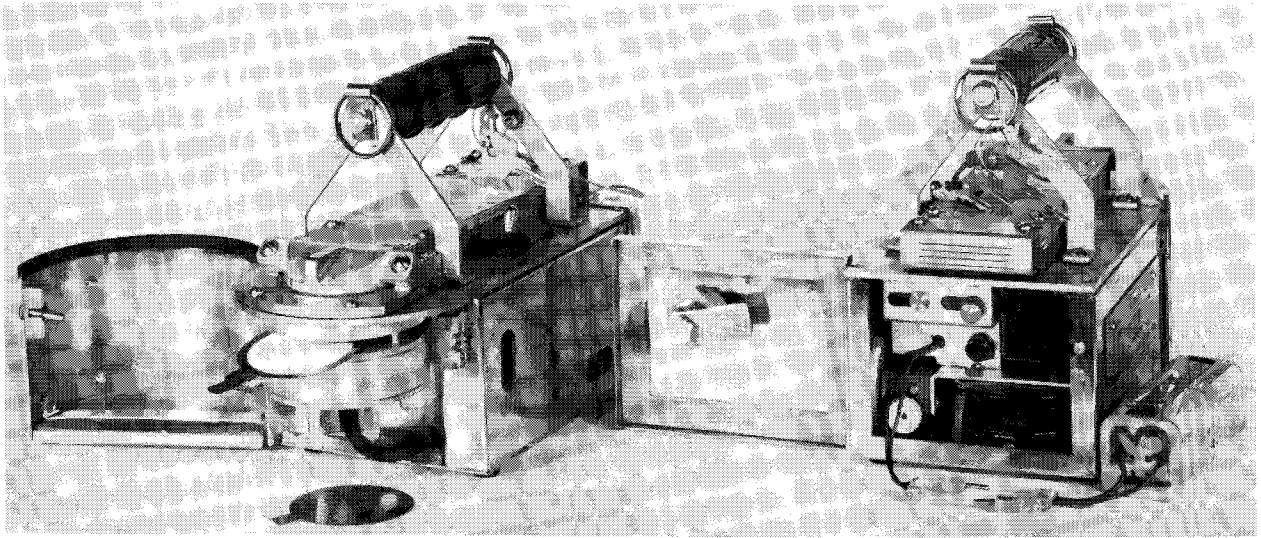


FIGURE 3. - MRE Gravimetric Respirable Dust Sampler.

1. Sampling Procedure

a. Battery

- (1) Check battery voltage.
- (2) Insert charged battery into battery compartment.
- (3) Slide battery-retaining spring clip across front of battery and lock in position.
- (4) Insert battery plug into instrument socket.

b. Filter

- (1) Unscrew the winged ring and remove stainless steel blanking plate.
- (2) Store the blanking plate by sliding it under the retaining strip located across the bottom of the curved compartment door.
- (3) Take a weighed filter assembly and carefully insert it into the holder, making sure that it seats correctly in the recess. This assembly should be treated with care and handled only by the tag. It should be visually inspected before use for holes or creases, and if such defects are present, the filter should be replaced.
- (4) Finger-tighten the winged ring to clamp the assembly firmly in position.

c. Flow Check

(1) Switch on the instrument and check the flow as indicated by the flowmeter. The float should lie between the two limit lines on the flowmeter; that is, between 2.4 and 2.6 liters per minute.

(2) Block off the intake; the pump should stall.

(3) Switch off the instrument.

(4) Close and fasten the curved door.

d. Counter

(1) Reset the counter to zero.

(2) Close the flat door, lock the instrument, and remove the key.

e. After Sampling

(1) To avoid contamination of the sample, maintain the instrument at horizontal; do not jar the sampler when transporting from place of sampling.

(2) Take instrument to a reasonably clean room and wipe off external dust and dirt.

(3) Open the curved door of the instrument case and clean off any dust around the filter holder and in the compartment.

(4) Unscrew the winged ring to the end of its travel, without forcing it; then carefully remove the filter assembly and store it for weighing.

(5) Insert the blanking plate or another filter into the holder and retighten the winged ring.

(6) Note the reading on the counter indicating the number of liters of air sampled.

(7) Unlock and open the flat door.

(8) Loosen the battery retaining clip.

(9) Unplug the battery connector and remove the battery for charging. Check battery voltage.

2. Routine Field Maintenance

a. Cleaning Size Selector

The dust in the size selector should be disposed of after sampling. Remove the nose restrictor. Put the blanking plate into the filter holder,

but do not close the filter holder. Remove the dust by vacuuming through the front of the elutriator. A soft pipe cleaner can be used to clean between the plates, but do not use any article which can bend, distort, or damage the plates. Under no circumstances should any attempt be made to dismantle the elutriator, as this will alter the size selection mechanism.

b. Efficiency

Check the efficiency of the instrument at regular intervals of no longer than 10 sampling shifts. Before commencing the checks, insert a new filter and a charged battery in the instrument.

(1) Flow Rate

(a) Switch on the instrument and check that the flow rate is within the specified limits. If outside these limits, return sampler for maintenance.

(b) With the instrument running, slowly squeeze the rubber tubing at the bottom of the filter holder until it is completely closed; the motor should stall. If it continues to run at an appreciable speed, there is an air leak in the system. Return sampler for maintenance.

(2) Head

Remove the nose restrictor from the size selector, replace and tighten the fixing screws. Switch on the sampler and block off the entry to the selector with the flat of the hand or another suitable sealant; the motor should stall. If not, return sampler for maintenance.

(3) Motor Speed

Set counter to zero, switch on the instrument, and allow it to run for 24 minutes. At the end of this time the counter should read 60 ± 1 liters. If not, return sampler for maintenance.

B. Personal Sampler

The personal air sampler is another two-stage device that separates the airborne material into respirable and nonrespirable fractions. The mechanism of separation is cyclonic elutriation, as illustrated in figure 4. The sampler consists of a commercially available 10-mm-diameter nylon cyclone, a filter, and a pump.

The cyclone, filter, filter holder, and tubing are referred to as the sampling head assembly. The case which contains the pump, motor, and battery is referred to as the sampler. The following sections outline procedures for using and checking the operating performance of the sampler.

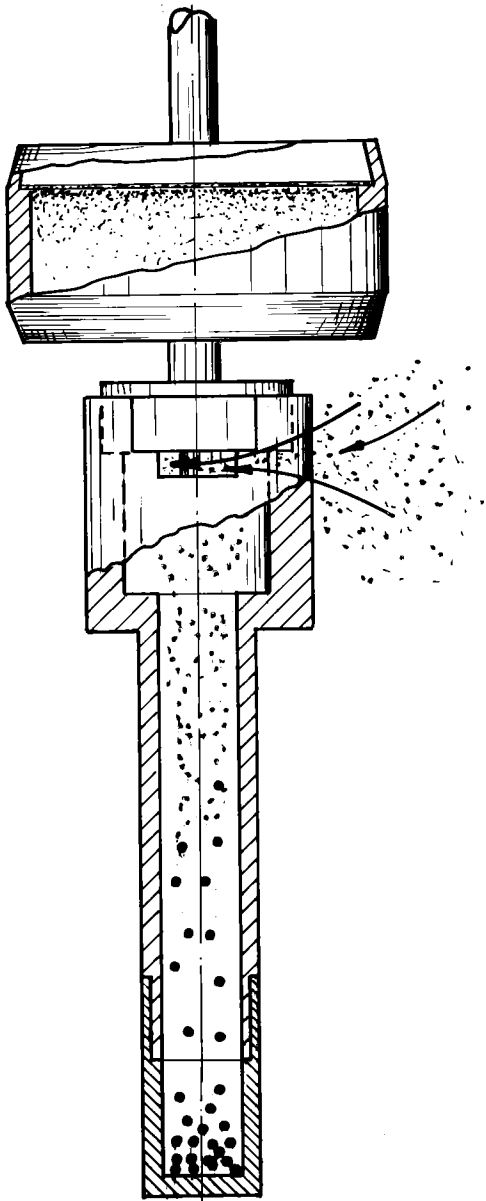


FIGURE 4. - 10-mm Cyclone With Filter.

1. Operation and Maintenance

Maintenance of the sampling head assembly involves the following:

- a. Cyclone must be cleaned after each working shift. The interior of the cyclone and grit pot can be cleaned by flushing with water or alcohol and then swabbing with a pipe cleaner. The interior and inlet of the cyclone must be inspected for scoring; if evidence of scoring is present, the unit must be replaced. Scoring will occur after approximately 1 year's usage. Leak testing of the cyclone should be done at least once a month. This test is done with the grit pot in place and the inlet of the cyclone blocked. A static pressure of at least 4 inches of water is applied to the outlet end of the cyclone. If the pressure head remains constant, the cyclone is free of leaks.

- b. Tubing must be inspected for deterioration and replaced if necessary.
- c. Holder must be inspected for damage and replaced if necessary.

2. Sampling Procedure

- a. Check voltage (voltage measurements must be in accordance with battery manufacturer's specifications) to determine if battery received a full charge.
- b. Attach sampling head to sampler. Care must be taken to insure that sampling head is connected to sampler, or pump intake can become fouled from dust drawn into the sampler.
- c. Turn on sampler.
- d. Adjust flow rate so that flow exceeds 2 liters per minute as shown on flow indicator. If the sampler can only pull 2 liters per minute or less at full flow, it will not operate a full 8 hours and therefore should be replaced and returned for maintenance.
- e. Turn off sampler.
- f. After sampling, take the instrument into a reasonably clean room and thoroughly wipe off the external dust and dirt.
- g. Recheck battery voltage. If it is less than 1.1 volts per cell, this indicates that sampler is drawing excessive current or that battery is defective. Return entire unit for maintenance.

3. Approved Personal Samplers

The requirements of the Secretaries are given in 30 CFR 74, Coal Mine Dust Personal Sampler Units, published in the Federal Register, v. 35, No. 48, March 11, 1970, and reprinted in appendix C of this publication.

a. Personal sampler units in use on or before June 30, 1970, which contain any combination of the following pumps, sampling head assemblies, and battery chargers may be used until January 1, 1971, to take samples of respirable dust as required by the act.

- (1) MSA Monitaire model G (fig. 5).
- (2) Unico Micronair model 3900 (fig. 6).
- (3) Unico Air Sampling Pump model C110 (fig. 7).
- (4) Cassella Air Sampling Pump model B, Mark II (fig. 8).

The following samplers have presently been approved in accordance with 30 CFR 74:

MSA Monitaire model G.

Unico Micronair model 3900.

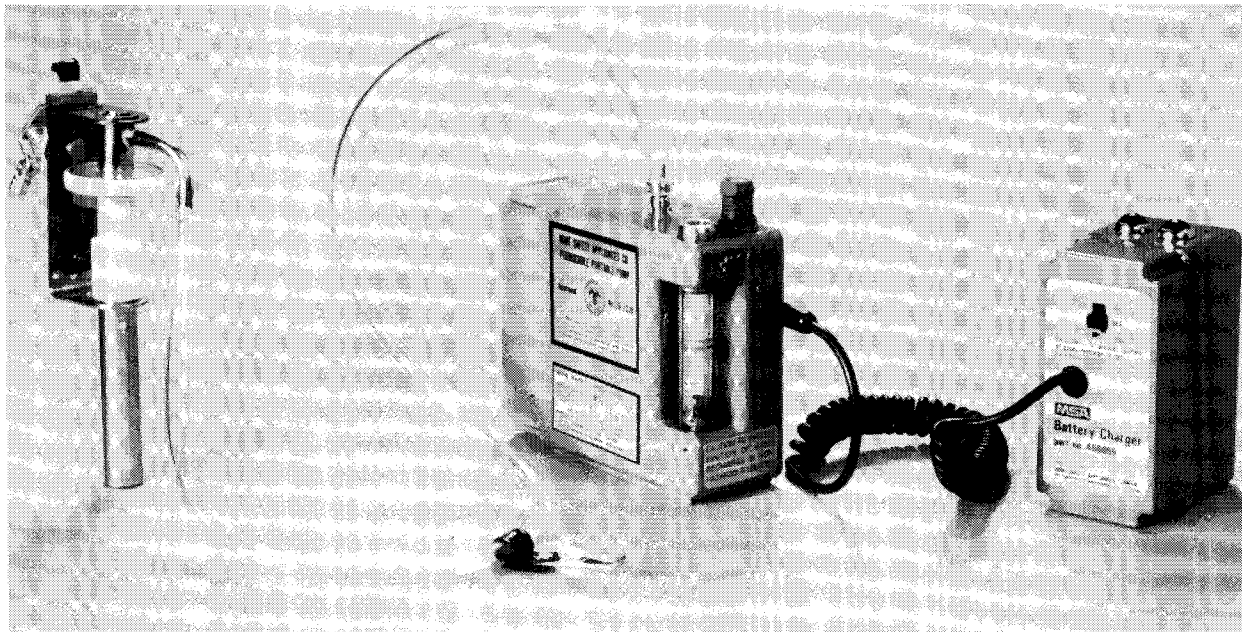


FIGURE 5. - MSA Monitaire Model G.

It should be noted here that if additional sampler models become available, the Secretaries will endeavor to disseminate data pertaining to operation and maintenance as soon as possible to interested parties.

C. Batteries

Nickel-cadmium batteries are used in the samplers previously mentioned. The advantages of this type of battery are that they may be recharged repeatedly; they have a relatively constant potential during discharge, and have excellent charge-retention properties; they have good low-temperature performance characteristics; and they are more than competitive with other systems in terms of cost per hour of use.

A typical discharge curve for a nickel-cadmium cell is shown in figure 9. Two important points illustrated by this curve are:

1. The lower discharge voltage for any nickel-cadmium cell must never fall below 1.1 volts.
2. The initial slope of the curve resulting from loss of surface charge necessitates readjustment of flow within 1 hour of initiation of sampling.

Batteries that are discharged below the recommended voltage are subject to permanent damage. Since this type of battery is subject to damage if not properly used, it is essential that the manufacturer's instructions be followed.

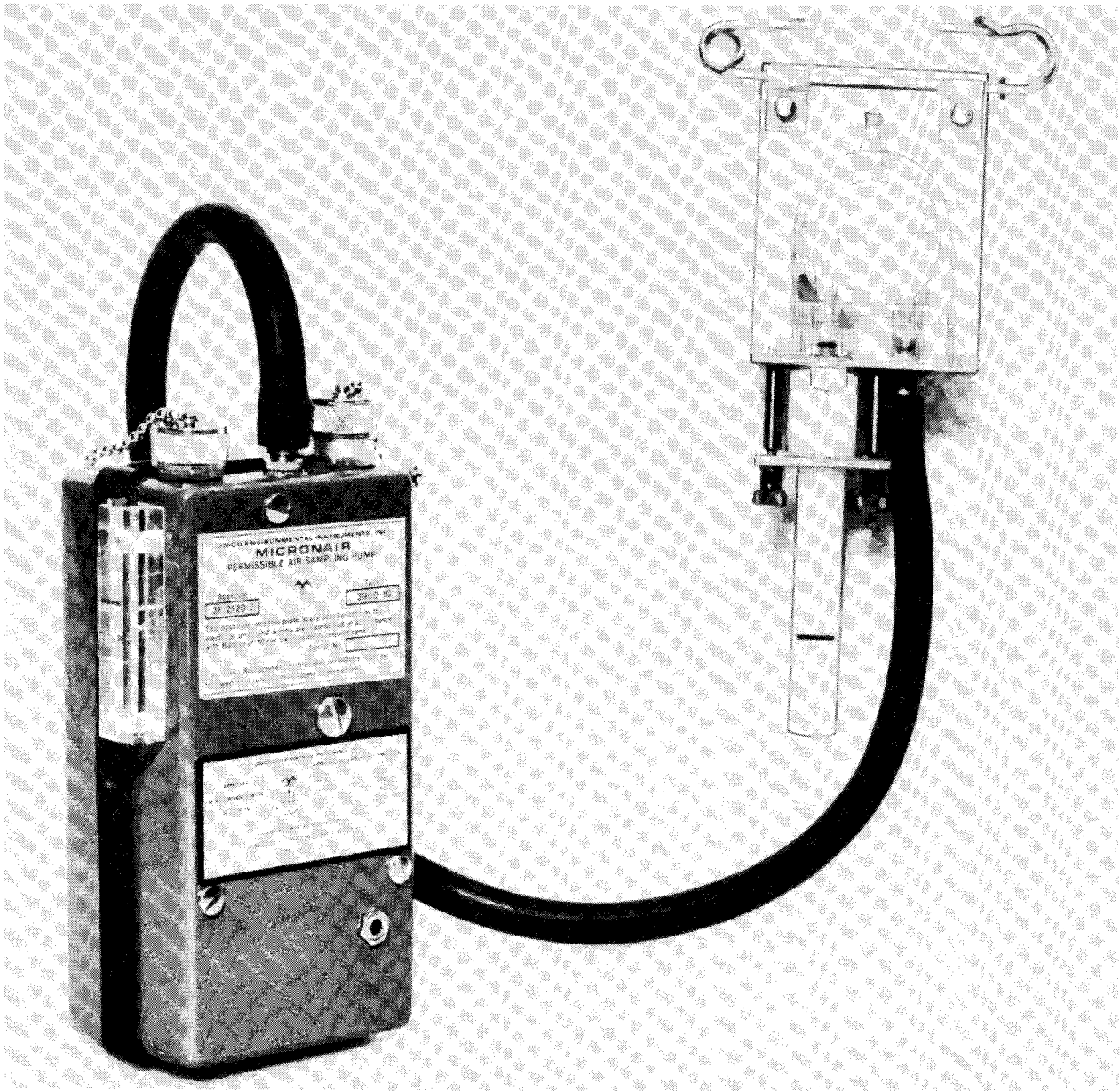


FIGURE 6. - Unico Micronair Model 3900.

VI. PROCEDURE FOR CONDUCTING DUST SAMPLING

The instructions for conducting dust sampling operations are detailed in 30 CFR, Part 70, Mandatory Health Standards--Underground Coal Mines, which was published in the Federal Register, Friday, April 3, 1970. A copy of these instructions is contained in appendix B. The following is a discussion of sampling procedure required by law, as outlined in these instructions.

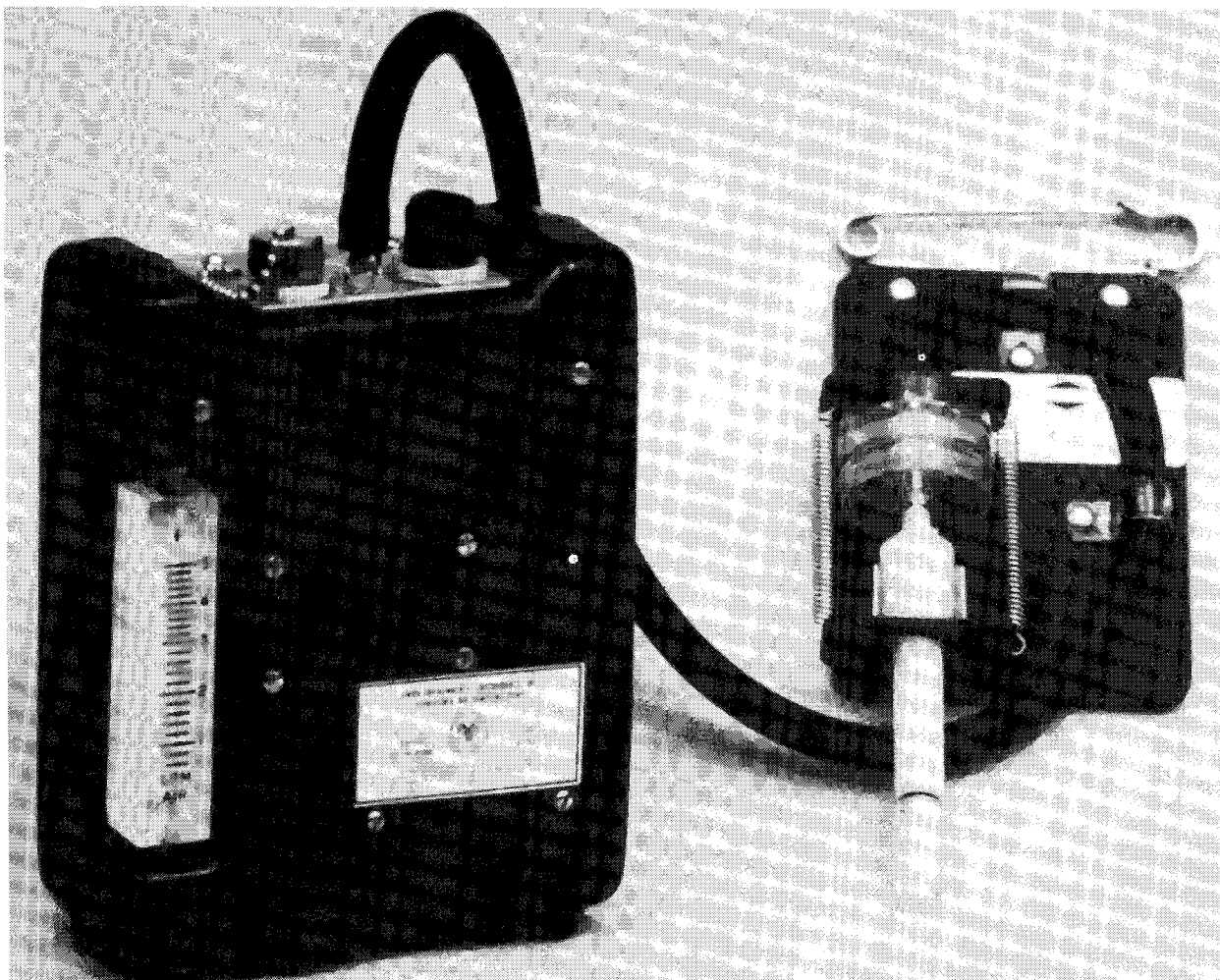


FIGURE 7. - Unico Model C110.

A. Operator's Responsibility

Section 202(a) of the Federal Coal Mine Health and Safety Act states that each operator of a coal mine shall take accurate samples of the amount of respirable dust in the mine atmosphere to which each miner in the active workings of such mine is exposed. Such samples shall be taken by any device approved by the Secretary of the Interior and the Secretary of Health, Education, and Welfare, in accordance with such methods, at such locations, at such intervals, and in such manner as the Secretaries have prescribed. Such samples shall be transmitted to the Secretary in a manner established by him, and shall be analyzed and recorded by him in a manner which will assure application of the provisions of section 104(i) when the applicable limit on the average concentration of respirable dust permitted to be maintained under this title is exceeded. The results of such analysis shall also be made available to the operator.

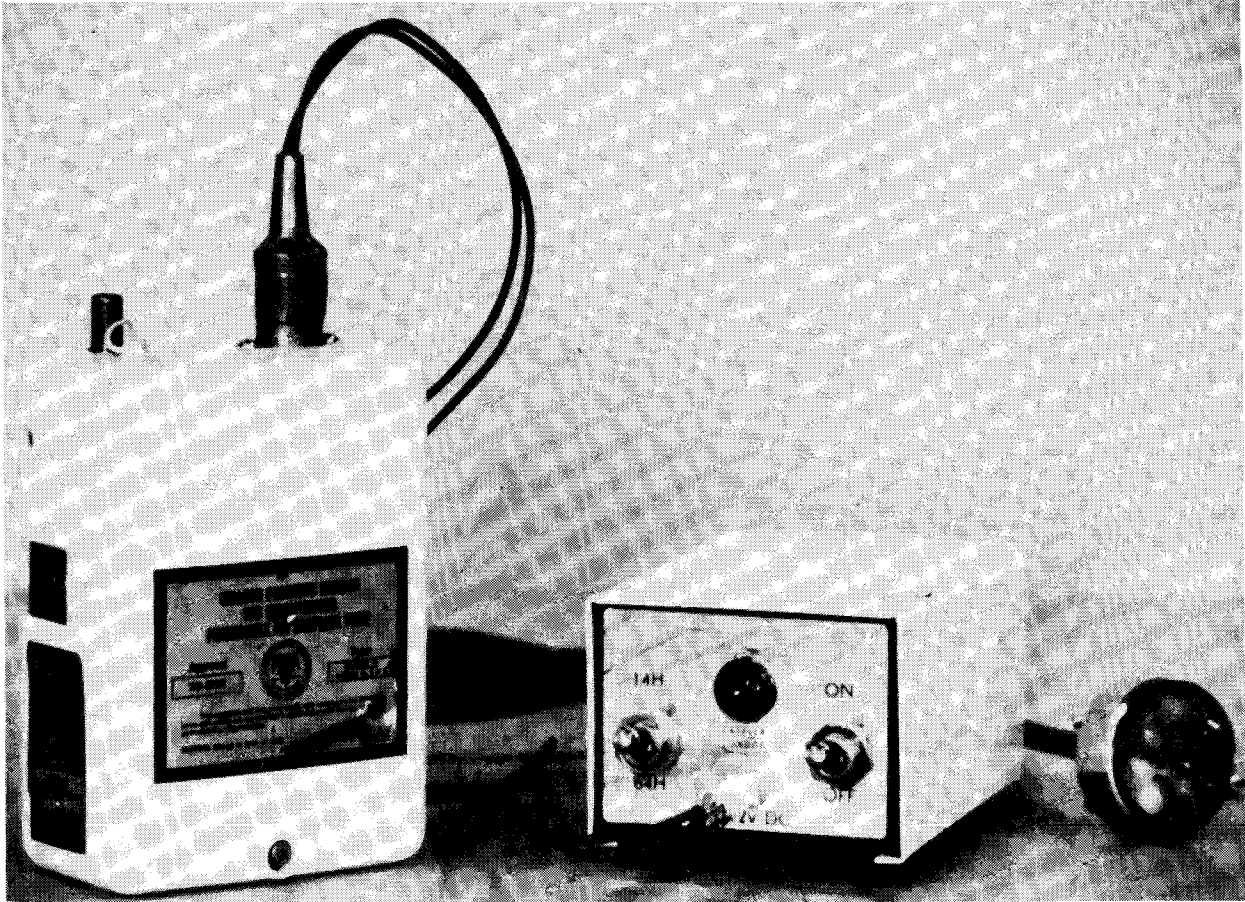


FIGURE 8. - Cassella Model B.

Each operator shall report and certify to the Secretary on or before June 30, 1970, and annually thereafter, the conditions relative to dust control which exist in the active workings of all mines in operation. Such reports shall be submitted on Bureau of Mines Form 6-1497. Report forms may be obtained from any Coal Mine Health and Safety District Office of the Bureau of Mines. Such reports shall be submitted to--

Health Division, Coal Mine Health and Safety
 Bureau of Mines
 Department of the Interior
 Washington, D.C. 20240.

1. Devices Used for Sampling

Respirable dust samples shall be collected with an MRE instrument or any other device approved by the Secretary of the Interior and the Secretary of Health, Education, and Welfare.

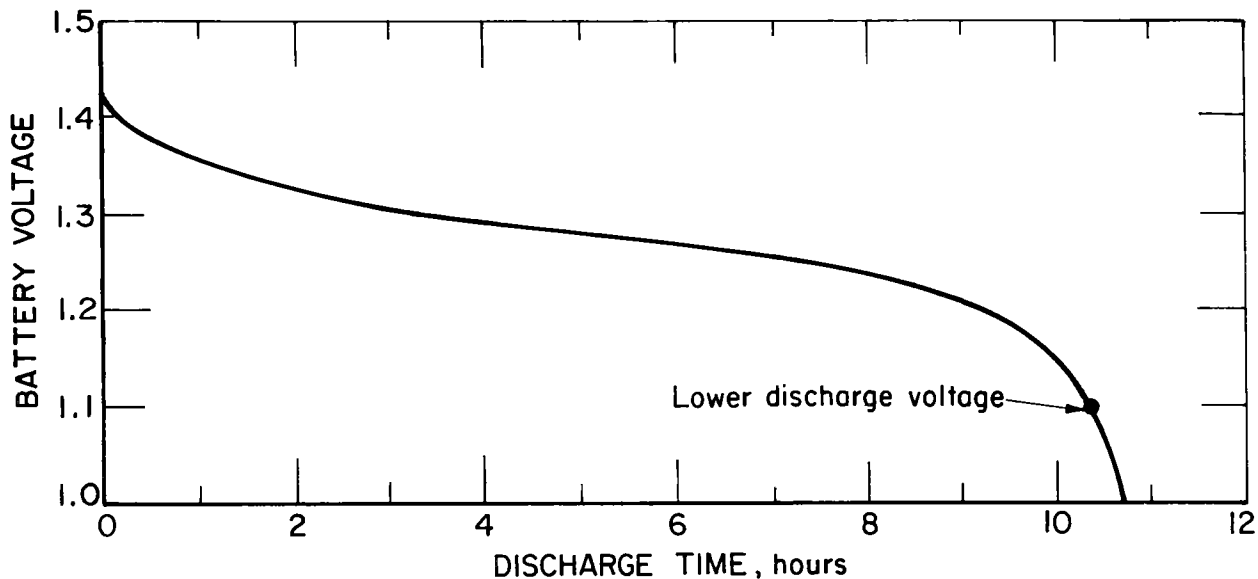


FIGURE 9. - Typical Battery Discharge Curve.

Approval requirements for complete assemblies of coal mine dust personal sampler units, including filters, were previously covered in Section V, Instrumentation for Dust Assessment.

2. Method of Sampling

Respirable dust samples shall be collected over a full shift, portal to portal, using an MRE or an approved personal sampling unit. Each operator shall be responsible for the cost of the sampler and accessories.

3. Manner of Sampling

The operator shall exercise care with respect to the location of the sampling device to assure that representative respirable dust samples of the mine atmosphere are taken. While sampling, the MRE instrument shall be kept in a level position, and the sampling head and the cyclone of the personal sampler shall be kept in an upright position.

4. Location of Sampling Device

a. The sampling device may be positioned on the mining equipment while taking samples of a working environment.

b. If the sampling device is located on the mining equipment, it shall be not more than 36 inches from the operator's normal working position, and in no instance shall the device be located outby the operator. If the operator leaves the machine for an extended time, he shall wear or carry the device.

c. The personal sampling device may be worn by the miner with the sampling head attached to his clothing at the chest, or it may be located in the working environment of the miner.

d. The sampling device used to take respirable dust samples in the intake ventilating air current shall be located as close to the working face as practicable, and in no instance shall the sampling device be located more than 200 feet from the working faces of the section.

5. Sampling of Individual Miners

The individual miner-exposure samples shall be taken during any shift where the miner is employed in his usual occupation, or in the occupation to which he was transferred.

a. Except as provided in paragraphs b and c, each miner's exposure shall be sampled during at least one shift every 180 days.

b. The exposure of each individual miner assigned to a working section shall be sampled at least once every 120 days.

c. The exposure of each miner who has exercised his option to transfer, in accordance with section 203(b)(1) of the act, shall be sampled at least once every 90 days.

6. Sampling of Working Sections

Effective June 30, 1970, every operator of a coal mine shall take samples for respirable coal mine dust during normal production shifts in each working section. A normal production shift means a shift during which the amount of coal produced in a working section is representative of the average amount of coal produced in that working section during all production shifts worked during the life of that section, or during the 6 months immediately preceding such production, whichever is the shorter period. With regard to a new working section, a normal production shift means a shift during which the amount of coal produced is comparable to the amounts produced in other comparable working sections.

Sampling in working sections shall be conducted as follows:

a. In a working section where conventional mining methods are employed, sampling will be confined to the operator of the cutting machine, unless otherwise directed by an authorized representative of the Secretary.

In the working section, the approved sampling device may remain on the operator or be placed on the machine he operates. If the sampling device is placed on the machine, the device shall be installed adjacent to the operator, within 36 inches in by his normal working position. In no case shall the device be installed out by the operator.

b. In a working section in which a continuous mining machine is employed, the approved sampling device may remain on the operator or be placed on the machine he operates, unless otherwise directed by an authorized representative of the Secretary.

If the sampling device is placed on a machine, the device shall be installed adjacent to the operator, within 36 inches inby his normal working position. In no case shall the device be installed outby the operator.

c. In a working section in which a longwall mining machine is used, the miner who works nearest the return air side of the longwall face may wear the approved sampling device, or it may be placed at a point in the return air current; but in no case may it be placed farther than 48 inches from the corner on the return side of the longwall face, unless otherwise directed by an authorized representative of the Secretary.

d. With respect to a working section in which coal is loaded by hand, 10 percent of the hand loaders, and in no case less than one hand loader, shall wear the approved coal mine dust sampler.

In the working section, the sampling units may remain on the hand loaders or may be placed at sites which represent the maximum concentrations of dust to which the hand loaders are exposed.

B. Sampling Cycles

1. Original Sampling Cycle

To establish a basic sample or original sampling cycle, samples of respirable dust shall be taken in each working section of a coal mine on 10 consecutive normal production shifts, each of which is worked on a separate calendar day. After June 30, 1970, an original sampling cycle shall be started in each working section of a coal mine no later than the 11th day upon which normal production shifts are worked in that section. For each working section, a series of 10 samples shall constitute the basic sample with respect to that working section. When working sections are located in multisection mines, the sampling cycle shall be staggered with those in other working sections to provide continuous sampling of the mine atmosphere. For example, if there are three working sections, samples from each working section shall be taken during different time periods. To provide continuous sampling, staggered sampling cycles may be overlapped.

2. Standard Sampling Cycle

During the calendar month beginning on the day the operator receives notice that a working section is in compliance, samples of respirable dust in that working section shall be taken each calendar month thereafter during five consecutive normal production shifts, each of which is worked on a separate calendar day. To insure that the procedures and methods for sampling set forth result in the transmission of an adequate number of reliable samples, additional samples obtained at more frequent intervals may be required.

3. Reduction in Standard Sampling Cycle

Where the samples from a standard sampling cycle have been included in the current basic sample and when the data recorded for the current basic

sample establish a cumulative concentration at or below 30 milligrams of respirable dust per cubic meter of air, the Secretary may establish in writing an alternating sampling cycle for such a working section. Under an alternating standard sampling cycle, the operator will not be required to take samples in that working section during the following calendar month.

During the third month, following completion of a standard sampling cycle, if the current basic sample shows that the cumulative concentration of respirable dust in a working section has not exceeded the limit of 30 milligrams per cubic meter of air, the operator will not be required to take samples from that working section during the following month or during any alternating months after which a determination of compliance has been made. For example:

July, basic sample in compliance; August, standard sampling cycle.
September, no sampling cycle; October, standard sampling cycle.
November, no sampling cycle; December, standard sampling cycle;
and so on.

4. Violations of Dust Standards

Upon receipt of a notice of violation of the dust standards in any working section, sampling procedures outlined in the preceding paragraph will not apply until the violation is abated. Instead, the operator shall sample during each normal production shift as required by section 104(i) of the act. Upon receipt of notice of abatement of a violation or upon renewal of a permit for noncompliance, the operator shall initiate an original sampling cycle on the first day on which there is a normal production shift.

5. Partial Sampling Cycle

If the Secretary fails to receive the specified number of valid samples from a particular working section, or if any samples taken during a sampling cycle have been rejected by the Secretary as invalid samples, the Secretary shall analyze the samples transmitted to him to determine whether such working section is in compliance with applicable respirable dust limit.

If the Secretary receives less than the required number of valid samples from a particular working section and has determined that the cumulative concentration of respirable dust does not exceed the applicable limit, the Secretary shall require the operator to initiate additional sampling. Upon receipt of advice that additional sampling is required, the operator shall commence such sampling on the first day on which there is a production shift and shall continue to take such consecutive samples until he is advised in writing by the Secretary that the total number of valid samples required has been received. If such additional sampling requires that samples be taken during a subsequent calendar month, the additional samples taken during the subsequent calendar month shall not relieve the operator of his duty to sample during that month.

Where additional sampling is required and when the Secretary receives more than the number of samples required, such additional samples shall be

MINE DATA CARD

CASSETTE NO. _____

INITIAL WT. _____

MINE ID NO. _____

FINAL WT. _____

SECTION ID NO. _____

SAMPLING TIME (MIN.) _____

MINER'S SSA NO. _____

OCCUPATION _____ TONS THIS SHIFT _____

TYPE OF SAMPLE _____

HIGH RISK _____ INTAKE AIR _____

NON-HIGH RISK:

FACE _____ NON-FACE _____ 203(B)(1) _____

FACE VENTILATION _____

EXHAUST _____ BLOWING _____

AUXILIARY _____ BRATTICE _____

TYPE OF MINING _____

DEVELOPMENT _____ RETREAT _____

METHOD OF MINING _____

CONTINUOUS _____ CONVENTIONAL _____

LONGWALL _____ OTHER _____

_____ CHECK IF SECTION WILL CLOSE
BEFORE NEXT SAMPLING CYCLE.

SIGNATURE:

(MINER SAMPLED) _____

(MINE OFFICIAL) _____

DATE _____

FIGURE 10. - Mine Data Card.

The mine data card, provided by the sampler manufacturer and shown in figure 10, shall have an identification number identical to that on the filter cassette used to take the sample and shall show the initial weight of the sample. Specific data noted on the card shall be inserted by the representative of the mining company responsible for the dust sampling procedure.

The data card shall be initialed by the miner whose environment was being sampled and by the representative of the mining company.

Upon receipt of respirable dust samples by the Bureau of Mines, each sample shall be analyzed and the specific data on the card shall be recorded. The data are then transmitted to an automatic data center for processing. The mine dust monitoring system is shown in figure 11. At the conclusion of each

combined with the samples previously received and the most recent 10 samples shall constitute the basic sample.

When additional samples are received by the Secretary, they will be combined with the valid samples already received, and a daily determination of compliance or noncompliance shall be made with respect to that working section.

If the sample being collected on the face equipment is accidentally destroyed or damaged during the shift, the sample should be voided and the section should be sampled on the same shift on the following day. The voided sample should be marked and sent to the Bureau of Mines, Pittsburgh, Pa. 15213.

C. Transmittal of Sample and Specified Data

At the conclusion of each production shift the operator shall promptly transmit the collected sample, along with the Mine Data Card certifying specified data to--

Pittsburgh Field Health Group
Bureau of Mines
4800 Forbes Avenue
Pittsburgh, Pa. 15213.

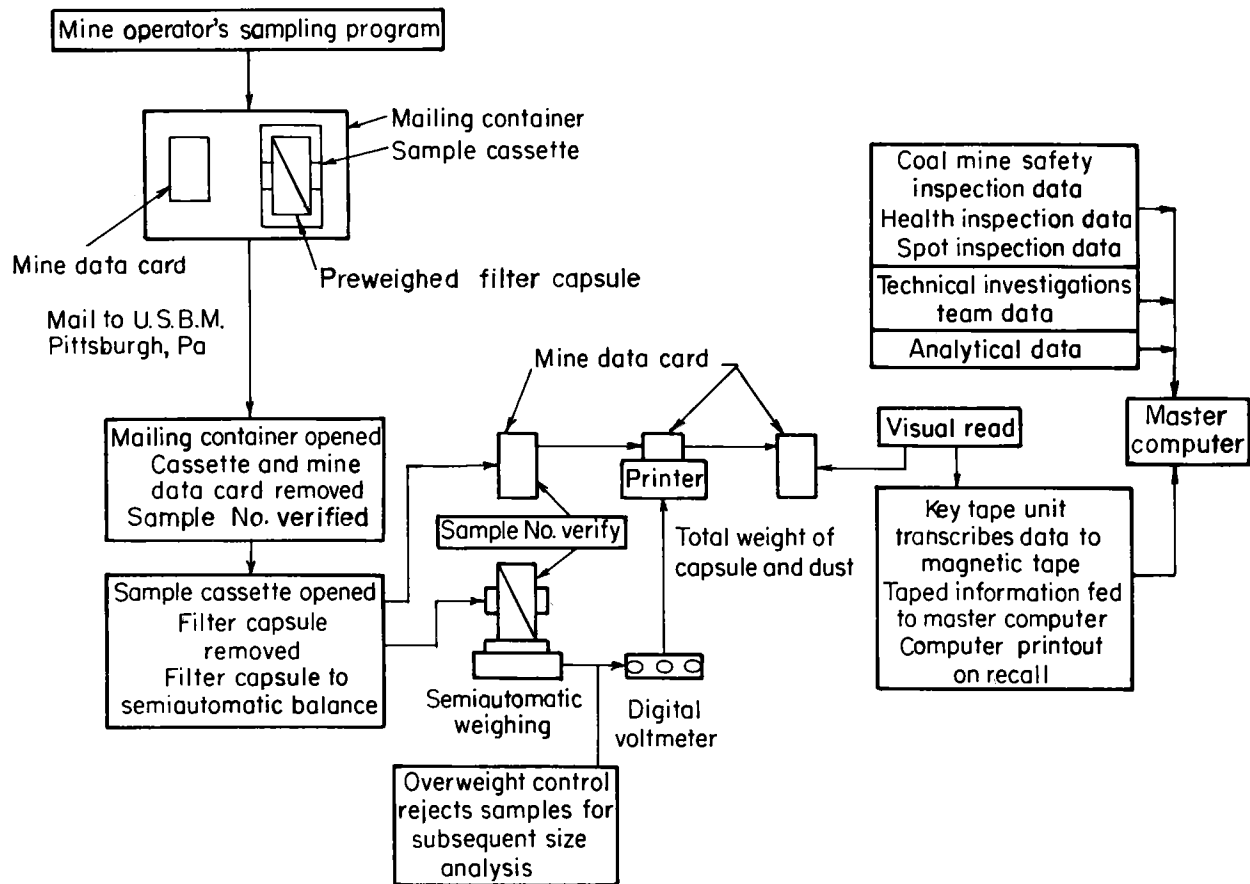


FIGURE 11. • Mine Dust Monitoring System.

sampling cycle, data printout shall be forwarded to the operator as soon as possible. This printout shall contain the following information:

Mine identification number.

Section identification number.

Dust concentration in mg/m^3 for each sample.

Cumulative dust concentration of all samples collected during each sampling cycle.

Dust concentration for the intake air samples.

D. Bureau of Mines Dust Inspection Program

At least four annual health and safety inspections of every operating coal mine are required by the act. Health inspections will be conducted in accordance with the procedures outlined in the Federal Coal Mine Inspectors' Manual. The operator's respirable dust sampling program shall be equivalent to two annual dust inspections by the Bureau of Mines.

At the discretion of the District Manager, the respirable dust inspection may be made in conjunction with the regular safety inspection or as a separate inspection.

To determine compliance with mandatory dust standards, frequent spot inspections of the active workings of coal mines are required.

VII. WEIGHING AND HANDLING OF SAMPLES

A. Filter Assembly

To prevent contamination of the filters used for collecting the respirable dust prior to and after sampling, various types of filter assemblies have been developed. These consist of a preweighed capsulated filter which is enclosed in an outer cassette. The initial weight of the capsule is recorded on a mine data card supplied with the assembly. A code number is recorded on the data card and on the capsule. Approved assemblies are manufactured by both the Gelman Instrument Co. and the Mine Safety Appliances Co. Although the assemblies are different in design, their performance characteristics are the same.

The filter within the preweighed capsule is a precision-engineered microporous polyvinyl membrane, having an approximate pore size of 5 microns. This particular filter material was chosen because of its low flow resistance and low moisture absorption coefficient. In addition, tests showed that the retention characteristics of these filters were better than 99 percent for respirable-size coal dust.

B. Balance Specifications and Operation

Any semimicro balance can be used to weigh the capsules, provided the weight capacity is 10 grams or greater. Although readability with this type of balance is one-hundredth of a milligram, results will be read and reported to one-tenth of a milligram. This insures that dust concentrations will be reported to the same number of significant figures as the legislative standard. Installation and operation of a balance must be in strict accordance with the manufacturer's instructions. Poor operation techniques, such as leaving the balance door open during weighing, and handling weights and samples without tweezers, can result in gross errors. Past experience has shown that a deionizing unit must be used to reduce the effect of static charge on the balance.

C. Processing Dust Samples

Prior to weighing, the protective cassette must be cleaned and removed from the capsule. The capsules are handled only with tweezers. Check the zero of the balance and then weigh the capsule. The weight gain due to dust load is determined as follows:

$$\text{Weight gain} = \text{final weight} - \text{initial weight.}$$

For example, if a capsule's preweight is 4.2638 grams and if after sampling the weight is 4.2652 grams, the weight gain is determined as follows:

$$\text{Weight gain} = 4.2652 \text{ grams} - 4.2638 \text{ grams,}$$

$$\text{weight gain} = 0.0014 \text{ gram.}$$

Since the weight gain is a small fraction of a gram, 0.0014 gram is changed to 1.4 milligrams. To convert from grams to milligrams, multiply by 1,000, which is equivalent to moving the decimal point three places to the right.

Dust concentrations are expressed in milligrams of dust per cubic meter of air sampled. The calculation is as follows:

$$\text{Dust concentration} = \frac{\text{Weight gain}}{(\text{T})(\text{R})},$$

where (T) is the time of sampling in minutes and (R) is the rate of sampling in cubic meters per minute (1 cubic meter = 1,000 liters).

The following example illustrates this calculation, using the weight gain determined previously, and assuming that the sample was collected for 480 minutes at a flow rate of 0.002 cubic meter per minute (which is 2 liters per minute):

$$\text{Weight gain} = 1.4 \text{ mg,}$$

and

$$\text{sampling time (T)} = 480 \text{ minutes.}$$

$$\text{Rate of sampling (R)} = 0.002 \text{ cubic meter per minute}$$

$$= \frac{2 \text{ liters per minute}}{1,000}$$

$$\text{Dust concentration (mg/m}^3\text{)} = \frac{1.4 \text{ mg}}{(480 \text{ minutes}) \left(\frac{0.002 \text{ m}^3}{\text{minute}} \right)}$$

$$= \frac{1.4 \text{ mg}}{0.96 \text{ m}^3}$$

$$= 1.5 \text{ mg/m}^3.$$

The same procedures and equations are used for determining dust concentrations using the MRE sampler; however, the sampling rate (R) is 0.0025 cubic meter per minute (2.5 liters per minute). Dust concentrations determined using the personal respirable sampler are converted to equivalent MRE concentrations by multiplying the personal sampler concentration by 1.6.

VIII. CALIBRATION PROCEDURES

A. Calibration Test Stand

Calibration of the sampling equipment is one of the most critical operations of any sampling program. This is especially true when the respirable dust criteria is dependent on the flow rate through the sampling instrument. To accurately calibrate the equipment approved for underground sampling, the test stand shown in figure 12, or its equivalent, should be used.

This stand comprises the following components:

1. Wet test meter--3-liter-capacity. The wet test meter must be calibrated periodically. The American Society for Testing and Materials has issued a standard method for calibrating wet test meters titled "Measurement of Gaseous Fuel Samples (D 1071-55)."
2. Voltmeter (dc)--0- to 10-volt range, 1,000 ohms/volt.
3. Milliammeter (dc)--0- to 500-ma range.
4. Power supply (dc)--0- to 10-volt, 0- to 500-ma range.

A Precision wet test meter
 B Cyclone
 C Pump
 D Manometer

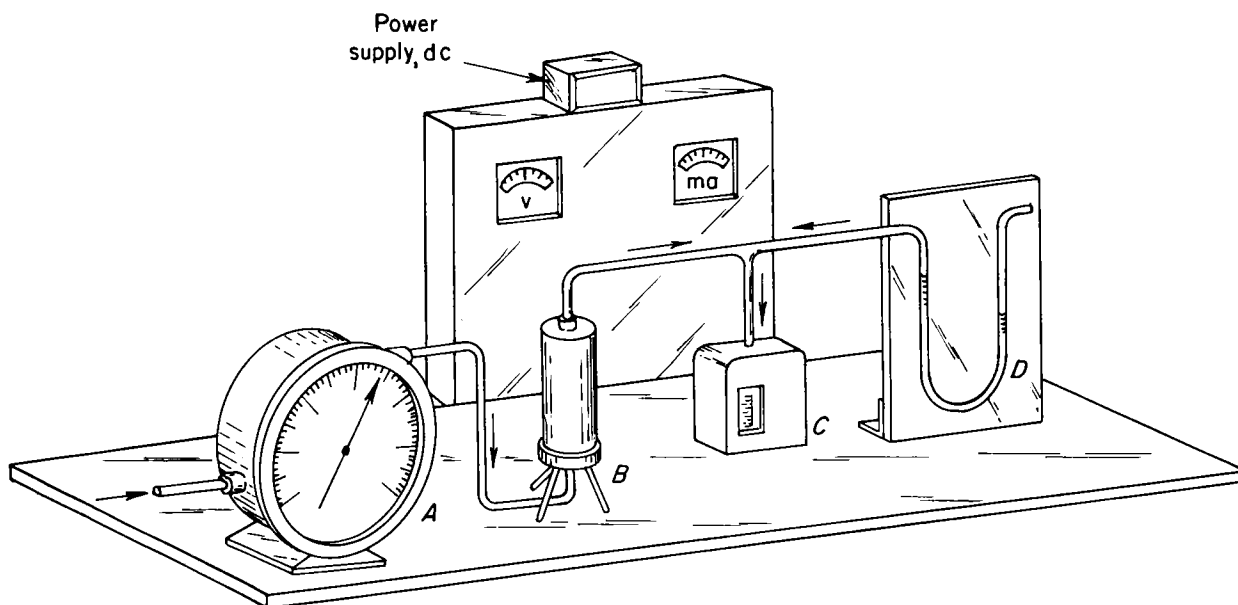
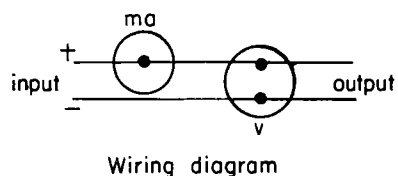


FIGURE 12. - Calibration Test Stand.

5. Test cell head--simulates the resistance of the sampling head.
6. Water manometer.
7. Stroboscope--for measuring the rpm of the MRE motor during adjustment.

B. Calibration Procedure

1. MRE Sampler

Should an MRE fail a check test, or at regular intervals of about 200 hours' running time, a complete check of the instrument's performance should be made and necessary servicing and adjustments carried out.

a. Pump Flow and Adjustment

The flowmeter in the instrument should be used to check the flow rate. The center line represents 2.5 liters per minute, and the lines above and below represent 2.6 and 2.4 liters per minute, respectively.

The instrument should be removed from its case by disconnecting the tube from the filter holder, removing the six Allen-head countersunk screws located along the edge of the top plate, and then lifting the instrument out of its case, feeding the rubber tube through from the filter compartment at the same time.

Place the instrument on a suitable stand, and measure the flow with the instrument operating on an applied voltage of 6.4 volts. The flow rate should be 2.5 liters per minute.

(1) High flow rate with motor at correct speed.

The swept volume of the pump may be altered by adjusting the length of the stroke. To adjust the stroke, slightly loosen the nut which clamps the crank slide and adjust the position of the slide in the flywheel by means of the small screw at the end of the slide. Recheck the motor speed after making any alteration to the pump and adjust the motor speed if necessary. Never make an alteration to the pump flow rate or to the motor speed without rechecking both, as they are interdependent. Retighten the crankpin slide locknut.

(2) Low flow rate with motor at correct speed.

A low flow rate normally results from a decrease in the efficiency of the pump and is caused by poor valve operation or by an air leak.

Remove the rubber tubing from both valve chests, and with the motor running, slowly block off both inlets with the fingers. The motor should virtually stop. If not, check the tightness of the pumphead retaining screws and the screws holding down the valve chests. If this does not correct the defect, there is probably a leak in the pump diaphragm.

To check the valve closure, run the instrument and slowly block off the inlet valve with a finger. This should almost, if not completely, stop the motor. Repeat check by blocking off the exhaust valve inlet.

(3) Smoothing device and flowmeter.

Check that there are no leaks in the smoothing device and flowmeter by sealing the top of the flowmeter, blowing gently into the rubber tube connected to the smoothing device to distend the rubber diaphragm, and then pinching off the tube to maintain the pressure. The diaphragm must remain distended until the pressure is released.

(4) Motor speed adjustment.

The motor speed may be checked by using the stroboscope or by noting the reading of the volume-indicating counter in a given time period. At a voltage of 6.4 volts and at a flow rate of 2.5 liters per minute, the motor pinion speed must be between 1,770 and 1,830 revolutions per minute. This is equivalent to a counter reading of 59 to 61 in 24 minutes running time. If the motor speed is outside these limits, check that the flow rate is within its limits before making any adjustments.

Small adjustments may be made to the motor speed by altering the tension of the governor spring. This is a delicate and precise operation and should only be attempted by a suitably experienced technician. It is impossible to get a motor to run at the correct speed if an attempt has been made to correct the flow from an inefficient pump by increasing the pump stroke. The extra power required to drive the pump is not available from the motor at its governed speed. With a correctly adjusted unit, the current drain should not exceed 70 ma and will generally be between 55 and 60 ma.

b. Running Check

After working on the instrument and particularly if the motor speed has been altered, it should be allowed to run for 4 hours. Check motor speed before reassembly into the case.

2. Personal Sampler

The sampler should be given a complete check and calibration at intervals no greater than 200 hours of running time. Because the sampler is worn on the person, it will receive more abuse than the MRE.

a. Initial Check

The sampler should first be examined for physical damage and missing parts (switch covers, screws, etc.). If the flow rate device is a flowmeter, it should be removed and thoroughly cleaned. Valve closure is checked by static loading of about 4 inches water gage, with vacuum on inlet side and pressure on outlet side. Low flow rate normally results from a decrease in the efficiency of the pump caused by poor valve operation or an air leak. Tubing should be checked for deterioration and replaced if necessary.

The sampler is then placed on the calibration test stand. When the power supply is set at the proper voltage, depending upon sampler model, and when connection is made to the inlet of the sampler, the unit is energized. The flow rate is set at 2.0 liters per minute. The current drain at this setting should be less than the 10-hour-capacity current of the battery. If it is not, additional maintenance is required. Causes might be improper gear mesh, an overextended eccentric, or a dirty commutator. Excessive current drain might also result from too much resistance on the sampler. The water manometer on the test stand serves as a check against this. Depending upon the sampler head, the resistance at 2 liters per minute will be fairly constant. Any value higher than this constant indicates a restriction in the system.

b. Flow Measurement

The unit is ready for calibrating after the above checks have been made. Once the desired flow rate of 2 liters per minute is set, a quantity of air per unit of time is measured. This unit of time should not be less than 4.5 minutes; it is desirable that it be 30 minutes. Once the unit is properly calibrated, the flow rate indicator should be checked for agreement and adjusted if necessary.

APPENDIX A.--INTERIM MANDATORY HEALTH STANDARDS PRESCRIBED IN THE ACT

Section 103(a). Authorized representatives of the Secretary shall make frequent inspections and investigations in coal mines each year for the purpose of (1) obtaining, utilizing, and disseminating information relating to health and safety conditions, the causes of accidents, and the causes of diseases and physical impairments originating in such mines, (2) gathering information with respect to mandatory health or safety standards, (3) determining whether an imminent danger exists, and (4) determining whether or not there is compliance with the mandatory health or safety standards or with any notice, order, or decision issued under this title. In carrying out the requirements of clauses (3) and (4) of this subsection, no advance notice of an inspection shall be provided to any person. In carrying out the requirements of clauses (3) and (4) of this subsection in each underground coal mine, such representatives shall make inspections of the entire mine at least four times a year.

Section 104(b). Except as provided in subsection (i) of this section, if, upon any inspection of a coal mine, an authorized representative of the Secretary finds that there has been a violation of any mandatory health or safety standard but the violation has not created an imminent danger, he shall issue a notice to the operator or his agent fixing a reasonable time for the abatement of the violation. If upon the expiration of the period of time as originally fixed or subsequently extended, an authorized representative of the Secretary finds that the violation has not been totally abated, and if he also finds that the period of time should not be further extended, he shall find the extent of the area affected and shall promptly issue an order requiring the operator of such mine or his agent to cause immediately all persons, except those referred to in subsection (d) of this section, to be withdrawn from, and to be prohibited from entering, such area until an authorized representative of the Secretary determines that the violation has been abated.

Section 104(c)(1). If upon any inspection of a coal mine, an authorized representative of the Secretary finds that there has been a violation of any mandatory health or safety standard, and if he also finds that, while the conditions created by such violation do not cause imminent danger, such violation is of such nature as could significantly and substantially contribute to the cause and effect of a mine safety or health hazard, and if he finds such violation to be caused by an unwarrantable failure of such operator to comply with such mandatory health or safety standards, he shall include such finding in any notice given to the operator under this act. If, during the same inspection or any subsequent inspection of such mine within 90 days after the issuance of such notice, an authorized representative of the Secretary finds another violation of any mandatory health or safety standard and finds such violation to be also caused by an unwarrantable failure of such operator to so comply, he shall forthwith issue an order requiring the operator to cause all persons in the area affected by such violation, except those persons referred to in subsection (d) of this section, to be withdrawn from, and to be prohibited from entering, such area until an authorized representative of the Secretary determines that such violation has been abated.

Section 104(i). If, based upon samples taken and analyzed and recorded pursuant to section 202(a) of this act, or samples taken during an inspection by an authorized representative of the Secretary, the applicable limit on the concentration of respirable dust required to be maintained is exceeded and thereby violated, the Secretary or his authorized representative shall issue a notice fixing a reasonable time for the abatement of the violation. During such time, the operator of the mine shall cause samples described in section 202(a) of this act to be taken of the affected area during each production shift. If, upon the expiration of the period of time as originally fixed, or subsequently extended, the Secretary or his authorized representative finds that the period of time should not be further extended, he shall find the extent of the area affected by the violation and shall promptly issue an order requiring the operator of such mine or his agent to cause immediately all persons, except those referred to in subsection (d) of this section, to be withdrawn from, and to be prohibited from entering such area, until the Secretary or his authorized representative has reason to believe, based on actions taken by the operator, that such limit will be complied with upon the resumption of production in such mine. As soon as possible after an order is issued, the Secretary, upon request of the operator, shall dispatch to the mine involved, a person or team of persons, to the extent such persons are available, who are knowledgeable in the methods and means of controlling and reducing respirable dust. Such person or team of persons shall remain at the mine involved for such time as they shall deem appropriate to assist the operator in reducing respirable dust concentration. While at the mine, such persons may require the operator to take such actions as they deem appropriate to insure the health of any person in the coal mine.

Section 202(a). Each operator of a coal mine shall take accurate samples of the amount of respirable dust in the mine atmosphere to which each miner in the active workings of such mine is exposed. Such samples shall be taken by any device approved by the Secretary and the Secretary of Health, Education, and Welfare and in accordance with such methods, at such locations, at such intervals, and in such manner as the Secretaries shall prescribe in the Federal Register within 60 days from the date of enactment of this act, and from time to time thereafter. Such samples shall be transmitted to the Secretary in a manner that will assure applications of the provisions of section 104(i) of this act when the applicable limit on the concentration of respirable dust required to be maintained under this section is exceeded. The results of such samples shall also be made available to the operator. Each operator shall report and certify to the Secretary at such intervals as the Secretary may require as to the conditions in the active workings of the coal mine, including, but not limited to, the average number of working hours worked during each shift, the quantity and velocity of air regularly reaching the working faces, the method of mining, the amount and pressure of the water, if any, reaching the working faces, and the number, location, and types of sprays, if any are used.

Section 202(b). Except as otherwise provided in this subsection--

(1) Effective on the operative date of this title, each operator shall continuously maintain the average concentration of respirable dust in the mine

atmosphere during each shift to which each miner in the active workings of such mine is exposed at or below 3.0 milligrams of respirable dust per cubic meter of air.

(2) Effective 3 years after the date of enactment of this act, each operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which each miner in the active workings of such mine is exposed at or below 2.0 milligrams of respirable dust per cubic meter of air.

(3) Any operator who determines that he will be unable, using available technology, to comply with the provisions of paragraph (1) of this subsection, as appropriate, or the provisions of paragraph (2) of this subsection, as appropriate, may file with the Panel, no later than 60 days prior to the effective date of the applicable respirable dust standard established by such paragraphs, an application for a permit for noncompliance. If, in the case of an application for a permit for noncompliance with the 3.0-milligram standard established by paragraph (1) of this subsection, the application satisfies the requirements of subsection (c) of this section, the Panel shall issue a permit for noncompliance to the operator. If, in the case of an application for a permit for noncompliance with the 2.0-milligram standard established by paragraph (2) of this subsection, the application satisfies the requirements of subsection (c) of this section and the Panel determines that the applicant will be unable to comply with such standard, the Panel shall issue to the operator a permit for noncompliance.

(4) In any case in which an operator who has been issued a permit (including a renewal permit) for noncompliance under this section, determines, not more than 90 days prior to the expiration date of such permit, that he still is unable to comply with the standard established by paragraph (1) of this subsection, or the standard established by paragraph (2) of this subsection, as appropriate, he may file with the Panel an application for renewal of the permit. Upon receipt of such application, the Panel, if it determines, after all interested persons have been notified, and given an opportunity for a public hearing under section 5 of this act, that the application is in compliance with the provisions of subsection (c) of this section, and that the applicant will be unable to comply with such standard, may renew the permit.

(5) Any such permit or renewal thereof so issued shall be in effect for a period not to exceed 1 year and shall entitle the permittee during such period to maintain continuously the average concentration of respirable dust in the mine atmosphere during each shift in the working places of such mine to which the permit applies at a level specified by the Panel, which shall be at the lowest level which the application shows the conditions, technology applicable to such mine, and other available and effective control techniques and methods will permit, but in no event shall such level exceed 4.5 milligrams of dust per cubic meter of air during the period when the 3.0-milligram standard is in effect, or 3.0 milligrams of dust per cubic meter of air during the period when the 2.0-milligram standard is in effect.

(6) No permit or renewal thereof for noncompliance shall entitle any operator to an extension of time beyond 18 months from the date of enactment of the act to comply with the 3.0-milligram standard established by paragraph (1) of this subsection, or beyond 72 months from the date of enactment of this act to comply with the 2.0-milligram standard established by paragraph (2) of this subsection.

Section 202(c). Any application for an initial or renewal permit made pursuant to this section shall contain--

(1) A representation by the applicant and the engineer conducting the survey referred to in paragraph (2) of this subsection that the applicant is unable to comply with the standard applicable under subsections (b)(1) or (b)(2) of this section at specified working places because the technology for reducing the concentration of respirable dust at such places is not available or because of the lack of other effective control techniques or methods, or because of any combination of such reasons;

(2) An identification of the working places in such mine for which the permit is requested; the results of an engineering survey by a certified engineer of the respirable dust conditions of each working place of the mine with respect to which such application is filed, and the ability to reduce such dust to the level required to be maintained in such place under this section; a description of the ventilation system of the mine and its capacity; the quantity and velocity of air regularly reaching the working faces; the method of mining; the amount and pressure of the water, if any, reaching the working faces; the number, location, and type of sprays, if any; action taken to reduce such dust; and such other information as the Panel may require; and

(3) Statements by the applicant and the engineer conducting such survey, of the means and methods to be employed to achieve compliance with the applicable standard, the progress made toward achieving compliance, and an estimate of when compliance can be achieved.

Section 204. The dust resulting from drilling in rock shall be controlled by the use of permissible dust collectors, or by water or water with a wetting agent, or by ventilation, or by any other method or device approved by the Secretary which is at least as effective in controlling such dust. Respiratory equipment approved by the Secretary and the Secretary of Health, Education, and Welfare shall be provided [to] persons exposed for short periods to inhalation hazards from gas, dusts, fumes, or mist. When the exposure is for prolonged periods, other measures to protect such persons or to reduce the hazard shall be taken.

Section 205. In coal mining operation where the concentration of respirable dust in the mine atmosphere of any working place contains more than 5 percent quartz, the Secretary of Health, Education, and Welfare shall prescribe an appropriate formula for determining the applicable respirable dust standard under this title for such working place and the Secretary shall apply such formula in carrying out his duties under this title.

APPENDIX B.--MANDATORY HEALTH STANDARDS, 30 CFR, PART 70

Title 30—MINERAL RESOURCES**Chapter I—Bureau of Mines,
Department of the Interior****SUBPART O—COAL MINE HEALTH AND SAFETY****PART 70—MANDATORY HEALTH
STANDARDS — UNDERGROUND
COAL MINES**

Part 70, reading as set forth below, is added to Subchapter O of Chapter 1, Title 30, Code of Federal Regulations. In addition to provisions relating to sampling respirable dust in coal mine atmospheres, this part sets out certain mandatory health standards contained in title II of the Federal Coal Mine Health and Safety Act of 1969, interpretations thereof, and statements with respect to respiratory equipment approved by the Secretary of the Interior and the Secretary of Health, Education, and Welfare. It is impracticable to give notice of proposed rulemaking with respect to the provisions relating to sampling respirable dust because of the limitations of time imposed by section 202(a) of the Act in this regard.

Part 70 shall become effective on June 30, 1970.

WALTER J. HICKEL,
Secretary of the Interior.

ROBERT H. FINCH,
*Secretary of Health, Education,
and Welfare.*

APRIL 1, 1970.

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AUTHORITY: The provisions of this Part 70 issued under title II, and sec. 508 of the Federal Coal Mine Health and Safety Act of 1969 (83 Stat. 742).

Subpart A—General

§ 70.1 Scope.

This Part 70 sets forth health standards compliance with which is mandatory in each underground coal mine subject to the Federal Coal Mine Health and Safety Act of 1969. Regulations supplementary to these standards also are set forth in this part.

§ 70.2 Definitions.

For the purpose of this Part 70, the term—

(a) “Certified” or “registered” as applied to any person means a person certified or registered by the State in which the coal mine is located to perform duties prescribed by such titles, except that, in a State where no program of certification or registration is provided or where the program does not meet at least minimum Federal standards established by the Secretary, such certification or registration shall be by the Secretary;

(b) “Qualified person” means, as the context requires, an individual deemed qualified by the Secretary and designated by the operator to make tests and examinations required by this Act; and

(c) “Permissible” as applied to equipment used in the operation of a coal mine, means equipment, other than permissible electric face equipment, to which an approval plate, label, or other device is attached as authorized by the Secretary for the construction and maintenance of such equipment and are designed to assure that such equipment will not cause a mine explosion or a mine fire;

(d) “Working face” means any place in a coal mine in which work of extracting coal from its natural deposit in the earth is performed during the mining cycle;

(e) “Working place” means the area of a coal mine in by the last open crosscut;

(f) “Working section” means all areas of the coal mine from the loading point of the section to and including the working face; when two or more mechanized mining sections (as defined in § 75.319-1 of Part 75, Subchapter O this chapter) are engaged in the production of coal within the same working section, each such mechanized mining section shall be considered a separate “working section” for the purpose of this Part 70;

(g) “Active workings” means any place in a coal mine where miners are normally required to work or travel;

(h) “Normal production shift” (as differentiated from a maintenance shift) means a shift during which the amount of coal produced in a working section is representative of the average amount of

coal produced in such working section during all production shifts worked during the life of such working section or during the 6 months immediately preceding such production, whichever is the shorter period. With regard to a new working section, a “normal production shift” means a shift during which the amount of coal produced is comparable to the amounts produced during “normal production shifts” in other comparable working sections.

(i) “Respirable dust” means only dust particulates 5 microns or less in size;

(j) “Coal mine” includes areas of adjoining mines connected underground;

(k) “Secretary” means the Secretary of the Interior or his delegate;

(l) “Act” means the Federal Coal Mine Health and Safety Act of 1969;

(m) “Concentrations of respirable dust” means the average concentration of respirable dust if measured with an MRE instrument or such equivalent concentrations if measured with another device approved by the Secretary and the Secretary of Health, Education, and Welfare;

(n) “MRE instrument” means the gravimetric dust sampler with four channel horizontal elutriator developed by the Mining Research Establishment of the National Coal Board, London, England; and

(o) “Average concentration” means a determination which accurately represents the atmospheric conditions with regard to respirable dust to which each miner in the active working of a mine is exposed (1) as measured, during the period ending June 30, 1971, over a number of continuous production shifts to be determined by the Secretary and the Secretary of Health, Education, and Welfare and (2) as measured thereafter, over a single shift only, unless the Secretary and the Secretary of Health, Education, and Welfare find, in accordance with the provisions of § 101 of the Act, that such single shift measurement will not, after applying valid statistical techniques to such measurement, accurately represent such atmospheric conditions during such shift.

Subpart B—Dust Standards

§ 70.100 Dust standards; respirable dust.

(a) Effective June 30, 1970, each operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which each miner in the active workings of such mine is exposed at or below 3.0 milligrams of respirable dust per cubic meter of air.

(b) Effective December 30, 1972, each operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which each miner in the active

workings of such mine is exposed at or below 2.0 milligrams of respirable dust per cubic meter of air.

(c) An operator need not comply with paragraph (a) or paragraph (b) of this section during the period of time specified in a permit of noncompliance issued by the Interim Compliance Panel established by the Act, but during that period the operator shall continuously maintain the average concentration of respirable dust in the mine atmosphere during each shift to which each miner in the active workings of the mine is exposed at or below the limit specified in the permit of noncompliance.

Subpart C—Sampling Procedures

§ 70.201 Sampling; general requirement.

Each operator of a coal mine shall, as prescribed in this Part 70, take accurate samples of the amount of respirable dust in the mine atmosphere to which each miner in the active workings of such mine is exposed.

§ 70.202 Sampling; by whom done.

The dust sampling required by this Part 70 shall be done by, or as directed by, a person—

(a) Who has had practical experience in an underground coal mine;

(b) Who has a working knowledge of the mining equipment employed in the mine in which samples are taken;

(c) Who has a working knowledge of the coal mine ventilation system in the mine in which samples are taken;

(d) Who has a working knowledge of the operation and care of the sampling devices mentioned in § 70.203 and the filters employed in such devices; and

(e) Who has satisfactorily completed a course approved by the Secretary in sampling and evaluation of respirable coal mine dust concentrations with the sampling devices mentioned in § 70.203.

§ 70.203 Approved sampling devices.

Except as provided in § 70.204, the samples which this Part 70 requires to be taken shall be taken only with a coal mine dust personal sampler unit approved under Part 74 of this chapter or with an MRE instrument.

§ 70.204 Approved sampling devices; existing coal mine dust personal sampler units.

(a) Coal mine dust personal sampler units in use on or before June 30, 1970, which contain any combination of the pumps, sampling head assemblies and battery chargers listed in paragraphs (b), (c), and (d) of this section may be used until January 1, 1971, to take samples of respirable dust as required by this Part 70.

(b) The following battery operated

pump units approved by the Bureau of Mines for intrinsic safety under the provisions of Part 18 of this chapter (Bureau of Mines Schedule 2F and 2G):

(1) Cassella, Ltd., Willson Products Division, Post Office Box 622, Reading, Pa. 19603: Mark II, Model B;

(2) Mine Safety Appliances Co., 201 North Braddock Avenue, Pittsburgh, Pa. 15208: Model G;

(3) UNICO Environmental Instruments, Inc., 150 Cove Street, Fall River, Mass. 02720: Model C110.

(c) The following sampling head assemblies:

(1) Mine Safety Appliances Co., 201 North Braddock Avenue, Pittsburgh, Pa. 15208: Gravimetric Dust Sampler;

(2) UNICO Environmental Instruments, Inc., 150 Cove Street, Fall River, Mass. 02720: Respirable Mass Lapel Sampler;

(3) Any other sampling head assembly employing the following components:

(i) A Dorr-Oliver nylon cyclone, a nylon vortex finder and a grit cap, as specified in subparagraph (1), paragraph (b) of § 74.3 of Part 74 of this chapter;

(ii) A filter assembly, as specified in subparagraph (2), paragraph (b) of § 74.3 of Part 74 of this chapter, except the filter assembly need not meet the preweight specification prescribed in that subparagraph.

(d) A battery charger designated as appropriate by the manufacturer of the pump unit employed in the particular coal mine dust sampler unit.

§ 70.205 Approved sampling devices; operation, rates of air flow.

An approved coal mine dust personal sampler unit shall be operated at a flow rate of 2.0 liters of air per minute. An MRE instrument shall be operated at a flow rate of 2.5 liters of air per minute.

§ 70.206 Approved sampling devices; equivalent concentrations.

The concentration of respirable dust expressed in milligrams per cubic meter of air shall be determined by dividing the weight of dust in milligrams collected on the filter by the volume of air in cubic meters passing through the filter. To convert a concentration of respirable dust as measured with an approved coal mine dust personal sampler unit to an equivalent concentration of respirable dust as measured with an MRE instrument, the concentration of respirable dust measured with an approved coal mine dust personal sampler unit shall be multiplied by a constant factor of 1.6 and the product shall be the equivalent concentration as measured with an MRE instrument.

ORIGINAL DETERMINATION OF RESPIRABLE DUST CONCENTRATION

§ 70.210 Original sampling cycle; establishment of basic sample.

(a) Samples of respirable dust with

respect to each working section of a coal mine shall be taken on 10 consecutive normal production shifts, each of which is worked on a separate calendar day, beginning with a normal production shift completed on or after June 30, 1970, except that, with respect to working sections located in multisection mines, original sampling may be conducted in accordance with the provisions of § 70.241 of this part. An original sampling cycle shall be begun with respect to each working section of a coal mine no later than the 11th day upon which normal production shifts are worked in that section. For each working section, this series of 10 samples, or a series of 10 samples submitted in accordance with the provisions of § 70.230 of this part, shall constitute the basic sample with respect to that working section.

(b) Where a working section is opened after June 30, 1970, the original sampling cycle required in accordance with the provisions of paragraph (a) of this section shall be begun on a normal production shift (as defined in § 70.220) on the first production day in such working section and thereafter on consecutive production shifts (as defined in § 70.220).

§ 70.211 Violation of dust standard; original sampling cycle.

(a) If the data recorded pursuant to § 70.261 for an original sampling cycle with respect to a working section of a coal mine establish a cumulative concentration of respirable dust in excess of the cumulative concentration stated in paragraph (b) of this section with respect to the particular applicable limit, without regard to the number of samples analyzed, the Secretary shall issue a notice to the operator that he is in violation of paragraph (a) or paragraph (c) of § 70.100 of this Part 70. Paragraph (a) of § 70.100 prescribes a limit of 3.0 milligrams of respirable dust per cubic meter of air. Paragraph (c) of § 70.100 covers permits for noncompliance issued by the Interim Compliance Panel established by the Act. Such a permit may establish a limit of 4.5 milligrams, 4.0 milligrams, or 3.5 milligrams.

(b) The cumulative concentration of respirable dust recorded from samples which establish noncompliance with a particular applicable limit may be as follows:

(1) If, when a limit of 4.5 milligrams per cubic meter of air is in effect, the cumulative concentration exceeds 45 milligrams of respirable dust per cubic meter of air;

(2) If, when a limit of 4.0 milligrams per cubic meter of air is in effect, the cumulative concentration exceeds 40 milligrams of respirable dust per cubic meter of air;

(3) If, when a limit of 3.5 milligrams per cubic meter of air is in effect, the cumulative concentration exceeds 35

milligrams of respirable dust per cubic meter of air;

(4) If, when a limit of 3.0 milligrams per cubic meter of air is in effect, the cumulative concentration exceeds 30 milligrams of respirable dust per cubic meter of air.

(5) If, when any limit, other than those stated in subparagraphs (1), (2), (3), and (4) of this paragraph, is in effect under a permit for noncompliance, the cumulative concentration exceeds 10 times the specified limit of respirable dust per cubic meter of air.

STANDARD SAMPLING CYCLE

§ 70.220 Standard sampling cycle.

(a) (1) Except as provided in subparagraph (2) of this paragraph, during the calendar month beginning on the day the operator receives notice that a working section of a coal mine is in compliance, samples of respirable dust with respect to that working section shall be taken each calendar month thereafter during five consecutive normal production shifts, each of which is worked on a separate calendar day.

(2) In order to ensure that the procedures and methods for sampling set forth in this part result in the transmission of an adequate number of reliable samples, the Secretary, with the concurrence of the Secretary of Health, Education, and Welfare, may require any operator of a coal mine to sample at more frequent intervals than are prescribed in subparagraph (1) of this paragraph.

(3) Upon the issuance of a notice of violation of paragraph (a) or (c) of § 70.100 of this part with respect to any working section of a coal mine, paragraph (a) of this section shall not apply in respect of that working section until the violation is abated, and the operator shall take samples with respect to that working section during each production shift as required by § 104(i) of the Act.

(4) Upon receipt of a notice of the abatement of a violation with respect to a working section for which a notice of violation has been issued in accordance with the provisions of § 104(i) of the Act, or upon receipt of a notice of modification of a permit for noncompliance establishing a new dust standard, or upon the expiration of a permit for noncompliance, the operator shall initiate (in accordance with provisions of § 70.210) an original sampling cycle on the first day following receipt of such notice or such expiration on which there is a normal production shift.

(b) For the purpose of this Subpart C:

(1) "normal production shift" (as differentiated from a maintenance shift) means a shift during which the amount of coal produced in a working section is representative of the average amount of coal produced in such working section during all production shifts worked dur-

ing the life of such working section or during the six months immediately preceding such production, whichever is the shorter period. With regard to a new working section, a "normal production shift" means a shift during which the amount of coal produced is comparable to the amounts produced during normal production shifts in other comparable working sections.

(2) A production shift during a calendar day (for example, the day shift on June 4) following a production shift during an earlier calendar day (for example, the afternoon shift on June 1) shall be considered consecutive production shifts even though a nonproducing calendar day or days (June 2 and June 3) may have intervened.

(3) The calendar month with respect to any working section for which a basic sample has been established pursuant to § 70.210 shall begin on the day upon which the operator receives notice from the Secretary that the working section is in compliance.

(4) A calendar month (regardless of whether the month or months of the calendar involved have 28, 29, 30, or 31 days) is a period terminating with the day of the succeeding month (of the calendar) numerically corresponding to the day (date) of its beginning, less one, except, if there be no corresponding day of the succeeding month, the period terminates with the last day of the succeeding month. (For example, if the calendar month begins on July 20, it ends on August 19 of the same year and on the 19th day of each succeeding month.)

§ 70.221 Daily determination of average respirable dust concentrations; notice of violation.

(a) Each sample transmitted by an operator with respect to a working section from the standard sampling cycle shall be combined with the 10 samples taken in such working section during the original sampling cycle. After combining these 11 samples, the first sample transmitted during the original sampling cycle shall be discarded. The remaining 10 samples will then constitute a current basic sample with respect to that working section and a daily determination of compliance or noncompliance shall be made on the basis of the data recorded from the 10 samples contained in the current basic sample. Thereafter, as each subsequent sample is received during a standard sampling cycle the most recent sample transmitted in accordance with the provisions of § 70.220 will be combined with the 10 samples contained in the current basic sample, the oldest sample discarded, and a determination of compliance or noncompliance made on the basis of the data recorded from the current basic sample.

(b) If the data recorded pursuant to § 70.261 for a current basic sample with

respect to a working section of a coal mine establish an average concentration of respirable dust in excess of the average concentration stated in paragraph (b) of § 70.211, as applicable, the Secretary shall issue a notice to the operator that he has exceeded the applicable limit and is in violation of paragraph (a) or paragraph (c) of § 70.100 of this Part 70, as the case may be. Paragraph (a) of § 70.100 prescribes a limit of 3.0 milligrams of respirable dust per cubic meter of air. Paragraph (c) of § 70.100 covers permits for noncompliance issued by the Interim Compliance Panel established by the Act.

§ 70.222 Reduction in monthly standard sampling cycle.

(a) Where the samples from a standard sampling cycle with respect to a working section of a coal mine have been included in the current basic sample and the data recorded for the current basic sample pursuant to § 70.261 establish a cumulative concentration at or below 30 milligrams of respirable dust per cubic meter of air, the Secretary may in writing, establish an alternating sampling cycle for such working section.

(b) Under an alternating standard sampling cycle established by the Secretary for a working section under the provisions of paragraph (a) of this section, the operator will not be required to take samples with respect to that working section during the following calendar month. If the current basic sample following completion of a standard sampling cycle during the third month shows that the cumulative concentration of respirable dust with respect to that working section has not exceeded the limit of 30 milligrams per cubic meter of air, the operator will not be required to take samples from the working section during the following month or during any alternating months after which a determination of compliance has been made in accordance with the provisions of paragraph (c) of § 70.221. For example:

July, basic sample in compliance: August, standard sampling cycle;
 September, no sampling cycle: October, standard sampling cycle;
 November, no sampling cycle: December, standard sampling cycle;
 January, no sampling cycle: February, standard sampling cycle;
 March, no sampling cycle: April, standard sampling cycle;
 May, no sampling cycle: June, standard sampling cycle.

§ 70.223 Alternating standard sampling cycle; return to monthly standard sampling cycle.

When an alternating standard sampling cycle has been established for a working section under the provisions of § 70.222, the operator shall revert to the original sampling cycle provided in § 70.210, if, at any time, analysis of the samples contained in the current basic

sample or an analysis based on a Bureau of Mines inspection with respect to such section show the cumulative dust concentration to be in excess of the limit of 30 milligrams per cubic meter of air.

PARTIAL SAMPLING CYCLE

§ 70.230 Sampling cycles consisting of less than the required samples; general.

(a) If the Secretary fails to receive the number of valid samples with respect to a working section required under the provisions of § 70.210 or § 70.220, or if any number of samples taken during a sampling cycle in accordance with the provisions of § 70.210 or § 70.220 have been rejected by the Secretary as invalid samples, the Secretary shall, in accordance with the provisions of § 70.261, analyze the samples transmitted to determine whether such working section is in compliance with the applicable respirable dust limit.

(b) If the Secretary receives less than the required number of valid samples with respect to a working section, and has determined in accordance with the provisions of paragraph (a) of this section that the cumulative concentration of respirable dust does not exceed the applicable limit set forth in paragraph (b) of § 70.211, the Secretary shall require the operator to initiate additional sampling. Upon receipt of advice that additional sampling is required, the operator shall commence such sampling on the first day on which there is a production shift following the day upon which he receives such advice from the Secretary pursuant to this paragraph, and shall continue to take such consecutive samples until he is advised in writing by the Secretary that the total number of valid samples required have been received. If such additional sampling requires that samples be taken during a subsequent calendar month, the additional samples taken during the subsequent calendar month shall not relieve the operator of his duty to sample during that month in accordance with the provisions of § 70.220.

(c) Where additional sampling is required under the provisions of paragraph (b) of this section and the Secretary receives more than the number of samples required under the provisions of § 70.210 or § 70.220 of this part, such additional samples shall be combined with the samples previously received and the most recent 10 samples shall constitute the basic sample under § 70.210 or the current basic sample under § 70.210.

(d) As additional samples are received by the Secretary in accordance with paragraph (b) of this section and combined with the valid samples already received, a daily determination of compliance or noncompliance shall be made with respect to that working section. If

the data recorded pursuant to § 70.261 with respect to that working section, establish a cumulative concentration of respirable dust in excess of the cumulative concentration stated in paragraph (b) of § 70.211 with respect to the particular applicable limit, the Secretary shall issue a notice to the operator that he is in violation of paragraph (a) or paragraph (c) of § 70.100 of this Part 70.

METHODS OF SAMPLING WORKING SECTIONS

§ 70.240 Monthly sampling procedures; general.

The monthly sampling procedures set forth in this part with respect to working sections are designed to determine the average concentration of respirable dust to which the miners assigned to a working section of a coal mine are exposed, portal to portal. Accordingly, a provision that samples of respirable dust be taken "with respect to" a working section means that an approved sampling device should be attached to the miner or carried into the working section to which he is assigned when he enters or leaves the mine and that the device should remain operative during the entire shift—portal to portal.

§ 70.241 Multisection mines.

In a coal mine in which there are two or more working sections, the sampling cycle with respect to each working section shall be staggered with those taken in other working sections to provide continuous sampling of the mine atmosphere. For example, if there are three working sections, samples from each working section should be taken during different time periods. In order to provide continuous sampling, staggered sampling cycles may be overlapped.

§ 70.242 Working sections; conventional mining.

(a) Unless otherwise directed by an authorized representative of the Secretary, in a working section in which conventional mining methods are employed, the samples taken in the working section shall be confined to the operation of the cutting machine.

(b) In the working section, the approved sampling device may remain on the operator (if it is a coal mine dust personal sampler unit) or be placed on the machine which he operates. If the sampling device is placed on a machine, the device shall be installed adjacent to the operator within 36 inches in by his normal working position. In no case shall the device be installed behind the operator.

§ 70.243 Working sections; continuous mining.

Unless otherwise directed by an authorized representative of the Secretary:

(a) In a working section in which a continuous mining machine is employed,

the approved sampling device may remain on the operator (if it is a coal mine dust personal sampler unit) or be placed on the machine which he operates; and

(b) If the sampling device is placed on a machine, the device shall be installed adjacent to the operator within 36 inches in by his normal working position. In no case shall the device be installed behind the operator.

§ 70.244 Working sections; longwall mining.

Unless otherwise directed by an authorized representative of the Secretary, with respect to a working section in which a longwall mining machine is used, the miner who works nearest the return air side of the longwall face may wear the approved sampling device (if it is a coal mine dust personal sampler unit) or the device may be placed at a point in the return air current but in no case farther than 48 inches from the corner on the return side on the longwall face.

§ 70.245 Working sections; hand loading.

(a) With respect to a working section in which coal is loaded by hand, 10 percent of the hand loaders, and in no case less than one hand loader, shall wear an approved coal mine dust personal sampler unit.

(b) In the working section, the sampling units may remain on the hand loaders or, the devices may be placed at sites which represent the maximum concentrations of dust to which the hand loaders are exposed in the working section.

§ 70.246 Working sections; intake air.

During one production shift in every sampling cycle with respect to a working section, an approved sampling device shall be placed in the intake air course of that working section and a sample will be taken within 200 feet out by the working faces of such section.

SAMPLING OF INDIVIDUAL MINERS

§ 70.250 Individual sampling procedures; at least once every 180 days.

(a) Except as provided in paragraphs (b) and (c) of this section, one sample of respirable dust shall be taken from the mine atmosphere to which each individual miner is exposed at least once every 180 days, except those miners already sampled during such 180-day period in sampling cycles conducted under the provisions of §§ 70.210, 70.220, and 70.230.

(b) One sample of respirable dust shall be taken from the mine atmosphere to which each individual miner assigned to a working section is exposed at least once every 120 days, except those miners already sampled during such 120-day pe-

riod in sampling cycles conducted under the provisions of §§ 70.210, 70.220, and 70.230 of this part.

(c) One sample of respirable dust shall be taken from the mine atmosphere to which each individual miner who has exercised his option to transfer in accordance with the provisions of § 203(b) (1) of the Act is exposed at least once every 90 days.

(d) The samples required under the provisions of this section shall be taken during any shift where the miner is employed in his usual occupation or in the occupation to which he was transferred.

TRANSMISSION AND ANALYSIS OF SAMPLES

§ 70.260 Respirable dust samples; transmission.

(a) At the conclusion of each production shift in a sampling cycle, the operator shall promptly collect and transmit all samples in a container provided by the manufacturer of the filter to:

Pittsburgh Field Health Group, Bureau of Mines, Department of the Interior, Pittsburgh, Pa. 15213.

(b) Each sample shall be accompanied by a completed 3 x 5 inch white data card identical to the card contained in Figure 1 of this Part 70, provided for this purpose by the cassette manufacturer. The card shall have an identification number identical to that on the cassette used to take the sample, and the name and Social Security number of the miner whose environment was being sampled. The data card shall be initialed by the miner whose environment was being sampled and the representative of the company responsible for the dust sampling procedure.

§ 70.261 Respirable dust samples; analysis by the Secretary; report to the operator.

Upon receipt by the Bureau of Mines of respirable dust samples taken with respect to a working section, each sample shall be analyzed and the following data shall be recorded:

(a) The mine identification number;

(b) The working section within the mine from which the samples were taken;

(c) The dust concentration, expressed in milligrams per cubic meter of air, for each sample;

(d) The cumulative total of respirable dust for all valid samples, exclusive of intake air, expressed in milligrams per cubic meter of air;

(e) The average dust concentration for all valid samples, exclusive of the sample of intake air, expressed in milligrams per cubic meter of air;

(f) The dust concentration, expressed in milligrams per cubic meter of air, for the intake air sample of each working section; and,

(g) The Social Security number of the individual miner whose environment was sampled.

§ 70.262 Report of data.

The Secretary shall provide the operator with a report of the data recorded pursuant to § 70.261 as soon as practicable.

MISCELLANEOUS

§ 70.270 Installation of sampling devices.

For purposes of sampling under the provisions of Subpart C of this part, the operator shall install all MRE sampling devices in a near level position and all coal mine dust personal sampler units in a near upright or vertical position.

§ 70.271 Spot inspections.

In order to obtain compliance with the provision of Part 70, the Bureau of Mines shall conduct frequent spot inspections of the active workings of coal mines.

§ 70.272 Report and certification of conditions in active mine workings.

Each operator of a coal mine shall, on or before June 30, 1970, and annually thereafter on the anniversary date of each initial report and certification, report and certify to the Secretary the conditions relative to dust control which exist in the active workings of all mines operated. Such reports shall be submitted on Bureau of Mines Form No. 6-1497. Report forms may be obtained from any Coal Mine Safety District Office of the Bureau of Mines. Reports shall be submitted to:

Office of Mineral Industry Health, Bureau of Mines, Department of the Interior, Washington, D.C. 20240.

Subpart D—Respiratory Equipment

§ 70.300 Respiratory equipment; respirable dust.

(a) Respiratory equipment approved by the Secretary and by the Secretary of Health, Education, and Welfare shall be made available to all persons whenever exposed to concentrations of respirable dust in excess of the levels required to be maintained under this Part 70. Use of respirators shall not be substituted for environmental control measures in the active workings. Each operator shall maintain a supply of respiratory equipment adequate to deal with occurrences of concentrations of respirable dust in the mine atmosphere in excess of the levels required to be maintained under this Part 70.

§ 70.300-1 Approved respiratory equipment; respirable dust.

(a) Filter-type respirators approved on and after January 19, 1965, under Part 14 of this chapter (Bureau of Mines Schedule 21B) and supplied-air respirators, Type G, approved on and after

April 19, 1965, under Part 12 of this chapter (Bureau of Mines Schedule 19B) for protection against pneumoconiosis-producing dust, toxic dust, pneumoconiosis-producing mist, toxic mist, and toxic fumes are approved respiratory equipment for the purposes of § 70.300.

(b) Respirators approved during the period April 12, 1953, through January 18, 1965, under Part 14 of this chapter (Bureau of Mines Schedule 21A), and in use on or before June 30, 1970, for protection against pneumoconiosis-producing dust, toxic dust, pneumoconiosis-producing mist, toxic mist, and toxic fumes are approved respirators for the purposes of § 70.300 until December 31, 1970. Such respirators shall not be provided for protection under the provisions of § 70.300 on or after January 1, 1971.

§ 70.305 Respiratory equipment; gas, dusts, fumes, or mists.

Respiratory equipment approved by the Secretary and the Secretary of Health, Education, and Welfare shall be provided persons exposed for short periods to inhalation hazards from gas, dusts, fumes, or mist. When the exposure is for prolonged periods, other measures to protect such persons or to reduce the hazard shall be taken.

§ 70.305-1 Approved respiratory equipment; gas, dusts, fumes, or mists.

Respiratory equipment which has been approved by the Bureau of Mines under the parts of this chapter, on and after the dates listed in this section, are approved respiratory equipment for the purposes of § 70.305 but only with respect to the specific hazards referred to in the approved labels:

Part 13—Gas Masks (Bureau of Mines Schedule 14F) April 23, 1955;

Part 14—Filter-type, Dust, Fume, and Mist Respirators (Bureau of Mines Schedule 21B) January 10, 1965;

Part 14a—Non-Emergency Gas Respirators (Chemical Cartridge Respirators Including Paint Spray Respirators) (Bureau of Mines Schedule 23B) August 4, 1959.

Subpart E—Dust From Drilling Rock

§ 70.400 Dust from drilling rock; control.

The dust resulting from drilling in rock shall be controlled by use of permissible dust collectors, or by water or water with a wetting agent, or by ventilation, or by any other method or device approved by the Secretary which is at least as effective in controlling such dust.

§ 70.400-1 Dust from drilling rock; approved devices.

Dust collectors approved by the Bureau of Mines under Part 33 of this chapter (Bureau of Mines Schedule 25B) are permissible dust collectors for the purposes of § 70.400.

§ 70.400-2 Dust from drilling rock; water.

Water used to control dust from drilling rock shall be applied through a hollow drill steel or stem or by the flooding of vertical drill holes in the floor.

§ 70.400-3 Dust from drilling rock; ventilation.

In order to control adequately dust from drilling rock, the air current shall be so directed that the dust is readily dispersed and carried away from the drill operator or any other worker in the area.

Subpart F—Noise Standard

§ 70.500 Noise standard.

(a) On and after June 30, 1970, the standards on noise prescribed under the Walsh-Healy Public Contracts Act, as amended, in effect on October 21, 1969, shall be applicable to each coal mine and each operator of such mine shall comply with them. The standard referred to is as follows:

Occupational noise exposure

“(a) Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in Table I of this section when measured on the A scale of a standard sound level meter at slow response. When noise levels are determined by octave band analysis, the equivalent A-weighted sound level may be determined as follows:

“Equivalent sound level contours. Octave band sound pressure levels may be converted to the equivalent A-weighted sound level by plotting them on this graph and noting the A-weighted sound level corresponding to the point of highest penetration into the sound level contours. This equivalent A-weighted sound level, which may differ from the actual A-weighted sound level of the noise, is used to determine exposure limits from Table I.

“(b) When employees are subjected to sound exceeding those listed in Table I of this section, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of the table, personal

protective equipment shall be provided and used to reduce sound levels within the levels of the table.

“(c) If the variations in noise level involve maxima at intervals of 1 second or less, it is to be considered intermittent. In such cases, where the duration of the maxima are less than 1 second, they shall be treated as of 1-second duration.

“(d) In all cases where the sound levels exceed the values shown herein, a continuing, effective hearing conservation program shall be administered.

TABLE I

PERMISSIBLE NOISE EXPOSURES¹

<i>Duration per day, hours</i>	<i>Sound level dBA</i>
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
¼ or less	115

¹ 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: $C_1/T_1 + C_2/T_2 \dots C_n/T_n$ exceeds unity, then, the mixed exposure should be considered to exceed the limit value. C_n indicates the total time of exposure at a specified noise level, and T_n indicates the total time of exposure permitted at that level.

“Exposure to impulsive or impact noise should not exceed 140 dBA peak sound pressure level.”

(b) In meeting the standard set forth in paragraph (a) of this section, the operator shall not require the use of any protective device or system, including personal devices, which the Secretary or his authorized representative finds to be hazardous or cause a hazard to the miners in such mine.

APPENDIX C.--COAL MINE DUST PERSONAL SAMPLER UNITS, 30 CFR, PART 74

Title 30—MINERAL RESOURCES**Chapter I—Bureau of Mines,
Department of the Interior****SUBCHAPTER O—COAL MINE HEALTH AND
SAFETY****PART 74—COAL MINE DUST
PERSONAL SAMPLER UNITS**

Section 202(a) of the Federal Coal Mine Health and Safety Act of 1969 provides for the taking of samples of the respirable dust in coal mine atmospheres by a device approved by the Secretary of the Interior and the Secretary of Health, Education, and Welfare. Accordingly, Part 74, reading as set forth below, is added to Subchapter O of Chapter I, Title 30, Code of Federal Regulations. This part sets forth the requirements which must be met by approved coal mine dust personal sampler units. It is important that sampler units meeting these requirements be produced as quickly as possible. Therefore, it would not be in the public interest either to give notice of proposed rulemaking on, or to delay the effective date of, Part 74. Accordingly, Part 74 shall become effective upon its publication in the FEDERAL REGISTER.

WALTER J. HICKEL,
Secretary of the Interior.

ROBERT H. FINCH,
*Secretary of Health,
Education, and Welfare.*

MARCH 6, 1970.

Sec.	
74.1	Purpose.
74.2	Sample unit.
74.3	Specifications of sampler unit.
74.4	Tests of coal mine dust personal sampler units.
74.5	Conduct of tests; demonstrations.
74.6	Applications.
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74.10	Changes after certification.
74.11	Withdrawal of certification.

AUTHORITY: The provisions of this Part 74 issued under sec. 508, Federal Coal Mine Health and Safety Act of 1969 (83 Stat. 803).

§ 74.1 Purpose.

The regulations in this part set forth the requirements for approval of coal mine dust personal sampler units designed to determine the concentrations of respirable dust in coal mine atmospheres; procedures for applying for such approval; test procedures; and labeling.

§ 74.2 Sampler unit.

A coal mine dust personal sampler unit shall consist of (a) a pump unit, (b) a

sampling head assembly, and (c) if rechargeable batteries are used in the pump unit, a battery charger.

§ 74.3 Specifications of sampler unit.

(a) *Pump unit*—(1) *Dimensions.* The overall dimensions of the pump unit, hose connections and valve or switch covers shall not exceed 8 inches in height, 6 inches in width and 4 inches in thickness.

(2) *Weight.* The pump unit shall not weigh more than 4 pounds.

(3) *Construction.* The case and all components of the pump unit shall be of sufficiently durable construction to endure the wear of use in a coal mine and shall be tight fitting, so as to minimize the amount of dust entering the pump case.

(4) *Exhaust.* The pump shall exhaust into the pump case, maintaining a slight positive pressure which will reduce the entry of dust into the pump case.

(5) *Switch.* The pump unit shall be equipped with an on-off switch or equivalent device on the outside of the pump case. This switch shall be protected against accidental operation during use and protected to keep dust from entering the mechanisms.

(6) *Flow rate adjustment.* Except as provided in the last sentence of this subparagraph, the pump unit shall be equipped with a suitable means of flow rate adjustment accessible from outside the case. To prevent accidental adjustment, the flow rate adjuster shall be recessed in the pump case and shall require the use of an adjusting tool. If the pump is capable of maintaining the flow rate consistency required in this part without adjustment, an external flow rate adjuster is not required.

(7) *Battery.* The power supply for the pump shall be a suitable battery located in the pump case or in a separate case which attaches to the pump case by a permissible electrical connection.

(8) *Pulsation.* The irregularity in flow rate due to pulsation shall have a fundamental frequency of not less than 20 Hz.

(9) *Belt clips.* The pump unit shall be provided with a belt clip which will hold the pump securely on a coal miner's belt.

(10) *Recharging connection.* A suitable connection shall be provided so that the battery may be recharged without removing the battery from the pump case or from the battery case if a separate battery case is used.

(11) *Flow rate indicator.* A visual indicator of flow rate (e.g., a flowmeter) shall be provided either as an integral part of the pump unit or of the sampling head assembly. The flowrate indicator shall be calibrated within ± 5 percent at 2, 1.8, and 1.6 liters per minute to indicate the rate of air passing through the accompanying sampling head assembly.

(12) *Flow rate range.* The pump shall be capable of operating in or over a range of from 1.5 to 2.5 liters per minute and shall be adjustable over this range.

(13) *Flow rate consistency.* The flow shall remain within ± 0.1 liters per minute over an 8-hour period when the pump is operated at 2 liters per minute with a standard sampling head assembly. Not more than two readjustments of the flow rate to 2 liters per minute shall be required to maintain this accuracy.

(14) *Duration of operation.* The pump shall be capable of operating for not less than 8 hours at a flow rate of 2 liters per minute against a resistance of 4 inches of water measured at the inlet of the pump.

(b) *Sampling head assembly.* The sampling head assembly shall consist of a cyclone and a filter assembly as follows:

(1) *Cyclone.* The cyclone shall consist of a cyclone body with removable grit cap and a vortex finder and shall be constructed of nylon or a material equivalent in performance. The dimensions of the components, with the exception of the grit cap, shall be identical to those of a Dorr-Oliver 10 mm. cyclone body, part No. 28541/4A or 01B11476-01 and vortex finder, part No. 28541/4B.

(2) *Filter assembly.* The filter assembly shall meet the following requirements:

(i) *Filter.* The filter shall be a membrane filter type with a nominal pore size not over 5 microns. It shall be non-hydroscopic and shall not dissolve or decompose when emersed in ethyl or isopropyl alcohol. The strength and surface characteristics of the filter shall be such that dust deposited on its surface may be removed by ultrasonic methods without tearing the filter. The filter resistance shall not be more than 2 inches of water at an airflow rate of 2 liters per minute.

(ii) *Capsule.* The capsule enclosing the filter shall not permit sample air to leak around the filter. The capsule shall be made of nonhydroscopic material. Its weight, including the enclosed filter, shall not exceed 5 grams and it shall be preweighed by the manufacturer with a precision of ± 0.1 milligrams. Impact to the capsule shall not dislodge any dust from the capsule, which might then be lost to the weight measurement.

(iii) *Cassette.* The cassette shall enclose the capsule so as to prevent contamination. The cassette must be easily removable without causing a loss or gain

of capsule weight. Appropriate covers shall be provided to prevent contaminants from entering, or dust from leaving, the capsule when it is not in use.

(3) *Arrangement of components.* The connections between the cyclone vortex finder and the capsule and between the capsule and the $\frac{1}{4}$ -inch (inside diameter) hose mentioned in subparagraph (5) of this paragraph shall be mechanically firm and shall not leak at a rate of more than 0.1 liters per hour under a vacuum of 4 inches of water.

(4) *Clamping of components.* The clamping and positioning of the cyclone body, vortex finder, and cassette shall be rigid, remain in alignment, be firmly in contact and airtight. The cyclone-cassette assembly shall be attached firmly to a backing plate or other means of holding the sampling head in position. The cyclone shall be held in position so that the inlet opening of the cyclone is pointing perpendicular to, and away from, the backing plate.

(5) *Hose.* A 3-foot long, $\frac{1}{4}$ -inch (inside diameter) hose shall be provided to form an airtight connection between the inlet of the sampler pump and the outlet of the filter assembly. A device, capable of sliding along the hose and attaching to the miner's outer garment shall be provided.

(c) *Battery charger*—(1) *Power supply.* The battery charger shall be operated from a 117 volt, 60 Hz power line.

(2) *Connection.* The battery charger shall be provided with a cord and polarized connector so that it may be connected to the charge socket on the pump or battery case.

(3) *Protection.* The battery charger shall be fused, shall have a grounded power plug, and shall not be susceptible to damage by being operated without a battery on charge.

(4) *Charge rates.* The battery charger shall be capable of operating at either a 16-hour or a 64-hour charge rate. The battery charger shall be capable of fully charging the battery in the pump unit in the stated times and shall not overcharge a discharged battery in 16 hours when operating at the 16-hour charge rate or in 88 hours when operating at the 64-hour charge rate.

§ 74.4 Tests of coal mine dust personal sampler units.

(a) The Bureau of Occupational Safety and Health, Department of Health, Education, and Welfare, shall conduct tests to determine whether a coal mine dust personal sampler unit which is submitted for approval under these regulations meets the requirements set forth in § 74.3.

(b) The Bureau of Mines, Department of the Interior, will conduct tests, pursuant to § 18.68 of this chapter, to determine whether the pump unit of a coal mine dust personal sampler unit sub-

mitted for approval under these regulations is intrinsically safe.

§ 74.5 Conduct of tests; demonstrations.

Prior to the issuance of a certificate of approval, only personnel of the Bureau of Mines and Bureau of Occupational Safety and Health, representatives of the applicant, and such other persons as may be mutually agreed upon may observe the tests conducted. The Bureau of Mines and the Bureau of Occupational Safety and Health shall hold as confidential, and shall not disclose, principles of patentable features prior to certification, nor shall the bureaus disclose any details of the applicant's drawings or specifications or other related material. After the issuance of a certificate of approval, the Bureau of Mines or the Bureau of Occupational Safety and Health may conduct such public demonstrations and tests of the approved coal mine dust personal sampler unit as the bureau deems appropriate. The conduct of all investigations, tests, and demonstrations shall be under the sole direction of the Bureau of Occupational Safety and Health and the Bureau of Mines and any other persons shall be present only as observers.

§ 74.6 Applications.

(a) Testing of a coal mine dust personal sampler unit will be undertaken by the Bureau of Occupational Safety and Health, and testing of the pump unit of such a sampler unit will be undertaken by the Bureau of Mines, only pursuant to a written application in duplicate, each copy accompanied by complete scale drawings, specifications and description of materials. An application to the Bureau of Mines must be accompanied by a check, bank draft, or money order in the amount of \$105, payable to the U.S. Bureau of Mines, to cover the fee specified in § 18.7 of this chapter. The applications, together with the drawings and specifications and any other related documents shall be sent to Bureau of Occupational Safety and Health, Department of Health, Education and Welfare, 1014 Broadway, Cincinnati, Ohio 45202, and to the Bureau of Mines, Department of the Interior, 4800 Forbes Avenue, Pittsburgh, Pa. 15213.

(b) Ten complete coal mine dust personal sampler units must be sent to the Bureau of Occupational Safety and Health in connection with an application. One pump unit must be sent to the Bureau of Mines in connection with an application.

(c) Drawings and specifications shall be adequate in number and fully detailed to identify the design of the coal mine dust personal sampler unit or pump unit thereof and to disclose the dimensions and materials of all component parts.

(d) An application shall describe the

way in which each lot of components will be sampled and tested to maintain their quality prior to assembly of each sampler unit. In order to ensure that the quality of the coal dust personal sampler unit will be maintained in production through adequate quality control procedures, the Bureau of Occupational Safety and Health and the Bureau of Mines reserve the right to have their qualified personnel inspect each applicant's control-test equipment procedures, and records and to interview the employees who conduct the control tests. Two copies of the results of any tests made by the applicant on the coal mine dust personal sampler unit or the pump unit thereof shall accompany an application.

§ 74.7 Certificate of approval.

(a) Upon completion of the testing of a coal mine dust personal sampler unit or the pump unit thereof, the Bureau of Occupational Safety and Health or the Bureau of Mines, as appropriate, shall issue to the applicant either a certificate of approval or a written notice of disapproval, as the case may require. The Bureau of Occupational Safety and Health shall not issue a certificate of approval for a coal mine dust personal sampler unit unless the Bureau of Mines has issued a certificate of approval for the pump unit thereof. No informal notification of approval will be issued. If a certificate of approval is issued, no test data or detailed results of tests will accompany such approval. If a notice of disapproval is issued, it will be accompanied by details of the defects, resulting in disapproval, with a view to possible correction.

(b) A certificate of approval will be accompanied by a list of the drawings and specifications, covering the details of design and construction of the coal mine dust personal sampler unit or the pump unit thereof upon which the certificate of approval is based. The applicant shall keep exact duplicates of the drawings and specifications submitted to the Bureau of Occupational Safety and Health and to the Bureau of Mines relating to the sampler unit or pump unit thereof which has received a certificate of approval. The approved drawings and specifications shall be adhered to exactly in the production of the certified sampler unit, including the pump unit thereof, for commercial purposes. In addition, the applicant shall observe such procedures for, and keep such records of, the control of component parts as either bureau may in writing require as a condition of certification.

§ 74.8 Approval labels.

(a) Certificates of approval will be accompanied by photographs of designs for the approval labels to be affixed to each coal mine dust personal sampler unit.

(b) The labels showing approval by the Bureau of Occupational Safety and Health and by the Bureau of Mines shall contain such information as the appropriate bureau may require and shall be reproduced legibly on the outside of a sampler unit as directed by the appropriate bureau.

(c) The applicant shall submit full-scale designs or reproductions of approval labels and a sketch or description of the position of the labels on each unit.

(d) Use of the approval labels obligates the applicant to whom the certificates of approval were issued to maintain the quality of the complete coal mine dust personal sampler unit and to guarantee that the complete sampler unit is manufactured or assembled according to the drawings and specifications upon which the certificates of approval were based. Use of the approval labels is authorized only on sampler units which conform strictly with the drawings and specifications upon which the certificates of approval were based.

§ 74.9 Material required for record.

(a) As part of the permanent record of the investigation, the Bureau of Occupational Safety and Health will retain a complete coal mine dust personal sampler unit, and the Bureau of Mines will retain a pump unit, that has been tested and certified. Material not required for record purposes will be returned to the applicant at his request and at his expense on written shipping instructions to the appropriate bureau.

(b) As soon as a coal mine dust personal sampler unit is commercially available, the applicant shall deliver a complete unit free of charge to the Bureau of Occupational Safety and Health, Department of Health, Education, and Welfare, 1014 Broadway, Cincinnati, Ohio 45202.

§ 74.10 Changes after certification.

(a) If the applicant desires to change any feature of a certified coal mine dust personal sampler unit, he shall first ob-

tain the approval of the Bureau of Occupational Safety and Health pursuant to the following procedures:

(1) Application shall be made as for an original certificate of approval, requesting that the existing certification be extended to encompass the proposed change. The application shall be accompanied by drawings, specifications and related material, as in the case of an original application.

(2) The application and accompanying material will be examined by the Bureau of Occupational Safety and Health to determine whether testing of the modified sampler unit or components will be required. Testing will be necessary if there is a possibility that the modification may affect the performance of the sampler unit adversely. The Bureau of Occupational Safety and Health will inform the applicant whether such testing is required.

(3) If the proposed modification meets the pertinent requirements of these regulations, a formal extension of certification will be issued, accompanied by a list of new and revised drawings and specifications to be added to those already on file as the basis for the extension of certification.

(b) If a change is proposed in a pump unit of a certified coal dust personal sampler unit, the approval of the Bureau of Mines with respect to intrinsic safety shall be obtained in accordance with the procedures set forth in paragraph (a) of this section.

§ 74.11 Withdrawal of certification.

The Bureau of Occupational Safety and Health or the Bureau of Mines may rescind, for cause, any certificate of approval which the respective bureau has issued under the regulations in this part.

[F.R. Doc. 70-2968; Filed, Mar. 10, 1970; 8:49 a.m.]