

KE 0022515

N22515

MINE SAFETY APPLIANCE COMPANY

KE 0022516



CABLE ADDRESS
"MINSAP" PITTSBURGH

Mine Safety Appliances Co.

Pittsburgh, Pa.

March 19, 1936.

Mr. Frederick Thamann,
Laboratory of Applied Physiology,
College of Medicine,
University of Cincinnati,
Cincinnati, Ohio.

Dear Mr. Thamann:

We very much appreciate your letter of March 4. Carbon Monoxide Indicators are available in two types - with self-contained Edison batteries, making operation entirely independent of connections to outside source of 6-volt AC or DC. The selling prices of these two types of instruments are \$350.00 and \$300.00 respectively, f.o.b. Pittsbu

We are in a position to furnish the standard MSA Continuous Carbon Monoxide Recorder equipped with any one of three drying systems - the acid train drying system, the alumina drying system, or the full automatic alumina drying system.

The MSA CO Recorder consists of the drier, analyzer, and potentiometer recorder. A motor-driven pump draws a sample continuously from the point of sampling and forces a part of this sample through the drier and then through the analyzer where it passes through the Hopedalite cell. Any carbon monoxide present is oxidized to carbon dioxide with a liberation of heat in proportion to the amount of carbon monoxide present. Heat liberated is measured by the thermocouples imbedded in the Hopedalite and the resultant current is reflected in the recording potentiometer which indicates on a chart the percentage of carbon monoxide present. The potentiometer may also be equipped with up to six sets of discs and contacts to open and close external circuits at predetermined concentrations of carbon monoxide, thus operating suitable warning signals, etc.

In the bulletin attached, an acid train is used to dry the sample. This necessitates changing the acid every two days. The recorder, as illustrated, sells at \$2400.00 F.O.B. Pittsburgh, Pennsylvania.

In place of the acid train, which in the past has been used for drying the sample, we are prepared to furnish an alumina drier. This drying system consists of two towers of activated alumina so connected that while one is drying the air sample passing to the analyzer, the other is simultaneously being reactivated. A 350 watt heater forms an integral part of each tower. A motor and pump for passing air through the tower during reactivation is provided. A timing device for automatically shutting off the heating units and the motor-driven pump is incorporated. The component parts of the drier unit are so interconnected that alternating t

KE 0022517



the pump and heater are all accomplished by the simple shifting of one lever once in twelve (12) hours. This unit is mounted on the lower shelf of the analyzer. It operates on 110 volts, 60 cycles, A.C. and requires about 750 watt. The reactivation will require the operation of the heater and pump for four to six hours out of each twelve-hour period. The alumina should not require replacement more than once a year and the cost of replacing the alumina in both towers should not exceed \$7.50. The alumina drier will require a vent pipe to the outside in order to avoid unpleasant odor and accumulation of moisture during reactivation.

The MSA Continuous Carbon Monoxide Recorder, equipped with the above described alumina drier, is priced at \$3000.00 F.O.B. Pittsburgh, Pennsylvania.

At a further increase in price, the drying system may be made full automatic, in which case at the end of the operating cycle, determined by a timer motor, which is a part of the equipment, circuits are energized to operate the valve mechanism cutting the spent tower out of the line and the fresh tower into service. At the same time the automatic reactivation of the spent tower is started. Within a six-hour period the spent tower is completely reactivated and ready for operation again, so that a continuous supply of dried air may be obtained from this fully automatic equipment without interruption. The MSA Continuous Carbon Monoxide Recorder, equipped with full automatic alumina drier, is priced at \$3500.00 F.O.B. Pittsburgh. This type of equipment is illustrated in the separate photograph.

For the sampling line we recommend 1/2" brass pipe for distances up to 100 feet.

The motor and pump for drawing the sample and forcing it through the analyzer is mounted in the lower shelf of the analyzer. The pump is driven by a 1/4 H.P. motor, which may be furnished to operate on either 110 or 220 volts AC or DC. The current available for this connection should be specified.

After passing through the drier the sample then passes through the charcoal tower, through the canister containing chemicals for purifying the sample, then through a calcium chloride tube. The charcoal tower should be refilled with charcoal about once a month and requires about 1/2-pound of charcoal for each refilling. The canister should be changed once every three months. The calcium chloride tubes should be refilled weekly and will require approximately five pounds of calcium chloride for the two tubes.

From the calcium chloride tube the sample passes through the automatic flow meter calibrated for 20 liters per minute. It then passes through the coils in the steam bath to the Hopcalite cell.

The steam bath has two heating units, one of 750 watts and one of 1050 watts, so that either or both may be used and requiring a maximum of 1800 watts. Heaters may be supplied to

3.

operate on either 110 or 220 volts, 60 cycles, single phase current. The steam bath requires the addition of approximately one quart of water every 24 hours. It is fitted with an air cooled reflux condenser, which replaces the water cooled condenser formerly employed. This also eliminates the necessity for a running water supply or drain.

The sample after passing through the cell passes through a calcium chloride drier to the outside. As before noted, the calcium chloride should be changed weekly. This calcium chloride tube prevents any moist air entering the Hopcalite cell from the outside.

Leads from the thermocouples pass to terminals on the analyzer where connection is made to the circuit leading to the potentiometer recorder. A maximum resistance of 78 ohms in this circuit is permissible. If the resistance is between 78 ohms and 200 ohms, an electro magnet operating on 110 volts DC must be used.

A Leeds and Northrup Micromax Potentiometer Recorder, especially equipped to compensate for variation in calibration, is used. The contacts on the potentiometer will carry 1/2 ampere non-inductive load at 110 volts. When relays are used, a type of relay requiring the potentiometer contacts to carry a maximum of .1 ampere are recommended. The potentiometer as furnished is suitable for either wall or panel mounting. The potentiometer can be furnished with up to six sets of adjustable discs and contacts for operating as many external circuits.

For vehicular tunnels, the usual calibration is 0 to 10 parts of carbon monoxide in 10,000 parts of air. A chart ruled for this calibration serves as a permanent record of the concentration analyzed. The potentiometer recorder is equipped with a synchronous motor for operating on 110 volts, single phase, 60 cycle current.

We guarantee MSA Standard Carbon Monoxide Recorders for one year from date of installation against defective materials and workmanship. We further guarantee for a period of one year that the permissible error of the graphic recorder including errors in analyzing and errors of transmission shall not exceed five parts per 100,000 and that with a range of 0 to .1% carbon monoxide, the recorders will have a sensitivity of four parts per million, provided that the recorders are assembled and calibrated by a member of our technical staff, and that the operating instructions, including renewal of the replacement chemicals are carried out.

It is our experience that for accurate calibration of the Carbon Monoxide Recorder, we must utilize a calibrator. A definite concentration of carbon monoxide in air prepared by the calibrator is passed through the analyzer and the recorder is calibrated against this known mixture. The MSA Calibrator sells for \$800.00. One calibrator may be used for checking any number of recorders. Wherever our CO Recorders have been supplied for tunnel installation, the MSA Calibrator has always been supplied.

4.

MSA CO Recorders, equipped with the acid train drying system have been installed as follows:

Holland Tunnel, New York City.....	14
Wawona Tunnel, Yosemite Valley.....	2
Detroit-Windsor Tunnel.....	2
Leige, Belgium.....	4
Radio City, New York.....	4

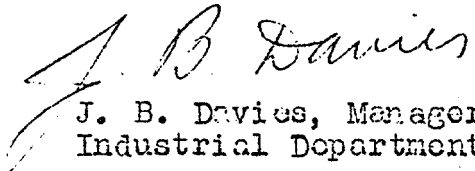
The Liberty Tunnels of Pittsburgh have been equipped with CO Recorders using the alumina drier system, and we have supplied four Recorders for the East Boston Tunnel at Boston, Mass., equipped with full automatic alumina drier. The trend, therefore, is toward the alumina drier which completely eliminates the necessity for the handling of chemicals in connection with the drier system.

The detectors and potentiometer unit would be completely assembled and thoroughly tested before shipment, but it would be necessary to separate the various parts in order to pack them for shipment. The prices quoted do not include any installation or any extra equipment other than that specifically mentioned. For example, it does not include any labor incident to the installation or assembly. We can, however, arrange to send a service representative to supervise the unpacking, assembly, and calibration of the recorder and to instruct the operating personnel in their operation and care. Our charge for a service representative's time is \$15.00 per day, plus his living and traveling expenses.

If you have any further questions, we shall be pleased to answer them.

Very truly yours,

MINE SAFETY APPLIANCES COMPANY


J. B. Davies, Manager,
Industrial Department.

JBD*RK

RE 0022520