

November 24, 1936

Mr. O. B. Lewis
Ethyl Gasoline Corporation
Chrysler Building
New York, New York

Dear Mr. Lewis:

We are enclosing herewith, a copy of some of our observations on air-line respirators, provided us for the purposes of inspection.

Your attention is directed to the summary, in which we state the limits of approval for this type of equipment; namely, in connection with tank cleaning operations. There may be a tendency to use this respirator in connection with blending and repair work, as you noted in Brazil, but until our studies on hose permeability, etc., are completed, we shall limit the use of this type of respirator to the purposes indicated.

Very truly yours,

WM:vn

Willard F. Machle, M.D.

KE 0022465

CONFIDENTIAL

November 20, 1936

Memorandum: Air-Line Respirators

The following air-line respirators were examined and inspected by us from the point of view of design, practicability, operating efficiency, and suitability for use by the safety representatives of the Ethyl Gasoline Corporation:

- (1) Lines Safety Appliances Company, Number E. B. 9111
- (2) Davis Emergency Equipment Company, air-line respirator Number D. S. 1-50
- (3) E. D. Bullard Company, air-line respirator Number H. N. - 30

And in addition the Davis D. S. 1-50 equipped with Davis Roots positive pressure blower.

The attached graph gives the relative air supply of the blowers of these different assemblies as determined by us, using a five light gas meter with a one-half inch pressure drop across the meter. The curve for the positive pressure blower was taken by us from similar data furnished by the Davis Company.

As a result of observations made while wearing the various masks under conditions of rest and differing degrees of exertion, we are led to the conclusion that the positive pressure blower offers a distinct advantage from the physiological point of view, and can be considered a safer type, in that we did not encounter negative pressure inside the face piece during the inspiratory phase of respiration, as was the case with the impeller type of blower. However, the use of these blowers as they are now manufactured, involves an additional expense, and for comfort of a wearer of the mask, particularly in the colder weather, changes in design of existing face pieces will be necessary. We feel that these changes in design will be forthcoming, and that some type of blower that provides an increased air supply to workers will accompany it; but for the present it has not been found feasible, in our minds, to associate the positive pressure blower with existing equipment. Our curves for air delivery from the impeller type blower on the three equipments studied may be considered somewhat low due to the susceptibility of these blowers to the degree of line resistance offered by the meter. For this correction and with a rate of turn of ≈ 45 revolutions per minute, it

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Memorandum: Air-Line Respirators (Continued)

is probable that the air supply will be adequate for our safety men in the circumstances in which they will be employed.

The face pieces on all three types of equipment could be made to fit on all the faces on which they were tested, although there was considerable difference in the discomfort attendant upon their use. All observers found the M. S. A. and the Bullard face pieces to be relatively comfortable, while the Davis face piece was found to cause considerable discomfort after prolonged use, as a consequence of the pressure asserted, principally upon the forehead by the "gasket ring", molded into the mask. The maximum difference in the weight of any of the three face pieces was 70 grams; but these differences were offset by the suspension and different weight distributions of the masks.

Visibility was good from all of the masks, especially so in the case of the Bullard face piece, which seemed to give a somewhat closer fit and less contained air volume than the other types.

The safety harnesses were made well and substantial in all cases; the M. S. A. however, was found to be more comfortable and considerably more stable, as a consequence of a higher insertion of the attachment for the hose.

Tests have not yet been made on the permeability of the hose. All of the masks submitted, satisfied by a wide margin, the requirements laid down in the Bureau of Mines Schedule Number 19. We are planning experiments on the permeability of at least one brand of air-line hose to tetraethyl lead and iso-propyl ether.

Summary:

There is a marked similarity in design, and operating procedure in all of the equipment studied, and we feel that any of the three types will prove quite satisfactory when used in connection with tank cleaning operations carried out in accordance with our rules and regulations.

Signed:

Willard F. Machle, M. D.

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RATE OF DELIVERY OF BLOWERS EACH WITH 50 FEET OF HOSE

