

May 22, 1943

AIR MAIL

Mr. Ray Bevan,
The Associated Ethyl Company Limited,
Artillery House,
Artillery Row,
London, S. W. 1,
England.

Dear Ray:

In the matter of the handling of high concentrations of Ethyl Fluid in gasoline, we are dealing with a rather difficult problem. It would be much simpler to advise you if I knew more of the circumstances. I appreciate, however, that it is impossible to transmit any such information, and therefore I shall give you the best advice I can based on generalities. So far as the toxic properties of tetraethyl lead in gasoline are concerned, let me remind you that in your volume of "Lead Studies," the green book from this Laboratory, there is an article on the absorption of tetraethyl lead through the skin in various dilutions in gasoline. The facts briefly are these. Tetraethyl lead itself is absorbed through the skin with fair rapidity. The absorption is hindered somewhat by dilution with gasoline. However, if the lead compound is present in gasoline to the extent of approximately 10% by volume, the absorption through the skin is still rapid, a fatal poisoning can be brought about by comparatively short exposures. This is roughly 2 1/2% by volume. We have no figures on the speed of absorption at this concentration. However, at 1% by volume the lead absorption out of the gasoline is so greatly retarded that repeated and somewhat prolonged exposures can be had without rapid absorption. There is no doubt that some absorption would take place. However, with the exercise of considerable care, this could be reduced to a minimum, and the dangers from skin absorption would probably not be very great.

As to the dangers of inhalation, I think it is fair to say that the quantities of tetraethyl lead given off from gasoline containing 1% of the lead compound, would be rather slight. Precautions greater than those required in the handling of ordinary gasoline ought to be taken, but the hazard here would not be excessive so far as the finished product was concerned if the mixing operations were carried out with considerable care. On the whole I should say that if the dosage were not too great,

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there would be great advantage from the hygienic point of view in dropping to a concentration not in excess of 1% of tetraethyl lead by volume.

I should not want you to think that there would be no hazard in handling gasoline containing 1% of tetraethyl lead. I am quite sure that there would be serious trouble if such gasoline were not handled quite carefully. Any considerable spillage would permit appreciable quantities of tetraethyl lead to evaporate after the evaporation of the more volatile gasoline. Moreover, as I have indicated above, some absorption would occur through the skin. For this reason persons should not be exposed for a very long time to the hazards of handling this gasoline. The containers should be marked in some distinctive fashion so that they could not be confused with ordinary leaded gasoline.

I think it would be quite impossible to handle such gasoline in the usual fashion and to fill small containers with it (or even large) under the usual conditions prevailing indoors in the packaging of gasoline.

Obviously, the mixing should be carried out with the same type of precautions that are employed in the mixing plants in general. Once the gasoline has been mixed, the filling of containers should be accomplished with the least possible contact and with the least opportunity for inhalation. I would think that some scheme not wholly different from that employed in the mixing plants might be set up for filling the containers with the concentrated gasoline. Barrels or even smaller containers could be filled on some out of doors platform. Inhalation could be prevented both by natural ventilation or by use of either an airline or a canister mask. I doubt if rubber gloves should be used to prevent skin contact. I suspect that any glove will be a disadvantage rather than an advantage. Skin contact will need to be avoided as much as possible and provision should be made for washing the hands free of gasoline, using either kerosene or perhaps better soap and water as soon as possible after contact has occurred.

I think it would be highly advantageous to avoid this procedure if it can possibly be done. On the other hand I think you will recognize from what I have said that it is not impossible to do this with safety, if the work could be confined to a few people under reasonably careful supervision. As you will recognize, once this concentrated gasoline has been diluted to the usual

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concentrations at its destination, all the dangers I have spoken of will have been disposed of. Accordingly it is my feeling that such dilution ought to be accomplished at the earliest possible time so that there will be as little opportunity as possible for the inadvertent handling and use of the concentrated product.

I hope this gives you my general attitude, but if opportunity affords itself to give more specific information, please let me know as soon as possible.

Sincerely yours,

Robert A. Kehoe, M. D.

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