

Rehse MS
Box 99

January 4, 1971

Darrel D. Douglas, P.E.
Chief Industrial Hygiene Engineer
Occupational Health Section
Oregon State Board of Health
P.O. Box 231
Portland, Oregon 97207

Dear Mr. Douglas:

I shall endeavor to answer your actual and implied questions as fully as I can.

The problem of pottery and ceramic ware used for household purposes in connection with food and beverages is indeed, an important one, and we have seen that cases of poisoning among young adults in good health can result from defective glazes on such articles, when they are used regularly, instead of being used occasionally. The articles to which I refer were produced in this country, and the difficulty resulted primarily from unsatisfactory firing. Whenever you see a mat glaze on any of the articles so colored - especially yellows and greens - as to be made with lead pigments, you are entitled to suspect that the firing has been done at low temperatures so that the lead in the glaze has not been converted to glass, i.e., silicate.

If the firing of which you speak is done at 2000°F, it should not be defective, but if the instrumentation employed should not be accurate, the results might not be good. At any rate, the test which you have used should indicate that such is the case, although it is not as severe as the test described by Mr. Merwin, to which we would adhere, if we were to use only one test. (There are some data to indicate that the tests should be of multiple design.)

In my view, both the group of the Potter's Association, with whom we worked, as well as the F.D.A., are in considerable error in setting a standard at 7 ppm. The general run of tableware runs lower than this, and I believe the standard should be no higher than 2 parts per million. This would eliminate some of the fancy stuff, but it is achievable, and I believe the standard should be set as low as is feasible. There is simply no point in granting a large leeway here, so far as I can see.

I would be the first person to admit, however, that the tests of pottery and glazed ware, in general, should be ample to deal with the practical situation. There may well be much more investigation so as to establish the facts with respect to various solvents - coffee for example. There may be others, such as complex organic acids which yield some odd results. (Incidentally, I believe the U.S.F.D.A. standard was set, or thought of, as having a precedent in the standard set years ago for lead on small fruits. I have always considered it to be higher than it should be. You are right, of course, in calling attention to the result which you obtained in a dinner plate tested overnight.

As to the problem of the other metals, I am no authority, I know nothing about such tests and I know little, off the cuff, about what the standards should be. I'll discuss this with our chemists here and see what I can learn. (This is Saturday afternoon, when none of the usual staff members are around, and I don't wish to wait to reply to your letter, since I'm leaving town for a time.)

You are right about most of the makers of things of this sort, especially the designers and manufacturers of objects of art. The standards for these activities should be exacting and should be enforced. First, however, they need to be worked out, and so far as I know, this has not been done. The materials I should fear most, in this connection, are those which contain cadmium. Selenium may be a source of trouble also, but I doubt that copper and zinc are. There is no reason, however, why opinions and predictions should be trusted. It is necessary to know the facts.

Jerry Cole of Lead Industries Association told me recently that they have sponsored some comprehensive research on lead. This, however, will not help with other metals. You are quite right. There should be required tests for various possible contaminants, and it should not be possible for every Tom, Dick and Harry who has a bright idea, to foist it upon family, friends, and neighbors far and near.

Sincerely yours,

Robert A. Kehoe, M.D.
Professor Emeritus of
Occupational Medicine

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Robert A. Kehoe, M.D.
Kettering Laboratory
College of Medicine
Cincinnati, Ohio 45219

Dear Dr. Kehoe:

We again have some problems concerning lead and come to you seeking advice. Our problem at the moment is pottery used for food preparation and serving, and the possibility of leaching lead from the glaze coating. The problem is really broader than that of lead and brings up potential problems with other toxic metals. For the moment, however, our questions concern lead.

Our case in hand does not involve imported pottery but is that of domestic pottery manufactured by a small religious group for sale to the public. The group utilizes some commercial glazes and also procures raw materials for mixing their own glazes. The formulas they use are standard mixes taken from glazing manuals, and the firing is in the neighborhood of 2000°F.

The occurrence of several episodes of illness in this group over a period of time led to the request by our Epidemiology Section, that we evaluate their pottery making operations and use of such pottery. Several pieces of pottery were taken at random and filled with acidic acid at a pH of 3.1 and left at room temperature for 24 hours. The samples were then analyzed through the use of atomic absorption. The results can be seen in the first column of the attached table.

After viewing the results we made contact with several persons in the pottery industry and eventually we were placed in touch with Mr. B. W. Merwin, Chairman of the Research Committee of

the United States Potters Association. He indicated that the Potters Association has sponsored a vast amount of work in this area over the past 10 years; and that you were partly responsible for their entrance into this area. We obtained a copy of the ASTM method Mr. Merwin indicated, which in essence differed from ours in sample preparation. The ASTM method calls for a 5% acidic acid solution to be placed in the container for 30 minutes at 60°C. The results of our analysis under these conditions, can be seen in column 2 of the attached Table. Utilizing the 7ppm limit for lead mentioned by Mr. Merwin, we see that there are no problems with this pottery.

At the time we talked to Mr. Merwin, he indicated that Federal Food and Drug Administration was also involved in this field and may come up with standards that are slightly different from theirs. We have made some preliminary contacts with the Food and Drug personnel and find that the method being used in the Seattle office calls for a 4% acidic acid solution to remain in contact with the pottery piece for 24 hours. They also use a 7ppm limit for lead.

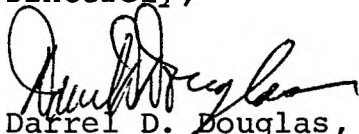
We are confused by this apparent difference in standards and also confused by the rationale of the standards themselves. The short term application of a concentrated acid solution to a dinner plate or a dinner cup may be satisfactory in protecting the consuming public from lead ingestion, but what about a casserole or a dish that may be used for food storage? A casserole may be placed in an oven at an elevated temperature for three or four hours and a food storage dish may be placed in a refrigerated area for several days. In our own case, one of the dinner plates revealed a very high concentration of lead when left over night. When run by the method specified under ASTM the results came out to be rather low. While this meets the ASTM standard, is this a realistic standard if food storage is to be taken into consideration?

At the moment our concern is not this particular group, but domestic pottery made by any number of small manufacturers. In the so-called hobby field, there are a good many who seem to want to collect these gayly colored utensils, not only for decorative purposes at home, but for use with food. Many of the persons involved in the manufacture may not, we believe, be sufficiently skilled in this area and this may constitute a significant threat to public health because of toxic metals involved. This brings up our other concern of the different metals utilized for colors, such as cadmium, selenium, zinc, and copper. I would assume that the same leaching method could be utilized for all of these materials if a standard time, concentration, and temperature can be agreed upon. However, the standards for each one should be different and we do not have standards for these materials at this time.

Robert A. Kehoe, M.D.
December 24, 1970
Page 3

I have raised several questions that are perplexing to us. I hope that there are not so many that they will prevent you from commenting on them, since we would certainly appreciate your opinions on these matters.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Darrel D. Douglas', written over the typed name.

Darrel D. Douglas, P.E.
Chief Industrial Hygiene Engineer
Occupational Health Section

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