

INDUSTRY DEVELOPMENT BULLETIN

Lead Industries Association, Inc.
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Look Ahead with Lead

March 13, 1963

SUBJECT: "NEW" SHIELDING MATERIALS

To Members of the Lead Industries Association, Inc.:

Several materials have recently appeared on the market which purport to be "new" radiation shielding products. We should like to point out to our members that there is not now, nor is there likely to be in the near future, anything that is really new for this purpose. Many of these materials contain lead, but in a greatly reduced amount, and therefore require more material for equal attenuation than does pure lead. This does not imply that there is no use for some of these products, nor does it mean that we feel they will, necessarily, displace sheet lead from its shielding market, but we should like to point out that the products should be used with knowledge of their limitations.

The instruction sheets which accompany some of these products are misleading especially to those who are not expert in radiation shielding design. For instance, one manufacturer states that his product contains 76 per cent of lead by weight and thereby infers that it is three-quarters as effective as pure lead. An example showing that this is not the case is the fact that it would take as much as a 5-inch thick layer of this product to be equivalent to 1/16-inch thick lead sheet as a shield for a 150 kv X-ray. Another product which is "a sand-like ceramic material that is much lighter than lead but can be used in X-ray rooms and radiation areas" obviously attempts to infer that it is a replacement for lead and a lighter weight replacement. This is simply not true and when one remembers that lead is effective in proportion to its mass and density, one may readily realize that other materials used to replace lead must also provide an equivalent mass to be as effective.

As an example let me quote from the National Bureau of Standards Handbook 76 entitled "Medical X-ray Protection Up to Three Million Volts" wherein 1/16-inch lead sheet weighing 4 lbs. per square foot is listed as equivalent to a 5.3-inch thick concrete wall which weighs 65 lbs. a square foot for 150 kv X-ray shielding. This is a good indication, of course, that lead itself is probably the most efficient, and certainly the lightest weight, of any other shielding material commonly available.

The position of government agencies having jurisdiction in this area is that almost any material may be used for radiation shielding provided that it is used in such a manner as to meet the attenuation requirements specified

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by law. For example, in the case of the material previously mentioned, if a physician should wish to place a 5-inch thick layer on the doors and walls of his X-ray room instead of using 1/16-inch lead, if tests by an expert certify that the material has been applied correctly so that there are no bubbles or other gaps, then the government could approve such an installation.

In summary, we wish to show that the principles of radiation protection and the materials available for such protection have not really changed in spite of shielding manufacturers' data sheets. There is undoubtedly a place for some of these new products, but not an indiscriminate replacement of lead.

Very truly yours,

Don G. Fowler
Don G. Fowler
Director of Health and Safety

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