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## Shielding Properties of Glasses with Different Heavy Elements Additives for Radiation Shielding in the Energy Range 15-300 keV

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### Abstract

The addition of bismuth (Bi) and lead (Pb) in the casting of glasses can provide better shielding characteristics. Selected fractions of  $\text{Bi}_2\text{O}_3$ ,  $\text{PbO}$ , and other compounds were added to the glass. The mass attenuation coefficient, half value layer (HVL), and the exposure rate with and without build up factor were computed using MicroShield. These parameters of dosimetric interest have been investigated in the energy range of 15-300 keV. A comparison between 6 types of glass based on shielding efficiency and cost of construction is demonstrated herein. An optimization suggestion is provided for the glass type to be used for construction of transparent windows used in the energy range for hot cells, monitoring windows in nuclear facilities, x-ray diagnostic and CT-scanner rooms to provide adequate shielding.

### Key words

Radiation shielding, bismuth-glasses, heavy-metal blended glasses, attenuation coefficient, half value layer thickness

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