Gamma ray energy-absorption buildup factors were computed, using the five-parameter Geometric Progression fitting formula and the ANSI/ANS-6.4.3 report, for some fluorides and sulfates in the energy range 0.015−15 MeV, and for penetration depths up to 40 mfp. The generated energy-absorption buildup factors are studied as functions of penetration depth and incident photon energy. At a given penetration depth, the buildup factor first increases, reaching a maximum value, and then decreases with increasing energy. The maximum value of the buildup factor occurs in the energy range 0.15–0.3 MeV. At these energies, Compton scattering is the major photon interaction process, and photoelectric absorption is of relatively little importance, leading to large buildup factors. The results of the present work should be useful in radiation dosimetry, diagnostics and therapy. The tissue equivalence of these materials is also discussed. It is found that lithium fluoride can be effectively used as a tissue equivalent material for cortical bone in the energy region 0.2−2 MeV.