Purpose: For external photon beams, the depth dependence of the stopping power ratio between air and water in the buildup region is difficult for accurate quantitative characterization. Qualitatively the depth dependence increases as the photon energy increases above the cobalt-60 energy. As a result, the depth dependence is often ignored and the "uncorrected" percentage depth dose curves are being used in many clinics. However, accurate knowledge on dose in the buildup region is important for applications such as the tangential beam setup. This work is to look for a dosimeter that measures with ease the correct photon beam PDD curves for all depth in phantom including the buildup region and beyond.

Method and Materials: The PDDs of a 10 MV photon beam at field size of 10x10 cm^2 and 100 cm SSD was scanned in a water-tank with a cylindrical (Scanditronix, RK) ion chamber, a parallel-plane (NACP) ion chamber, and a diode dosimeter (Scanditronix, designed for photon field with back-scatter absorber). The raw scan readings were corrected only for the effective point shifts as defined for depth beyond dmax. The Monte Carlo code EGS was used to generate the "true" PDD curve.

Results: The ion chambers, diode and EGS show good agreement beyond the dmax region. In the buildup region, the diode matches the EGS curve within 3% while the two ion chamber curves differ from the EGS curve by 5% to 20%.

Conclusion: A scanning diode dosimeter can be designed to generate true PDD curves, with a simple effective point correction, for both the buildup region and beyond for high energy photon beams. The ease of use afforded by such diode dosimeters would mean more availability of true PDD curves at clinic, including the dose buildup region.