A new commercially manufactured cylindrical ionization chamber (PTW Model 31006, "Pinpoint") with an extremely small sensitive volume (0.015 cm^3) and sensitive length (0.045cm) has been calibrated by the University of Wisconsin ADCL with cobalt-60 radiation and evaluated using a number of sources of small stereotactic fields. The units tested included both the Elekta Model U and Model B Gamma Knife, the OUR Model XGD Rotating Gamma Source and the BrainLAB stereotactic linear accelerator circular collimator set (from 1.5 to 5.0 cm diameter) with a 6MV X-ray beam. Results obtained with the Elekta Gamma Knife reproduce the manufacturer's recommended helmet factor for 14mm diameter helmet, and disagree by about 2.7 to 3% for the 8mm helmet. However, there is strong deviation between the measured helmet factors for the 4mm helmet and the present results (21 to 25%). Remarkably, the deviation between the collimator output factors for the OUR rotating gamma unit and the PTW Pinpoint chamber results parallel these results almost exactly: 14mm collimator (0.2% low), 8mm (2.9 to 3.1% low) and 4mm (31% low). The disagreement with extremely small photon fields may be due to slight misalignment, partial volume or stem effect. The device is robust, with good leakage characteristics and is capable of yielding extremely reproducible short term readings. The instrument calibration may have drifted by slightly over 1% in 3 months (re-calibration pending). The device is a useful addition to the armamentarium of the clinical physicist seeking to calibrate extremely small high energy photon fields.