

Purpose: To investigate and commission a PTW Starcheck 2-D array in megavoltage photon beams and determine to what extent it can be used to replace in-water ion chamber scans. **Method and Materials:** The Starcheck was introduced in 2008 and consists of 4 main arrays (0°, 90° and two diagonals) and is designed for both live diagnostics of linac beams and 2-D QA measurements. Three parameters were investigated – dose linearity, relative precision, energy dependence (k_Q) – and the results from the Starcheck mounted in a Virtual Water phantom were compared with scans obtained in a water tank (using both an ion chamber and diode) and with a 1-D ion chamber array (Victoreen THEBES). **Results:** The dose linearity was found to be better than $\pm 0.1\%$ over the range 0.25 Gy to 8 Gy and short-term repeatability was at the same level. The measured relative calibration was found to be significantly better than the manufacturer's specification, with a relative precision of 0.3 % (1 sd). The absolute calibration results for 6, 10 and 25 MV photon beams were surprising as the k_Q factors for the central chamber did not follow the expected water-air stopping power ratio, indicating a significant perturbation (perhaps due to the construction of the electrodes). The comparison of scans for a 10x10 cm field showed that the Starcheck in solid phantom agreed with the in-water ion chamber scan within 0.5% at all points. **Conclusion:** The Starcheck is an easy-to-use device that meets, and generally exceeds, the manufacturer's specifications for relative dosimetry and can be used as a substitute for ion chamber scans where a precision of 0.5% is acceptable.