The main element of the X-ray optic layout in the portable diffractometer is Kumakhov’s focusing capillary lens with a specific X-ray convergence angle of 1°-3° enabling, with the help of a linear-coordinate detector to register diffracted reflection at an angle of ~5°, to determine wafer crystallographic orientation compared to a standard sample. Requirements of the X-ray angle of convergence from Kumakhov’s full lens are determined by the maximum permissible deviation of the crystal plane angle $\Delta \phi_{\text{max}}$ from the specified angle $\phi > 2 \Delta \phi_{\text{max}}$. X-ray beam converging on the sample makes it possible to eliminate the need for sample holder rotation in search for diffraction reflection maximum.

A special sample holder has been developed to achieve precise determination of the deviation angle of wafer shear planes from the standard sample. The accuracy of the developed comparator diffractometer in regards to the above mentioned measurement depends on wafer flatness and equals to $\pm 5 \text{ Å}$sec. Dependence of the reflected diffraction shape and width on the quality of wafer treatment during various technological processes, such as cutting, grinding, polishing, was established. The device is equipped with software for automatic determination of the angle of deviation for the wafers under analysis.

Keywords: CAPILLARY OPTICS, SINGLE CRYSTAL, WAFERS