WHAT IS CLAIMED IS:

1. A focal position detecting method in a laser processing apparatus including holding means having a workpiece holding surface for holding a workpiece, laser beam applying means having focusing means applying a laser beam to an upper surface of the workpiece held on the workpiece holding surface of the holding means to thereby form a focal point, focal position adjusting means moving the focal point of the laser beam to be formed by the focusing means in a direction perpendicular to the workpiece holding surface of the holding means, feeding means relatively moving the holding means and the laser beam applying means in a feeding direction, imaging means imaging the upper surface of the workpiece held on the workpiece holding surface of the holding means, control means, and storage means,

the focal position detecting method for detecting a focal position of the laser beam to be applied by the laser beam applying means, comprising:

a test wafer mounting step of mounting a test wafer having a flat upper surface and a flat lower surface on the workpiece holding surface of the holding means;

a laser spot forming step of changing the focal position of the laser beam plural times in a

predetermined range in a vertical direction with respect to the upper surface of the test wafer after performing the test wafer mounting step, and next continuously applying a pulsed laser beam having an absorption wavelength to the test wafer to thereby form a plurality of laser spots at different vertical positions in the predetermined range such that a spacing is defined between any adjacent ones of the laser spots in the feeding direction; and

a just focus position deciding step including substeps of imaging the plurality of laser spots formed at the different vertical positions by using the imaging means after performing the laser spot forming step, next extracting a shape of each laser spot from an image obtained by the imaging means, next calculating a degree of similarity of the shape of each laser spot to an ideal laser spot shape previously stored in the storage means, next preparing an approximation curve for the degree of similarity of the shape of each laser spot, and next deciding the focal position corresponding to a maximum value for the degree of similarity as a just focus position, the substeps of extracting, calculating, preparing, and deciding being performed by the control means.