Spherometer

03017.00

Operating instructions

1 PURPOSE AND DESCRIPTION

The spherometer is used for the measurement of the radius of curvature on spherical surfaces. In addition the thickness of plates and the differences in level between surfaces can be found in a convenient manner.

The device has a tripod with three measuring points which form an equilateral triangle. In the centre of this triangle is located the probe of a dial gauge. The distance between the tip of the probe and the plane defined by the three measuring points can be read on the dial gauge. The measurement accuracy is better than 10^{-2}mm.

2 OPERATION

There are four threaded holes available on each leg of the tripod for the acceptance of the three measuring points. The points must all have the same separation from the central probe. In order to achieve a high accuracy of measurement, the points are screwed in positions as far outwards as possible. Consideration should be given to the limits set by the size of the surface to be investigated.

The dial gauge latches into the tripod at two precisely defined positions. The upper position for the dial gauge is used for measuring convex surfaces; in this case the black figures on the gauge scale are used. If the dial gauge is pushed downwards in the tripod until it latches, then concave surfaces can be measured using the red figures. It is important to check the zero-point adjustment after matching the gauge position to the measurement task in hand.

To adjust the zero point the spherometer is placed on a flat surface (e.g. Glass Plate 08204.00) and the scale on the dial gauge is rotated using the knurled ring so that its zero point lies below the pointer. Vertical pressure on the spherometer should be avoided during the reading.

Once this preparatory step has been completed, the device is placed on the surface to be measured and the difference in height h is measured. One revolution of the large pointer corresponds to 1mm (1 subdivision corresponds to 10^{-2}mm). The number of revolutions is given by the small pointer. The maximum measurement displacement is 10mm.

The radius of curvature R of a spherical surface is obtained from the measured difference in height h according to the equation

$$R = \frac{1}{2} \cdot \frac{a^2}{h} + \frac{h}{2}$$

where a is the distance of the measuring points from the centre of the system. The following figures are given for the four possible positions of the measuring points from the inside towards the outside, labelled with 1 to 4:

Pos	a/mm
1	15.0
2	25.0
3	32.5
4	40.0