

## 小孔内径测量的传感器精度分析

作者：马玉真, 于永新, 孙选, 郑义中

单位：济南大学

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摘要：

针对小孔的结构特点, 介绍了电容传感器探针测量小孔孔径的原理; 分析了测量时电容传感器由于参数的线性化、电容探针与小孔的中心线偏心带来的测量误差; 并针对以上因素影响, 采取了自动对中机构实现测量过程中的最小化偏心, 通过标定得到了孔径值与测量值之间的对应关系。实验结果表明, 系统的重复性精度可达到, 稳定性能达到六小时内漂移不超过, 该指标完全可以满足实际测量要求。

关键词：小孔孔径; 测量; 传感器探针; 精度

## Sensor precision analysis for pinhole diameter measurement

**Author's Name:**

**Institution:**

**Abstract:**

Aiming at the pinhole structure feature, the aperture measurement principle of pinholes with the capacitance sensor probe was introduced, the measurement error caused by the parameter linearization of sensor and the centerline eccentricity between the capacitance probe and pinhole were analyzed. And in view of the above factors, an automatic centring mechanism was taken to realize minimized eccentricity in the process of measurement, through calibration the corresponding relation between the measured values and aperture values was obtained. Experimental results show that the system can achieve the repeatability precision, and stability performance achieved with excursion not more than in six hours, these parameters can meet the practical measurement requirements.

**Keywords:** pinhole aperture; measurement; sensor probe; precision

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