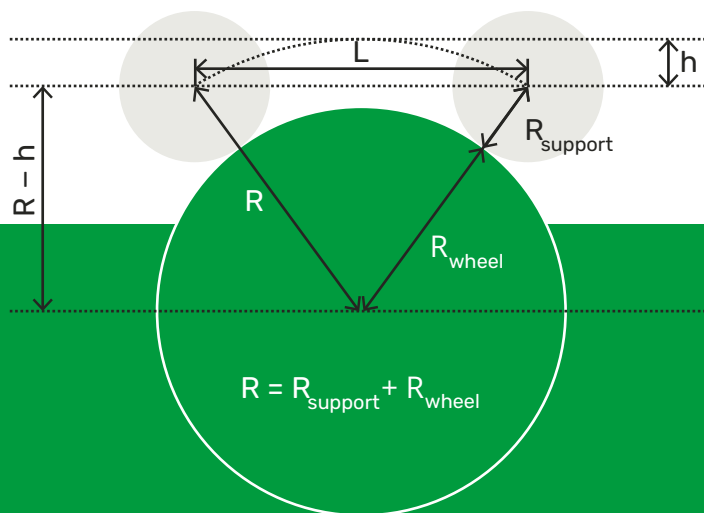


VERSINE MEASURING PRINCIPLE

The diameter measurement of the MiniProf Wheel 250 and MiniProf Wheel 400 is based on the commonly used versine measuring principle, assuming an ideal wheel with no deformations and perfect surface conditions.



$$R_{\text{wheel}} = \frac{(\frac{1}{2}L)^2 + h^2}{2h} - R_{\text{support}}$$

Assuming a perfect wheel, the MiniProf Wheel 250 and 400 provide theoretical diameter accuracy depending on the size of the wheel being measured, as outlined in the table to the right.

Wheel diameter	MiniProf Wheel 250	MiniProf Wheel 400
800 mm	90 µm	30 µm
1000 mm	150 µm	50 µm
1200 mm	220 µm	80 µm

The versine measuring principle is used by Greenwood Engineering and most manufacturers of similar full-contact and non-contact handheld measuring systems. Regardless of the manufacturer, it is crucial to understand that even minor defects or surface irregularities on the measured wheel flanges can cause significant inaccuracies in the diameter readings.

For example, a small 0.1 mm dent on the flange of a 1000 mm wheel measured with the MiniProf Wheel 400 instrument could result in a diameter deviation of up to 2.2 mm.

ERROR AMPLIFICATION AS A FUNCTION OF WHEEL DIAMETER

