

# APPLICATION NOTE

## QUICK AND ACCURATE $M^2$ MEASUREMENTS USING A MANUAL METHOD

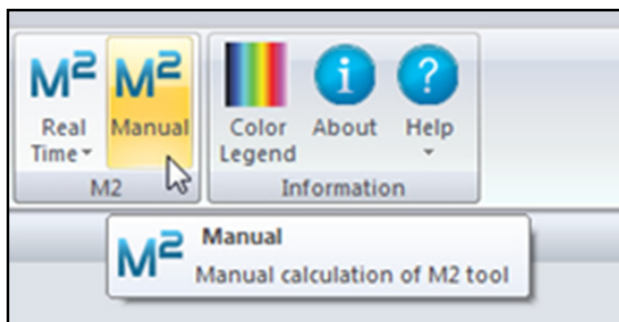
With a single Beamage camera and an easy optical setup, it is possible to do an ISO calculation of the  $M^2$ . It is the simplest method and the most accurate, but it is important to note that it is not an instantaneous measurement. This means that, in order to obtain the best accuracy, *it is necessary to have a very stable laser source.*

### TOOLS YOU WILL NEED

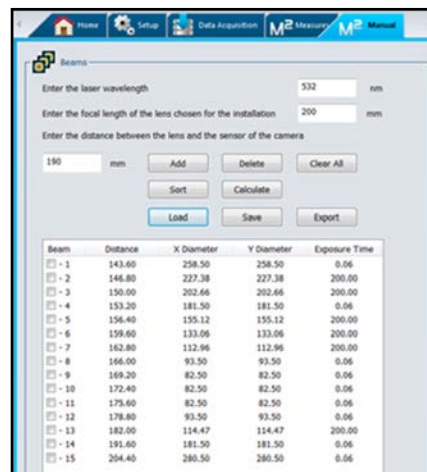


### PROCEDURE

1. Click the **M<sup>2</sup> Manual** button in the main menu.



2. Go to the **M<sup>2</sup> Manual** panel and enter the information about your setup



- Enter the laser wavelength
- Enter the focal length of the lens chosen for the installation

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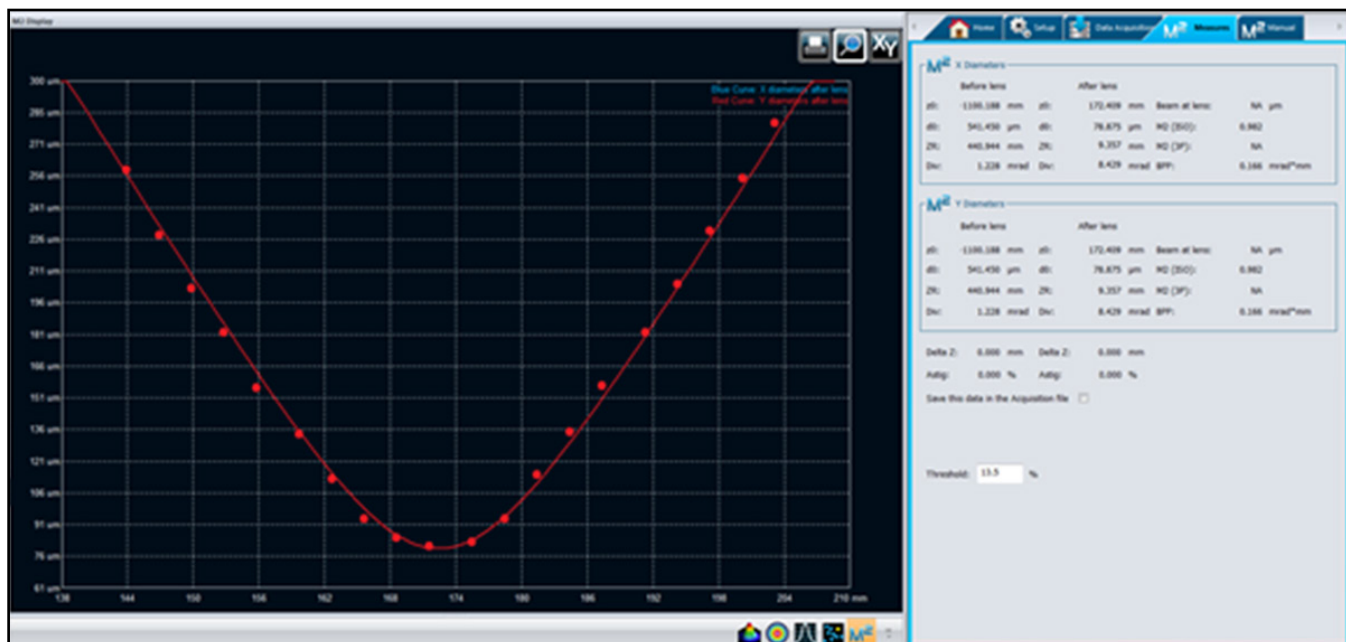
3. Below are all the available functions:

- a. **Distance:** Distance between the lens and the camera sensor.
- b. **Add:** Add the current beam diameter to the list.
- c. **Delete:** Remove the selected row from the list. The row must be selected before deleting it.
- d. **Clear All:** Remove all the data from the list.
- e. **Sort:** All beams will be sorted by distance.
- f. **Calculate:**  $M^2$  measurements will be done with the current data.
- g. **Load:** Add saved beams from a \*.m2man file.
- h. **Save:** Save all beams from the list to a \*.m2man file.
- i. **Export:** Export all the data to an Excel compatible \*.txt file.

4. Before pressing the **Add** button to add a beam to the list, all the conditions below must be respected to maximize the accuracy of the  $M^2$  measurement :

- a. Set the Beam Diameter Definition at **1/e2 along crosshairs (13.5%)**
- b. Set the Crosshair position at:
  - i. Center: **Centroid**
  - ii. Orientation: **0 degrees**
- c. Set Exposure Time at **Auto** to optimize the intensity of your beam
- d. Make a **Subtract Background** to minimize the noise
- e. Measure the distance between the lens and the surface of the camera's sensor and enter this value into the **Distance** field in the **Manual  $M^2$**  panel

5. Repeat step 4 until a minimum of 5 beams have been entered, then use the **Calculate** function. A curve fit will then be available in the  **$M^2$  Curve Display** and all  $M^2$  measurements will be available in the  **$M^2$  Measures** tab panel



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**6.** At any time during the process:

- a. More beams can be added to the list by using the **Add** button. When using this function, all previously added beams will be kept.
- b. A beam can be deleted by using the **Delete** button. The corresponding beam row must be selected before using this function.
- c. New  $M^2$  calculations can be done by using the **Calculate** button. If a new beam has been added or deleted, the **Calculate** button must be used to know the new result of the  $M^2$  measurements

**7.** A customized print report has been made for the  **$M^2$  manual** mode. To use the Print Report function, press the **Print Report** button in the main menu

