



**Purpose:** To determine the radius at the base of a bowling pin.

**Materials:**

- Keyence digital microscope, VHX-100K series
- Keyence digital microscope lens, VH-Z25
- Keyence digital microscope User's Manual
- Bowling Pin to be tested
- Set of radius gauges
- Digital microscope
- Pin holding jig

**Procedure:**

1. Power up the microscope.
2. Place pin in the pin holding jig
3. Position the pin base under the microscope
4. Place a white business card on the stage.
  - a. Focus in on a letter.
  - b. Flip the card over to its white backside.
  - c. Touch the "White Balance" key on the front panel of the CPU.
5. Adjust coarse adjustment knob to a magnification of 25.
6. Calibrate the lens.
  - a. Select **Lens** from the main toolbar (located in the bottom right-hand corner of the screen).
    - i. Select the lens power; in this case, click 25
    - ii. Click on "Calibration"
    - iii. Check to be sure lens power is set to x25 (on screen)
    - iv. Verify that the units are set to inches and set the number of decimal points to three.
    - v. Select OK to save changes and continue.
7. Adjust focus of microscope so that the profile of the radius is sharp.



8. Select *Menu* from the main toolbar.
9. From the menu bar at the top left-hand corner of the screen, select the Measure command.
10. Verify that the lens power is set correctly at the bottom of the Measure Tool Window screen and select the “Radius” measuring option.
11. Click the screen to select three best-fit points to display the base radius on the screen.
12. Rotate the pin  $\frac{1}{4}$  turn.
13. Repeat steps 11 and 12 until four measurements have been taken.
14. Save all data.
  - a. Resize the Measure Result Window so that it shows *all* radius measurements.
  - b. Select “Save as CSV.”
  - c. Using the mouse, move the soft keyboard window to the side (it will open up directly on top of the Save window).
  - d. Type in file name and select (create if necessary) appropriate folder.
15. Average the four results for the final measurement and record on the pin threshold worksheet.

**Alternate method:**

1. Hold the bowling pin so the base is easily inspected.
2. Match the radius at the base of the pin to the best fit radius gauge.
3. Record the radius at the base of the bowling pin from the radius gauge in inches.