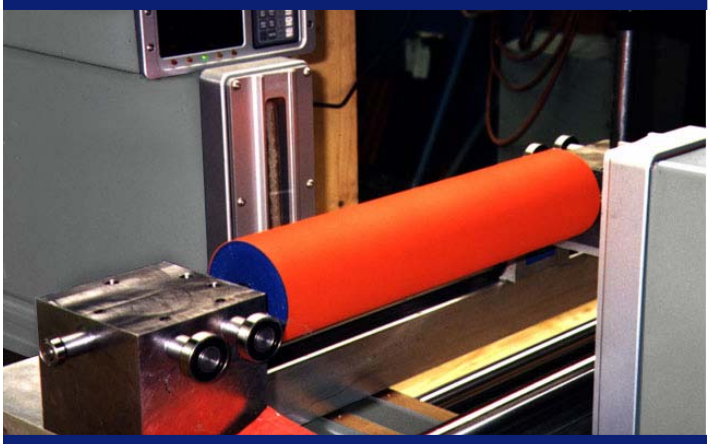
Application Note

Fast, Accurate, and Efficient Measurements of Rubber Print Rollers

Print Roller Measurement



Benefits:

- High accuracy measurement technique helps you ensure the highest possible product quality
- Non-contact length measurement technique ensures no damage to product
- Automated documentation of product quality simplifies the process
- Provides fast, accurate measurements of multiple product dimensions, including Diameter, Ovality, and TIR
- Flexible fixturing options can be tailored to your application

Improve product quality with laser micrometry

Manufacturers of new and reconditioned rubber-coated print rollers face new challenges to meet the high accuracy requirements imposed by their customers. Exacting limits for diameter, concentricity, and straightness require improved manufacturing and measurement processes.

Understanding the Problem

Conventional dimensional measurement techniques, such as pi-tapes, calipers, and dial indicators have several limitations in terms of accuracy, repeatability, speed, and integrity of the data.

First, the resolution of these devices is limited. Even under ideal conditions, the resolution may be ±0.001 inch or less. In addition, material hardness affects the reading. At a specific tension, a very soft material will read smaller than a hard material.

Repeatability is also affected since each operator will apply a different tension to the tape or caliper and can interpret the reading differently. Taking multiple readings along the length of the gauge is tedious and time-consuming.

Finally, the operator must transcribe the reading to paper or computer form. Calculations such as deviation from nominal, ovality, and TIR must be made manually. This process increases the chances that the data will be recorded incorrectly, lost, or not recorded at all.

In addition to the measurement limitations, contact devices can scratch or nick the surface of a soft rubber roller or a highly polished bearing or journal. This can result in damaged or scrap product.

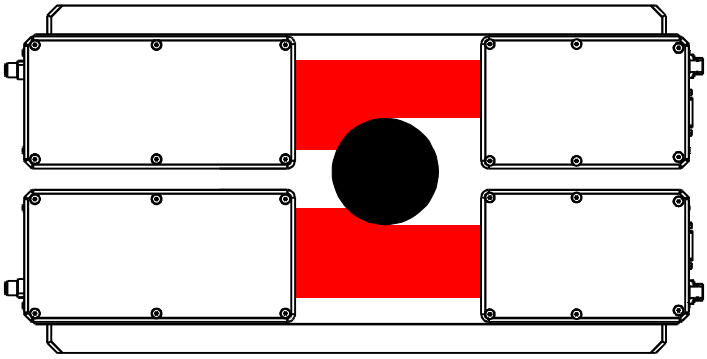
Using a laser micrometer in place of conventional contact gauging eliminates all these problems and provides additional benefits. These benefits include documented quality reports, process analysis tools, and measurement and reporting of complex roller profiles. However, there are several topics to consider when using a laser micrometer.

Z-Mike
by BETA LaserMike

Overcoming Obstacles

Many roller suppliers and reconditioners support a wide range of roller diameters — some as large as 30 inches. Since laser micrometers utilize a shadow measurement technique, the laser gauge must generate a scanning field wider then the largest roll to be measured. Producing a gauge with a uniform beam field in sizes larger than 13 inches is prohibitively expensive, so Beta LaserMike has developed a technique utilizing two smaller, lower-cost laser gauges. This solution is called Stacked Scanners.

As the name suggests, Stacked Scanners consist of a pair of laser gauges stacked one on top of another. The top gauge is inverted, and rails or spacers are used to create a predetermined gap between the gauges. As shown below, a gap exists between the two laser beams. Rolls to be measured must be larger than this “dead space” and must be roughly centered between the two beams. Using this technique, the diameter of the roll is determined by the sum of the shadow cast in the top laser, the shadow cast in the bottom laser, and the fixed distance between the two laser beams. Beta LaserMike processors have a special Stacked Scanner mode that eliminates the complex configuration required by other gauges.



In addition to creating a laser beam wide enough for the measurement of wider products, provisions must be made for holding the roller so that it can be scanned by the laser beam. Typically, this consists of a set of bearing surfaces that hold the roll by the journals. The position of these bearing surfaces is adjustable to accommodate a range of roller lengths. Roller bearings are often used so that the roller can be easily rotated for ovality or concentricity measurement. The bearing surfaces must be at the same height to ensure that the roller is perpendicular to the scanning beam(s). If the roller is not perpendicular, the laser will not measure the true cross-sectional diameter of the product. Beta LaserMike’s Specials Engineering Department can supply fixturing for these unique situations or help you to develop fixturing for your application.

To measure TIR, or for applications where a roller profile must be generated, it’s necessary to position the gauge at multiple points along the roller length. The easiest way to accomplish this is to mount the laser gauge on a sliding rail. By moving the gauge instead of the roller, the space required for inspection is half that required if the roller needed to be moved on either side of the gauge. The gauge can be positioned manually, or for generating detailed profile or shape analysis, a motorized positioner can be used. Beta LaserMike has solutions for profile measurement and analysis.

The Benefit to You

The bottom line for roller manufacturers is that laser micrometers can provide improved quality control, better and more manageable reporting for customers, and enhanced capability for demanding applications. The key is to work with an experienced gauge manufacturer that can help you ensure that your investment is a success.

To find out more about how to improve your quality with a laser micrometer, contact Beta LaserMike today.

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