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## **Nanometrology - NIST and Mitutoyo achieve world's highest accuracy roundness measurements**

(Aurora, Illinois) The National Institute of Standards and Technology, NIST, has recently begun calibrating roundness of precision spheres and hemispheres more accurately than any other laboratory in the world.

In a collaborative effort with Mitutoyo America Corporation, NIST has developed calibration procedures that utilize a standard Mitutoyo RA-H5000 roundness tester and that achieve a measuring uncertainty of less than 3 nanometers (0.000003 mm), or close to one-tenth of a millionth of an inch (0.0000001 inch).

As a federal agency within the U.S. Commerce Department, the mission of NIST includes providing advanced measurement services in support of U.S. industry. Within their 578-acre campus in Gaithersburg, Maryland, lies the Engineering Metrology Group, which has laboratories and equipment to provide industry with standards directly traceable to national and international standards through use of state-of-the-art calibration services.

In the past, the ability of NIST to provide roundness calibrations had not kept up with the accuracy needs of industry. But, with adoption of techniques recently developed for use in conjunction with the Mitutoyo RA-H5000, NIST has become the international leader in roundness calibration.

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In his presentation at the *2005 NCSLI International Workshop and Symposium*, Dr. Theodore Doiron, the acting Group Leader for NIST's Engineering Metrology Group, discussed how NIST was able to achieve their remarkably low uncertainty. Dr. Doiron explained the keys to their uncertainty are a special error separation measuring method, a tight temperature controlled environment and the stability of the RA-H5000.

In 2004, NIST opened the doors to their new Advanced Measurement Laboratory (AML). Some of the labs within the AML control temperature to an incredible  $\pm 0.01^{\circ}\text{C}$ , and the RA-H5000 is located in one of these. Used in this environment, NIST researchers have found the RA-H5000 to have a long-term repeatability of around 1 nanometer, which is key to their world class uncertainty.

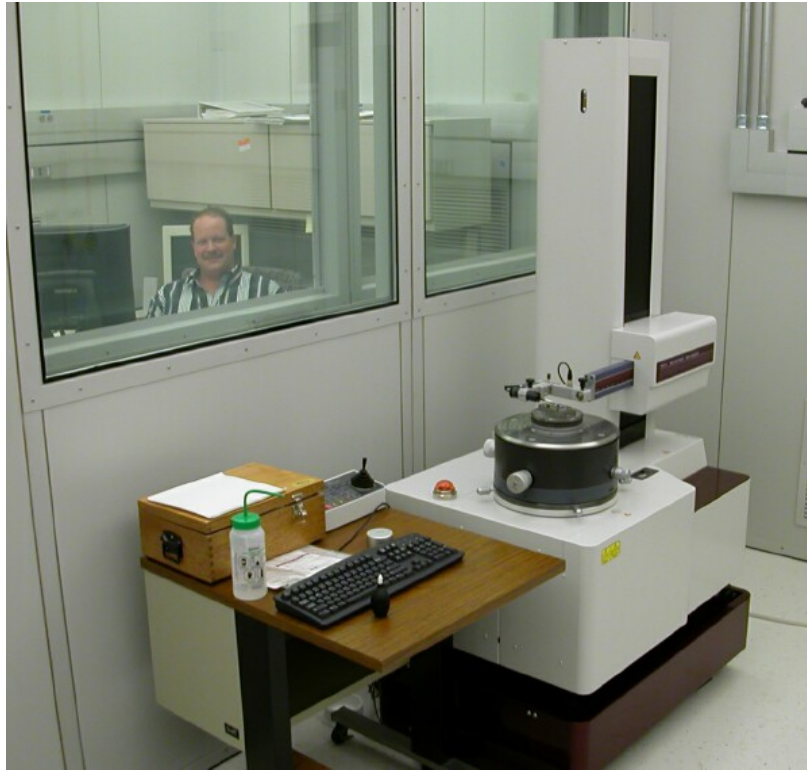
Dr. James Salsbury, Corporate Metrologist at Mitutoyo America Corporation, worked with the researchers at NIST in development of this measurement process. According to Dr. Salsbury, "The new roundness capability at NIST will quietly impact many U.S. industries where roundness is controlled to tighter and tighter tolerances. This is quite significant, and I'm very excited for NIST."

Mitutoyo America Corporation's nationwide network of Metrology Centers and support operations provide application, calibration, service, repair and educational programs for industry. This ensures that our 6,000+ metrology products will deliver measurement solutions for our customers throughout their lifetime. Contact Mitutoyo America Corporation, 965 Corporate Boulevard, Aurora, IL 60504. Phone: (630) 978-5385 Fax: (630) 820-7403

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The world's highest accuracy roundness measurements are performed on this Mitutoyo RA-H5000 located in the new Advanced Measurement Laboratory at NIST. In the background is Mr. Eric Stanfield, the NIST researcher who developed the calibration procedure. He is sitting in the machine control room, which is separated from the machine in order to maintain the best possible environmental conditions.

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