

## Spectroscopy products and applications

**Renishaw manufactures a wide range of spectroscopy products, including Raman microscopes, compact process monitoring spectrometers, diode lasers, and state-of-the-art cooled CCD detectors, for end-user and OEM applications.**

The primary products are the RM series of Raman microscopes and the RA series of Raman analysers, which exploit the Raman effect to identify and characterise the chemistry and structure of materials in a non-contacting, non-destructive manner.

The Raman effect occurs when laser light is shone on a material; light is scattered, a tiny fraction of which is shifted in frequency as atoms in the material vibrate. Analysis of the frequency shifts (spectrum) of the light reveals the characteristic vibration frequencies of the atoms and hence the chemical composition and structure of the material. Particles as small as 1 micrometre can be uniquely identified!



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Users in research laboratories, development labs and production lines worldwide employ the microscopes and analysers in a diverse range of fields - for example, in the computer hard disc, pharmaceutical, polymer, semiconductor, and chemical industries. More exotic applications include the identification of drugs and explosives by forensic scientists, and the analysis of paint and pigments on historic works of art as an aid to accurate restoration.

Gemmologists are also using the Raman microscopes to identify gemstones, and to determine their source by analysing the tiny mineral inclusions contained within them. Renishaw Raman systems can reveal when a new heat treatment for poor quality diamonds has occurred which changes their appearance to that of gem quality stone. This ensures that true diamond quality is maintained.

A variety of medical applications is being developed, one of the most notable being the detection of cancerous and pre-cancerous cells. It is hoped that small optical fibre probes and automated microscope systems will be used in the future to acquire data from human tissue, allowing the rapid diagnosis of potential cancers as an outpatient procedure.

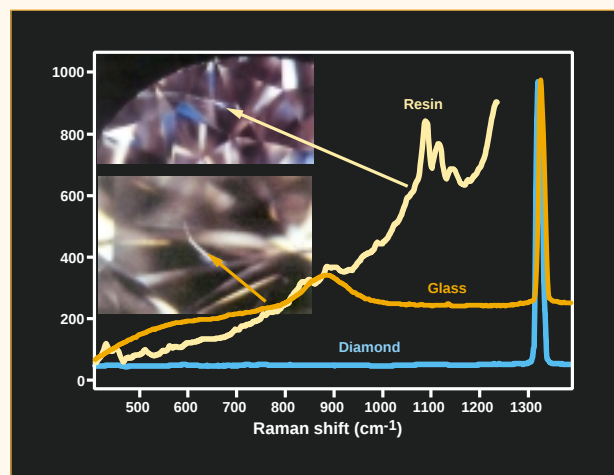
The capabilities of Renishaw's instruments have been expanded to include a wider range of lasers, enhanced optical filtering systems, many accessories, increased automation and improved software, which makes them even easier to use. The number of applications will increase as Renishaw continues to develop new technologies in Raman spectroscopy.



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1. Prof. Yury Gagotsi, director of the Nano-materials Group at Drexel University, Philadelphia, USA, using his RM2000 Raman microscope to analyse synthetic diamonds.

2. High power near-IR diode laser.

3. RenCam CCD camera with USB plug and play connection.

4. Spectra of diamond showing inclusions of resin and glass, used to fill cracks in an attempt to hide imperfections – courtesy of J. Yuan International Inc, Taiwan).

5. Raman microscope in use at the University of Southampton, Department of Chemistry.

## Sales support worldwide

**Renishaw has established fully-owned subsidiary companies, together with other regional support operations to support its major markets around the globe. Distributors and agents have been appointed in other key countries around the globe. A full list may be obtained from Renishaw's website:**



[www.renishaw.com](http://www.renishaw.com)

Renishaw demonstrates its products and product capabilities at major exhibitions around the world, together with local promotions and seminars. These are organised in conjunction with the Group's subsidiary companies overseas and international distributors. The events are promoted with international advertising, together with application features on the benefits of using Renishaw's products.

Renishaw's continuous expansion has been assisted by the impressive growth in its export markets, which account for some 90% of the Group's sales.

The demonstration facilities at New Mills are used for product display, product development and customer training. Similar facilities are available at most of the Group's subsidiary companies overseas.

Renishaw has a high commitment to customer care. Should any problem arise, a core team of skilled technicians,

based in the UK and at the Group's overseas subsidiary companies, is ready to provide service or perform test and re-calibration as may be required.

To maximise their investment in the Group's products, customers are encouraged to discuss their particular applications with Renishaw's engineers so that the greatest benefits can be gained and their individual production operations made most cost-effective.

Training on the best utilisation can take place at the customer's location but sometimes it is better for the customer to visit New Mills where a full range of Renishaw's product features, capabilities and benefits can be demonstrated. Visitors can also see how the company uses its own probes and calibration systems in the manufacture of components for the Group's products. Customer training is also undertaken around the world.



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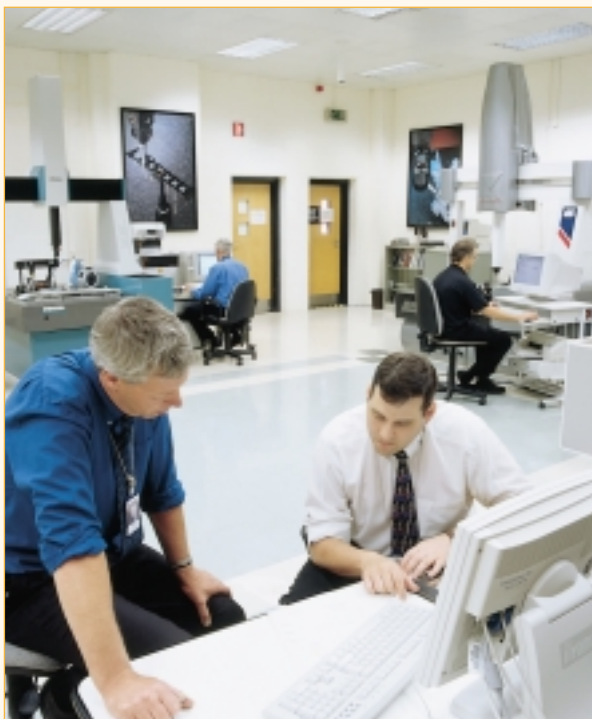
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1. CONTROL Exhibition, Sinsheim, Germany.
2. Laser system re-calibration, Service Center, USA.

3. New Mills Customer Repair Centre.
4. Service Center, Renishaw Inc, USA.
5. CMM Demonstration area, New Mills.

6. CNC machine tool Demonstration area, New Mills.