



Fig. 1: Inspecting the insulation on a monopolar electrode after a stress test in the ERBE test lab

## Easy and Precise

### Inspecting Components with the pixel-fox Imaging System

**More and more manufacturers are relying on optical systems for inspection, testing and control. They find that the only way to deal with rising quality expectations, tightening process tolerances, accelerating delivery times and more complex components is to conduct thorough visual inspections during and after the production process.**

The optical systems vary depending on their work pieces, materials or product assemblies and range from endoscopes and stereoscopic microscopes to optical light microscopes and macro lenses. And the actual inspection is only part of the process – powerful software products also let them measure, document and permanently archive their images. ERBE Elektromedizin in Tübingen, Germany is a 150-year-old multinational company that develops and produces electrosurgery, waterjet surgery and cryosurgery systems. In this highly sensitive market, the name of the game is precision. That's why one of the main tools in ERBE's kit is pixel-fox, the imaging package developed by dhs Dietermann & Heuser Solution, a software company based in Hessen, Germany. "We use the camera and software to identify and document instrument damage after standard testing and to inspect PCB components," reports Ralf Mack, Head of the Quality Assurance Testing Lab at ERBE.

#### Inspecting the Insulation on a Monopolar Electrode after a Stress Test in the ERBE Test Lab

The imaging package consists of a state-of-the-art, high-resolution digital microscope camera, a calibration tool and an imaging software program. A C-mount adapter connects the camera to the optics system – a Lynx 5/10 inspection microscope from Vision Engineering. This is an international adapter standard, however, and so the camera can be installed on any conventional optics system, regardless of make or model. It connects easily to the PC over a USB 2.0 interface offering threefold benefits:

- Almost every computer has a USB interface
- One cable provides both power and data transfer (no cable mess, no separate power supply)
- Rapid data transfer



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Not only that, but USB2.0 is one of the fastest interfaces on the market. That translates into a high refresh rate and a large, smooth live image on the computer monitor. pixel-fox is designed as a plug 'n play system. With its clean design and minimal use of components, even inexperienced users can get the software and image source up and running in no time. After a brief installation lasting a few minutes, ERBE's QA Lab was able to start work immediately. The software loads an intuitive start screen with a toolbar containing all the software's functions. Users can open and process images on hard drives, network drives or removable media, or can download live images from the connected USB camera. What Ralf Mack appreciates most is the system's ability to present full-screen images. That makes it child's play to position, focus and examine specimens and work pieces. By adjusting certain camera setting sliders, he can produce a perfect image in very little time.

#### Broad Range of Parameters

Overexposed, underexposed or unfocused pictures are a thing of the past now. Since everything is visualised in real time, he only saves the image after all the settings have been properly configured. No two specimens are alike. Rough surfaces need different settings than smooth or reflective components. Black plastic can't be displayed in the same way as bright textiles. Transparent media (liquids, films, etc.) are harder to visualise than high-contrast specimens under reflected light. That's why the software offers such a broad range of parameters for producing useful images under the most difficult conditions: exposure time, brightness, contrast, colour saturation, RGB values, white balance, shading cor-

Fig. 2: Checking a pin in a pump unit for irregularities after testing

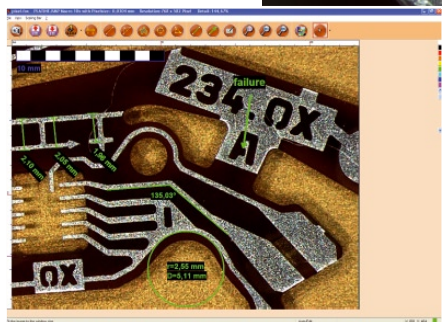
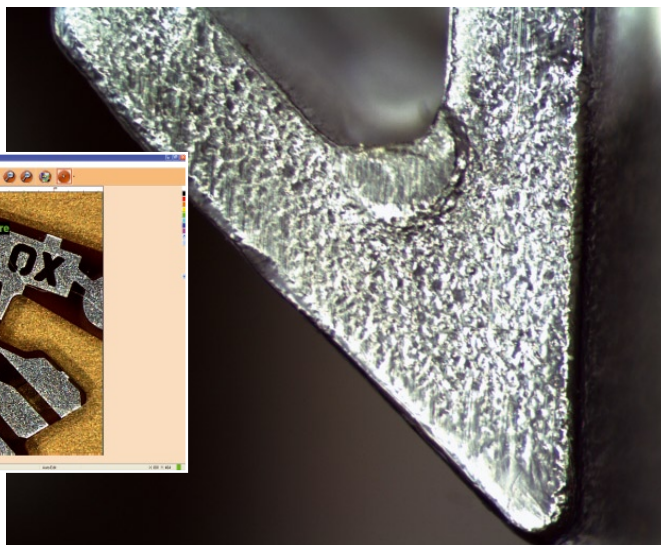


Fig. 3: Picture from the pixel-fox measurement tool

rection, flip, refocus. Some can even be done automatically. Different camera settings can be saved in an unlimited number of profiles. It then just takes a single mouse click to switch from one acquisition mode to another – no need to manually reset anything. That saves a lot of valuable time. No wonder the innovative medical equipment manufacturer measures its components with pixel-fox.

### Measuring in 2D

The 2D measurement function is a core feature of the imaging package. Included in the toolkit is a stage micrometer, which the software program uses to generate a calibration file. Essentially, this file contains a numerical value that describes the stage to pixel ratio: the relationship of a defined stage (which is precisely laser-

ed into the micrometer) to the pixels used to display the image. Calibration thus only needs to be performed once for each magnification level of the microscope. For future images, users simply retrieve and apply the appropriate calibration file for the image. After completing these preparations, it was time for the ERBE employees to harness the powerful measurement features: lines, circles, areas, angles, drop perpendicular, and more. The visualisation tools are equally useful: show/hide ruler, scale bar, digital zoom for precise measurement point placement, crosshairs and labels (arrows and text). Best of all, all these additions can be customised based on personal preference or image characteristics – line thickness, font size, colours, etc. Cutting-edge layer technology even allows users to edit all these entries right up to the time when the images are finally stored!

### Extremely User-friendly

pixel-fox draws on dhs's nearly 20 years of experience with dhs Image Data Base, a high-end modular solution for demanding laboratory and QA applications in use at thousands of workstations all over the globe. In other words, a deep pool of imaging knowledge was leveraged to produce an entirely new product that was extremely stable and completely user-friendly from the very beginning. The software runs on Win 2000, XP and even under the new Windows Vista operating system, providing maximum flexibility for users. The product is available in English and German and ships with a context-sensitive online help function. This is a great advantage for users in need of help: Instead of poring through thick user manuals, they can just press the F1 key. And if they need more help for a particular issue, they can count on competent, free eMail support.

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Fig. 4: The pixel-fox package



Fig. 5: The digital pixel-fox USB camera, mounted on a microscope