

Reference

X-ray imaging of pearls with **Medici** DR system in Gübelin Gem Lab Ltd. Luzern, Switzerland and Hong Kong



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 Medici DR Systems

Reference

The first Gübelin Gem research laboratory was founded in Lucerne in the 1920s by a jeweller named Eduard Gübelin who intended to test the gemstones and pearls required by his own company, for consistency and valence. His laboratory later provided this service for other traders and jewellers as well. The highly qualified specialists of the Gübelin Gem laboratories – today situated in Lucerne and Hong Kong – now boast many years of international experience in the field of identification, classification and determination of authenticity of gemstones and pearls. On the instructions of gemstone traders all over the world, the Gübelin Gem Lab tests the identity and authenticity of gemstones and pearls. To be able to continue conducting reliable and even more efficient tests to differentiate between natural and cultured pearls and to establish the quality of cultured pearls with nuclei, the company decided to upgrade to digital X-ray imaging systems by OR Technology.

Dr. Stefanos Karamelas: "The systems designed for us by OR Technology are predominantly used to differentiate between cultured and artificial pearls. After trying for five years to find a solution to change from film to digital x-ray imaging of pearls, we found OR Technology who developed a system for Gübelin Gem Labs that is optimally suited to our requirements. Our company has successfully utilized this X-ray technology for the last two years."

To meet the requirements of the Gübelin Gem Laboratory in Lucerne, i.e. good imaging quality at a low radiation dose, high throughput, no use of chemicals (lead nitrate) and minimal noise, OR Technology decided to use a high-resolution tooth sensor while adapting the in-house **dicomPACS®DX-R** software. Thanks to the X-ray system, high-value natural pearls can be tested for authenticity in a minimum of time by means of superior images without compromising the quality of the particular pearl.

Further information is available under
www.or-technology.com



The system installed at the Gübelin Gem Laboratories in Hong Kong by OR Technology was an HF X-ray generator, completed by a (14"x17") flat panel detector. One of the system's numerous benefits is its easy ceiling installation.

Both laboratories are equipped with the **dicomPACS®DX-R** acquisition and diagnostic evaluation software.

Optimal workflow by means of the custom-made software

Dr. Stefanos Karampelas: "The Hong Kong branch system's main function is to assess the quality of pearls purchased in bulk at the request of wholesale pearl merchants. The X-ray system is used to test the thickness and evenness of the nacre layer, by determining the strength of that layer and detecting luminescence by means of X-rays. A question frequently asked when it comes to pearl identification and assessment of cultured pearls is whether the specimen is from a freshwater or a saltwater mollusc. The X-ray system by OR Technology allows pearls to be classified by observing their luminescence reaction. Most fresh water samples react to X-rays while saltwater samples remain predominantly inactive. Furthermore, cultured pearls are assessed by applying the so-called "5 S"-criteria which include shape, size, shade, shine as well as surface. An even more detailed analysis of pearls may then be conducted in the Lucerne laboratory by means of its X-ray system which measures the precise diameter of the pearl as well as the outer layer to find out how much new nacre was formed around the implanted nucleus. We very often use the dicomPACS®DX-R distance measuring tool designed by OR Technology. In addition, the tools to adjust the sharpness of the image are very important to us."

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Identification of natural and cultured pearls by means of X-ray images

High-resolution X-ray images are essential for categorizing natural and cultured pearls. Today, two different types of cultured pearls are available: pearls without a nucleus (mostly produced in freshwater shells) and cultured pearls with a nucleus.

Cultured pearls without a nucleus generally form by means of a transplant whereas cultured pearls with a nucleus are mostly produced in saltwater shells, growing in the shell's gonad. It is generally easy to identify cultured pearls with artificial nuclei (small nacre spheres cut from the shells of large oysters) since the round implant and the line around it are clearly discernible on the X-ray image. Genuine, naturally grown pearls normally display concentric grey lines consisting of organic matter ("onion structures") which appear darker in the X-ray image than non-organic matter. An optimal analysis of the internal structures requires X-rays taken from various perspectives, which is greatly facilitated by the system installed by OR Technology in Lucerne.

Dr. Stefanos Karampelas: "We don't only use the X-ray beam system to check the quality of pearls but also to identify lead glass rubies and fracture-filled diamonds. To us, OR Technology is a flexible and competent partner for digital X-ray imaging supporting us in our daily work with custom software solutions and helping us to find fast and professional diagnosis options as well as an economical transfer of X-ray images between our branches via **dicomPACS® MobileView.**"





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DR Systems

With the **Medici** DR X-ray detector upgrade, work routines for materials testing and quality inspection become simpler and faster. Furthermore, the digital technology clearly leads to improved image quality and higher reproducibility. Our **Medici** DR systems are available for nearly every X-ray unit manufactured. After choosing the appropriate make and size of wireless flat panel detector, the system can be configured according to your needs.

The acquisition and control software for radiographic testing **ORinspect** is easy to operate, has a touchscreen interface, improves the workflow and produces outstanding X-ray images. Naturally, Medici DR systems can be integrated with your information system software and programmed to transfer X-ray images to an image management system (**dicomdePACS**).

 **OR Technology**

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