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## High-performance X-ray systems for medical devices sterilization

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High-energy X-rays are produced by 5 to 7 MeV electron beams striking high-Z metallic targets made of Tantalum or Tungsten. The resulting X-rays have similar penetrating power as gamma rays produced by Cobalt-60 sources. Both X-rays and gamma irradiations are very effective for the sterilization of large loads of low-density products such as medical devices. The IBA Company has launched in the recent years the development of industrial irradiators allowing an efficient use of X-rays for the sterilization of medical devices on pallet. The proposed systems have been developed thanks to the use of state-of-the-art Monte Carlo simulation codes to optimize both their throughput and dose uniformity figures. This effort resulted in the installation of the first full X-ray facility in Daniken, Switzerland, operated by Synergy Health. Thanks to the unique TT1000 rhodotronm accelerator developed by IBA, this facility uses a 7 MeV, 700 kW electron beam to generate X-rays used exclusively for medical devices sterilization. With 700 kW beam power, the Synergy Health facility can process up to 1.5L m<sup>3</sup>/year of low bulk density products. For a pallet load with density of 0.15 g/cm<sup>3</sup>, this X-ray system reaches a remarkable dose uniformity ratio better than 1.2

### Biography

Frederic Stichelbaut has completed his PhD in High-Energy Physics at the Free University of Brussels (ULB) in Belgium in 1993. After his PhD, he worked 2 years at the European Organization for Nuclear Research (CERN) in Geneva and 4 years at Fermi National Laboratory in Chicago, Illinois for postdoctoral studies. He joined the Ion Beam Application (IBA) Company in 1999 and has been involved in R&D studies for the past 15 years. He has published more than 500 papers in peer-review journals and is a member of ASTM committee E61 on radiation processing. At IBA, he is in charge of all studies related to describe the interactions between particle beams and matter. "I am thrilled by the opportunity to meet with the Medical Devices community and to see how our R&D studies on the sterilization of medical devices would help you to develop even better products.

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