

Linear Accelerators with Submillimeter Beam Spot Size for Non-Destructive Testing and Security Screening

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Non-Destructive Testing (NDT) and Security Screening of various objects with high energy X-ray sources based on linear electron accelerators has been rapidly growing in aerospace, defense, energy, and civil infrastructure markets. Anytime an image of the object is created using Bremsstrahlung radiation generated by an Electron Beam (EB), a smaller spot size is always useful for better resolution of the resulting image. Historically, X-ray spot size in low to medium energy commercial linear electron beam accelerators (Linacs) has been measured on an order of 1.5-3.0 mm in diameter, and typical specification calls for less than 2 mm beam spot size. It is much more difficult to create a submillimeter Electron Beam spot size in microwave linacs when its energy exceeds 1 MeV, especially when there are no external focusing system installed. In recent years Varex Imaging, world leader in innovation, development, and manufacture of X-ray imaging component solutions, has been developing a series of new Linac products with improved parameters including higher output, improved stability, while demonstrating electron beam spot size at or lower than 1 mm. We present our achievements of record 0.8 mm diameter minimum EB spot size in our new linacs without any external focusing magnetic systems.