Standard Imaging	TECHNICAL NOTE	**DATE** 03-19-01 **PAGE** page 1 of 1 **NUMBER** 4440-02	SeeDOS Ltd cwalters@seedos.com

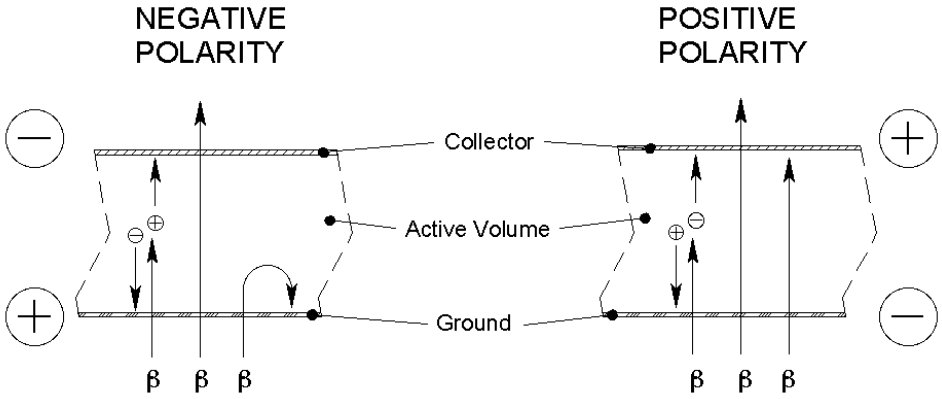
SUBJECT: **The polarity effect on ionization chambers resulting from beta particles**

The following information is provided as a service to our users and customers:

Beta particles (which are electrons) are negatively charged. The interactions occurring in ionization chambers are affected by the direction of the incoming beta particles relative to the electric field used to collect the charged particles produced by the ionization. This is known as the Polarity Effect.

To see the result of the electric field polarity on charged particles, consider the chamber wall (ground) and collector wall of an ionization chamber, as schematically represented below. The chamber polarity is represented by the large plus (+) and minus (-) signs, the beta particles are shown as β, and the ionization products are represented by the small plus (+) for positively charged particles and the small minus (-) sign for negatively charged particles.

Three possible interactions are shown: 1) The β ionizes an air molecule, creating positively and negatively charged particles, which are collected, 2) The β is of high enough energy to pass entirely through the chamber, or 3) The β is attracted to the Positive Polarity of the Collector, and is collected, or is repelled by the Negative Polarity of the Collector, and is not collected.



Conclusion: For beta particles, unequal amounts of charge will be collected for negative versus positive polarization of an ionization chamber. The recommended way to use beta particle calibration factors for ionization chambers is to calibrate with one polarity and thereafter use only that polarity for beta charge measurement.

If there are any questions or comments regarding this information, please contact Standard Imaging or your authorized dealer.