Model 3088 Advanced Aerosol Neutralizer: Comparisons with Previous Generation

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Charge neutralization is a necessary and important step for many aerosol instruments and techniques. Particle sizing by differential mobility analysis, for example, relies on sample particles having a well-defined, known charge state. Traditionally, radioactive neutralizers have been used to generate bipolar ions which interact with particles by diffusion, and bring the particle population to a known, bipolar charge distribution.

Recently, low-energy soft X-ray neutralizers have been employed as an alternative to radioactive sources (Shimada *et al*, 2002; Lee *et al*, 2005). The soft X-rays ionize the air molecules, creating bipolar ions which bring the particles that they interact with to a Fuchs distribution consistent with radioactive sources such as americium-241.

Presented here are side-by-side comparisons between the previous (Model 3087) and new (Model 3088) generations of TSI's Advanced Aerosol Neutralizer. The new model features neutralizer performance consistent with the previous generation along with enhanced usability. Further, it offers full integration into the new TSI Model 3082 Electrostatic Classifier (Farnsworth, *et al*, 2013).

Radiation output from the soft x-Ray source was measured directly and was consistent between the models. Particle losses and particle generation were characterized across the full flow range of the instrument with agreement between the models.

Figure 1 shows several examples of particle size distributions comparing the SMPS response using the different neutralizers. This comparison was extended to the full flow and concentration range of the neutralizers and showed consistent performance from the previous generation to the new generation of Advanced Aerosol Neutralizer.

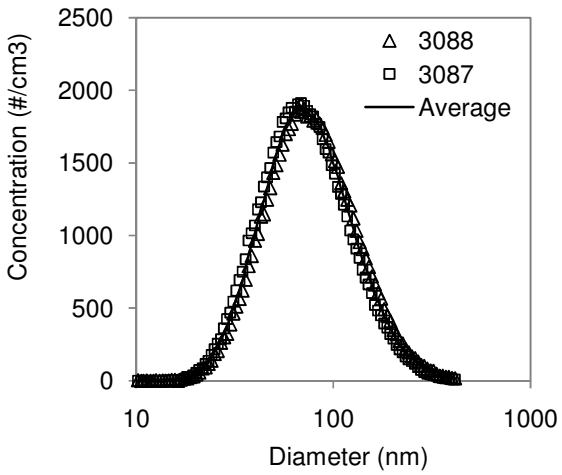

Figure 1. Comparison of SMPS response with Model 3087 and new Model 3088 Advanced Aerosol Neutralizer

Farnsworth, J.E., Quant, F., Horn, H.G., Osmondson, B. and Caldow, R. (2013) *Proc. Of Euro. Aerosol Conf.* In Preparation.

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