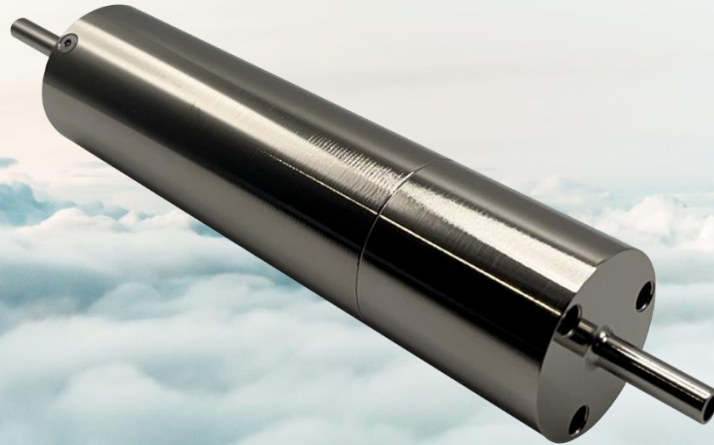


AEROSOL CHARGE CONDITIONER ACC-EL1-63

Fast and accurate aerosol measurements – anywhere



APPLICATIONS

- Electrostatic particle classifiers – Scanning Mobility Particle Spectrometer (SMPS) and Particle Mass Analyzer (PMA)
- Ambient aerosol measurements – Source attribution and characterization
- Neutralization of charged aerosol – Regulatory measurements, filter testing and sample collection

BENEFITS

FIELD-READY



Conventional neutralizers typically use ion sources with high radioactivity, limiting their use to only specific licensed users and locations. Atmoso's patent-pending technology [1] allows the ACC-EL1-63 to use a license-exempt* ion source without sacrificing performance. Thus, it can be used without handling restrictions*, including at roadside or mobile labs.

FAST RESPONSE



New 'fast scanning' techniques of SMPS systems conflict with the often long and uneven delays in particle transmission of conventional neutralizers, affecting measurements of transient aerosols [2]. The ACC-EL1-63 provides consistent residence time for all particles by careful fluid dynamics design.

- Exempt from license requirements* for end-users
- Low radiation levels
- Consistent, fast response time
- Known charge levels on particles
- Form compatible with TSI Kr-85 3077A applications
- Consistent ion source with a long half-life (101 years)
- Leverages cutting-edge measurement methodologies [3,4] and modeling [5,6] for particle charging

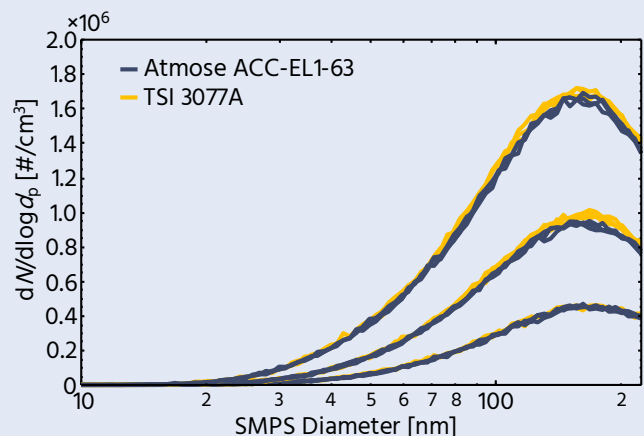


Figure 1 – SMPS scans of di-octyl sebacate (DOS) spheres at 1.5 L/min. Three repeats at each of three dilution settings.

Specifications	
Mode of operation	Bipolar diffusion charging
Ion Source	Ni-63
Radioactivity [†]	92.5 MBq (2.5 mCi)
Half-life	101 years
Housing Material	Aluminum or Stainless Steel
Particle Penetration [§]	>99%

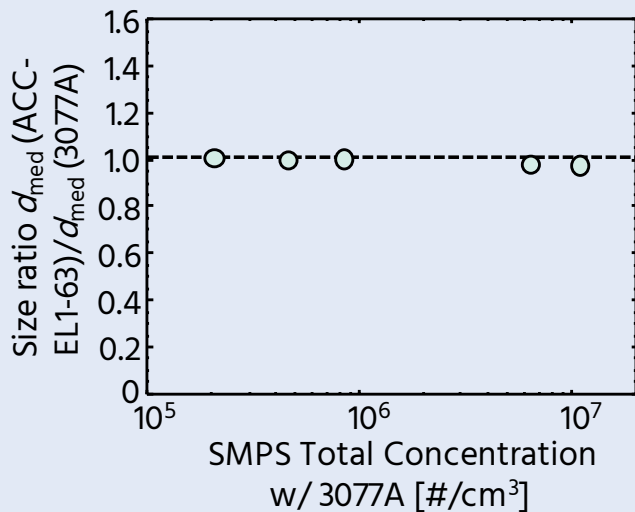


Figure 2 – Ratio of median diameter of SMPS Scans found using Atmose ACC-EL1-63 over TSI 3077A charger.

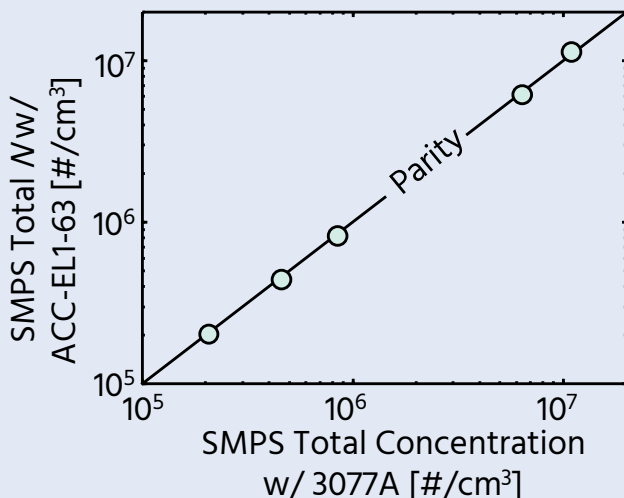


Figure 3 – Total concentration from SMPS Scans found using Atmose ACC-EL1-63 compared with TSI 3077A charger.

- These results demonstrate the suitability of the ACC-EL1-63 for use with electrostatic particle classifiers, such as SMPS and PMA systems.
- Size distributions of spherical particles were measured over a range of dilution settings using the SMPS. Particles were initially neutral, di-octyl sebacate spheres. Three repeat scans were performed at each dilution setting.
- Median diameters using the Atmose ACC-EL1-63 were within 3% of those using TSI 3077A as the charge conditioner at 1.5 L/min flow (see Figure 2).
- Similarly, the total number concentration was within 5% over a wide range of number concentrations (see Figure 3).

REFERENCES

- [1] Johnson and Nishida (2023). Patent Application GB2303960.5
- [2] Woo, Nishida, Johnson et al., in preparation
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- [4] Johnson, Nishida et al. (2021). DOI: [10.1016/j.jaerosci.2020.105705](https://doi.org/10.1016/j.jaerosci.2020.105705)
- [5] Nishida, Johnson et al., in preparation
- [6] Woo, Nishida et al. (2022). DOI: [10.1016/j.cpc.2022.108399](https://doi.org/10.1016/j.cpc.2022.108399)
- [7] IAEA (2014). URL: <http://www.iaea.org/publications/8930/radiation-protection-and-safety-of-radiation-sources-international-basic-safety-standards>

NOTES

*This source is exempt under Schedule I of the General Safety Requirements (GSR) Part 3 [7] published by the International Atomic Energy Agency (IAEA). 177 countries are members of IAEA and many of them have incorporated these exemption guidelines within their regulatory framework. However, the requirements for radioactive sources can still vary between countries and regions. A list where the ACC-EL1-63 is compliant and license-exempt is available from Atmose on request.

[†]Target radioactivity of ion source. The true radioactivity of the ion source may vary by up to ±10% from target, depending on the procurement date.

[§]Determined using monodispersed, spherical particles with mobility diameters of 55, 240 and 1045 nm at 0.3 L/min sample flow, and 55 and 1045 nm at 1.5 L/min sample flow.

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