ACTRIS Recommendation for measurements with the Ecotech Integrating Nephelometers 3000 or 4000 - Part II Standard Operation Procedure

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Standard Operation Procedure and System Checks

For long-term light scattering measurements, we recommend the following listed items to improve the quality of the measurements.

- Leak testing of the nephelometer should be part of the regular maintenance schedule for the instrument.
- The different system photons counts should be checked after each deployment and once per year. The shutter photons counts for all 3 wavelengths should be between 0.8 and 1.3M. The measure photons counts should be between 1000 and 20000; the dark photons count should be below 1000.
- The humidity and temperature sensor inside the measurement cell has to be checked prior to their deployment and afterwards at least once per year.
- Calibration should be performed every 3 months using highly pure CO2 (>99.9%). Values for the different wavelengths are given in table 1. Note that these values are normalized to 0°C and 1013hPa. The calibration coefficients (parameters M & C) should be recorded before and after each calibration.

Aurora Readings Full Scattering						
wavelength	CO_2	fm200	SF6	r12	r22	r134
450	44.21	392.68	157.62	392.95	179.31	174.37
525	23.86	211.93	85.07	211.93	96.77	94.11
635	11.15	99.02	39.72	99.02	45.22	43.97
Aurora Readings Backscatter						
wavelength	CO_2	fm200	SF6	r12	r22	r134
450	22.11	196.34	78.81	196.34	89.66	87.19
525	11.93	105.97	42.54	105.97	48.39	47.06
635	5.58	49.51	19.86	49.51	22.61	21.99

Table 1: High span gas light scattering readings for different gases. All coefficients are for high purity gases (>99.9%) and normalised to 0°C and 1013hPa.

- The automatic Zero-check of the system should be enabled and performed daily. The zero check should be between -2Mm^{-1} and 2Mm^{-1}.
- The nephelometer should be operated in an environment of 0-40°C to avoid a malfunction photomultiplier tube.