COMPARABILITY OF AMBIENT (OUTDOOR AND INDOOR) OZONE MEASUREMENTS

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We want to be able to compare measurements results over time, and between different laboratories all over the world. According to ISO guide 99 (*International vocabulary of metrology — Basic and general concepts and associated terms*, VIM) this metrological comparability is obtained when the results are metrologically traceable to the same reference.

For any gas measurements the best reference is the mole. For ozone this is not directly possible to realise. The very reactive nature of ozone precludes its storage in cylinders. As a consequence, ozone has to be produced and measured simultaneously. This generator is based on the photolysis of O_2 molecules contained in pure air using radiation at 185 nm.

The principal method of ozone concentration determination is ultraviolet photometry using a defined absorption cross-section of ozone at 253.7nm, for which there is an international standard (ISO 13964). In 2003 to 2005 SP participated in the international pilot study P28 *Ozone at ambient level* organised within CCQM Consultative Committee for Amount of Substance), the chemistry committee within the international SI system. These intercomparisons are performed at the highest metrological level. The ozone reference standards of 23 institutes were compared to one common reference, the BIPM ozone reference standard, in a series of bilateral comparisons carried out between July 2003 and February 2005. Results are shown in Figure 1. In order to obtain the comparability, SP performs measurement periodically at BIPM in France. Last time was 2009.

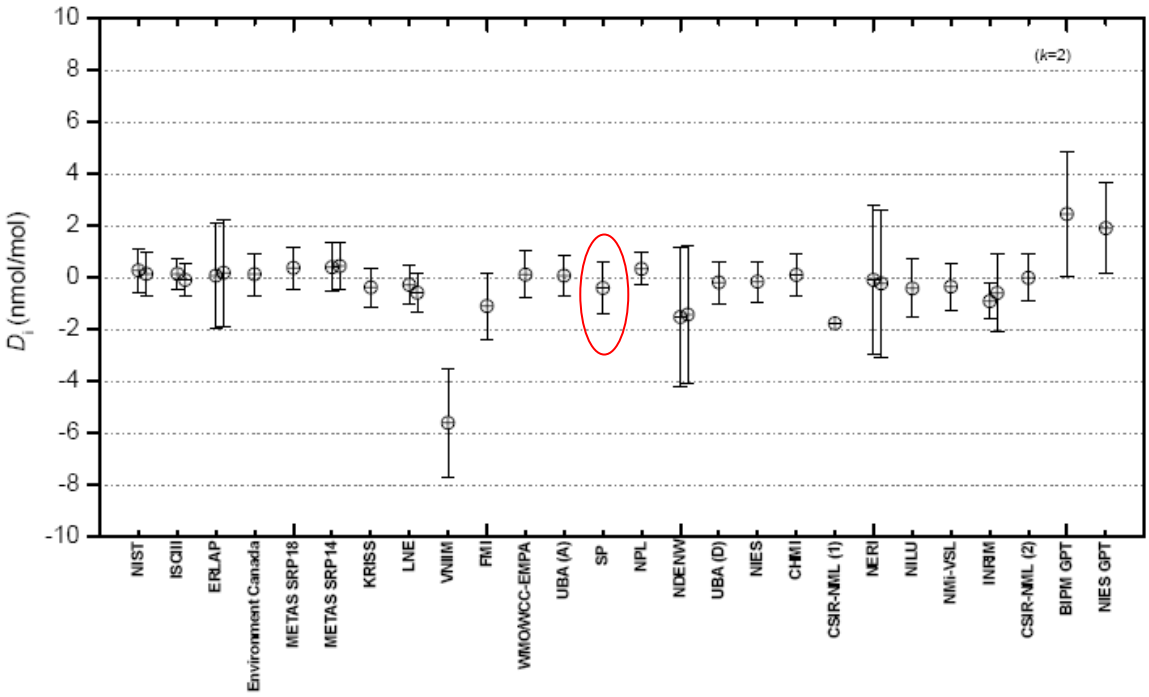

Figure 1 *Differences from the reference value at a nominal ozone mole fraction of 80 nmol/mol*

Viallon J. et al. "International Comparison CCQM-P28: Ozone at ambient level." *Metrologia* **2006**, 43, Technical Supplement, 08010.