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QUALITY CONTROL PROGRAM FOR ENVIRONMENTAL CHAMBER EVALUATIONS

UL Environment's (ULE) IAQ testing laboratories are ISO/IEC 17025 accredited with defined and executed internal and third party verification programs encompassing emission test methods and low level pollutant measurements. ULE's quality control program is designed to ensure the integrity of the measured and reported data obtained during its product evaluation studies. This program encompasses all facets of the measurement program from sample receipt to final review and issuance of reports. As a firm with ISO/IEC 17025 accredited IAQ testing laboratories, ULE's product control, testing, data handling, and reporting protocols and procedures are standardized and controlled. ULE participates in proficiency tests, round robin and inter-lab comparisons. Quality assurance is maintained through ULE's computerized data management system. An electronic "paper trail" for each analysis is also maintained and utilized to track the status of each sample, and to store the results. A complete quarterly quality report can be provided upon request and all test data and analysis procedures are available for customer review.

Chamber Evaluations

One of the most critical parameters in ULE's product evaluations is the measurement of ultratrace levels of gaseous chemicals, typically in the ppb air concentration range. This necessitates a very rigidly maintained effort to control background contributions and contamination. These contributions must be significantly less than those levels being measured for statistically significant data to be obtained. ULE addresses this control in many directions including chamber construction materials, air purification and humidification, sampling materials and chemicals, sample introduction, and analysis.

Supply air purity is monitored on a weekly basis, using identical methodology to the chamber testing. The supply air is assured to contain less than 10 µg/m³ TVOC, < 2 µg/m³ formaldehyde, and < 2 µg/m³ for any individual VOC. Preventative maintenance ensures supply air purity, and corrective action is taken when any potential problems are noted in weekly samples. Supply air filter maintenance is critical for ensuring the purity of the chamber supply air. Chamber background samples are obtained to ensure contaminant backgrounds meet the required specifications prior to product exposure. Results of this monitoring are maintained at ULE and available for on-site inspection. Chambers are also validated on an annual basis to ensure air exchange, mixing, tightness and recovery, and performing with determined parameters. All environmental chamber procedures are in accordance the specified test method to ensure all data quality objectives are met.

VOC and Aldehyde Measurements

Precision of TVOC and aldehyde analyses is assessed by the Relative Standard Deviation (%RSD) from duplicate samples. All QC data measurements are calculated based on a 12 month period. The VOC accuracy is based on the recovery of toluene mass spiked onto sorbent material. The aldehyde accuracy is based on proficiency tests results that are performed at least annually and are measured by the mean Relative Percent Difference (%RPD).

Quality Controls

Third party proficiency testing for low level VOCs are continuously conducted and reported in ULE's quarterly Quality Assurance Report, and is available to all customers upon request.

Quality Controls include but are not limited to:

- appropriate record keeping of sample identifications and tracking throughout the study;
- calibration of all instrumentation and equipment used in the collection and analysis of samples;
- validation and tracking of all chamber parameters including air purification, environmental controls, air change rate, chamber mixing, air tightness, and sample recovery;
- analysis of spiked samples for accuracy determinations;
- duplicate analyses of 10% of all samples evaluated and analyzed;
- multi-point calibration and linear regression of all standardization;
- analysis of controls including chamber backgrounds, sampling media, and instrumental systems.

For UL Environment's technical references and resources click here or https://industries.ul.com/wp-content/uploads/sites/2/2018/02/Technical-references-and-resources.pdf
For RSD, Quality Assurance Report or other quality documents, Request here or contact ULE.