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TDTS

Thermal Desorption Technical Support

Note 70: Materials emissions testing using the FLEC® Cell: Testing recovery and sink effects

Keywords:

emission test cell, FLEC® test kit, ultra-volatile compounds, PrENV 13419

Method PrENV 13419 "Building products – Determination of the emission of volatile organic compounds, Part 2: Emission Test Cell Method", requires that the FLEC® emission cell be tested for recovery and sink effects using toluene, n-dodecane and those compounds that are of primary interest for the experiments in hand.

An accessory is available for the FLEC for carrying out recovery tests. The FLEC Test Kit for recovery measurements is available from Markes International Ltd. using P/N FL-0100. It comprises a thick glass plate on a cushioned base with a precision-ground hole in the centre. A specially made, ground glass vial containing a known mass of the compound of interest is placed into the hole in the glass plate. Approximately 1 ml of pure liquid is normally used.

The FLEC cell is placed on to the glass plate with the vial of standard positioned centrally. Air flow conditions should be set to replicate real sample collection *i.e.* 100-500 ml/min of pure air at 50% relative humidity.

For compounds such as toluene and n-dodecane, the system should be left in operation for approximately 24 hours with duplicate samples, collected over 15 minutes, taken after ~3 hours and after ~24 hours. [*N.B.* The total experiment time must be reduced for ultra volatile compounds to prevent complete evaporation of the target analyte.]

The four samples collected during these experiments should be analysed using standard thermal desorption – gas chromatography – mass spectrometry/flame ionisation detector (TD-GC-MS/FID) methods. Data from the four samples collected, are used to calculate an average emission from the vial in g/h and per 24-hour period.

The vial is re-weighed at the end of the 24 hour experiment to determine actual overall weight loss.

To comply with the requirements of PrENV 13419, the 24-hour weight loss predicted from the emission data should be at least 90% of the actual determined weight loss from the vial. Any more significant difference between calculated and actual weight loss is likely to be the result of incomplete recovery through the sampling system

For non-ideal compounds such as reactive species, this method can also be used to calculate an overall 'response' factor for the method, including all aspects of sampling, desorption and GC analysis.