

Atmos'Fair 2021

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Intitulé de l'exposé

Développement et comparaison de trois systèmes analytiques pour la détection et la quantification du formaldéhyde

Title of the presentation

Comparison and development of three analytical systems for detection and quantification of formaldehyde

Key-words

Aldehydes, Formaldehyde, Acetaldehyde, Methanol, Gas Chromatography, Flame Ionization Detection, FID, Volatile Organic Compounds, VOC, Ozone precursor

Issues

Formaldehyde originate mainly from anthropic activities, such as wooden-composite material plants, paints, dissolvents, glues and textiles. As an example, car interiors are the most common places where formaldehyde is detected at levels higher than recommended by the World Health Organization. According to the INERIS report (DRC-18-173500-10929A), indoor air quality guide-values are of 30ppb since 2015, and will be of 10ppb from 2023.

Regarding the (UE) 2019/983 directive, the professional exposition limit values for formaldehyde are now of 0,3 ppm during 8 consecutive hours, and of 0,6 ppm during fifteen minutes. In order to prevent any risks for human beings manufacturers, builders and industrials, started to implement directives and solutions to reduce the exposition to those chemical species.

But how can you ensure, daily and continuously, the efficiency of such recommendations ?

Continuous and on-line monitoring: Chromatotec started years ago, the development of a GC FID-based analyzer. Chromatotec's® Airmo HCHO is an on-line system which allows the continuous monitoring of formaldehyde and acetaldehyde, directly into processes like solvent distillations or composite materials manufacturing. Provided with hydrogen and nitrogen generators, this analyzer requires only power supply to run 24h a day and 7 days a week. With its pre-concentration trap, the Airmo HCHO is able to monitor Formaldehyde, Acetaldehyde and Methanol at low concentrations (0-100ppb), with an excellent linearity and without any interferents. The results are automatically validated thanks to an internal HCHO calibration standard.

Portable system for in-field measurements: With more than two hours autonomy and a detection limit of 1ppb, this compact microfluidic formaldehyde analyzer is the perfect mix between laboratory and continuous monitoring of Formaldehyde emissions. Integrated in a carrying case with battery charger/power supplier, eluents and sampling pipes the system weighs only 6,5 kg. This system is able to analyze DNPH cartridges by extracting aldehydes contained in it.

Transportable HPLC system: Chromatotec® has developed a HPLC system which can be operated in a laboratory or directly in the field. The system, which is equipped with C18 column and UV detector, allows the quantification of aldehydes down to ppt level with very good linearity up to high ppb values. This system is the most sensitive analytical technique but requires the use of solvent and trained people. In addition to this solution, a sampling device with DNPH cartridges offers the possibility to trap Formaldehyde and Acetaldehyde traces in any place, to perform a lab analysis at ultra-trace levels (ppt) or directly on the field with the transportable analytical unit.