Diffusive sampler for Hydrogen chloride

Health effects

Hydrochloric acid is used in the production of chlorides, fertilizers, and dyes, in electroplating, and in the photographic, textile, and rubber industries.
The Reference Concentration for hydrochloric acid is 20 (µg/m3) based on hyperplasia of the nasal mucosa, larynx, and trachea in rats. The RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious noncancer effects during a lifetime. It is not a direct estimator of risk but rather a reference point to gauge the potential effects. At exposures increasingly greater than the RfC, the potential for adverse health effects increases. Lifetime exposure above the RfC does not imply that an adverse health effect would necessarily occur.

Air quality standards

Air quality standards vary from country to country:

TALuft	100 µg/m³	(annual)
Maine Bureau of Health Ambient Guidelines	10 µg/m³	(annual)
California EPA's Office of Environmental Health Hazard Assessment	9 µg/m³	(annual)

Diffusive sampler

The Hydrogen chloride diffusive sampler is based on the principle of ammonia molecules diffusion on an absorbent medium, in this case Triethanolamin. The subsequent analysis is performed by ion chromatography [1].

The diffusive sampler consists in a polypropylene housing which has a 20mm diameter opening. A glass fibre membrane supported by a wire net is used in order to reduce wind effects. A special suspension device is also recommended to protect the sampler from wind and stress of weather.

Sampling periods for this sampler usually range from 2 to 4 weeks.

Applications

- Indicative measurement of daily means for monitoring air quality standards
- Assessment of personal exposure for epidemiological studies

Specifications

Sampling rate	16.6 ml per minute at 20°C (calculated)	
Working range	0.25 - 50 µg/m³	
Exposure time	2 to 4 weeks	
Detection limit	Monthly exposure	0.5 µg/m³
External influences: wind speed	influence of wind speed < 10%	up to 10 m/sec
temperature	no influence between	10 to 30°C
humidity	no influence between	20 to 80%
Storage	before use: after use:	12 months 4 months
Interferences	specific	
Extended uncertainty*	28.1 % at a level of 100 µg/m³	

*according to GUM; subject to change without notice

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References

[1] James Lodge: Methods of Air Sampling and Analysis:Method 720 A und 720 B
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