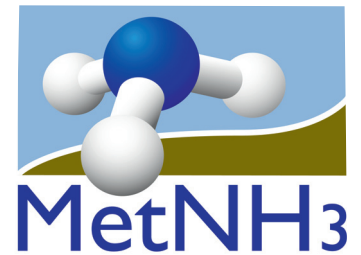


METROLOGY FOR AMMONIA IN AMBIENT AIR



Joint Research Project within the Environment Call of the
European Metrology Research Programme (EMRP)

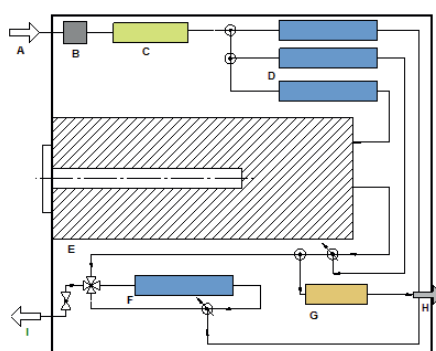
BACKGROUND AND NEED

- Ammonia is a major ambient air pollutant
- Three main NH_3 emission sources and its contribution:
Agriculture 93.6 %, waste 2.3 %,
road transport 1.8 % and other 2.3 % (EEA*), 2011
- European Directive 2001/81/EC regulates ammonia
emissions in the member states
- Understanding ambient air quality including particulate
matter and atmospheric impacts on ecosystems
- Ensure reliable ammonia measurements in
analytical technology, uncertainty, quality assurance
and quality control procedures

* EEA = European Environment Agency

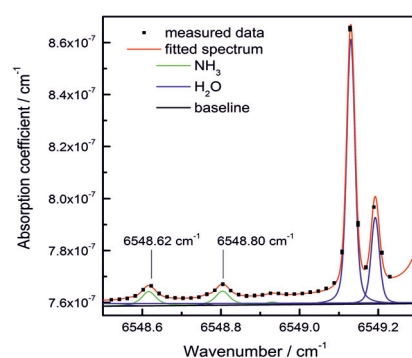


Ammonia emission source on the example of animal husbandry.



Scheme of a dynamic reference gas generator based on the permeation method with two dilution steps

A) carrier gas inlet, B) pressure regulator,
C) mass flow meter, D) mass flow controllers,
E) Oven with inserted ammonia permeation
element, F) mass flow controller for split flow,
G) backpressure regulator, H) overflow outlet,
I) reference gas outlet.



Measured and fitted CRDS spectra of 100 nmol/mol ammonia and 75 % relative humidity at 22 °C in synthetic air, results from the PTB

SCIENTIFIC AND TECHNICAL OBJECTIVES

Reference gas mixtures – WP1

- Develop improved traceable reference gas mixtures by static and dynamic gravimetric generation methods at ambient molar fraction levels (0.5 to 500 nmol/mol) under real air and laboratory conditions

Ammonia detection by laser based optical standards – WP2

- Develop and characterise traceable optical transfer standards
- Evaluate the applicability of open path measurement techniques as optical transfer standard

Metrological transfer to field applicable methods – WP3

- Giving guidance for the proper use of certified reference materials and sampling in field measurements
- Evaluate and compare results produced with field measuring methods, to develop suitable sampling methods in order to promote long-term efficiency monitoring of ammonia reduction measures



Air quality monitoring station near Waldhof
photo by Axel Eggert, Umweltbundesamt