Method Summary

Determination of Total Nitrogen in Waters by High Temperature Catalytic Oxidation

Scope and Range

This method is suitable for all waters.

The detection limit is 1mg/l and the calibrated range is 0-100mg/l.

In this context, the term Total Nitrogen refers to the total of Nitrate N, Nitrite N, Organic N and Ammoniacal N. These species are analysed together to give one non-speciated result.

Speciation is available by further analysis of the sample to subtract the Nitrate N, Nitrite N and/or the Ammoniacal N: -
e.g. Total Nitrogen – (Nitrate N + Nitrite N) = Kjeldahl Nitrogen (Organic N & Ammoniacal N)

References

ISO/TR 11905-2: 1997. Water quality – Determination of nitrogen – part 2: Determination of bound nitrogen after combustion and oxidation to nitrogen dioxide using chemiluminescence detection.

Principle

Preparation and Extraction:
The samples are filtered through 0.45µm syringe filters.

Analysis:
The sample is injected into a high temperature furnace, containing a catalyst, with a flow of oxygen.
The nitrogen compounds in the sample react with the oxygen in the presence of the catalyst to form nitric oxide (NO). The gas flow through the system carries this to an ozonator reactor where it forms 'excited' nitrogen dioxide (NO_2). As the nitrogen dioxide loses this 'excitement', the energy given off is detected and recorded. When plotted over time, this recording forms peaks. The amount of nitrogen in the sample is quantified by comparison to the areas of peaks from standards of known concentration.

$$NO + O_3 \rightarrow NO_2^* + O_2 \rightarrow NO_2 + O_2 + h\upsilon$$

Interferences

Low pH samples may adversely affect the catalysts and therefore the recovery achieved.
High TOC levels are listed as a possible interference.