

- **Fast and accurate response**
- **Highly selective**
- **Robust construction**
- **Easy to use**

#### **Applications**

The ammonia probe has been used in a wide range of applications including:

**Water** – boiler water, river water and potable waters, sea water, well water and waste water. Waste water includes ammonia and total nitrogen determinations in treated and untreated sewage.

**Food and beverages industries** – total nitrogen in meat products, animal feeds, milk products, beers, cider and wines.

**Biological** – soils, serum, urine, sweat and saliva – ammonia in blood plasma and total nitrogen in urine.

#### **General Ammonia Measurements**

The ammonia probe Model 8002 enables precise determinations of ammonia concentrations in solution to be made in minutes. Ammonium and total nitrogen determinations can also be made.

#### **Total Kjeldahl Nitrogen Determination**

The ammonia probe is also widely used for determining total nitrogen (in the form of ammonia) in residues resulting from the Kjeldahl digestion process. The probe is not affected by turbidity in the sample so the distillation step, essential before a titrimetric or a Nessler colorimetric analysis, can be eliminated.



## Theory

The ammonia probe responds to the partial pressure of ammonia in the sample. Ammonia is transferred across a gas permeable membrane until the partial pressure in the thin film of filling solution between the glass electrode membrane and the probe equals that in the sample solution. The resultant pH change in this film is measured by the combination glass electrode, and the probe develops a potential related to the partial pressure and hence concentration of the ammonia in the sample solution, given by the Nernst Equation.

## Range

Model 8002 has a linear (Nernstian) response in the range  $5 \times 10^{-6} \text{M NH}_3$  to  $5 \times 10^{-2} \text{M NH}_3$ . The Nernstian response can be extended to even lower concentrations in high purity water. The upper limit of the probe can also be increased by modifying the probe filling solution.

## Response Time

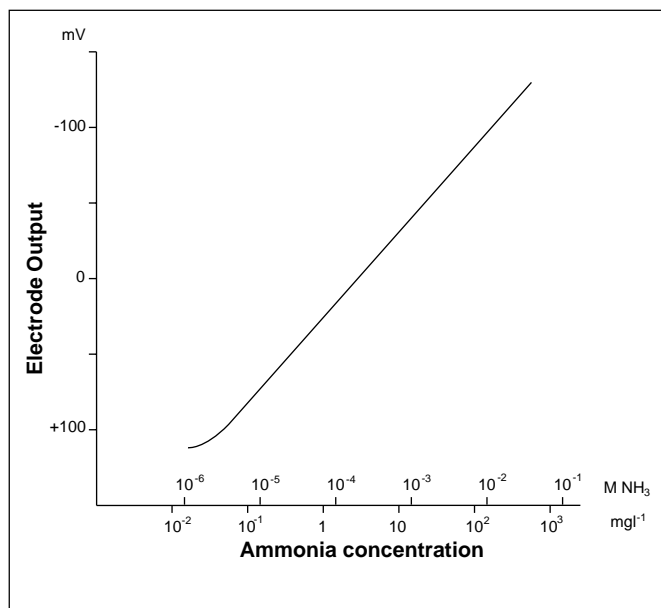
The response time of Model 8002 is temperature dependent. At 25°C the response time for a decade change in concentration from  $10^{-4} \text{M}$  to  $10^{-3} \text{M}$  is typically 30 seconds.

## Temperature

The ammonia probe can be used over the range 5 to 40°C but as its response time is temperature sensitive, samples and standards must be of similar temperature.

## Selectivity

High selectivity – only volatile or filming amines such as hydrazine, cyclohexylamine and octadecylamine interfere.



## Reproducibility

Better than 2% of concentration.

## Drift

Less than 1mV in 12 hours.

## Calibration

A 2-point calibration is recommended with concentration points a decade apart – for example 10ppm and 100ppm. These points can then be plotted on semi-log paper as a calibration curve.

Alternatively, if your pH/mV meter will display concentration directly, then follow meter manufacturer's advice.

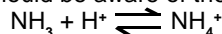
## Application Advice

Ammonia is usually determined by colorimetric methods, such as those based on indophenol blue or Nessler procedures. Such methods frequently require preliminary distillation of the ammonia, and careful control of reagent volumes and colour development conditions.

With the ammonia probe ammonia determinations can be made simply and directly, even in highly coloured or turbid samples, without distillation or rigorous experimental controls. The probe is assembled and calibrated easily and quickly, permitting rapid determinations of sample ammonia concentrations. Recalibration is only necessary once a day, but can be checked more often if required using one standard solution.

Maintenance is kept down to a minimum as both membrane and filling solution only require replacement every 60 days.

You should be aware of the following reversible reaction:



To measure ammonia in solution you need to drive the reaction to the left, i.e. by reducing H<sup>+</sup> concentration giving alkaline conditions. A pH of more than 12 is therefore preferred to ensure all the ammonia in solution is present as ammonia and not as ammonium ions.

## Reference

No reference electrode is needed with the ammonia probe.

## Electrode Range

8002-803 Ammonia Probe – BNC  
8002-800 Ammonia Probe – coaxial

Other terminations are available on request.

*For further information please contact your local distributor or our sales office at Stonehouse.*

# ABB

The Company's policy is one of continuous product improvement and the right is reserved to modify the information contained herein without notice.  
© ABB 2004 Printed in U.K. (06.04)

### ABB Limited

Oldends Lane, Stonehouse  
Gloucestershire, GL10 3TA  
UK

Tel: +44 (0)1453 826661  
Fax: +44 (0)1453 829671

### ABB Inc.

Analytical Instruments  
9716 S. Virginia St., Ste. E  
Reno, Nevada 89521  
USA

Tel: +1 775 850 4800  
Fax: +1 775 850 4808