

# Ammonium Measuring Range Exceedance (LCK304) Application APP-PHM-0003

## General

Ammonium nitrogen is found in many water bodies on the surface, in some groundwater bodies, in all household waste water and to a large extent, in industrial waste water. The scope of application of photometric determination of ammonium nitrate is limited to a maximum of 1 mg/l in DIN 38406 E5.

The LANGE cuvette test LCK304 for purified waste water, surface water, drinking water and bathing water bases its measurements on DIN H38406 E5 and has a measurement range of 0,015–2,0 mg/l NH<sub>4</sub>-N.

When evaluating unknown samples; for instance during round robin tests or when measuring external samples, a heavily increased ammonium content can cause the photometer evaluation to display results that are within the measurement range.

This malfunction can occur with any NH<sub>4</sub>-N determination based on the measurement principles of DIN 38406 E5. This fact is therefore clearly indicated in the work instructions for the LCK304 cuvette test.



Figure 1:  
Cuvettes 1–3 within the measurement range, cuvettes 4–6 with too high ammonium content

## Method

The DIN 38406 E5 as well as the cuvette test LCK304 use the following procedure: Ammonium ions at a pH value of 12.6 react with hypochlorite ions (these are created in an alkaline medium by hydrolysis of dichloroisocyanuric acid ions) and salicylate ions in the presence of sodium prusside-sodium as a catalyst for the blue dye indophenol blue.

The visible colouration is green as the blue dye complex is perceived in conjunction with the yellow colouration caused by excess sodium prusside-sodium. The green colouration is proportional to the concentration of ammonium. High concentrations of ammonium reduce the yellow colour complex and the overall impression of the sample is a slight to distinct shift from green to turquoise. However, this is only partially visible to users.

The Ammonium measuring range exceedance evaluation for spectrophotometers DR 2800, DR 3800, DR 5000, DR 3900 and DR 6000 takes the change in colour into account by measuring at a number of wavelengths. This method detects excessive ammonium content in the sample and extrapolates the result. The photometer displays the error message **Over measuring range!**

Users can be assured that no incorrect measurement results will be displayed and documented, not even for unknown samples or during round robin tests. In general, measurement tests should always be subjected to a plausibility check (diluting and/or increasing the sample), especially when dealing with unknown samples.

## Materials

|                 |                              |
|-----------------|------------------------------|
| LPV422.99.00001 | Spectrophotometer DR 2800 or |
| LPV424.99.00001 | Spectrophotometer DR 3800 or |
| LPV408.99.00001 | Spectrophotometer DR 5000 or |
| LPV440.99.00011 | Spectrophotometer DR 3900 or |
| LPV441.99.00011 | Spectrophotometer DR 6000    |
| LCK304          | Ammonium cuvette test        |

## When using the DR 2800 / DR 3800 / DR 5000 / DR 3900 / DR 6000 for the first time:

Download the additional evaluation Ammonium Measuring Range Exceedance APP-PHM-0003 as an application from the Internet.

- Go to [www.hach-lange.com](http://www.hach-lange.com) and search under **LCK304** and **Documents and Software** the application **Ammonium Measuring Range Exceedance** and save it on your PC.
- Open the zipped file with a double-click and save the folder used for your photometer to an USB stick:
- DR 2800 / DR 3800 dbhlc
- DR 5000 dbhl
- DR 3900 dbhlm
- DR 6000 dbhlh
- Take the USB stick and upload the application to your photometer.
- In the PDF file you will find the application note with detailed description.

For further information, please see the operating instructions for your photometer.

## Determining the content

### Sample preparation

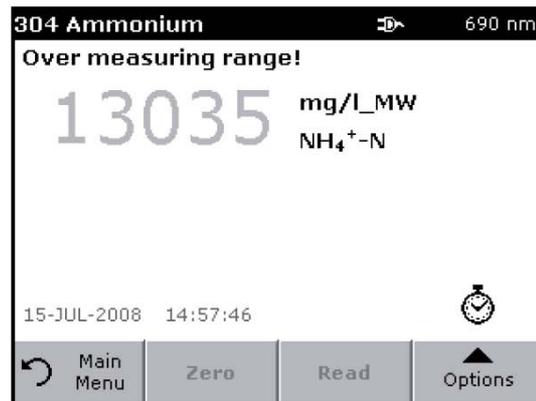
Prepare the samples in accordance with the work instructions for LCK304

### Work process

1. Switch on the spectrophotometer and insert the cuvette.
2. Select the method **\_MW (Multiple Wavelength)** in the selection box and press the **Start** key.
3. Select this method as **Start permanent** where appropriate.



4. The measurement is carried out. The measurement result on the display will be extremely high and accompanied by the error message **Over measuring range!** if the ammonium content is too high.



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