

## APPLICATION NOTE

T2O-AN-102

## MERCURY METHOD

The following application note explains the procedure for the detection of Mercury using the HM1000 Metalyser®.

**PLEASE READ THIS APPLICATION NOTE CAREFULLY. TRACE2O® HAS ALTERED THE NAMES OF SOME REAGENTS FOR SIMPLICITY AND SO THE PROCEDURE MAY BE DIFFERENT FROM THAT FOLLOWED PREVIOUSLY.**

### Equipment:

- **HM1000 Kit**
- **HM2 Buffer** (Previously M2 Buffer sachets)
- **HG50 Hg standard** (Previously M2 Standard (5ppm))
- **AU500 Au Plating Solution** (Previously M2&3 Conditioning Solution)

### Electrode conditioning:

- Polish WE2 Electrode to a mirror finish and perform a visual check to ensure that no scratches or scuffs are present.
- Half-fill the sample analysis beaker (SAB) with **AU500 Au Plating Solution** and fit to the Sonde.
- Select 'M2&3 Conditioning' from the 'Test Methods' menu then select 'Condition Electrode'.
- The M2&3 conditioning step will take approximately 5 minutes.
- Once completed, return the **AU500 Au Plating Solution** to the **AU500 Au Plating Solution** bottle and rinse the Sonde and SAB with the Electrode Rinse Solution and/or deionised water.

### Sample preparation:

- Add **one sachet of HM2 Buffer** to the SAB.
- Add 70ml of sample water to the SAB, either by adding a measured volume or by fitting the SAB to the Sonde and submerging in the water source until the bubbles stop.

There are two methods for carrying out the analysis. The single-point standard addition is the recommended option, using two data points to calculate concentration. The calibration option is designed for rapid analysis of several samples with a similar matrix (i.e. several samples from different points along the same river bank).

### **Analysis (single-point standard addition method)**

- Fit the SAB to the Sonde (If not using submersion method).
- Select 'Hg' from the 'Test Methods' menu, then select 'Condition Electrode' and wait approximately two minutes for it to complete.
- Select 'Standard Addition'. Wait approximately two minutes until prompted to add 20ppb of the standard. When prompted use the pipette to add 280µL of the **HG50 Hg standard** into the SAB and click 'OK'. The analysis will continue to run for approximately two further minutes after which the results will be displayed.

### **Result (single-point standard addition method)**

- The result(s) are shown in the instrument display until 'Ok' is clicked. Following this the user will be given the option of saving the ppb results into the results log. The most recent scan can be viewed graphically in 'Data log', 'Last result'. The graph displayed is that of the scan after the standard addition, and is intended for diagnostic purposes only. If Hg has been detected the peak will be identified as Hg and will be marked up as such. The original sample concentration will be reported in ppb.

### **Analysis (calibration method)**

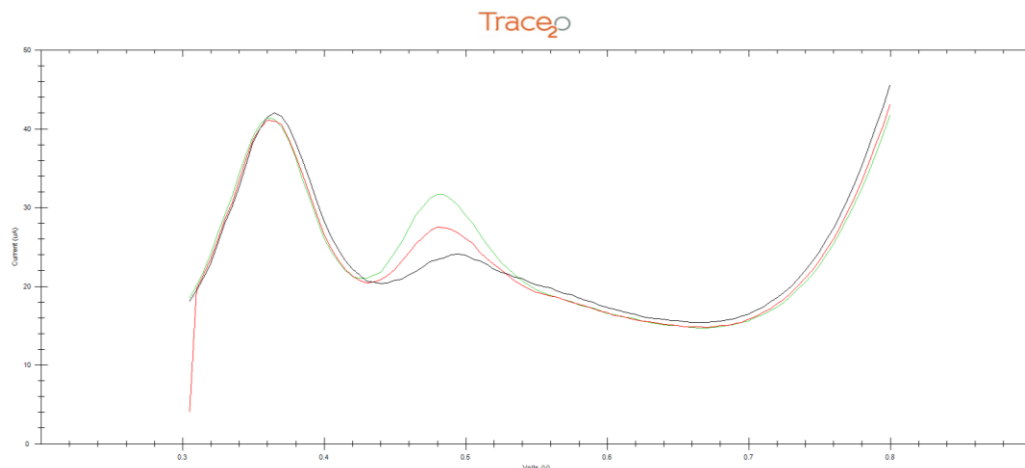
- Fit the SAB to the Sonde.
- Select 'Hg' from the 'Test Methods' menu, then select 'Condition Electrode' and wait approximately two minutes for it to complete.
- Select 'Calibration'. Wait approximately two minutes until prompted to add 20ppb of the standard. When prompted use the pipette to add 280µL of the standard into the SAB and click 'OK'. The analysis will continue to run for approximately two further minutes until prompted to add another 20ppb of standard. Repeat the addition process and click 'ok'. The analysis will run for another two minutes before completing the calibration.
- Once the calibration has been completed several consecutive analyses can be carried out.
- Select 'Analyse Sample' and wait approximately two minutes for the analysis to complete.

### **Result (calibration method)**

- The result(s) are shown in the instrument display until 'OK' is clicked. Following this the user will be given the option of saving the ppb results into the results log. The most recent scan can be viewed graphically in 'Data log', 'Last result'. The graph displayed is intended for diagnostic purposes only. If Hg has been detected the peak will be identified as Hg and will be marked up as such. The original sample concentration will be reported in ppb.

## Graph

- Mercury appears as a sharp peak at around 0.45V. Copper appears as a larger peak to the left. The Copper peak can be used to improve baseline selection as described below, and does not interfere with the analysis.



## LOD

- The Lower LOD is 5ppb, upper LOD is 500ppb.
- To increase the range the sample can be diluted using Ultra-pure de-ionised water. Other water types could introduce contamination.

## Interferences

- If performing Mercury analysis after using an Hg Plating Solution, ensure that the sonde is cleaned thoroughly with deionised water. Residual mercury from the Hg Plating Solution may affect the quality of the result.
- In some cases, adding 280uL of CU50 Copper standard to the sample water before commencing analysis may improve the accuracy of the result.
- Solutions are available for combating interferences in the sample. These may be specific to particular water types or conditions. For further information, please contact Trace2o® Technical Support department – [technical@trace2o.com](mailto:technical@trace2o.com)