

## **Analytical Data Sheet for ANDalyze Copper (40-200 ppb) Sensor**

### ***Detection of copper in drinking water***

**40-200 ppb**

ANDalyze's proprietary Catalytic DNA sensor for copper uses a DNAzyme reaction that fluoresces in the presence of the target contaminant, copper. The fluorescence of the reaction is measured using the ANDalyze fluorimeter to determine the concentration of free copper (present as  $\text{Cu}^{2+}$ ) in solution and is reported in parts per billion (ppb) of copper.

*Note that a different sensor pack (Part Number: AND013) is available for detecting copper in the range of 0.6 – 3 ppm.*

### **Performance**

Copper dilutions containing between 0 – 400 ppb of copper were prepared in DI water. The Copper Sensor kits and the AND1000 fluorimeter were used to perform the copper test at each dilution (five replicates).

#### **Materials Used:**

ANDalyze Fluorimeter  
Copper (Low) Sensor kit (Part Number: AND012)  
Standard Copper Solutions

#### **Limit of Detection (LOD)**

10 ppb copper  
Based on 3 sigma method

#### **Limit of Quantification (LOQ)**

35 ppb copper  
Based on 10 sigma method

#### **Linear Detection Range**

20 – 200 ppb Copper

#### **Precision**

Standard: 40 ppb  $\text{Cu}^{2+}$   
95% Confidence Limits: 32 – 48 ppb  $\text{Cu}^{2+}$

#### **Coefficient of Variation (CV)**

40–200 ppb  $\text{Cu}^{2+}$   $\pm 20\%$  or 20ppb, whichever is greater

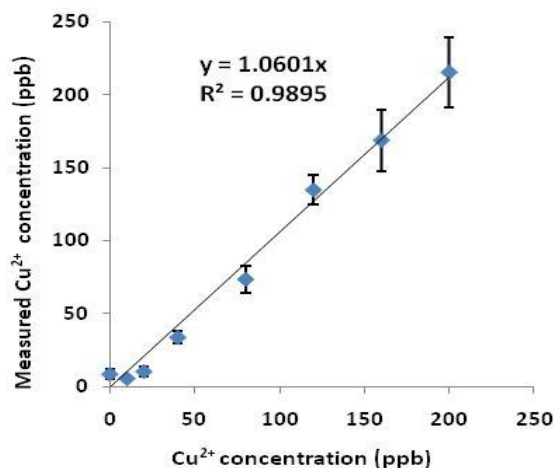
**Note:** This data is for tests in DI water. Environmental and other matrix variations will be higher.

**All specifications are subject to change without notice.**

## Graphs

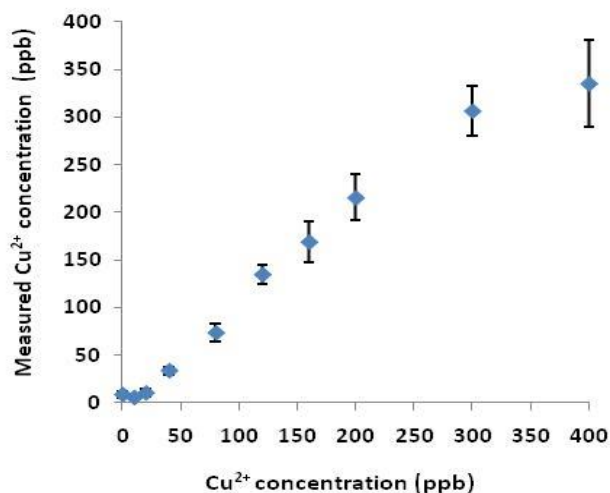
The plot depicts the average measured copper concentration as displayed on ANDalyze fluorimeter (y-axis) vs. the known concentration of the copper standards (x-axis). Error bars depict the standard deviation from at least five measurements.

**Figure 1**



Linear detection range is 20-200 ppb copper (Figure 1). For higher concentration of copper (tested up to 400 ppb copper), the accuracy decreases (Graph 2). *Note that a different sensor pack (Part Number: AND013) is available for detecting copper in the range of 0.6 – 3 ppm.*

**Figure 2**



## **Interference**

Interference tests were done with a 5ppm  $\text{Zn}^{2+}$  solution plus the potential interfering ion. The interference tolerance levels represent the concentration above which the zinc concentration is changed to  $\pm 20\%$ . Data represents an average of at least three replicates. For each interference test, an on-site calibration with the particular water matrix (containing the interfering ion) was performed.

Interfering ion	Interference level
Calcium, $\text{Ca}^{2+}$	1000 ppm
Magnesium, $\text{Mg}^{2+}$	400 ppm
Zinc, $\text{Zn}^{2+}$	10 ppm
Aluminum, $\text{Al}^{3+}$	0.6 ppm
Copper, $\text{Cu}^{2+}$	2 ppm
Iron, $\text{Fe}^{3+}$	2 ppm
Iron, $\text{Fe}^{2+}$	0.1 ppm
Cadmium, $\text{Cd}^{2+}$	10 ppm
Mercury, $\text{Hg}^{2+}$	0.6 ppm
Manganese, $\text{Mn}^{2+}$	20 ppm
Lead, $\text{Pb}^{2+}$	0.2 ppm
Ammonium, $\text{NH}_4^+$	500 ppm
Carbonate, $\text{CO}_3^{2-}$	1000 ppm
Phosphate, $\text{PO}_4^{3-}$	100 ppm
Chloride, $\text{Cl}^-$	2000 ppm
Nitrate, $\text{NO}_3^-$	600 ppm
Sulfate, $\text{SO}_4^{2-}$	1000 ppm

## **Temperature Range**

ANDalyze test kits work when the sample is in the 17 – 35 °C (63 – 95 °F) temperature range. However, the most accurate and precise results are obtained if the sample is in the range of 20 – 25 °C (68 – 77 °F). A change in temperature of several degrees will require an on-site calibration to be performed.

## **Storage and Shelf Life**

The shelf life is 1 year (12 months) from manufacture date for the sensors if stored in cool, dry area away from direct sunlight at temperature less than 23°C (73°F); however the shelf life of the product is limited by the liquid buffer supplied with the sensor kit which is only 6 months from manufacture date. The life of the liquid buffer can be improved if refrigerated/frozen for up to one year from manufacture date.