



## Aqua TROLL Multiparameter Sensor Summary

### Sensor Summary

| Sensors             | Expected Lifetime*   | Recommended Calibration Frequency | Pressure Rating - PSI                            | Usable Depth<br>m   ft                   |                                             | Operational Temperature Range |
|---------------------|----------------------|-----------------------------------|--------------------------------------------------|------------------------------------------|---------------------------------------------|-------------------------------|
| pH/ORP              | 2 years or greater** | 10 to 12 weeks**                  | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |
| RDO                 | 2 years or greater   | 12 months**                       | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |
| Conductivity        | 2 years or greater   | User calibration only if needed   | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |
| Temperature         | 2 years or greater   | NA                                | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |
| Turbidity           | 2 years or greater   | User calibration only if needed   | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |
| Pressure            | 2 years or greater   | User calibration only if needed   | 12.8<br>14.2<br>42.7<br>108<br>142<br>285<br>350 | 9<br>10<br>30<br>76<br>100<br>200<br>250 | 30<br>33<br>100<br>250<br>328<br>650<br>820 | - 5 to 50° C                  |
| Barometric Pressure | 2 years or greater   | User calibration only if needed   | NA                                               | NA                                       | NA                                          | - 5 to 50° C                  |
| Ammonium            | 6 to 12 months**     | Monthly**                         | 30                                               | 25                                       | 70                                          | 0 to 40° C                    |
| Chloride            | 1 year or greater**  | Monthly**                         | 350                                              | 250                                      | 820                                         | 0 to 50° C                    |
| Nitrate             | 6 to 12 months**     | Monthly**                         | 30                                               | 25                                       | 70                                          | 0 to 40° C                    |
| Chlorophyll a       | 2 years or greater   | User calibration only if needed   | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |
| BGA-PC              | 2 years or greater   | User calibration only if needed   | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |
| BGA-PE              | 2 years or greater   | User calibration only if needed   | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |
| Rhodamine           | 2 years or greater   | User calibration only if needed   | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |
| Fluorescein         | 2 years or greater   | User calibration only if needed   | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |
| FDOM                | 2 years or greater   | User calibration only if needed   | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |
| Crude Oil           | 2 years or greater   | User calibration only if needed   | 350                                              | 250                                      | 820                                         | - 5 to 50° C                  |

\* Expected lifetime includes total shelf life and deployment lifetime.

\*\* Lifetime and calibration frequency depend on site and storage conditions.

This information is relevant to Aqua TROLL 500, 600, 700, and 800 Multiparameter Sondes

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## Solutions

| Solution                          | Shelf Life - Unopened                                    | Shelf Life - Opened                                             |
|-----------------------------------|----------------------------------------------------------|-----------------------------------------------------------------|
| Quick Cal                         | 4 months. Store in a cool, dark place. Shake before use. | 7 to 21 days ( $\pm 10$ mV, $\pm 0.05$ pH, $\pm 50$ $\mu$ S/cm) |
| ZoBell's                          | 9 months. Store in a cool, dark place.                   | 3 to 6 months                                                   |
| Low Conductivity (147 $\mu$ S/cm) | 12 months                                                | Hours ( $\pm 1$ $\mu$ S/cm, check before use)                   |
| Other Conductivity                | 12 months                                                | 3 to 6 months                                                   |
| pH Calibration Buffers            | 24 months                                                | 3 to 6 months                                                   |
| Sensor Reference Filling Solution | 24 months                                                | 12 months                                                       |
| pH Storage Solution               | 24 months                                                | 12 months                                                       |
| Sodium Sulfite                    | 12 months                                                | 3 to 6 months                                                   |
| Turbidity                         | 12 months                                                | 12 months from expiration date                                  |
| Deionized Water                   | 24 months                                                | Hours, check before use for calibration                         |
| Ammonium                          | 12 months                                                | 3 to 6 months                                                   |
| Chloride                          | 12 months                                                | 3 to 6 months                                                   |
| Nitrate                           | 12 months                                                | 3 to 6 months                                                   |

## Potential Interferents

### pH

Sodium salts (at pH >12)

### Dissolved Oxygen

Temperature, atmospheric pressure, salinity, chlorinity

### Ammonium

Cesium, Potassium, Thallium, pH, Silver, Lithium, Sodium

### Nitrate

Perchlorate, Iodide, Chlorate, Cyanide, Bromide, Nitrite, Hydrogen Sulfide (bisulfite), Hydrogen Carbonate (bicarbonate), Carbonate, Chloride, Dihydrogen Phosphate, Hydrogen Phosphate, Phosphate, Acetate, Fluoride, Sulfate

### Conductivity

Temperature

### ORP

Ions that are stronger reducing agents than hydrogen or platinum, e.g., chromium, vanadium, titanium, etc.

### Chloride

Hydroxide, Ammonia, Thiosulfate, Bromide, Sulfide, Iodide, Cyanide

### BGA-PC, BGA-PE, Chlorophyll a, Rhodamine WT, FDOM, Crude Oil and Fluorescein WT

Turbidity

## RDO Cap Chemical Incompatibility



The following chemicals will damage the RDO sensing element.

- Alcohols > 5%
- Hydrogen peroxide > 3%
- Sodium hypochlorite (commercial bleach) > 3%
- Gaseous sulfur dioxide
- Gaseous chlorine
- Do not use in organic solvents (e.g., acetone, chloroform, methylene chloride, etc.), which may destroy the sensing element

## Conductivity/Temperature Sensor



Soaking the Conductivity/Temperature sensor in vinegar for longer than one hour can cause serious damage.

## Ammonium, Chloride, and Nitrate Interferent Concentrations

### Ammonium

The table below lists concentrations of possible interfering ions that cause 10% error at various levels (in ppm) of  $\text{NH}_4^+$ .

| Ion                        | 100 ppm $\text{NH}_4^+$ | 10 ppm $\text{NH}_4^+$ | 1 ppm $\text{NH}_4^+$ |
|----------------------------|-------------------------|------------------------|-----------------------|
| Cesium ( $\text{Cs}^+$ )   | 100                     | 10                     | 1                     |
| Potassium ( $\text{K}^+$ ) | 270                     | 27                     | 2.7                   |
| Thallium ( $\text{Tl}^+$ ) | 3100                    | 310                    | 31                    |
| pH ( $\text{H}^+$ )        | pH 1.6                  | pH 2.6                 | pH 3.6                |
| Silver ( $\text{Ag}^+$ )   | 270,000                 | 27,000                 | 2,700                 |
| Lithium ( $\text{Li}^+$ )  | 35,000                  | 3,500                  | 350                   |
| Sodium ( $\text{Na}^+$ )   | 11,100                  | 1,100                  | 110                   |

### Chloride

The table below lists concentrations of possible interfering ions that cause 10% error at various levels (in ppm) of  $\text{Cl}^-$ .

| Ion                                         | 100 ppm $\text{Cl}^-$ | 10 ppm $\text{Cl}^-$ | 1 ppm $\text{Cl}^-$  |
|---------------------------------------------|-----------------------|----------------------|----------------------|
| Hydroxide ( $\text{OH}^-$ )                 | 3,840                 | 384                  | 38.4                 |
| Ammonia ( $\text{NH}_3$ )                   | 6                     | 0.6                  | 0.06                 |
| Thiosulfate ( $\text{S}_2\text{O}_3^{2-}$ ) | 3                     | 0.3                  | 0.03                 |
| Bromide ( $\text{Br}^-$ )                   | 0.68                  | 0.068                | $6.8 \times 10^{-3}$ |
| Sulfide ( $\text{S}^{2-}$ )                 | $9 \times 10^{-5}$    | $9 \times 10^{-6}$   | $9 \times 10^{-7}$   |
| Iodide ( $\text{I}^-$ )                     | $1.8 \times 10^{-4}$  | $1.8 \times 10^{-5}$ | $1.8 \times 10^{-6}$ |
| Cyanide ( $\text{CN}^-$ )                   | $1.5 \times 10^{-5}$  | $1.5 \times 10^{-6}$ | $1.5 \times 10^{-7}$ |

### Nitrate

The table below lists concentrations of possible interfering ions that cause 10% error at various levels (in ppm) of  $\text{NO}_3^-$ .

| Ion                                | 100 ppm $\text{NO}_3^-$ | 10 ppm $\text{NO}_3^-$ | 1 ppm $\text{NO}_3^-$ |
|------------------------------------|-------------------------|------------------------|-----------------------|
| Perchlorate ( $\text{ClO}_4^-$ )   | $7 \times 10^{-2}$      | $7 \times 10^{-3}$     | $7 \times 10^{-4}$    |
| Iodide ( $\text{I}^-$ )            | 4                       | 0.4                    | 0.04                  |
| Chlorate ( $\text{ClO}_3^-$ )      | 30                      | 3                      | 0.3                   |
| Cyanide ( $\text{CN}^-$ )          | 20                      | 2                      | 0.2                   |
| Bromide ( $\text{Br}^-$ )          | 400                     | 40                     | 4                     |
| Nitrite ( $\text{NO}_2^-$ )        | 230                     | 23                     | 2                     |
| Hydrogen Sulfide ( $\text{HS}^-$ ) | 230                     | 23                     | 2                     |

|                                                    |         |        |       |
|----------------------------------------------------|---------|--------|-------|
| Bicarbonate ( $\text{HCO}_3^-$ )                   | 440     | 440    | 44    |
| Carbonate ( $\text{CO}_3^{2-}$ )                   | 8,600   | 860    | 86    |
| Chloride ( $\text{Cl}^-$ )                         | 7,600   | 760    | 76    |
| Dihydrogen Phosphate ( $\text{H}_2\text{PO}_4^-$ ) | 34,640  | 3,464  | 346   |
| Hydrogen Phosphate ( $\text{HPO}_4^{2-}$ )         | 34,300  | 3,430  | 343   |
| Phosphate ( $\text{PO}_4^{3-}$ )                   | 33,900  | 3,390  | 339   |
| Acetate ( $\text{OAc}^-$ )                         | 104,200 | 10,420 | 1,042 |
| Fluoride ( $\text{F}^-$ )                          | 81,400  | 8,140  | 814   |
| Sulfate ( $\text{SO}_4^{2-}$ )                     | 685,700 | 68,570 | 6,857 |

### Fluorometer Wavelengths

| Sensor        | Excitation Wavelength (nominal) | Detection Wavelength |
|---------------|---------------------------------|----------------------|
| Chlorophyll a | 430 nm                          | 675 nm to 750 nm     |
| BGA-PC        | 590 nm                          | 640 nm to 690 nm     |
| BGA-PE        | 498 nm                          | 575 nm to 625 nm     |
| Rhodamine     | 530 nm                          | 580 nm to 660 nm     |
| Fluorescein   | 462 nm                          | 525 nm to 570 nm     |
| FDOM          | 375 nm                          | 455 nm to 530 nm     |
| Crude Oil     | 365 nm                          | 430 nm to 505 nm     |

### Additional Information

For additional sensor details including accuracy, range, resolution, methodology, detection limits, response time, and more, view the Aqua TROLL specification sheet at [www.in-situ.com](http://www.in-situ.com).