

# Total Dissolved Solids and Conductivity

as Calculated by the French Creek Engine

## TDS

The French Creek Ion Association Model Engine calculates total dissolved solids(TDS) as follows:

- The Engine iteratively solves for the most likely distribution of species for an analysis based upon 122 ion pair species, as outlined in Table 1.
- TDS is calculated by taking the molal concentration of each species, multiplying each by its molecular weight, and converting to mg/L.
- The calculated TDS is the sum of all species.

This method provides a more accurate estimation of TDS for thermodynamic calculations than taking the individual ions, converting to mg/L, and summing them.

## Conductivity

The French Creek Ion Association Model Engine calculates conductivity as molar conductivity as follows:

- The Engine multiplies each specie( $m$ ) by its molar conductivity ( $\Lambda_m^0$ )sums up the individual conductivity contributions to calculate a base specific conductivity (SC).

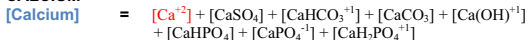
$$SC = \sum (\Lambda_m^0 m)$$

- The conductivity calculations used by the French Creek Engine include corrections for activity as ionic strength increases or decreases.
- Calculated molar conductivity will not necessarily duplicate a measured value for conductivity. It is much more accurate than rules of thumb such as

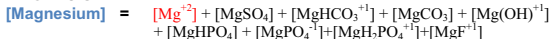
$$\mu = TDS/0.7$$

## Table 1: Example Ion Pairs Used To Estimate Free Ion Concentrations

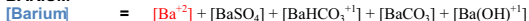
### CALCIUM



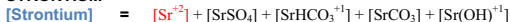
### MAGNESIUM



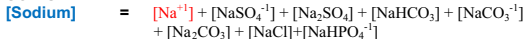
### BARIUM



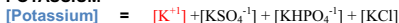
### STRONTIUM



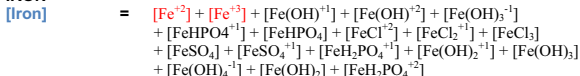
### SODIUM



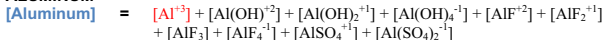
### POTASSIUM



### IRON



### ALUMINIUM



Total Analytical Value

Free Ion Concentration

**French Creek**

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French Creek  
P. O. Box 68  
1220 Valley Forge Road, Ste. 21  
Valley Forge, PA 19481-0068  
USA

Office: 610-935-8337

Fax: 610-935-1008

Email: [info@frenchcreeksoftware.com](mailto:info@frenchcreeksoftware.com)

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[support@frenchcreeksoftware.com](mailto:support@frenchcreeksoftware.com)

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