Useful reminders

WAT-E2120 Physical and Chemical Treatment of Water and Waste

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Addition of substances

- Convert all the ions and molecules as the share of the element only, to be able to add compounds together:
  - $\underline{NH_3\text{-}N}$ or $\underline{NH_3 \text{ as } N}$ or $\underline{NH_3 \text{ x mgN/l}}$
- Examples (this list is just the beginning!):
  - Nitrogen: NH_3, NH_4^+, NO_3^-, NO_2^-, N_{tot}, org. N, NO, N_2O, NO_2, N_2O_5, ...
  - Phosphorus: PO_4^{3-}, $H_2PO_4^-$, P_{tot}, P_{aq}, PO_3, P_2O_5, ...
  - Sulphur: SO42-, SO32-, SO2, SO3, ...
  - Chlorine: Cl^-, HOCl, OCl^-, ClO_2, Cl_2O, Cl_2O_7, ClO_2^-, ClO_3^-, ...
- Works for one element at a time
- P_{tot}, N_{tot}, Fe_{tot}, etc. are the total amount of each element. Don't add them up to other compounds, because they already include them all!

How to convert compounds and ions for addition

- Change the ion or molecule to moles (e.g. mol/l or mmol/l) by dividing with the molar mass of the compound
  - 15 mg/l NH_3 = (15~~mg~~/l)/[(14+3*1)~~mg~~/mmol] = 0.88 mmol/l NH_3
- Multiply the moles of ion or molecule with the number of atoms in the compound
  - 1 mol/l NH_3 contains 1 mol/l N and 3 mol/l H
- Change the moles back to mg:s or g:s by multiplying with the element's molar mass
  - 0.88 ~~mmol~~/l * 14 mg/~~mmol~~ = 12.3 mg/l NH_3-N = 12 mg/l NH_3-N
- Molar masses are e.g. in the course book or any other periodic table of the elements (e.g. http://www.ptable.com/)

Reality check -Units

- What is the difference of mg/l and g/m^3
- What is the difference of kg/m^3 and g/l

Significant numbers – another reality check!

- Consider very strictly if there are more than 2 significant numbers!!!!
- If you use only 2 significant numbers, you are correct in 99% of cases
- Sometimes there is only one significant number...