

MASS CALCULATION in the software readout.

The basic formula for calculating "mass per bin" from "particle size" and "number per bin" obtained from the particle counter.

Note: The only particles considered in these calculations are those in sized bins. We had to make the simplifying assumption that no mass exists in the underflow and overflow bins since we don't know their sizes and number.

The volume of all particles in bin number 'i' is:

$$n[i] * 4/3 * \pi * r[i]^{(1 + \text{volume exponent})}$$

Where 'i' is the bin number 1 through 16 (or 32 for integrated scans) ,

n[i] is the number of particles in bin 'i',

r[i] is the radius of bin 'i' in microns (or the nominal bin size, or diameter, divided by 2).

NB: Multiplication is denoted by '*' and exponentiation by '^'.

A value of 1.75 for the volume exponent means that the radii are being raised to the 2.75 power (ie 1 is added to the specified exponent value). Spectrex has experimentally calculated that 1.75 is the best value for the volume exponent. See "Settings" icon above bar graph histogram.

The 'volume %' figures shown on the printout are the percentages of the sample's total sized mass in each bin. Each bin's mass percentage is given by the ratio of that bin's volume to the total volume across all bins (since mass is assumed to be directly proportional to volume). Specific gravity is assumed to be 1. Thus MASS, or TOTAL SUSPENDED SOLIDS (TSS), in MGS PER LITER is the same as PARTS PER MILLION.

If the specific gravity of any sample is other than 1, it's value can be entered using the "Settings" icon, multiplying out the TSS.