

confidence limits (about the mean)

Symmetric confidence limits ($\pm C$) about the estimated mean, which cover the population mean with probability $1 - \alpha$. The quantity C is calculated by the formula:

$$C = \frac{t_{p,v}^s}{\sqrt{n}}$$

Here $t_{p,v}$, is the critical value from the t - (or Student) distribution function corresponding to the confidence level $1 - \alpha$ and degrees of freedom v . The symbol p represents the percentile (or percentage point) of the t -distribution. For 1-sided intervals, $p = 1 - \alpha$; for 2-sided intervals, $p = 1 - \frac{\alpha}{2}$. In each case, the confidence level is $1 - \alpha$. The confidence interval is given as $\bar{x} \pm C$.

Note:

If the population standard deviation σ is known, confidence limits about a single result may be calculated with the formula:

$$C = t_{p,\infty} \sigma$$

The coefficient $t_{p,\infty}$, is the limiting value of the t -distribution function for $v = \infty$ at confidence level $1 - \alpha$. This is identical to z_p , the p th percentage point of the standard normal variate.

Source:

PAC, 1994, 66, 595 (*Nomenclature for the presentation of results of chemical analysis (IUPAC Recommendations 1994)*) on page 601