The combination rules of standard uncertainties

$f = f\left(x, y, z\right)$	$df = \left(\frac{\partial f}{\partial x}\right)dx + \left(\frac{\partial f}{\partial y}\right)dy + \left(\frac{\partial f}{\partial z}\right)dz$	$u\left(f\right)^2 = \left(\frac{\partial f}{\partial x}\right)^2 u\left(x\right)^2 + \left(\frac{\partial f}{\partial y}\right)^2 u\left(y\right)^2 + \left(\frac{\partial f}{\partial z}\right)^2 u\left(z\right)^2$	Δf
Addition / subtraction $f = x \pm y \pm z$	$df = \left(\pm 1\right)dx + \left(\pm 1\right)dy + \left(\pm 1\right)dz$	$u\left(f\right)^2 = \left(\pm 1\right)^2 u\left(x\right)^2 + \left(\pm 1\right)^2 u\left(y\right)^2 + \left(\pm 1\right)^2 u\left(z\right)^2$ $= u\left(x\right)^2 + u\left(y\right)^2 + u\left(z\right)^2$	$u\left(f\right) = \sqrt{u\left(x\right)^2 + u\left(y\right)^2 + u\left(z\right)^2}$
Multiplication / division $f = \frac{xy}{z} = xy.z^{-1}$	$df = \left(\frac{y}{z}\right)dx + \left(\frac{x}{z}\right)dy + \left(-\frac{xy}{z^2}\right)dz$	$u\left(f\right)^2 = \left(\frac{y}{z}\right)^2 u\left(x\right)^2 + \left(\frac{x}{z}\right)^2 u\left(y\right)^2 + \left(-\frac{xy}{z^2}\right)^2 u\left(z\right)^2$ $= \left(\frac{f}{x}\right)^2 u\left(x\right)^2 + \left(\frac{f}{y}\right)^2 u\left(y\right)^2 + \left(-\frac{f}{z}\right)^2 u\left(z\right)^2$	$u\left(f\right) = f\sqrt{\left(\frac{u\left(x\right)}{x}\right)^2 + \left(\frac{u\left(y\right)}{y}\right)^2 + \left(\frac{u\left(z\right)}{z}\right)^2}$
Mean: $f = \frac{\sum_{i=1}^{N} x_i}{N}$ where $\forall\ i,\ \ \Delta x_i = \Delta x$	$df = \frac{\left(1\right)dx_1 + \left(1\right)dx_2 + \ldots + \left(1\right)dx_N}{N}$	$u\left(f\right)^2 = \left(\frac{1}{N}\right)^2 u\left(x_1\right)^2 + \left(\frac{1}{N}\right)^2 u\left(x_2\right)^2 + \ldots + \left(\frac{1}{N}\right)^2 u\left(x_N\right)^2$ $= \left(\frac{1}{N}\right)^2 u\left(x\right)^2 + \left(\frac{1}{N}\right)^2 u\left(x\right)^2 + \ldots + \left(\frac{1}{N}\right)^2 u\left(x\right)^2$ $= N\left(\frac{1}{N}\right)^2 u\left(x\right)^2 = \frac{u\left(x\right)^2}{N}$	$u\left(f\right) = \frac{1}{\sqrt{N}}u\left(x\right)$

Note: Recall that when the equipment certificate or other specification gives limits without specifying a level of confidence, or when an estimate is made in the form of a maximum range ($\pm\alpha$) with no knowledge of the shape of the distribution, then we may assume a rectangular distribution function with a semi-range of α with an associated standard uncertainty (or standard deviation) of:

$$u\left(x\right) = \frac{\alpha}{\sqrt{3}}$$