Interpretation of Relative Uncertainty Equations

The Uncertainty Equation: $U = b + mL$ in which the slope: $m = \left(\frac{U_2 - U_1}{L_2 - L_1} \right)$ and the Y intercept: $b = U_1 - \left(\frac{U_2 - U_1}{L_2 - L_1} \right) * L_1$

Note: The above equations contain the variable L for length. Any variable appropriate for the units being evaluated may be used.

Rel Unc Equation for length calibrations:

$\left(1.17 + 1.03 \times 10^{-3} L\right)$ means $\left(1.17\,\mu in + (1.03 \times 10^{-3}\,\mu in/in) \times Lin\right)$ μin in USC units

$\left(1.17 + 1.03 \times 10^{-3} L\right)$ means $\left(1.17\,\mu m + (1.03 \times 10^{-3}\,\mu m/mm) \times Lmm\right)$ μm in SI units.

When the scope contains relative uncertainty equations for length ranges, append the following footnote to the end of the scope: The term L represents length in inches or millimeters appropriate to the uncertainty statement.

Rel Unc Equation for weight calibrations:

$\left(1.17 + 1.03 \times 10^{-3} wt\right)$ means $\left(1.17\ lb + (1.03 \times 10^{-3} lb/lb) \times \text{wt in } lb\right)$ lb in USC units.

$\left(1.17 + 1.03 \times 10^{-3} wt\right)$ means $\left(1.17\ g + (1.03 \times 10^{-3} g/kg) \times \text{wt in } kg\right)$ g in SI units.

When the scope contains relative uncertainty equations for weight ranges, append the following footnote to the end of the scope: The term Wt represents weight in pounds or grams (including SI multiple and submultiple units) appropriate to the uncertainty statement.

Note: Care must be taken when using SI units with different prefix's to combine and account for the differences properly.

A typical form of the equation seen in expressions of uncertainty for electrical parameters is shown below:
$\left(0.115\ \text{mV/V} + 60\ \mu\text{V}\right)$ means $\left((0.115\ \text{mV/V}) \times \text{V} + 60\ \mu\text{V}\right)$ which can be written as $\left(60\ \mu\text{V} + (0.115\ \text{mV/V}) \times \text{Volts}\right)$ V .

This is identical in mathematical structure and appearance to the equations above for length and weight. The term Volts in the third form of the equation above represents any specific voltage within the stated range for which determination of the uncertainty is desired.