

Pesticide Risk Mitigation Engine

Policy on Units of Measurement

Goals:

- Define the requirements of the Units Engine built into the PRiME software system.
- Define the policy on changes to the Units Engine software and API.

General policies:

1. The design of PRiME is units aware and contains a feature-rich Units Engine capable of conversion and dimensional analysis.
2. It is recognized that PRiME incorporates different bio-physical models and data sources. Each of these models and data sources has different requirements for, and native values of, units and dimensionality.
3. Units-aware signifies that measurement units are explicitly specified for all parameters that are included within databases, user inputs, models and model outputs. The mechanisms for expressing units attributes are described elsewhere. Phys-chem, measurement condition, and climate and soil data, values passed as input or output have explicit units attributes.
4. With exceptions related to conventional usage and performance needs, the International System of Units (SI) will be used as the standard for all measurements (<http://physics.nist.gov/cuu/Units/index.html>). Resources for PRiME developers to use for verification and validation of Units Engine features include: the Mega Converter (<http://www.megaconverter.com/Mega2/index.html>), or the Digital Dutch Unit Converter (<http://www.digitaldutch.com/unitconverter/>), and for the case of obsolete or unusual measurements, the converter at (e.g. http://www.chemie.fu-berlin.de/chemistry/general/units_en.html)
5. Checks will be provided during the input process to verify units from the end user, and to provide for confirmation that data correspond with appropriate units, where this is feasible.
6. The onus of conversion formulae or look-up tables will not burden the end-users or researchers using PRiME. The Units Engine is a built-in feature of PRiME. The Units Engine will support foreign area measurements.

Complex conversion requirements:

Conversion formulae for pesticide application rates that account for (1) use patterns that are on an unusual areal basis, and (2) the input requirements of various calculations, will be developed using the Units Engine. Examples include use pattern data expressed as gallons or pints of formulation per foot of orchard tree row, that require and user input of row spacing, and models that require various levels of spatial and temporal detail regarding pesticide inputs.

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Changes to the Units Engine API

It is understood that the interfaces to the Units Engine API in current use are not to be removed unless a consensus of PRiME software developers emerges. Additional interfaces to the Units Engine API can be added.