Package 'gunit'

July 11, 2026

Type Package

Title Converts Conductance Units

Version 1.0.3

Description For plant physiologists, converts conductance (e.g. stomatal conductance) to different units: m/s, mol/m^2/s, and umol/m^2/s/Pa.

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Encoding UTF-8

Suggests testthat

RoxygenNote 7.2.1

Imports magrittr (>= 1.5), methods (>= 4.0.0), stringr (>= 1.4.0), units (>= 0.6.0), tibble (>= 2.1.1)

URL https://github.com/cdmuir/gunit

BugReports https://github.com/cdmuir/gunit/issues

NeedsCompilation no

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Repository CRAN

Date/Publication 2026-07-11 16:30:02 UTC

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`convert_conductance` *Convert conductance units*

Description

Convert conductance units

Usage

```
convert_conductance(
  .g,
  P = set_units(101.3246, kPa),
  R = set_units(8.31446, J/K/mol),
  Temp = set_units(298.15, K)
)
```

Arguments

`.g`	Conductance in class units. Units must convertible to one of "m/s", "umol/m^2/s/Pa", or "mol/m^2/s"
`P`	A pressure value of class `units` that is convertible to kPa. Default is 101.3246 kPa, Earth's atmospheric pressure at sea level.
`R`	Ideal gas constant of class `units` that is convertible to J/K/kg. Default is 8.31446 J/K/mol.
`Temp`	A temperature value of class `units` that is convertible to K. Default is 25 degreeC (298.15 K).

Value

@return a tibble in units "m/s", "umol/m^2/s/Pa", and "mol/m^2/s".

Examples

```
# library(gunit)
library(units)

g_sc <- set_units(10, "m/s")
convert_conductance(g_sc)

g_sc <- set_units(4, "umol/m^2/s/Pa")
convert_conductance(g_sc)

g_sc <- set_units(0.4, "mol/m^2/s")
convert_conductance(g_sc)
```

gunit gunit *package*

Description

Convert Conductance Units

Details

See the README on GitHub

gw2gc *Convert g_c (μmol CO2/m^2/s/Pa) to g_w (μmol H2O /m^2/s/Pa)*

Description

Convert g_c (μmol CO2/m^2/s/Pa) to g_w (μmol H2O /m^2/s/Pa)

Convert g_c (umol CO2/m^2/s/Pa) to g_w (umol H2O /m^2/s/Pa)

Usage

```
gw2gc(g_w, D_c, D_w, unitless, a)

gc2gw(g_c, D_c, D_w, unitless, a)
```

Arguments

g_w	conductance to water vapor in units (μmol H2O / (m^2 s Pa)) of class units.
D_c	diffusion coefficient for CO2 in air in units of m^2/s of class units
D_w	diffusion coefficient for H2O in air in units of m^2/s of class units
unitless	Logical. Should scientific units of arguments be checked and set? TRUE is safer, but slower. If FALSE, values provided are assumed to be in correct units. units
a	exponent used for conversion. Use 1 for still air; 0.67 for laminar flow (Jones 2014). Should be unitless.
g_c	conductance to CO2 in units (μmol H2O / (m^2 s Pa)) of class units.

Details

Diffusive conductance to CO2 is greater than that of H2O because of the higher molecular weight. To convert:

$$g_{\mathrm{c}} = g_{\mathrm{w}}(D_{\mathrm{c}}/D_{\mathrm{w}})^{a}$$
$$g_{\mathrm{w}} = g_{\mathrm{c}}(D_{\mathrm{w}}/D_{\mathrm{c}})^{a}$$

Value

Value with units μmol / (m^2 s Pa) of class `units`.

Note

This function will soon be moving to the standalone gunit package.

References

Jones H. 2014. Plants and Microclimate (3rd edition). Cambridge University Press.

Examples

```
library(units)
D_c = set_units(1.29e-05, "m^2/s")
D_w = set_units(2.12e-05, "m^2/s")
g_c = set_units(3, "umol/m^2/s/Pa")
a = 1
g_w = gc2gw(g_c, D_c, D_w, a, unitless = FALSE)
g_w

gw2gc(g_w, D_c, D_w, a, unitless = FALSE)
```

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