fancyunits V1.0.1

Heiko Bauke*

2007/02/01

Abstract

The package `fancyunits` had been developed based on Marcel Heldoorn's package `SIunits`. Both packages are designed to support typesetting of physical units of the international system of units (Système International d'Unités) in LaTeX2e.

The disadvantage of SIunits, however, is that units (and corresponding numbers) are always typeset using `\mathrm`, which can look very ugly in text with a sans serif font: The speed of light is 299 792 458 m/s. The package `fancyunits` overcomes this problem and allows consistent typesetting of units. The units are displayed in the current font family: The speed of light is 299 792 458 m/s.

Contents

*E-mail: `heiko.bauke@physics.ox.ac.uk`

1 Options

To use `fancyunits` load the package by placing the command

`\usepackage[`⟨*options*⟩`]{fancyunits}`

into the preamble of your LaTeX 2ε document. `fancyunits` depends on the packages `textcomp` (in base, so it should always be there) and `amstext`. Make sure that both of these packages are instaled.

The `fancyunits` package provides the following options:

`cdot` A · (`\cdot`) is typeset between composed units, e. g. N·m.

`thickspace` A thick space (`\;`) is typeset between composed units, e. g. N m.

`mediumspace` This option causes a medium space (`\:`) to be typeset between the units, e. g. N m.

`thinspace` With this option, only a thin space (`\,`) is put between the units, e. g. N m.

`thickqspace` A thick space (`\;`) is typeset between the number and the unit, e. g. 1 N.

`mediumqspace` Here, only a medium space (`\:`) is used, e. g. 1 N.

`thinqspace` Between number and unit a distance of a thin space (`\,`) is typeset, e. g. 1 N.

`spaceqspace` With this option, a `~` is used for the space between number and unit, e. g. 1 N.

`derivedinbase` Additional macros to typeset derived units in their base units are supplied.

`derived` With this option, a different set of macros for different typesetting of the same derived units is provided.

Default spacing options are `thickspace` and `thickqspace`. The macro `\usk` is used internally for the space between units and `\qsk` is used between numerical value and physical unit.

2 Using `fancyunits`

The central macro for typesetting units is `\unit{}{}`. Its first argument is the numerical value. Its second argument determines the unit. Also a prefix may be given, e. g. `\unit{1}{\ampere}` yields 1 A. The macro `\unit` works text mode and also in math mode.

2.1 Base units and derived units

Macros for all SI base units are given in table 1. In addition to the base units there are some derived units, see table 3. These units may be typeset in different variants. To choose between these variants, the user has to apply the package options `derivedinbase` or `derived`. Besides the SI units some non-SI units are defined, see table 2.

Table 1: SI base units

physical quantity	$\LaTeX\,2_\varepsilon$ macro	output
length	`\metre`	m
	`\meter`	m
mass	`\kilogram`	kg
time	`\second`	s
electric current	`\ampere`	A
thermodynamic temperature	`\kelvin`	K
amount of substance	`\mole`	mol
luminous intensity	`\candela`	cd

Table 2: Typesetting non-SI units

$\LaTeX\,2_\varepsilon$ macro	output	$\LaTeX\,2_\varepsilon$ macro	output
`\minute`	min	`\atomicmass`	u
`\hour`	h	`\gram`	g
`\dday`	d	`\ton`	t
`\degree`	°	`\tonne`	t
`\paminute`	’	`\barn`	b
`\parsecond`	”	`\hectare`	ha
`\angstrom`	Å	`\are`	are
`\AstroE`	AE	`\bbar`	bar
`\lightyear`	ly	`\curie`	Ci
`\parsec`	pc	`\rem`	rem
`\gal`	Gal	`\roentgen`	R
`\liter`	L	`\oersted`	Oe
`\litre`	l	`\electronvolt`	eV

Table 3: Composed units derived from the base units

		loaded with `derivedinbase`		loaded with `derived`	
LaTeX 2ε macro	output	LaTeX 2ε macro	output	LaTeX 2ε macro	output
`\rad`	rad				
`\sterad`	sr				
`\radian`	rad	`\radianbase`	$\mathrm{m\,m^{-1}}$	`\derradian`	$\mathrm{m\,m^{-1}}$
`\steradian`	sr	`\steradianbase`	$\mathrm{m^{2}\,m^{-2}}$	`\dersteradian`	$\mathrm{m^{2}\,m^{-2}}$
`\hertz`	Hz	`\hertzbase`	$\mathrm{s^{-1}}$	`\derhertz`	$\mathrm{s^{-1}}$
`\newton`	N	`\newtonbase`	$\mathrm{m\,kg\,s^{-2}}$	`\dernewton`	$\mathrm{m\,kg\,s^{-2}}$
`\pascal`	Pa	`\pascalbase`	$\mathrm{m^{-1}\,kg\,s^{-2}}$	`\derpascal`	$\mathrm{N\,m^{-2}}$
`\joule`	J	`\joulebase`	$\mathrm{m^{2}\,kg\,s^{-2}}$	`\derjoule`	N m
`\watt`	W	`\wattbase`	$\mathrm{m^{2}\,kg\,s^{-3}}$	`\derwatt`	$\mathrm{J\,s^{-1}}$
`\coulomb`	C	`\coulombbase`	s A	`\dercoulomb`	A s
`\volt`	V	`\voltbase`	$\mathrm{m^{2}\,kg\,s^{-3}\,A^{-1}}$	`\dervolt`	$\mathrm{W\,A^{-1}}$
`\farad`	F	`\faradbase`	$\mathrm{m^{-2}\,kg^{-1}\,s^{4}\,A^{2}}$	`\derfarad`	$\mathrm{C\,V^{-1}}$
`\ohm`	Ω	`\ohmbase`	$\mathrm{m^{2}\,kg\,s^{-3}\,A^{-2}}$	`\derohm`	$\mathrm{V\,A^{-1}}$
`\weber`	Wb	`\weberbase`	$\mathrm{m^{2}\,kg\,s^{-2}\,A^{-1}}$	`\derweber`	$\mathrm{m^{2}\,kg\,s^{-2}\,A^{-1}}$
`\tesla`	T	`\teslabase`	$\mathrm{kg\,s^{-2}\,A^{-1}}$	`\dertesla`	$\mathrm{Wb\,m^{-2}}$
`\henry`	H	`\henrybase`	$\mathrm{m^{2}\,kg\,s^{-2}\,A^{-2}}$	`\derhenry`	$\mathrm{Wb\,A^{-1}}$
`\celsius`	°C	`\celsiusbase`	K	`\dercelsius`	K
`\degreecelsius`	°C	`\degreecelsiusbase`	K	`\derdegreecelsius`	K
`\lumen`	lm	`\lumenbase`	$\mathrm{cd\,m^{2}\,m^{-2}}$	`\derlumen`	cd sr
`\lux`	lx	`\luxbase`	$\mathrm{cd\,m^{2}\,m^{-4}}$	`\derlux`	$\mathrm{lm\,m^{-2}}$
`\becquerel`	Bq	`\becquerelbase`	$\mathrm{s^{-1}}$	`\derbecquerel`	$\mathrm{s^{-1}}$
`\Gray`*	Gy	`\Graybase`*	$\mathrm{m^{2}\,s^{-2}}$	`\derGray`*	$\mathrm{J\,kg^{-1}}$
`\sievert`	Sv	`\sievertbase`	$\mathrm{m^{2}\,s^{-2}}$	`\dersievert`	$\mathrm{J\,kg^{-1}}$

* In contrast to `SIunits`, the captitalized macro `Gy` is used for the unit gray. Thus, conflicts with color macros are avoided.

2.2 Composing units

The package `fancyunits` defines the unit prefixes given in table 4. If the macros for decimal prefixes are not enough or you don't want them, you may use powers with `\power{}{}`: `\power{10}{-36}` yields 10^{-36}.[1]

The user can create new macros for units, that are not predefined by `fancyunits`, by using `\addunit{}{}`. The first argument is the macro name for the unit, the second determines how the unit is typeset. `\addunit{\ounce}{oz}`, for example, defines the macro `\ounce` which yields oz.

The `fancyunits` package provides some additional macros for typesetting composed units in a convenient manner. Unit fractions can by typeset in different ways. The `\per`-variant is only provided for reasons of compatibility to `SIunits`.

`\per` provides a very simple way to typeset fractions. `\kilogram\per\second` yields kg/s.

`\ufrac` produces small fractions, e.g. `\ufrac{\kilogram}{\second}` yields ${}^{\mathrm{kg}}/_{\mathrm{s}}$.

`\Ufrac` produces medium sized fractions, e.g. `\Ufrac{\kilogram}{\second}` yields $\frac{\mathrm{kg}}{\mathrm{s}}$.

`\UFrac` finally produces big fractions, e.g. `\UFrac{\kilogram}{\second}` yields $\dfrac{\mathrm{kg}}{\mathrm{s}}$.

To set a unit to a power, use the macros in Table 5. Since `\square` is yet defined in `amssymb.sty`, `\Square` is used in `fancyunits`. The units square metre and cubic metre are so frequently used, that shorthand macros `\Squaremetre` (yields m^2) and `\cubicmetre` (yields m^3) are defined.

And finally, there is a whole bunch of complex macros for composed units. Table 6 gives an overview over all those composed units in `fancyunits`.

3 Acknowledgements

Many thanks to Frank Küster[2]. He has traslated the original German documentation of `fancyunits` into English. This document is based on his work.

[1] Note that numbers are *not* typeset in math mode. Therefore you cannot use `10^{-36}` in the first argument to `\unit`, and switching to math mode again yields roman numbers, even if you are using a sans serif or `typewriter` font.

[2] E-mail: `frank@kuesterei.ch`

Table 4: Unit prefixes

LaTeX 2ε macro	output	LaTeX 2ε macro	output
\yocto	y	\yoctod	10^{-24}
\zepto	z	\zeptod	10^{-21}
\atto	a	\attod	10^{-18}
\femto	f	\femtod	10^{-15}
\pico	p	\picod	10^{-12}
\nano	n	\nanod	10^{-9}
\micro	µ	\microd	10^{-6}
\milli	m	\millid	10^{-3}
\centi	c	\centid	10^{-2}
\deci	d	\decid	10^{-1}
\deca	da	\decad	10^{-1}
\deka	da	\dekad	10^{-1}
		\decaD	10
\hecto	h	\hectod	10^{2}
\kilo	k	\kilod	10^{3}
\mega	M	\megad	10^{6}
\giga	G	\gigad	10^{9}
\tera	T	\terad	10^{12}
\peta	P	\petad	10^{15}
\exa	E	\exad	10^{18}
\zetta	Z	\zettad	10^{21}
\yotta	Y	\yottad	10^{24}

Table 5: Unit exponents

LaTeX 2ε macro	example	output
\Square	\Square\metre	m^{2}
\Squared	\metre\Squared	m^{2}
\cubic	\cubic\metre	m^{3}
\cubed	\metre\cubed	m^{3}
\fourth	\fourth\metre	m^{4}
\reciprocal	\reciprocal\metre	m^{-1}
\rp	\rp\metre	m^{-1}
\rpsquare	\rpsquare\metre	m^{-2}
\rpsquared	\metre\rpsquared	m^{-2}
\rpcubic	\rpcubic\metre	m^{-3}
\rpcubed	\metre\rpcubed	m^{-3}
\rpfourth	\rpfourth\metre	m^{-4}

Table 6: Different variants of composed units

physical quantity	$\LaTeX\,2_\varepsilon$ macro	output
absorbed dose rate	`\Graypersecond`	Gy/s
	`\Graypersecondnp`	Gy s^{-1}
	`\Grayperseconduf`	$^{\mathrm{Gy}}/_{\mathrm{s}}$
	`\GraypersecondUf`	$\frac{\mathrm{Gy}}{\mathrm{s}}$
	`\GraypersecondUF`	$\dfrac{\mathrm{Gy}}{\mathrm{s}}$
acceleration	`\metrepersquaresecond`	m/s^2
	`\metrepersquaresecondnp`	m s^{-2}
	`\metrepersquareseconduf`	$^{\mathrm{m}}/_{\mathrm{s}^2}$
	`\metrepersquaresecondUf`	$\frac{\mathrm{m}}{\mathrm{s}^2}$
	`\metrepersquaresecondUF`	$\dfrac{\mathrm{m}}{\mathrm{s}^2}$
angular acceleration	`\radianpersquaresecond`	rad/s^2
	`\radianpersquaresecondnp`	rad s^{-2}
	`\radianpersquareseconduf`	$^{\mathrm{rad}}/_{\mathrm{s}^2}$
	`\radianpersquaresecondUf`	$\frac{\mathrm{rad}}{\mathrm{s}^2}$
	`\radianpersquaresecondUF`	$\dfrac{\mathrm{rad}}{\mathrm{s}^2}$
angular moment	`\kilogramsquaremetrepersecond`	kg m^2/s
	`\kilogramsquaremetrepersecnduf`	$^{\mathrm{kg\ m}^2}/_{\mathrm{s}}$
	`\kilogramsquaremetrepersecondUf`	$\frac{\mathrm{kg\ m}^2}{\mathrm{s}}$
	`\kilogramsquaremetrepersecondUF`	$\dfrac{\mathrm{kg\ m}^2}{\mathrm{s}}$
angular velocity	`\radianpersecond`	rad/s
	`\radianperseconduf`	$^{\mathrm{rad}}/_{\mathrm{s}}$
	`\radianpersecondUf`	$\frac{\mathrm{rad}}{\mathrm{s}}$
	`\radianpersecondUF`	$\dfrac{\mathrm{rad}}{\mathrm{s}}$
area per volume	`\Squaremetrepercubicmetre`	m^2/m^3
	`\Squaremetrepercubicmetrenp`	m^2 m^{-3}
	`\Squaremetrepercubicmetreuf`	$^{\mathrm{m}^2}/_{\mathrm{m}^3}$
	`\SquaremetrepercubicmetreUf`	$\frac{\mathrm{m}^2}{\mathrm{m}^3}$
	`\SquaremetrepercubicmetreUF`	$\dfrac{\mathrm{m}^2}{\mathrm{m}^3}$
density per charge	`\kilogrampercubicmetrecoulomb`	kg/m^3 C
	`\kilogrampercubicmetrecoulombnp`	kg m^{-3} C^{-1}
	`\kilogrampercubicmetrecoulombuf`	$^{\mathrm{kg}}/_{\mathrm{m}^3\ \mathrm{C}}$
	`\kilogrampercubicmetrecoulombUf`	$\frac{\mathrm{kg}}{\mathrm{m}^3\ \mathrm{C}}$
	`\kilogrampercubicmetrecoulombUF`	$\dfrac{\mathrm{kg}}{\mathrm{m}^3\ \mathrm{C}}$

continued on next page

physical quantity	LaTeX 2ε macro	output
dynamic fluidity	\Squaremetrepernewtonsecond	$\mathrm{m^2/N\,s}$
	\Squaremetrepernewtonsecondnp	$\mathrm{m^2\,N^{-1}\,s^{-1}}$
	\Squaremetrepernewtonseconduf	$\nicefrac{\mathrm{m^2}}{\mathrm{N\,s}}$
	\SquaremetrepernewtonsecondUf	$\tfrac{\mathrm{m^2}}{\mathrm{N\,s}}$
	\SquaremetrepernewtonsecondUF	$\tfrac{\mathrm{m^2}}{\mathrm{N\,s}}$
dynamic viscosity	\pascalsecond	$\mathrm{Pa\,s}$
	\pascalsecondnp	$\mathrm{kg\,s^{-1}}$
	\pascalseconduf	$\nicefrac{\mathrm{kg}}{\mathrm{m\,s}}$
	\pascalsecondUf	$\tfrac{\mathrm{kg}}{\mathrm{m\,s}}$
	\pascalsecondUF	$\frac{\mathrm{kg}}{\mathrm{m\,s}}$
electrical charge density	\coulombpercubicmetre	$\mathrm{C/m^3}$
	\coulombpercubicmetrenp	$\mathrm{C\,m^{-3}}$
	\coulombpercubicmetreuf	$\nicefrac{\mathrm{C}}{\mathrm{m^3}}$
	\coulombpercubicmetreUf	$\tfrac{\mathrm{C}}{\mathrm{m^3}}$
	\coulombpercubicmetreUF	$\frac{\mathrm{C}}{\mathrm{m^3}}$
electrical charge per amount of substance	\coulombpermol	$\mathrm{C/mol}$
	\coulombpermol	$\mathrm{C/mol}$
	\Squaremetrepercubicmetrenp	$\mathrm{m^2\,m^{-3}}$
	\Squaremetrepercubicmetreuf	$\nicefrac{\mathrm{m^2}}{\mathrm{m^3}}$
	\SquaremetrepercubicmetreUf	$\tfrac{\mathrm{m^2}}{\mathrm{m^3}}$
	\SquaremetrepercubicmetreUF	$\frac{\mathrm{m^2}}{\mathrm{m^3}}$
electrical current density	\amperepersquaremetre	$\mathrm{A/m^2}$
	\amperepersquaremetrenp	$\mathrm{A\,m^{-2}}$
	\amperepersquaremetreuf	$\nicefrac{\mathrm{A}}{\mathrm{m^2}}$
	\amperepersquaremetreUf	$\tfrac{\mathrm{A}}{\mathrm{m^2}}$
	\amperepersquaremetreUF	$\frac{\mathrm{A}}{\mathrm{m^2}}$
electrical dipole moment	\amperemetresecond	$\mathrm{A\,m\,s}$
electrical field strength	\voltpermetre	$\mathrm{V/m}$
	\voltpermetrenp	$\mathrm{V\,m^{-1}}$
	\voltpermetreuf	$\nicefrac{\mathrm{V}}{\mathrm{m}}$
	\voltpermetreUf	$\tfrac{\mathrm{V}}{\mathrm{m}}$
	\voltpermetreUF	$\frac{\mathrm{V}}{\mathrm{m}}$
energy	\kilowatthour	kWh
energy density	\joulepercubicmetre	$\mathrm{J/m^3}$
	\joulepercubicmetrenp	$\mathrm{J\,m^{-3}}$

continued on next page

physical quantity	$\LaTeX\,2_\varepsilon$ macro	output
	`\joulepercubicmetreuf`	${}^{\mathrm{J}}\!/_{\mathrm{m}^3}$
	`\joulepercubicmetreUf`	$\frac{\mathrm{J}}{\mathrm{m}^3}$
	`\joulepercubicmetreUF`	$\dfrac{\mathrm{J}}{\mathrm{m}^3}$
energy density (per area)	`\joulepersquaremetre`	$\mathrm{J/m^2}$
	`\joulepersquaremetrenp`	$\mathrm{J\ m^{-2}}$
	`\joulepersquaremetreuf`	${}^{\mathrm{J}}\!/_{\mathrm{m}^2}$
	`\joulepersquaremetreUf`	$\frac{\mathrm{J}}{\mathrm{m}^2}$
	`\joulepersquaremetreUF`	$\dfrac{\mathrm{J}}{\mathrm{m}^2}$
force density	`\newtonpercubicmetre`	$\mathrm{N/m^3}$
	`\newtonpercubicmetrenp`	$\mathrm{N\ m^{-3}}$
	`\newtonpercubicmetreuf`	${}^{\mathrm{N}}\!/_{\mathrm{m}^3}$
	`\newtonpercubicmetreUf`	$\frac{\mathrm{N}}{\mathrm{m}^3}$
	`\newtonpercubicmetreUF`	$\dfrac{\mathrm{N}}{\mathrm{m}^3}$
force per mass	`\newtonperkilogram`	$\mathrm{N/kg}$
	`\newtonperkilogramnp`	$\mathrm{N\ kg^{-1}}$
	`\newtonperkilogramuf`	${}^{\mathrm{N}}\!/_{\mathrm{kg}}$
	`\newtonperkilogramUf`	$\frac{\mathrm{N}}{\mathrm{kg}}$
	`\newtonperkilogramUF`	$\dfrac{\mathrm{N}}{\mathrm{kg}}$
heat capacity, entropy	`\jouleperkelvin`	$\mathrm{J/K}$
	`\jouleperkelvinnp`	$\mathrm{J\ K^{-1}}$
	`\jouleperkelvinuf`	${}^{\mathrm{J}}\!/_{\mathrm{K}}$
	`\jouleperkelvinUf`	$\frac{\mathrm{J}}{\mathrm{K}}$
	`\jouleperkelvinUF`	$\dfrac{\mathrm{J}}{\mathrm{K}}$
kinetical energy of turbulences	`\Squaremetrepersquaresecond`	$\mathrm{m^2/s^2}$
	`\rpsquaremetrepersquaresecond`	$\mathrm{m^2\ s^{-2}}$
	`\Squaremetrepersquaresecondnp`	$\mathrm{m^2\ s^{-2}}$
	`\Squaremetrepersquareseconduf`	${}^{\mathrm{m}^2}\!/_{\mathrm{s}^2}$
	`\SquaremetrepersquaresecondUf`	$\frac{\mathrm{m}^2}{\mathrm{s}^2}$
	`\SquaremetrepersquaresecondUF`	$\dfrac{\mathrm{m}^2}{\mathrm{s}^2}$
kinetical viscosity	`\Squaremetrepersecond`	$\mathrm{m^2/s}$
	`\rpsquaremetrepersecond`	$\mathrm{m^2\ s^{-1}}$
	`\Squaremetrepersecondnp`	$\mathrm{m^2\ s^{-1}}$
	`\Squaremetrepersseconduf`	${}^{\mathrm{m}^2}\!/_{\mathrm{s}}$
	`\SquaremetrepersecondUf`	$\frac{\mathrm{m}^2}{\mathrm{s}}$

continued on next page

physical quantity	$\LaTeX\,2_\varepsilon$ macro	output
	`\SquaremetrepersecondUF`	$\dfrac{\mathrm{m}^2}{\mathrm{s}}$
luminosity	`\candelapersquaremetre`	cd/m^2
	`\candelapersquaremetrenp`	cd m^{-2}
	`\candelapersquaremetreuf`	$^{\mathrm{cd}}/_{\mathrm{m}^2}$
	`\candelapersquaremetreUf`	$\frac{\mathrm{cd}}{\mathrm{m}^2}$
	`\candelapersquaremetreUF`	$\dfrac{\mathrm{cd}}{\mathrm{m}^2}$
magnetical field strength	`\amperepermetre`	A/m
	`\amperepermetrenp`	A m^{-1}
	`\amperepermetreuf`	$^{\mathrm{A}}/_{\mathrm{m}}$
	`\amperepermetreUf`	$\frac{\mathrm{A}}{\mathrm{m}}$
	`\amperepermetreUF`	$\dfrac{\mathrm{A}}{\mathrm{m}}$
magnetical moment	`\joulepertesla`	J/T
	`\jouleperteslanp`	J T^{-1}
	`\jouleperteslauf`	$^{\mathrm{J}}/_{\mathrm{T}}$
	`\jouleperteslaUf`	$\frac{\mathrm{J}}{\mathrm{T}}$
	`\jouleperteslaUF`	$\dfrac{\mathrm{J}}{\mathrm{T}}$
mass density	`\kilogrampercubicmetre`	kg/m^3
	`\kilogrampercubicmetrenp`	kg m^{-3}
	`\kilogrampercubicmetreuf`	$^{\mathrm{kg}}/_{\mathrm{m}^3}$
	`\kilogrampercubicmetreUf`	$\frac{\mathrm{kg}}{\mathrm{m}^3}$
	`\kilogrampercubicmetreUF`	$\dfrac{\mathrm{kg}}{\mathrm{m}^3}$
mass density (per area)	`\kilogrampersquaremetre`	kg/m^2
	`\kilogrampersquaremetrenp`	kg m^{-2}
	`\kilogrampersquaremetreuf`	$^{\mathrm{kg}}/_{\mathrm{m}^2}$
	`\kilogrampersquaremetreUf`	$\frac{\mathrm{kg}}{\mathrm{m}^2}$
	`\kilogrampersquaremetreUF`	$\dfrac{\mathrm{kg}}{\mathrm{m}^2}$
mass density (per length)	`\kilogrampermetre`	kg/m
	`\kilogrampermetrenp`	kg m^{-1}
	`\kilogrampermetreuf`	$^{\mathrm{kg}}/_{\mathrm{m}}$
	`\kilogrampermetreuf`	$^{\mathrm{kg}}/_{\mathrm{m}}$
	`\kilogrampermetreUf`	$\frac{\mathrm{kg}}{\mathrm{m}}$
	`\kilogrampermetreUF`	$\dfrac{\mathrm{kg}}{\mathrm{m}}$
mass flux rate	`\kilogrampersecond`	kg/s
	`\kilogrampersecondnp`	kg s^{-1}
	`\kilogramperseconduf`	$^{\mathrm{kg}}/_{\mathrm{s}}$

continued on next page

physical quantity	$\LaTeX\,2_\varepsilon$ macro	output
	`\kilogrampersecondUf`	$\frac{\mathrm{kg}}{\mathrm{s}}$
	`\kilogrampersecondUF`	$\dfrac{\mathrm{kg}}{\mathrm{s}}$
mass flux	`\kilogrampersquaremetresecond`	kg/m^2 s
	`\kilogrampersquaremetresecondnp`	kg m^{-2} s^{-1}
	`\kilogrampersquaremetreseconduf`	$^{\mathrm{kg}}/_{\mathrm{m}^2\ \mathrm{s}}$
	`\kilogrampersquaremetresecondUf`	$\frac{\mathrm{kg}}{\mathrm{m}^2\ \mathrm{s}}$
	`\kilogrampersquaremetresecondUF`	$\dfrac{\mathrm{kg}}{\mathrm{m}^2\ \mathrm{s}}$
mass flux per volume	`\kilogrampersecondcubicmetre`	kg/s m^3
	`\kilogrampersecondcubicmetrenp`	kg s^{-1} m^{-3}
	`\kilogrampersecondcubicmetreuf`	$^{\mathrm{kg}}/_{\mathrm{s\ m}^3}$
	`\kilogrampersecondcubicmetreUf`	$\frac{\mathrm{kg}}{\mathrm{s\ m}^3}$
	`\kilogrampersecondcubicmetreUF`	$\dfrac{\mathrm{kg}}{\mathrm{s\ m}^3}$
molar energy	`\joulepermole`	J/mol
	`\joulepermolenp`	J mol^{-1}
	`\joulepermoleuf`	$^{\mathrm{J}}/_{\mathrm{mol}}$
	`\joulepermoleUf`	$\frac{\mathrm{J}}{\mathrm{mol}}$
	`\joulepermoleUF`	$\dfrac{\mathrm{J}}{\mathrm{mol}}$
molar density	`\molepercubicmetre`	mol/m^3
	`\molepercubicmetrenp`	mol m^{-3}
	`\molepercubicmetreuf`	$^{\mathrm{mol}}/_{\mathrm{m}^3}$
	`\molepercubicmetreUf`	$\frac{\mathrm{mol}}{\mathrm{m}^3}$
	`\molepercubicmetreUF`	$\dfrac{\mathrm{mol}}{\mathrm{m}^3}$
molar heat capacity, molar entropy	`\joulepermolekelvin`	J/mol K
	`\joulepermolekelvinnp`	J mol^{-1} K^{-1}
	`\joulepermolekelvinuf`	$^{\mathrm{J}}/_{\mathrm{mol\ K}}$
	`\joulepermolekelvinUf`	$\frac{\mathrm{J}}{\mathrm{mol\ K}}$
	`\joulepermolekelvinUF`	$\dfrac{\mathrm{J}}{\mathrm{mol\ K}}$
molar mass	`\kilogramperkilomole`	kg/kmol
	`\kilogramperkilomolenp`	kg kmol^{-1}
	`\kilogramperkilomoleuf`	$^{\mathrm{kg}}/_{\mathrm{kmol}}$
	`\kilogramperkilomoleUf`	$\frac{\mathrm{kg}}{\mathrm{kmol}}$
	`\kilogramperkilomoleUF`	$\dfrac{\mathrm{kg}}{\mathrm{kmol}}$
momentum	`\kilogrammetrepersecond`	kg m/s
	`\kilogrammetrepersecondnp`	kg m s^{-1}
	`\kilogrammetreperseconduf`	$^{\mathrm{kg\ m}}/_{\mathrm{s}}$

continued on next page

physical quantity	$\LaTeX\,2_\varepsilon$ macro	output
	`\kilogrammetrepersecondUf`	$\frac{\mathrm{kg\ m}}{\mathrm{s}}$
	`\kilogrammetrepersecondUF`	$\dfrac{\mathrm{kg\ m}}{\mathrm{s}}$
momentum of force,	`\newtonmetre`	N m
energy	`\newtonmetrenp`	N m
momentum of inertia	`\kilogramsquaremetre`	kg m^2
	`\kilogramsquaremetrenp`	kg m^2
change of momentum	`\kilogrammetrepersquaresecond`	kg $\mathrm{m/s}^2$
	`\kilogrammetrepersquaresecondnp`	kg m s^{-2}
	`\kilogrammetrepersquareseconduf`	$^{\mathrm{kg\ m}}/_{\mathrm{s}^2}$
	`\kilogrammetrepersquaresecondUf`	$\frac{\mathrm{kg\ m}}{\mathrm{s}^2}$
	`\kilogrammetrepersquaresecondUF`	$\dfrac{\mathrm{kg\ m}}{\mathrm{s}^2}$
particle emission rate	`\persquaremetresecond`	$1/\mathrm{m}^2$ s
	`\persquaremetresecondnp`	$\mathrm{m}^{-2}\ \mathrm{s}^{-1}$
	`\persquaremetreseconduf`	$^1/_{\mathrm{m}^2\ \mathrm{s}}$
	`\persquaremetresecondUf`	$\frac{1}{\mathrm{m}^2\ \mathrm{s}}$
	`\persquaremetresecondUF`	$\dfrac{1}{\mathrm{m}^2\ \mathrm{s}}$
permeability	`\henrypermetre`	H/m
	`\henrypermetrenp`	H m^{-1}
	`\henrypermetreuf`	$^{\mathrm{H}}/_{\mathrm{m}}$
	`\henrypermetreUf`	$\frac{\mathrm{H}}{\mathrm{m}}$
	`\henrypermetreUF`	$\dfrac{\mathrm{H}}{\mathrm{m}}$
permittivity	`\faradpermetre`	F/m
	`\faradpermetrenp`	F m^{-1}
	`\faradpermetreuf`	$^{\mathrm{F}}/_{\mathrm{m}}$
	`\faradpermetreUf`	$\frac{\mathrm{F}}{\mathrm{m}}$
	`\faradpermetreUF`	$\dfrac{\mathrm{F}}{\mathrm{m}}$
power density	`\wattpersquaremetre`	$\mathrm{W/m}^2$
(per area)	`\wattpersquaremetrenp`	W m^{-2}
	`\wattpersquaremetreuf`	$^{\mathrm{W}}/_{\mathrm{m}^2}$
	`\wattpersquaremetreUf`	$\frac{\mathrm{W}}{\mathrm{m}^2}$
	`\wattpersquaremetreUF`	$\dfrac{\mathrm{W}}{\mathrm{m}^2}$
power per mass	`\wattperkilogram`	W/kg
	`\wattperkilogramnp`	W kg^{-1}
	`\wattperkilogramuf`	$^{\mathrm{W}}/_{\mathrm{kg}}$
	`\wattperkilogramUf`	$\frac{\mathrm{W}}{\mathrm{kg}}$

continued on next page

physical quantity	$\LaTeX\,2_\varepsilon$ macro	output
	`\wattperkilogramUF`	$\dfrac{\mathrm{W}}{\mathrm{kg}}$
power per volume	`\wattpercubicmetre`	$\mathrm{W/m^3}$
	`\wattpercubicmetrenp`	$\mathrm{W\ m^{-3}}$
	`\wattpercubicmetreuf`	$\mathrm{{}^{W}\!/_{m^3}}$
	`\wattpercubicmetreUf`	$\tfrac{\mathrm{W}}{\mathrm{m^3}}$
	`\wattpercubicmetreUF`	$\dfrac{\mathrm{W}}{\mathrm{m^3}}$
pressure	`\newtonpersquaremetre`	$\mathrm{N/m^2}$
	`\newtonpersquaremetrenp`	$\mathrm{N\ m^{-2}}$
	`\newtonpersquaremetreuf`	$\mathrm{{}^{N}\!/_{m^2}}$
	`\newtonpersquaremetreUf`	$\tfrac{\mathrm{N}}{\mathrm{m^2}}$
	`\newtonpersquaremetreUF`	$\dfrac{\mathrm{N}}{\mathrm{m^2}}$
radiance	`\wattpersquaremetresteradian`	$\mathrm{W/m^2\ sr}$
	`\wattpersquaremetresteradiannp`	$\mathrm{W\ m^{-2}\ sr^{-1}}$
	`\wattpersquaremetresteradianuf`	$\mathrm{{}^{W}\!/_{m^2\ sr}}$
	`\wattpersquaremetresteradianUf`	$\tfrac{\mathrm{W}}{\mathrm{m^2\ sr}}$
	`\wattpersquaremetresteradianUF`	$\dfrac{\mathrm{W}}{\mathrm{m^2\ sr}}$
radiation exposure	`\coulombperkilogram`	$\mathrm{C/kg}$
	`\coulombperkilogramnp`	$\mathrm{C\ kg^{-1}}$
	`\coulombperkilogramuf`	$\tfrac{\mathrm{C}}{\mathrm{kg}}$
	`\coulombperkilogramUf`	$\tfrac{\mathrm{C}}{\mathrm{kg}}$
	`\coulombperkilogramUF`	$\dfrac{\mathrm{C}}{\mathrm{kg}}$
rate of change of	`\Squaremetrepercubicsecond`	$\mathrm{m^2/s^3}$
energy of turbulence	`\Squaremetrepercubicsecondnp`	$\mathrm{m^2\ s^{-3}}$
	`\Squaremetrepercubicseconduf`	$\mathrm{{}^{m^2}\!/_{s^3}}$
	`\SquaremetrepercubicsecondUf`	$\tfrac{\mathrm{m^2}}{\mathrm{s^3}}$
	`\SquaremetrepercubicsecondUF`	$\dfrac{\mathrm{m^2}}{\mathrm{s^3}}$
specific area	`\Squaremetreperkilogram`	$\mathrm{m^2/kg}$
	`\rpsquaremetreperkilogram`	$\mathrm{m^2\ kg^{-1}}$
	`\Squaremetreperkilogramnp`	$\mathrm{m^2\ kg^{-1}}$
	`\Squaremetreperkilogramuf`	$\mathrm{{}^{m^2}\!/_{kg}}$
	`\SquaremetreperkilogramUf`	$\tfrac{\mathrm{m^2}}{\mathrm{kg}}$
	`\SquaremetreperkilogramUF`	$\dfrac{\mathrm{m^2}}{\mathrm{kg}}$
specific energy	`\jouleperkilogram`	$\mathrm{J/kg}$
	`\jouleperkilogramnp`	$\mathrm{J\ kg^{-1}}$
	`\jouleperkilogramuf`	$\tfrac{\mathrm{J}}{\mathrm{kg}}$

continued on next page

physical quantity	$\LaTeX\,2_\varepsilon$ macro	output
	`\jouleperkilogramUf`	$\frac{\mathrm{J}}{\mathrm{kg}}$
	`\jouleperkilogramUF`	$\dfrac{\mathrm{J}}{\mathrm{kg}}$
specific heat capacity,	`\jouleperkilogramkelvin`	J/kg K
specific entropy	`\jouleperkilogramkelvinnp`	J kg^{-1} K^{-1}
	`\jouleperkilogramkelvinuf`	$^{\mathrm{J}}/_{\mathrm{kg\ K}}$
	`\jouleperkilogramkelvinUf`	$\frac{\mathrm{J}}{\mathrm{kg\ K}}$
	`\jouleperkilogramkelvinUF`	$\dfrac{\mathrm{J}}{\mathrm{kg\ K}}$
specific resistance	`\ohmmetre`	Ω m
specific volume	`\cubicmetreperkilogram`	m^3/kg
	`\rpcubicmetreperkilogram`	m^3 kg^{-1}
	`\cubicmetreperkilogramnp`	m^3 kg^{-1}
	`\cubicmetreperkilogramuf`	$^{\mathrm{m}^3}/_{\mathrm{kg}}$
	`\cubicmetreperkilogramUf`	$\frac{\mathrm{m}^3}{\mathrm{kg}}$
	`\cubicmetreperkilogramUF`	$\dfrac{\mathrm{m}^3}{\mathrm{kg}}$
surface tension	`\newtonpermetre`	N/m
	`\newtonpermetrenp`	N m^{-1}
	`\newtonpermetreuf`	$^{\mathrm{N}}/_{\mathrm{m}}$
	`\newtonpermetreUf`	$\frac{\mathrm{N}}{\mathrm{m}}$
	`\newtonpermetreUF`	$\dfrac{\mathrm{N}}{\mathrm{m}}$
thermal conductivity	`\wattpermetrekelvin`	W/m K
	`\wattpermetrekelvinnp`	W m^{-1} K^{-1}
	`\wattpermetrekelvinuf`	$^{\mathrm{W}}/_{\mathrm{m\ K}}$
	`\wattpermetrekelvinUf`	$\frac{\mathrm{W}}{\mathrm{m\ K}}$
	`\wattpermetrekelvinUF`	$\dfrac{\mathrm{W}}{\mathrm{m\ K}}$
velocity	`\metrepersecond`	m/s
	`\metrepersecondnp`	m s^{-1}
	`\metreperseconduf`	$^{\mathrm{m}}/_{\mathrm{s}}$
	`\metrepersecondUf`	$\frac{\mathrm{m}}{\mathrm{s}}$
	`\metrepersecondUF`	$\dfrac{\mathrm{m}}{\mathrm{s}}$
volume flux	`\cubicmetrepersecond`	m^3/s
	`\cubicmetrepersecondnp`	m^3 s^{-1}
	`\cubicmetrepersecondf`	$^{\mathrm{m}^3}/_{\mathrm{s}}$
	`\cubicmetrepersecondUf`	$\frac{\mathrm{m}^3}{\mathrm{s}}$
	`\cubicmetrepersecondUF`	$\dfrac{\mathrm{m}^3}{\mathrm{s}}$

Change History