The \texttt{mhchem} package provides commands for typesetting chemical molecular formulae and equations.

The \texttt{hpstatement} package provides commands for the official hazard statements and precautionary statements (H and P statements) that are used to label chemicals. 1272/2008, GHS.

The \texttt{rsphrase} package provides commands for the official Risk and Safety (R and S) Phrases that are used to label chemicals.
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The mhchem Package

Preamble

To use mhchem, request it in your document’s preamble with the command

\usepackage[version=4]{mhchem}

What about the version=4? During development, I became aware that additional functionality could not be added without changing the user-interface slightly. But what about backward compatibility? I could, of course freeze mhchem and publish an mhchem2 package. However, I decided to use a parameter in order to switch to the new interface. One can use version=4 for the most-recent version of mhchem, but version=2 to version=1 are still there for existing documents that use an old user-interface of mhchem. Those old documents should still produce the same results. However, spacing might differ slightly.

mhchem needs a couple of other packages. For instance, expl3, amsmath and calc.

Chemical Equations

\ce{CO_2 + C \rightarrow 2 CO}
\ce{Hg^{2+} \rightarrow HgI_2 \rightarrow [Hg^{II}I_4]^{2-}}

Chemical Formulae

\ce{H_2O}
\ce{Sb_2O_3}

This works in text mode (even in headings) and in math mode. (For PDF bookmarks you might have to specify a text-only version.)

This is text with H_2O and H_2O. \itshape

For how to fine-tune the font usage, see Fine Tuning.
Charges

\[ \text{H}^+ \quad \ce{H+} \]
\[ \text{CrO}_4^{2-} \quad \ce{CrO4^2-} \]
\[ [\text{AgCl}_2]^- \quad \ce{[AgCl2]-} \]
\[ \text{Y}^{99+} \quad \ce{Y^{99+}} \]
\[ \text{Y}^{99+} \quad \ce{Y^{99+}} \]

This will work in text mode and math mode. For text, the en-dash will be used as a minus sign.

Oxidation States

\[ \text{Fe}^{\text{II}}\text{Fe}^{\text{III}}_2\text{O}_4 \quad \ce{Fe^{II}Fe^{III}2O4} \]

Stoichiometric Numbers

\[ 2\text{H}_2\text{O} \quad \ce{2H2O} \]
\[ 2\text{H}_2\text{O} \quad \ce{2 \text{H}_2\text{O}} \]
\[ 0.5\text{H}_2\text{O} \quad \ce{0.5\text{H}_2\text{O}} \]
\[ \frac{1}{2}\text{H}_2\text{O} \quad \ce{1/2\text{H}_2\text{O}} \]
\[ (1/2)\text{H}_2\text{O} \quad \ce{(1/2)\text{H}_2\text{O}} \quad \text{IUPAC Green Book} \]
\[ n\text{H}_2\text{O} \quad \ce{$n$H2O} \]

This works in text mode and math mode. (The fraction line always comes from math mode and might appear too small when using bold text fonts.)
Nuclides, Isotopes

\[ ^{227}_{90}\text{Th}^+ \]
\[ ^{227}_{90}\text{Th}^+ \]
\[ _{\text{\textsuperscript{0}}{_{\text{-}1}}n^-} \]
\[ _{\text{\textsuperscript{0}}{_{\text{-}1}}n^-} \]

It might be ambiguous whether a superscript belongs to the left or right letter. You can make sure by hand (using \{\}) or leave it to the automatic detection (digits only = mass number = belongs to right side).

\[ \text{H}^3\text{HO} \]
\[ \text{H}^3\text{HO} \]

Of course, all of this works in text mode and math mode.

Parenthesis, Brackets, Braces

Use parenthesis ( ) and brackets [ ] normally. Write braces as \{ \}.  

\[ (\text{NH}_4)_2\text{S} \]
\[ \{ (\text{X}_2)_3 \}_2^{3+} \]

Small parenthesis etc. work in both, text mode and math mode. Large parenthesis etc. are a math-mode only feature.

Both, \texttt{\textbackslash left} and \texttt{\textbackslash right} macros, need to be in the same math environment, so you might have to put \texttt{\textbackslash ce} into \$ into \texttt{\textbackslash ce}, but that’s fine.

\[ \text{CH}_4 + 2 \left( \text{O}_2 + \frac{79}{21}\text{N}_2 \right) \]
\[ \text{CH}_4 + 2 \$\texttt{\textbackslash left} \texttt{\textbackslash ce}\{02 + 79/21 \text{N}2\} \texttt{\textbackslash right}\$ \]
States of Aggregation

\( \text{H}_2(\text{aq}) \) \% IUPAC recommendation

\( \text{CO}_3^{2-}(\text{aq}) \) \% not IUPAC-conform

\( \text{NaOH}(\text{aq,}\infty) \)

This works in text mode and math mode.

Unpaired Electrons, Radical Dots

\( \text{OCO}^- \)

\( \text{NO}^{(2\cdot)-} \)

This superscript-only feature works in text mode and math mode. A math bullet is used.

Variables like \( x, n, 2n+1 \)

Typographical conventions say that variables are typeset in italic font, while other entities (like chemical elements) are typeset in an upright font.

\( \text{NO}_x, \text{NO}_y \)

\( \text{Fe}^{0+}, \text{Fe}^{n+} \)

\( x \text{Na(NH}_4\text{)HPO}_4 \xrightarrow{\Delta} (\text{NaPO}_3)_x + x \text{NH}_3 \uparrow + x \text{H}_2\text{O} \)

If a more complex term is not properly recognized, you can switch to math mode (= italics) explicitly.
Greek Characters

Just write \alpha etc. This works in text mode and math mode.

Typographical conventions say that variables are typeset in italic font, while other entities (like chemical elements) are typeset in an upright font. Here, the Greek character is not a variable that stands for a number, therefore an upright font is used.

\( \mu\text{-Cl} \) \quad \text{\ce{\mu-Cl}}

\([\text{Pt}(\eta^2\text{-C}_2\text{H}_4)\text{Cl}_3]^– \) \quad \text{\ce{[Pt(\eta^2-C2H4)Cl3]-}}

If the greek character is followed by a space, you need to type \{\}, otherwise the space will be lost.

\( ^{234}_{90}\text{Th} \rightarrow _0^0\beta + ^{234}_{91}\text{Pa} \) \quad \text{\ce{^234_90Th -> ^0_0\beta + ^234_91Pa}}

By default, \LaTeX does not come with upright Greek characters. Therefore, it is recommended to load a package for that, that visually fits to your font. For more details, see the section [Greek Font](#).

If you need an italic Greek character (i.e. a variable that stands for a number), use math mode like $\alpha$.

**Italic) Math**

By using \ldots, you can escape to ‘font-corrected math mode’.

\[ \text{NaOH(aq, }\infty) \quad \text{\ce{NaOH(aq,$\infty$)}} \]

\[ \text{NO}_x \quad \text{\ce{NO$_x$}} \]

In font-corrected math mode, mhchem regonizes some common patterns and prints them font-corrected (e.g. for use in headings). Otherwise, it will fall back to ‘full math mode’.

\[ \text{NO}_x \quad \text{\ce{NO$_x$}} \]

You can force ‘full math mode’ with $\{\ldots\}$.

\[ \text{NO}_x \quad \text{\ce{NO$_x$}} \]
Italic Text

With the same mechanism, you can switch to italic font.

\[ \text{\textit{cis}}-\text{[PtCl}_2(\text{NH}_3)_2] \]

Spaces will be ignored. Use a ~ when you need to typeset a space.

This works for the text mode as long as you use latin characters. It also works for the math font.

Escape Parsing, Upright Text

If you want to escape parsing, for instance for a simple hyphen (that should not become a bond), use \{\ldots\}.

\[ \text{(+)}_{589}-\text{[Co(en)}_3\text{Cl}_3 \]

Addition Compounds

\( \text{KCr(SO}_4\text{)}_2 \cdot 12 \text{H}_2\text{O} \)

KCr(SO\textsubscript{4})\textsubscript{2} \cdot 12 H\textsubscript{2}O

KCr(SO\textsubscript{4})\textsubscript{2} \cdot 12 H\textsubscript{2}O

KCr(SO\textsubscript{4})\textsubscript{2} \cdot 12 H\textsubscript{2}O

The centered dot is taken from math font.

Bonds

C\textsubscript{6}H\textsubscript{5}-CHO

A-B=C\equiv D

A-B=C\equiv D
mhchem tries to differentiate whether \(\text{-}\) should be a bond, a charge or a hyphen.

The \# bond might not work if you pass it through other commands. In this case, use \texttt{\bond{3}} instead.

\[
\begin{align*}
\text{A} & \text{-} \text{B=} \text{C} \text{=} \text{D} \quad \text{\ce{A\bond{-}B\bond{=}C\bond{#}D}} \\
\text{A} & \text{-} \text{B=} \text{C} \text{=} \text{D} \quad \text{\ce{A\bond{1}B\bond{2}C\bond{3}D}} \\
\text{A} & \text{-} \text{B=} \text{C} \quad \text{\ce{A\bond{-}B\bond{-}C}} \\
\text{A} & \text{-} \text{B=} \text{C} \text{=} \text{D} \quad \text{\ce{A\bond{-}B\bond{-}C\bond{-}D}} \\
\text{A} & \text{-} \text{B=} \text{C} \quad \text{\ce{A\bond{...}B\bond{...}C}} \\
\text{A} & \text{-} \text{B=} \text{C} \quad \text{\ce{A\bond{->}B\bond{<-}C}} \\
\end{align*}
\]

**Text mode:** Line-based bonds are based on the text-font’s en-dash. For all the others, math glyphs are used.

**Math mode:** Bonds are based on the math-font minus sign. All bonds are vertically aligned on the math axis. For most math fonts, this is slightly lower than half the height of a capital letter.

If you switch to another font, the sidebearing of the minus sign may vary, which would cause the dashed bonds to align badly. In that case, adjust the alignment by using the following command with slightly changed values. Use \texttt{\mhchemoptions{minus-text-sidebearing-left=0.10em, minus-text-sidebearing-right=0.16em}} for text font adjustment and \texttt{\mhchemoptions{minus-math-sidebearing-left=0.06em, minus-math-sidebearing-right=0.11em}} for math font.

**Reaction Arrows**

\[
\begin{align*}
\text{A} & \longrightarrow \text{B} \quad \text{\ce{A -> B}} \\
\text{A} & \longleftarrow \text{B} \quad \text{\ce{A <- B}} \\
\text{A} & \leftrightarrow \text{B} \quad \text{\ce{A <-> B}} \% \text{ not to be used according to IUPAC} \\
\text{A} & \xleftrightarrow{\text{D}} \text{B} \quad \text{\ce{A <-> B}} \\
\text{A} & \xleftrightarrow{\text{D}} \text{B} \quad \text{\ce{A <-> B}} \\
\text{A} & \xleftrightarrow{\text{D}} \text{B} \quad \text{\ce{A <-> B}} \\
\text{A} & \xleftrightarrow{\text{D}} \text{B} \quad \text{\ce{A <-> B}} \\
\end{align*}
\]

The arrow arguments use the same syntax as the \ce command.
\text{For how you can change the layout of the arrows, see } \textit{Fine Tuning}.

**Equation Operators**

\[
\begin{align*}
A + B & \quad \text{"\text\ce{A + B}"} \\
A - B & \quad \text{"\text\ce{A - B}" % not to be confused with bonds} \\
A = B & \quad \text{"\text\ce{A = B}" % not to be confused with bonds} \\
A \pm B & \quad \text{"\text\ce{A \pm B}"} \\
\end{align*}
\]

This works in text mode and math mode. The respective font is used, except for \text\ce{pm}, which always come from math font.

**Precipitate and Gas**

\[
\begin{align*}
\text{SO}_4^{2-} + \text{Ba}^{2+} & \rightarrow \text{BaSO}_4 \downarrow \quad \text{"\text\ce{SO4^{2-} + Ba^{2+} -> BaSO4 v}"} \\
A \downarrow B \downarrow & \rightarrow B \uparrow B \uparrow \quad \text{"\text\ce{A v B (v) -> B ^ B (^)}"} \\
\end{align*}
\]
Further Examples

\[\ce{Zn^{2+} <=> [+ 2OH^-][+ 2H^+]}\]
\[\text{amphoteres Hydroxid}\]
\[\ce{Zn(OH)2 \downarrow}\]
\[\text{Hydroxozikat}\]
\[\ce{Zn^{2+} + 2OH^- + 2H^+ \rightleftharpoons [Zn(OH)4]^{2-}}\]

$K = \frac{[\ce{Hg^{2+}}][\ce{Hg}]}{[\ce{Hg^{2+}}]}$

$K = \frac{[\ce{Hg^{2+}}][\ce{Hg}]}{[\ce{Hg^{2+}}]}$

\[\ce{Hg^{2+} \rightarrow [I^-]}\]
\[\text{red}\]
\[\ce{HgI_2} \rightarrow [Hg^{II}I_4]^{2-}\]

Equation Environments

Aligning Equations

You can use & and \ inside \ce to align equations.

\[
\begin{align*}
\ce{RNO2 &<=>[+e] RNO2^-} \\
\ce{RNO2^- &<=>[+e] RNO2^{2-}}
\end{align*}
\]
Own Equation Command

When you use equation environments containing a \ce very often, you might want to create your own command. You could—preferably in your preamble—define the following two commands

\newcommand\reaction[1]{\begin{equation}\ce{#1}\end{equation}}
\newcommand\reactionnonumber[1]{\begin{equation*}\ce{#1}\end{equation*}}

and then use them as follows.

\begin{align*}
\text{CO}_2 + \text{C} & \quad (0.1) \\
\text{CO}_2 + \text{C} & \quad \reaction{\text{CO}_2 + \text{C}} \\
\text{CO}_2 + \text{C} & \quad \reactionnonumber{\text{CO}_2 + \text{C}}
\end{align*}

The advanced \LaTeX user could replace the two definitions by one

\begin{verbatim}
\makeatletter
\newcommand\reaction@[1]{\begin{equation}\ce{#1}\end{equation}}
\newcommand\reaction@nonumber[1]{\begin{equation*}\ce{#1}\end{equation*}}
\newcommand\reaction{\@ifstar{\reaction@nonumber}{\reaction@}}
\makeatother
\end{verbatim}

and then write

\begin{align*}
\text{CO}_2 + \text{C} & \quad (0.2) \\
\text{CO}_2 + \text{C} & \quad \reaction{\text{CO}_2 + \text{C}} \\
\text{CO}_2 + \text{C} & \quad \reaction*{\text{CO}_2 + \text{C}}
\end{align*}

for the same result.

So far, so good. All reactions will be labelled exactly as all the equations. A few people asked for a different set of numbers for equations and reactions. One could use this code:

\begin{verbatim}
\makeatletter
\newcommand\reaction\{\end{equation}\ce{#1}\end{equation}}
\newcommand\reactionnonumber\{\end{equation*}\ce{#1}\end{equation*}}
\newcommand\reaction\{\@ifstar{\reactionnonumber}{\reaction}}
\makeatother
\end{verbatim}

for article
With that, all reactions will be labelled independently of the equations.

\begin{equation}
a + b
\end{equation}

\reaction{CO_2 + C}

\reaction*[react:co]{CO_2 + C}

\begin{equation}
a + b
\end{equation}

Splitting the \ce command

As mentioned before, you can use $ to switch to math mode inside \ce. But maybe, you want to ‘escape’ to outside of \ce.

Comma Example

Assume, you are getting tired of typing
Then you could define your own command that splits at commas (plus space).
\newcommand*{\cec}{\cesplit{\text{, \, }\{}{#1}}}
\cec{N_2, O_2, CO_2}

You could re-define \ce with \newcommand*{\ce}{\cesplit{\ldots}{#1}}, if you do not like to create a new name.

Layer Stacks

Another example shows how physicists can use mhchem to write layer stacks.

\newcommand*{\stackslash}{\text{/}\allowbreak}
\newcommand*{\stackhyphen}{\text{-}\allowbreak}
\newcommand{\stack}{\cesplit{\text{\textbackslash}{\text{-}}}{#1}}
\ldots\text{ structure of Co-Fe-B/HfO_2/Co-Fe-B is resp}\ldots
\stack{Co-Fe-B/HfO_2/Co-Fe-B} is resp\ldots

The Details

\cesplit takes two parameters. The first one is a list of search-and-replace pairs, the second parameter is the chemistry string as you would put into \ce. The search-and-replace list uses the syntax of l3regex. As a rule of thumb, precede every non-letter with a backslash. You can replace it with some other text, or use \0 to retain the match. If you want to replace with a macro, write \c{macroname}. For further details, refer to the l3regex manual.

Do not nest \cesplit commands.

The result of \cesplit does not have the feature to use & and \ as you might to want to deal with them differently. \ce is itself defined by \cesplit (which, technically speaking, does not split \ce, but an internal command). As \ce is defined by
you could add these rules to your own \cesplit definition.

**Fine Tuning**

All options explained here, can either be set using the \mhchemoptions command

\mhchemoptions{arrows=pgf}

or as options to the package

\usepackage[version=4,arrows=pgf]{mhchem}

**Text Font and Math Font**

mhchem uses the current text font (if you use \ce in text mode) or the current math font (if you use \ce in math mode). If you want, however, you can set a font that will be used for all your formulae and equations.

Inside your document, you can use

\mhchemoptions{textfontcommand=\sffamily}
\mhchemoptions{mathfontcommand=\mathsf}

in order to get san-serif fonts in both, text mode and math mode.

You can use any font command there, not only the mentioned ones. Please be aware that the text-font command is a font switching command (taking no arguments) while the math-font command takes one argument and typesets it.

You can specify the commands by name only, i.e. without the \.

\mhchemoptions{textfontname=sffamily}
\mhchemoptions{mathfontname=mathsf}
Only the latter options can be used with the `\usepackage` command, because the font commands are not properly defined in the preamble, yet. The shortcut

`\mhchemoptions{font=sf}`

sets the two fonts to sans-serif, as mentioned above, and

`\mhchemoptions{font=}`

switches back to the default, which is equivalent to

`\mhchemoptions{textfontcommand=,mathfontcommand=\mathrm}`

**Greek Font**

If you load a package for upright Greek characters, this will automatically be used. You can load any of the following packages (e.g. `\usepackage{textgreek}` in the preamble). Choose the one that visually fits your font.

- `textgreek`,
- `upgreek`,
- `newtx`,
- `kpfonts`,
- `mathdesign`,
- `fourier`,
- `textalpha`,
- `fontspec`.

This functionality was possible by the very neat chemgreek package of Clemens Niederberger. If you want to have different Greek fonts for text mode and math mode, you can specify these ‘mappings’ by (for instance) `\mhchemoptions{text-greek=upgreek, math-greek=default}`. You can use any of the package names from above, or `default` or `var-default`. Refer to the [chemgreek manual](#) for details (in particular its Appendix ‘Overviews Over the Mappings’).

**Arrows**

By default, mhchem uses arrows that are composed of different math-font characters, because it uses some features of the amsmath package.

\[
A \iff B \quad \text{\texttt{\mhchemoptions{arrows=font}}} \% \text{default} \\
\ce{A <--> B}
\]

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But you may switch to arrows drawn with PGF (using TikZ). These are activated by

\usepackage[version=3, arrows=pgf]{mhchem}
% or
\usepackage[version=3, arrows=pgf-filled]{mhchem}

The \texttt{tikz} package is loaded automatically if you switch to PGF arrows in the pre-amble (as you do when using \texttt{\usepackage}). If you switch inside your document (with \texttt{\mhchemoptions}), don’t forget to load the required packages manually in your pre-amble: \texttt{\RequirePackage{tikz}\usetikzlibrary{arrows.meta}}.

\begin{verbatim}
A \rightleftharpoons B
\mhchemoptions{arrows=pgf}
\ce{A \rightleftharpoons B}
\mhchemoptions{arrows=pgf-filled}
\ce{A \rightleftharpoons B}
\end{verbatim}

You can select other pre-defined PGF arrows (see PGF manual) or even define your own. Activate them with the option \texttt{pgf=\{arrow-name\}\{line-width\}}. The dimensions of your custom arrows are expected to be close to those of the built-in \texttt{mhchem} arrows. By the way, they have line width of 0.09ex.

\begin{verbatim}
A \rightleftharpoons B
\mhchemoptions{arrows=pgf}
\ce{A \rightleftharpoons B}
\end{verbatim}

\textbf{Stacked Superscripts and Subscripts}

\begin{verbatim}
CrO\textsubscript{4}^{2-}
\mhchemoptions{layout=staggered-flat}\% default
\ce{CrO4^2-}
\end{verbatim}

\begin{verbatim}
CrO\textsubscript{4}^{2-}
\mhchemoptions{layout=staggered-deep}
\ce{CrO4^2-}
\end{verbatim}

\begin{verbatim}
CrO\textsubscript{3}^{2-}
\mhchemoptions{layout=stacked}
\ce{CrO4^2-} \% not IUPAC-conform
\end{verbatim}

\textbf{Rudimentary \LaTeX{}4ht (htlatex) support}

\texttt{mhchem} has basic support for \LaTeX{}4ht (htlatex). Summary formulae should work fine. Special bonds and reaction arrows are recognizable, but ugly. Complex math with \texttt{mhchem} inside might fail completely.
Major Changes

**Migrating from version 1**

Inner – characters are considered to be bonds. Use $\ldots$ for math mode inside `\ce` (no braces any more).

**Migrating from version 2**

Meaning and usage of `\bond` changed.

**Migrating from version 3**

The arrow arguments are set with the same syntax as the `\ce` command—use $\ldots$ or $\{\ldots\}$ for math. Deprecated commands like `\cf`, `,` and `\hyphen` and `\cmath` were removed completely. `\cee` was removed—just use `\ce` `{...}` does escape to text now, not math. $\ldots$ does only escape to ‘font-corrected math mode’—check the results. Additional spaces will be inserted: A $x\\ce{\,H2O}$ should be changed to $x\ H2O$. Appearance of bonds, radical dot, $x$, single-letter variables, – in subscripts etc. slightly changed—check if this fits with your font, in particular your text font. Check all complex subscripts and superscripts (more than just number or a charge).

Most Recent Changes

2024-01-29 mhchem v4.10
- Remove TeX4ht support, because the author of TeX4ht added it to his package

2021-12-31 mhchem v4.09
- Bring back lost TeX4ht support

2018-06-22 mhchem v4.08
- Work around unicode-math incompatibilities
2017-07-24 mhchem v4.07
• Adapt to \LaTeX3 (expl3) changes

2017-01-16 mhchem v4.06
• Adapt to upcoming \LaTeX3 change

2016-08-07 mhchem v4.05
• extended variable recognition – single lower-case letters in superscripts/subscripts are typeset in an italic font
• improved bond/charge/hyphen distinction
• fixed error handling for nonstopmode

2016-02-07 mhchem v4.04
• support for negative subscripts, \texttt{\ce{^0_-1n^-}}
• \texttt{\frac{\{\}{}\}} added
• $\alpha$ fixed (math Greek)

2015-11-29 mhchem v4.03
• reworked arrows and provided option for custom pgf arrows
• improved speed

2015-07-23 mhchem v4.02
• added rudimentary TeX4ht support
• fixed the \texttt{\str_case:nnn} bug—expl3 removed that function

2015-04-23 mhchem v4.01
• support upright greek characters (chemgreek)
• syntax improvements
• recognition of states of aggregation
• text-font operators $+, -, =$
2015-04-07 mhchem v4.00

- many syntax improvements
- many layout improvements
- stricter distinction between text font and math font, many math features are translated into their text equivalent, e.g. italic variables
- new options
- removed deprecated commands
The hpstatement Package and the rsphrase Package

The **hpstatement** package contains all official hazard statements and precautionary statements (H and P) of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and of the CLP Regulation of the European Union.

The statements are fully supported in English, French, and German. For other languages, just the base forms are available.

The **rsphrase** package contains the text of all official Risk and Safety (R and S) Phrases that were used to label chemicals.

These phrases are available in Danish, Englisch, French, German, Spanish, and Italian.

Please be advised that, as stated in the license, the authors provide no warranty of correctness.

**Usage**

The **hpstatement** package contains all text versions published by the European Parliament. Load the package with `\usepackage{hpstatement}` to get the most-recent versions. Or load with `\usepackage[date=2021-01-01]{hpstatement}` to get texts of a certain date and keep the document stable even after an update. In case you would need to switch within a document, use `\hpsetup{date=2021-01-01}`.

The package provides two commands: `\hpstatement` and `\hpnumber`. `\hpstatement` inserts the statement’s text, `\hpnumber` its formatted number.

```
The statement H200 is ‘Unstable explosives.’
```

```
The statement \hpnumber{H200}\ is ‘\hpstatement{H200}’
```
One can use the two commands with an empty argument. It is then assumed that the argument is equivalent to the one used previously.

The statement H200 is ‘Unstable explosives.’

The statement \hpnumber{H200}\hpstatement{} is ‘\hpstatement{}’

The commands add text in your currently selected language.

\selectlanguage{ngerman}% babel

H200: Instabil, explosiv.

\hpnumber{H200}:
\hpstatement{}

Some phrases allow you to choose between certain alternatives. In these cases, special numbers (<number>.1, <number>.2, …) are available for \hpstatement. Of course, the official number is typeset if you call \hpnumber with a special number.

P241: Use explosion-proof ventilating equipment.

\hpnumber{P241.2}:
\hpstatement{}

For phrases with selection, an additional special number is provided that refers to the base form as stated in the regulations: <number>.0 (e. g. P241.0).


\hpnumber{P241.0}:
\hpstatement{}

Some statements refer to ‘this label’. If you are creating documents that are not labels, you might want to rephrase this. You can do so, by using the (unofficial) <number>nolabel statement (e. g. P321.nolabel).

See the appendix for a complete list of all implemented English statements, including all options.

The rsphrase package has no date option, but otherwise works the same way, and provides the commands \rsnumber and \rsphrase.

Source of the H and P statements: This project contains data extracted from The Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (‘CLP regulation’), from https://eur-lex.europa.eu enhanced by individual contributors. This work is licensed under the Creative Commons Attribution 4.0 International licence (https://creativecommons.org/licenses/by/4.0/). This means that you can re-use
the content provided you acknowledge the source and indicate any changes you have made. The data is not necessarily comprehensive, complete, accurate or up to date. The acknowledgement is not needed when using statements of the data set for labelling products, of course, as this is the intended usage. © European Union, https://eur-lex.europa.eu 1998-2021, CC BY 4.0, © hpstatements contributors, https://github.com/mhchem/hpstatements/contributors 2019-2021, CC BY 4.0


Most Recent Changes

2024-01-29 hpstatement v2.1.0

• Using most-recent statements from the EU

2021-12-31 hpstatement v2.0.0

• Using most-recent statements from the EU
• Adding date option and all statements in all versions ever published by the EU
• Enhanced statements just for English, French, German
Appendix

List of Implemented H and P Statements

These statements are available in English, French, and German.

For other languages, just the base forms are available, e.g. P241, but not P241.0, P241.1, etc. A package update that brings full support might lead to an error message that will be easy to fix. If you are a native speaker of either Bulgarian, Czech, Danish, Dutch, Estonian, Finnish, Greek, Hungarian, Irish, Italian, Latvian, Lithuanian, Maltese, Polish, Portuguese, Romanian, Slovak, Slovenian, Spanish or Swedish, and would like to help offering the statements in those languages, please contact the author. It’s not much work to do.

The statements are available in all the versions published by the European Union. Oldest version: 2008-12-16. Newest version: 2023-12-01.

and eye damage. **H315** (H315): Causes skin irritation. **H317** (H317): May cause an allergic skin reaction. **H318** (H318): Causes serious eye damage. **H319** (H319): Causes serious eye irritation. **H330** (H330): Fatal if inhaled. **H331** (H331): Toxic if inhaled. **H332** (H332): Harmful if inhaled. **H334** (H334): May cause allergy or asthma symptoms or breathing difficulties if inhaled. **H335** (H335): May cause respiratory irritation. **H336** (H336): May cause drowsiness or dizziness. **H340.0** (H340): May cause genetic defects <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>. **H340[]** (H340): May cause genetic defects. **H340[abc]{} (H340): May cause genetic defects[abc]. **H341.0** (H341): Suspected of causing genetic defects[abc]. **H341[abc] (H341): Suspected of causing genetic defects[abc]. **H350.0** (H350): May cause cancer <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>. **H350[]** (H350): May cause cancer. **H350[abc] (H350): May cause cancer[abc]. **H350i (H350): May cause cancer by inhalation. **H351.0** (H351): Suspected of causing cancer <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>. **H351[] (H351): Suspected of causing cancer. **H351[abc] (H351): Suspected of causing cancer[abc]. **H360.0** (H360): May damage fertility or the unborn child <state specific effect if known > <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>. **H360[] (H360): May damage fertility or the unborn child. **H360[abc] (H360): May damage fertility or the unborn child[abc]. **H360F (H360): May damage fertility. **H360D (H360): May damage the unborn child. **H360FD (H360FD): May damage fertility. Suspected of damaging the unborn child. **H360DF (H360DF): May damage the unborn child. **H361.0** (H361): Suspected of damaging fertility or the unborn child. **H361[abc] (H361): Suspected of damaging fertility or the unborn child[abc]. **H361f (H361f): Suspected of damaging fertility. **H361d (H361d): Suspected of damaging the unborn child. **H361fd (H361fd): Suspected of damaging fertility. Suspected of damaging the unborn child. **H362 (H362): May cause harm to breast-fed children. **H370.0** (H370): Causes damage to organs <or state all organs affected, if known> <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>. **H370[] (H370): Causes damage to organs. **H370[def] (H370): Causes damage to organs[def]. **H370[abc] (H370): Causes damage to [abc]. **H370[abc][def] (H370): Causes damage to [abc][def]. **H371.0** (H371): May cause damage to organs <or state all organs affected, if known> <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>. **H371[] (H371): May cause damage to organs. **H371[def] (H371): May cause damage to organs[def]. **H371[abc] (H371): May cause damage to [abc]. **H371[abc][def] (H371): May cause damage to [abc][def]. **H372.0** (H372): Causes damage to organs <or state all organs affected, if known> through prolonged or repeated exposure <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>. **H372[] (H372): Causes damage to organs. **H372[def] (H372): Causes damage to [abc][def]. **H373.0** (H373): May cause damage to organs <or state all organs affected, if known> through prolonged or repeated exposure <state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard>. **H373[] (H373): May cause damage to organs. **H373[def] (H373): May cause damage to [abc][def]. **H373[abc] (H373): May cause damage to [abc]. **H373[abc][def] (H373): May cause damage to [abc][def]. **H374 (H374): Fatal if swallowed or in contact with skin. **H375 (H375): May cause damage to organs. **H376 (H376): May cause damage to organs or the unborn child. **H377 (H377): May cause damage to organs. **H378 (H378): May cause damage to organs or the unborn child. **H379 (H379): May cause damage to organs.

List of Implemented R and S Phrases


S1, S2, S3, S4, S5[abc], S6[abc], S7, S8, S9, S12, S13, S14[abc], S15, S16, S17, S18, S20, S21, S22, S23[abc], S23.0, S23.1, S23.2, S23.3, S23.4, S24, S25, S26, S27, S28[abc], S29, S30, S33, S35, S36, S37, S38, S39, S40[abc], S41, S42 S43.0[abc], S43.1[abc], S44, S46[abc], S47[abc], S48[abc], S49, S50[abc], S51, S52, S53, S56, S57, S59, S60, S61, S62[abc], S63, S64, S1/2, S3/7, S3/9/14[abc], S3/9/14/49[abc], S3/9/49[abc], S3/14[abc], S7/8, S7/9, S7/47[abc], S20/21, S24/25, S27/28[abc], S29/35, S29/56, S36/37, S36/37/39[abc], S36/39[abc], S37/39, S47/49[abc]

Danish Thanks to the extensive help of Rasmus Villemoes, the Danish phrases could be included. There were a couple of typos in the official documents: We changed ‘bebølse’ to ‘beboelse’, ‘omgående’ to ‘omgående’ and ‘producentesn’ to ‘producenten’.

French Dominique Richard helped with the French phrases. Many thanks to him!
**German** I adapted the German R and S Phrases to the current (‘new’) spelling. Therefore, when writing a text in german and using rsphrase, you will get a warning (‘Your current language setting is german, rsphrase only knows the current German spelling (ngerman) which therefore was used.’).

**Italian** Italian phrases implemented by Lorenzo Vagnarelli. Thanks a lot.

**Spanish** Ignacio Fernández Galván sent me the Spanish phrases. Thanks a lot!