

The tcolorbox package

Manual for version 2.50 (2013/07/29)

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Abstract

`tcolorbox` provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part. The package `tcolorbox` can be used for the setting of L^AT_EX examples where one part of the box displays the source code and the other part shows the output. Another common use case is the setting of theorems. The package supports saving and reuse of source code and text parts.

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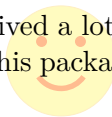
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1 Introduction

The package originates from the first edition of my book «*L^AT_EX – Einführung in das Textsatzsystem*» [16] in about 2006. For the L^AT_EX examples and tutorials given there, I wanted to have accentuated and colored boxes to display source code and compiled text in combination. Since, in my opinion, this type of boxes is also quite useful to highlight definitions and theorems, I applied them for my lecture notes in mathematics [13–15] as well. With this package, you are invited to apply these boxes for similar projects.

Starting with version 2.00, all internal calculations are not longer performed by the package `calc` [18] but by ε -T_EX [1] expressions since ε -T_EX is assumed to be used by everybody (hopefully). The breaking news for version 2.00 is the support for breakable boxes. This new feature allows new applications of the package without affecting the core package too much if you do not need boxes to break automatically. With version 2.20, the often requested 'side by side' mode for listings has been added.

Since the first public release in 2011, I received a lot of feedback from all over the world. I want to thank all who wrote me for supporting this package by sending bug reports and ideas for new or better features.



1.1 Installation

Typically, `tcolorbox` will be installed as part of a major L^AT_EX distribution and there is nothing special to do for a user.

If you intend to make a local installation *by hand*, see the `README` file of the `tcolorbox` package for some hints. The short story is: you have to install not only `tcolorbox.sty`, but also all `*.code.tex` files in the local `texmf` tree.

1.2 Loading the Package

The base package `tcolorbox` loads the packages `pgf` [17], `verbatim` [12], `etoolbox` [6], and `environ` [10]. `tcolorbox` itself is loaded in the usual manner in the preamble:

```
\usepackage{tcolorbox}
```

The package takes option keys in the key-value syntax. Alternatively, you may use these keys later in the preamble with `\tcboxuselibrary`^{P. 5} (see there). For example, the key to typeset listings is:

```
\usepackage[listings]{tcolorbox}
```

1.3 Libraries

The base package `tcolorbox` is extendable by program libraries. This is done by using option keys while loading the package or inside the preamble by applying the following macro with the same set of keys.

`\tcbuselibrary{<key list>}`

Loads the libraries given by the `<key list>`.

```
\tcbuselibrary{listings,theorems}
```

The following keys are used inside `\tcbuselibrary` respectively `\usepackage` without the key tree path `/tcb/library/`.

`/tcb/library/skins` (LIB skins)

Loads the package `tikz` [17] and provides additional styles (skins) for the appearance of the colored boxes; see Section 6 from page 71.

`/tcb/library/listings` (LIB listings)

Loads the package `listings` [5] and provides additional macros for typesetting listings which are described in Section 7 from page 126.

`/tcb/library/listingsutf8` (LIB listingsutf8)

Loads the packages `listings` [5] and `listingsutf8` [8] for UTF-8 support. This is a variant of the library `(LIB listings)` and is described in Section 7 from page 126.

`/tcb/library/minted` (LIB minted)

Loads the package `minted` [11] to typeset listings with the `Pygments` [9] tool, also see Section 7 on page 126.

`/tcb/library/theorems` (LIB theorems)

Provides additional macros for typesetting theorems which are described in Section 8 from page 151.

`/tcb/library/breakable` (LIB breakable)

Provides support for automatic box breaking from one page to another; see Section 9 from page 165.

`/tcb/library/fitting` (LIB fitting)

Provides support for font size adaption of the box content to the box dimensions; see Section 10 from page 176.

`/tcb/library/hooks` (LIB hooks)

Extends several option keys to 'hookable' keys; see Section 11 from page 185.

`/tcb/library/documentation` (LIB documentation)

Provides additional macros for typesetting \LaTeX documentations which are described in Section 12 from page 193.

/tcb/library/many (style, no value)

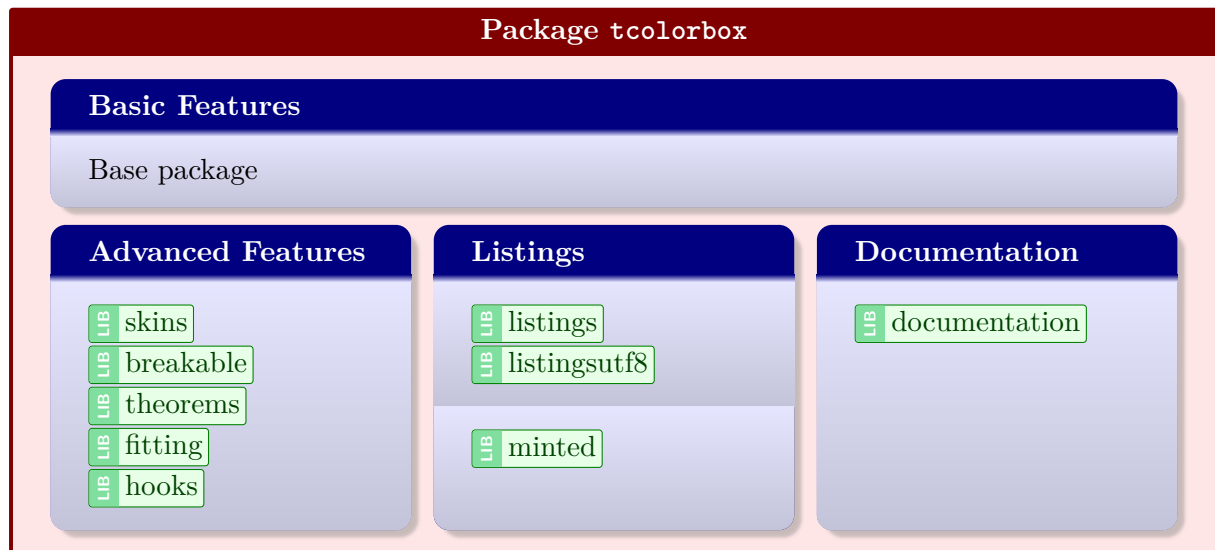
Loads the libraries `\lib skins`, `\lib breakable`, `\lib hooks`, `\lib theorems`, and `\lib fitting`. Use this shortcut, if you want to use all features of `tcolorbox` with exception of typesetting listings and using the specialized `\lib documentation` library.

/tcb/library/most (style, no value)

Loads all libraries except `\lib minted` and `\lib documentation`. Use this shortcut, if you want to use all features of `tcolorbox` with exception of using the `minted` package and using the specialized `\lib documentation` library.

/tcb/library/all (style, no value)

Loads all libraries. Use this shortcut only, if you intend to use the `\lib documentation` library.



2 Macros for Box Creation

```
\begin{tcolorbox}[\langle options \rangle]
  \langle environment content \rangle
\end{tcolorbox}
```

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts. The appearance of this box is controlled by numerous options. In the most simple case the source code

```
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

creates the following compiled text box:

This is a **tcolorbox**.

The text content of the box can be divided in an upper and a lower part by the command `\tcblower`. Visually, both parts are separated by a line. For example:

```
\begin{tcolorbox}
This is another \textbf{tcolorbox}.
\tcblower
Here, you see the lower part of the box.
\end{tcolorbox}
```

This code gives the following box:

This is another **tcolorbox**.

Here, you see the lower part of the box.

The `\langle options \rangle` control the appearance and several functions of the boxes, see section 3 for the complete list. A quick example is given here:

```
\begin{tcolorbox}[colback=red!5!white,colframe=red!75!black,title=My nice heading]
This is another \textbf{tcolorbox}.
\tcblower
Here, you see the lower part of the box.
\end{tcolorbox}
```

My nice heading

This is another **tcolorbox**.

Here, you see the lower part of the box.

`\tcblower`

Used inside `tcolorbox` to separate the upper box part from the optional lower box part. The upper and the lower part are treated as separate functional units. If you only want to draw a line, see `\tcblines`^{→ P. 102}.

`\tcbset{<options>}`

Sets options for every following `tcolorbox`^{→P.7} inside the current TeX group. By default, this does not apply to nested boxes, see Section 3.12 from page 56.

For example, the colors of the boxes may be defined for the whole document by this:

```
\tcbset{colback=red!5!white,colframe=red!75!black}
```

`\tcbbox[<options>]{<box content>}`

Creates a colored box which is fitted to the width of the given *<box content>*. In principal, most *<options>* for a `tcolorbox`^{→P.7} can be used for `\tcbbox` with some restrictions. A `\tcbbox` cannot have a lower part and cannot be broken.

```
\tcbset{colframe=blue!50!black,colback=white,colupper=red!50!black,
fonttitle=\bfseries,nobeforeafter,center title}

Text \tcbbox[tcbbox raise base]{Hello World}\hfill
%
\tcbbox[left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=0mm,
toptitle=0.5mm,bottomtitle=0.5mm,title=My table]{%
\arrayrulecolor{blue!50!black}\renewcommand{\arraystretch}{1.2}%
\begin{tabular}{r|c|l}
One & Two & Three \\\hline\hline
Men & Mice & Lions \\\hline\hline
Upper & Middle & Lower
\end{tabular}}\hfill
%
\tcbbox{colback=blue!85!black,
left=0mm,right=0mm,top=0mm,bottom=0mm,boxsep=1mm,arc=0mm,boxrule=0.5pt,
title=My picture}{%
\includegraphics[width=5cm]{Basilica_5.png}}
```

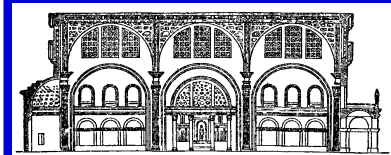
Text

Hello World

My table

| One | Two | Three |
|-------|--------|-------|
| Men | Mice | Lions |
| Upper | Middle | Lower |

My picture



`\newtcolorbox`[*<init options>*]{*<name>*}[*<number>*][*<default>*]{*<options>*}

Creates a new environment *<name>* based on `tcolorbox` ^{P.7}. Basically, `\newtcolorbox` operates like `\newenvironment`. This means, the new environment *<name>* optionally takes *<number>* arguments, where *<default>* is the default value for the optional first argument. The *<options>* are given to the underlying `tcolorbox`. Note that `/tcb/savedelimiter` ^{P.14} is set to the given *<name>* automatically. The *<init options>* allow to set up automatic numbering, see Section 4 from page 65.

```
\newtcolorbox{mybox}{colback=red!5!white,
colframe=red!75!black}

\begin{mybox}
This is my own box.
\end{mybox}
```

This is my own box.

```
\newtcolorbox{mybox}[1]{colback=red!5!white,
colframe=red!75!black,fonttitle=\bfseries,
title=#1}

\begin{mybox}{Hello there}
This is my own box with a mandatory title.
\end{mybox}
```

Hello there

This is my own box with a mandatory title.

```
\newtcolorbox{mybox}[2][{}]{colback=red!5!white,
colframe=red!75!black,fonttitle=\bfseries,
title=#2,#1}

\begin{mybox}[colback=yellow]{Hello there}
This is my own box with a mandatory title
and options.
\end{mybox}
```

Hello there

This is my own box with a mandatory title and options.

Definition in the preamble:

```
\newtcolorbox[auto counter,number within=section]{pabox}[2][{}]{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=Examp.~\thetcbcounter: #2,#1}
```

```
\begin{pabox}[colback=yellow]{Hello there}
This is my own box with a mandatory
numbered title and options.
\end{pabox}
```

Examp. 2.1: Hello there

This is my own box with a mandatory numbered title and options.

`\newtcbox[⟨init options⟩]{⟨name⟩}[⟨number⟩][⟨default⟩]{⟨options⟩}`

Creates a new macro `\⟨name⟩` based on `\tcbox` ^{P.8}. Basically, `\newtcbox` operates like `\newcommand`. The new macro `\⟨name⟩` optionally takes `⟨number⟩+1` arguments, where `⟨default⟩` is the default value for the optional first argument. The `⟨options⟩` are given to the underlying `tcbox`. The `⟨init options⟩` allow to set up automatic numbering, see Section 4 from page 65.

```
\newtcbox{\mybox}{colback=red!5!white,
colframe=red!75!black}

\mybox{This is my own box.}
```

This is my own box.

```
\newtcbox{\mybox}[1]{colback=red!5!white,
colframe=red!75!black,fonttitle=\bfseries,
title=#1}

\mybox{Hello there}{This is my own box.}
```

Hello there

This is my own box.

```
\newtcbox{\mybox}[2][]{colback=red!5!white,
colframe=red!75!black,fonttitle=\bfseries,
title=#2,#1}

\mybox[colback=yellow]{Hello there}%
{This is my own box.}
```

Hello there

This is my own box.

Definition in the preamble:

```
% counter from previous example
\newtcbox[use counter from=pabox]{\pbbox}[2][]{%
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
title=(\thetcbcounter) #2,#1}
```

```
\pbbox[colback=yellow]{Hello there}%
{This is my own box.}
```

(2.2) Hello there

This is my own box.

```
\newtcbox{\mybox}[1][red]{nobeforeafter,tcbbox raise base,
arc=0pt,outer arc=0pt,colback=#1!10!white,colframe=#1!50!black,
boxsep=0pt,left=1pt,right=1pt,top=2pt,bottom=2pt,
boxrule=0pt,bottomrule=1pt,toprule=1pt}
\newtcbox{\xmybox}[1][red]{nobeforeafter,tcbbox raise base,
arc=7pt,colback=#1!10!white,colframe=#1!50!black,
before upper={\rule[-3pt]{0pt}{10pt}},boxrule=1pt,
boxsep=0pt,left=6pt,right=6pt,top=2pt,bottom=2pt}
```

The `\mybox[green]{quick}` brown `\mybox{fox}` `\mybox[blue]{jumps}` over the `\mybox[green]{lazy}` `\mybox{dog}`. `\par`
The `\xmybox[green]{quick}` brown `\xmybox{fox}` `\xmybox[blue]{jumps}` over the `\xmybox[green]{lazy}` `\xmybox{dog}`.

The quick brown fox jumps over the lazy dog.
The quick brown fox jumps over the lazy dog.

3 Option Keys

For the $\langle options \rangle$ in `tcolorbox`^{→P.7} respectively `\tcbset`^{→P.8} the following pgf keys can be applied. The key tree path `/tcb/` is not to be used inside these macros. It is easy to add your own style keys using the syntax for pgf keys, see [16, 17] or the examples starting from page 138.

3.1 Title

/tcb/title= $\langle text \rangle$ (no default, initially empty)
Creates a heading line with $\langle text \rangle$ as content.

```
\begin{tcolorbox}[title=My heading line]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My heading line

This is a **tcolorbox**.

/tcb/notitle (no value, initially set)
Removes the title line if set before.

/tcb/adjusted title= $\langle text \rangle$ (style, no default, initially unset)
Creates a heading line with $\langle text \rangle$ as content. The minimal height of this line is adjusted to fit the text given by `/tcb/adjust text`. This option makes sense for single line headings if boxes are set side by side with equal height. Note that it is very easy to trick this adjustment.

```
\tcbset{colback=White,arc=0mm,width=(\linewidth-4pt)/4,
equal height group=AT,before=,after=\hfill,fonttitle=\bfseries}
```

```
The following titles are not adjusted:\\
\foreach \n in {xxx,ggg,AAA,\"Ägypten}
{\begin{tcolorbox}[title=\n,colframe=red!75!black]
Some content.\end{tcolorbox}}
Now, we try again with adjusted titles:\\
\foreach \n in {xxx,ggg,AAA,\"Ägypten}
{\begin{tcolorbox}[adjusted title=\n,colframe=blue!75!black]
Some content.\end{tcolorbox}}
```

The following titles are not adjusted:

| xxx | ggg | AAA | Ägypten |
|---------------|---------------|---------------|---------------|
| Some content. | Some content. | Some content. | Some content. |

Now, we try again with adjusted titles:

| xxx | ggg | AAA | Ägypten |
|---------------|---------------|---------------|---------------|
| Some content. | Some content. | Some content. | Some content. |

/tcb/adjust text= $\langle text \rangle$ (no default, initially `Äpgjy`)
This sets the reference text for `/tcb/adjusted title`. If your texts never exceed 'Äpgjy' in depth and height you don't need to care about this option.

3.2 Lower Part

/tcb/lowerbox= $\langle mode \rangle$ (no default, initially visible)

Controls the treatment of the lower part of the box. Feasible values for $\langle mode \rangle$ are:

- **visible**: usual type setting of the lower part,
- **invisible**: empty space instead of the lower part contents,
- **ignored**: the lower part is not used (here).

The last two values are usually applied in connection with **savelowerto**.

```
\begin{tcolorbox}[lowerbox=invisible,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part (but invisible).
\end{tcolorbox}

\begin{tcolorbox}[lowerbox=ignored,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part (but ignored).
\end{tcolorbox}
```

This is a **tcolorbox**.

This is a **tcolorbox**.

/tcb/savelowerto= $\langle file name \rangle$ (no default, initially empty)

Saves the content of the lower part in a file for an optional later usage.

```
\begin{tcolorbox}[lowerbox=invisible,savelowerto=\jobname_bsp save.tex,colback=white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part which may be quite complex:

$$f(x)=\frac{1+x^2}{1-x^2}$$
.
\end{tcolorbox}

Now, we load the saved text:\\
\input{\jobname_bsp save.tex}
```

This is a **tcolorbox**.

Now, we load the saved text:

This is the lower part which may be quite complex: $f(x) = \frac{1+x^2}{1-x^2}$.

`/tcb/lower separated=<boolean value>` (default `true`, initially `true`)

If set to `true`, the lower part is visually separated from the upper part. It depends from the chosen skin how the visualization of the separation is done.

```
% \tcbuselibrary{skins}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,nobeforeafter,
width=(\linewidth-4mm)/2,fontlower=\itshape}

\begin{tcolorbox}[title=Lower separated]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}\hfill
\begin{tcolorbox}[title=Lower not separated,lower separated=false]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}
\par\bigskip\par
\begin{tcolorbox}[sidebyside,title=Lower separated]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}\hfill
\begin{tcolorbox}[sidebyside,title=Lower not separated,lower separated=false]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}
\par\bigskip\par
\begin{tcolorbox}[beamer,title=Lower separated]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}\hfill
\begin{tcolorbox}[beamer,title=Lower not separated,lower separated=false]
This is the upper part.
\tcblower
This is the lower part.
\end{tcolorbox}
```

Lower separated

This is the upper part.

This is the lower part.

Lower not separated

This is the upper part.

This is the lower part.

Lower separated

This is the upper
part.

*This is the lower
part.*

Lower not separated

This is the upper
part.

*This is the lower
part.*

Lower separated

This is the upper part.

This is the lower part.

Lower not separated

This is the upper part.

This is the lower part.

`/tcb/savedelimiter=<name>` (no default, initially `tcolorbox`)

Used in connection with new environment definitions which extend `tcolorbox` and use or allow the option `savelowerto`. To catch the end of the new box environment `<name>` has to be the name of this environment. Additionally, the environment definition has to use `\tcolorbox` instead of `\begin{tcolorbox}` and `\end{tcolorbox}` instead of `\end{tcolorbox}`.

```
\newenvironment{mybox}[1]{%
  \tcolorbox[savedelimiter=mybox,
    savelowerto=\jobname_bspsave2.tex,lowerbox=ignored,
    colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
    title=#1]}%
  {\end{tcolorbox}}

\begin{mybox}{My Example}
Upper part.
\tcblower
Saved lower part!
\end{mybox}

Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname_bspsave2.tex}
\end{tcolorbox}
```

My Example

Upper part.

Now, the saved part is used:

Saved lower part!

The `savedelimiter` is used implicitly with `\newtcolorbox`^{→P.9} which allows a more convenient usage:

```
\newtcolorbox{mybox}[1]{%
  savelowerto=\jobname_bspsave2.tex,lowerbox=ignored,
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  title=#1}%

\begin{mybox}{My Example}
Upper part.
\tcblower
Saved lower part!
\end{mybox}

Now, the saved part is used:
\begin{tcolorbox}[colback=green!5]
\input{\jobname_bspsave2.tex}
\end{tcolorbox}
```

My Example

Upper part.

Now, the saved part is used:

Saved lower part!

3.3 Colors and Fonts

/tcb/colback= $\langle color \rangle$ (no default, initially black!5!white)

Sets the background $\langle color \rangle$ of the box.

```
\begin{tcolorbox}[colback=white]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

/tcb/colframe= $\langle color \rangle$ (no default, initially black!75!white)

Sets the frame $\langle color \rangle$ of the box.

```
\begin{tcolorbox}[colframe=red!50!yellow]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

/tcb/colupper= $\langle color \rangle$ (no default, initially black)

Sets the text $\langle color \rangle$ of the upper part.

```
\begin{tcolorbox}[colupper=yellow,
colback=blue!50,colframe=blue]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

This is a **tcolorbox**.

This is the lower part.

/tcb/collower= $\langle color \rangle$ (no default, initially black)

Sets the text $\langle color \rangle$ of the lower part.

```
\begin{tcolorbox}[collower=yellow,
colback=blue!50,colframe=blue]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

This is a **tcolorbox**.

This is the lower part.

/tcb/coltext= $\langle color \rangle$ (style, no default, initially black)

Sets the text $\langle color \rangle$ of the box. This is an abbreviation for setting colupper and collower to the same value.

```
\begin{tcolorbox}[coltext=yellow,
colback=blue!50,colframe=blue]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

This is a **tcolorbox**.

This is the lower part.

/tcb/coltitle= $\langle color \rangle$ (no default, initially white)

Sets the title text $\langle color \rangle$ of the box.

```
\begin{tcolorbox}[coltitle=blue!50!black,
colframe=blue!25,title=Test]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

Test

This is a **tcolorbox**.

/tcb/fontupper= $\langle text \rangle$ (no default, initially empty)
 Sets $\langle text \rangle$ before the content of the upper part (e.g. font settings).

```
\begin{tcolorbox}[fontupper>Hello!~\sffamily]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

Hello! This is a **tcolorbox**.

/tcb/fontlower= $\langle text \rangle$ (no default, initially empty)
 Sets $\langle text \rangle$ before the content of the lower part (e.g. font settings).

```
\begin{tcolorbox}[fontlower=\sffamily\bfseries]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

This is a **tcolorbox**.

This is the lower part.

/tcb/fonttitle= $\langle text \rangle$ (no default, initially empty)
 Sets $\langle text \rangle$ before the content of the title text (e.g. font settings).

```
\begin{tcolorbox}[fonttitle=\sffamily\bfseries\large,title=Hello]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

Hello

This is a **tcolorbox**.

More color options are provided by using skins documented in Section 6 from page 71.

3.4 Geometry

/tcb/width= $\langle length \rangle$ (no default, initially `\linewidth`)
Sets the total width of the colored box to $\langle length \rangle$. See also `/tcb/height`^{→ P. 27}.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[width=\linewidth/2]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

/tcb/toprule= $\langle length \rangle$ (no default, initially 0.5mm)
Sets the line width of the top rule to $\langle length \rangle$.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[toprule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

/tcb/bottomrule= $\langle length \rangle$ (no default, initially 0.5mm)
Sets the line width of the bottom rule to $\langle length \rangle$.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[bottomrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

/tcb/leftrule= $\langle length \rangle$ (no default, initially 0.5mm)
Sets the line width of the left rule to $\langle length \rangle$.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[leftrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

/tcb/rightrule= $\langle length \rangle$ (no default, initially 0.5mm)
 Sets the line width of the right rule to $\langle length \rangle$.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[rightrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

/tcb/titlerule= $\langle length \rangle$ (no default, initially 0.5mm)
 Sets the line width of the rule below the title to $\langle length \rangle$.

```
\tcbset{enhanced,colback=red!5!white,colframe=red!75!black,
colbacktitle=red!90!black}

\begin{tcolorbox}[titlerule=3mm,title=This is the title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is the title

This is a **tcolorbox**.

/tcb/boxrule= $\langle length \rangle$ (style, no default, initially 0.5mm)
 Sets all rules of the frame to $\langle length \rangle$, i.e. **/tcb/toprule**^{→P.17}, **/tcb/bottomrule**^{→P.17}, **/tcb/leftrule**^{→P.17}, **/tcb/rightrule**, and **/tcb/titlerule**.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[boxrule=3mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

More options for drawing a **/tcb/borderline**^{→P.91} are provided by using skins documented in Section 6 from page 71.

/tcb/arc= $\langle length \rangle$

(no default, initially 1mm)

Sets the inner radius of the four frame arcs to $\langle length \rangle$.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[arc=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[arc=4mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

This is a **tcolorbox**.

/tcb/outer arc= $\langle length \rangle$

(no default, initially unset)

Sets the outer radius of the four frame arcs to $\langle length \rangle$.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[arc=4mm,outer arc=1mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

/tcb/auto outer arc

(no value, initially set)

Sets the outer radius of the four frame arcs automatically in dependency of the inner radius given by **/tcb/arc**.

/tcb/boxsep= $\langle length \rangle$

(no default, initially 1mm)

Sets a common padding of $\langle length \rangle$ between the text content and the frame of the box. This value is added to the key values of **left**, **right**, **top**, **bottom**, and **middle** at the appropriate places.

```
\tcbset{colback=red!5!white,colframe=red!75!black,width=(\linewidth-4mm)/2,
before=,after=\hfill}

\begin{tcolorbox}[boxsep=5mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[boxsep=5mm,draft]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

frame: w=195.33255pt, h=48.97505pt

upper: w=141.2724pt, h=6.296pt

interior: w=192.4873pt, h=46.1298pt

/tcb/left=*(length)* (style, no default, initially 4mm)

Sets the left space between all text parts and frame (additional to **boxsep**). This is an abbreviation for setting **lefttitle**, **leftupper**, and **leftlower** to the same value.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[left=0mm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

/tcb/lefttitle=*(length)* (no default, initially 4mm)

Sets the left space between title text and frame (additional to **boxsep**).

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[lefttitle=3cm,title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My Title

This is a **tcolorbox**.

/tcb/leftupper=*(length)* (no default, initially 4mm)

Sets the left space between upper text and frame (additional to **boxsep**).

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[leftupper=3cm,title=My Title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My Title

This is a **tcolorbox**.

/tcb/leftlower=*(length)* (no default, initially 4mm)

Sets the left space between lower text and frame (additional to **boxsep**).

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[leftlower=3cm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

This is a **tcolorbox**.

This is the lower part.

/tcb/right= $\langle length \rangle$ (style, no default, initially 4mm)

Sets the right space between all text parts and frame (additional to **boxsep**). This is an abbreviation for setting **righttitle**, **rightupper**, and **rightlower** to the same value.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[width=5cm,right=2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

/tcb/righttitle= $\langle length \rangle$ (no default, initially 4mm)

Sets the right space between title text and frame (additional to **boxsep**).

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[width=5cm,righttitle=2cm,title=My very long title text]
This is a \textbf{tcolorbox} with standard upper box dimensions.
\end{tcolorbox}
```

My very long title text

This is a **tcolorbox** with standard upper box dimensions.

/tcb/rightupper= $\langle length \rangle$ (no default, initially 4mm)

Sets the right space between upper text and frame (additional to **boxsep**).

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[width=5cm,rightupper=2cm,title=My very long title text]
This is a \textbf{tcolorbox} with compressed upper box dimensions.
\end{tcolorbox}
```

My very long title text

This is a **tcolorbox** with compressed upper box dimensions.

/tcb/rightlower= $\langle length \rangle$ (no default, initially 4mm)
 Sets the right space between lower text and frame (additional to **boxsep**).

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[width=5cm,rightlower=2cm]
This is a \textbf{tcolorbox} with standard upper box dimensions.
\tcblower
This is the lower part with large space at right.
\end{tcolorbox}
```

This is a **tcolorbox** with
standard upper box dimen-
sions.

This is the lower
part with large
space at right.

/tcb/top= $\langle length \rangle$ (no default, initially 2mm)
 Sets the top space between text and frame (additional to **boxsep**).

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[top=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

This is a **tcolorbox**.

This is the lower part.

/tcb/fortitle= $\langle length \rangle$ (no default, initially 0mm)
 Sets the top space between title and frame (additional to **boxsep**).

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[fortitle=3mm,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My title

This is a **tcolorbox**.

/tcb/bottom= $\langle length \rangle$ (no default, initially 2mm)
 Sets the bottom space between text and frame (additional to **boxsep**).

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[bottom=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```



/tcb/bottomtitle= $\langle length \rangle$ (no default, initially 0mm)
 Sets the bottom space between title and frame (additional to **boxsep**).

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[bottomtitle=3mm,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```



/tcb/middle= $\langle length \rangle$ (no default, initially 2mm)
 Sets the space between upper and lower text to the separation line (additional to **boxsep**).

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[middle=0mm,boxsep=0mm]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```



`/tcb/oversize=<length>`

(style, default 0pt)

Sets the text width of the upper part to the current line width plus an optional `<length>`. This is achieved by changing the keys `/tcb/width`^{P.17} `/tcb/enlarge left by`^{P.52}, and `/tcb/enlarge right by`^{P.52} appropriately. The resulting box is overlapping into the left and right margin of the page. Note that this style option has to be given *after* all other geometry keys!

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\textit{Normal text for comparison:}\
\lipsum[2]

\begin{tcolorbox}[oversize,title=Oversized box]
\lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[title=Normal box]
\lipsum[2]
\end{tcolorbox}
```

Normal text for comparison:

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Oversized box

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Normal box

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

`/tcb/toggle left and right`= $\langle toggle\ preset \rangle$ (default `evenpage`, initially `none`)

According to the $\langle toggle\ preset \rangle$, the left and the right settings of the `tcolorbox` are switched or not. Feasible values are:

- `none`: no switching.
- `forced`: the values of the left and right rules and spaces are switched.
- `evenpage`: if the page is an even page, the values of the left and right rules and spaces are switched. It is recommended to use this setting in conjunction with `/tcb/check odd page`^{→ P. 63}.

```
% \usepackage{changepage} for 'check odd page'
% \usepackage{lipsum}
% \usetikzlibrary{patterns}
% \tcbuselibrary{skins,breakable,hooks}
\begin{tcolorbox}[skin=enhancedmiddle,breakable,
  check odd page,toggle left and right,
  boxrule=0mm,top=0mm,bottom=0mm,left=1mm,right=1mm,
  rightrule=1cm,colupper=blue!25!black,
  watermark graphics=lichtspiel.jpg,watermark opacity=0.5,
  watermark overzoom=1.00,watermark opacity=0.25,
  frame style={pattern=crosshatch dots light steel blue},
  overlay app={%
    \ifoddpage\coordinate (X) at ([xshift=-5mm]frame.east);
    \else\coordinate (X) at ([xshift=5mm]frame.west);\fi
    \fill[shading=ball,ball color=blue!50!white,opacity=0.5] (X) circle (4mm);}]
\lipsum[1-6]
\end{tcolorbox}
```

This example switches a 1cm thick rule from the left to the right side depending on the page number. Thereby, the rule is always on the outer side of the double-sided paper. Additionally, a ball is drawn on the outer side with help of an overlay.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris. Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim.



Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa. Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetur.

Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

3.5 Height Control

In a typical usage scenario, the height of a `tcolorbox` is computed automatically to fit the content. Nevertheless, the height can be set to a fixed value or to fit commonly for several boxes, e.g. if boxes are set side by side.

The height control keys are only applicable to unbreakable boxes. If a box is set to be `/tcb/breakable`^{→ P. 167}, the height is always computed according to the *natural height*.

`/tcb/natural height` (no value, initially set)

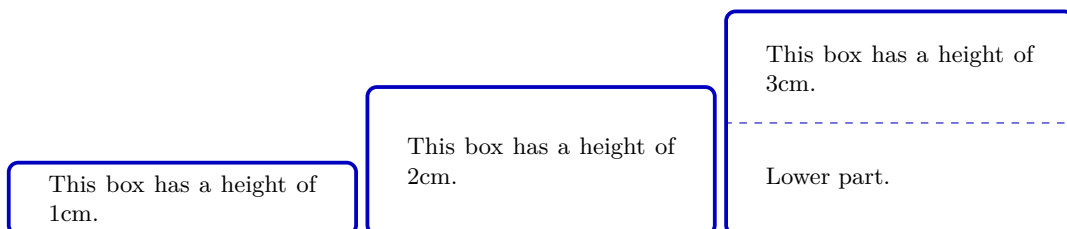
Sets the total height of the colored box to its natural height depending on the box content.

`/tcb/height=<length>` (no default)

Sets the total height of the colored box to `<length>` independent of the box content. `<length>` is the minimum height of the box, if `??`^{→ P. ??} is larger than zero.

```
\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill,
colframe=blue!75!black,colback=white}

\begin{tcolorbox}[height=1cm,valign=center]
  This box has a height of 1cm.
\end{tcolorbox}
\begin{tcolorbox}[height=2cm,valign=center]
  This box has a height of 2cm.
\end{tcolorbox}
\begin{tcolorbox}[height=3cm,split=0.5,valign=center,valign lower=center]
  This box has a height of 3cm.
  \tcblower
  Lower part.
\end{tcolorbox}
```

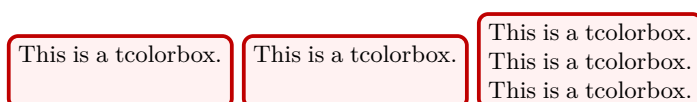


`/tcb/height plus=<length>` (no default, initially 0pt)

The box may extend a given fixed `/tcb/height` up to the given `<length>`.

```
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm,
right=1mm,boxsep=0mm,width=3cm,nobeforeafter}

\begin{tcolorbox}[height=1cm]
  This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[height=1cm,height plus=1cm]
  This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[height=1cm,height plus=1cm]
  This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{tcolorbox}
```



`/tcb/height from=<min> to <max>`

(style, no default)

Sets the box height to a dimension between $\langle min \rangle$ and $\langle max \rangle$.

```
% \usepackage{lipsum}
\newtcolorbox{mybox}{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,
  bottom=1mm,right=1mm,boxsep=0mm,width=4.5cm,nobeforeafter,
  height from=2cm to 8cm}

\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{mybox}
\begin{mybox}
\lipsum[2]
\end{mybox}
```

This is a tcolorbox.

This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.

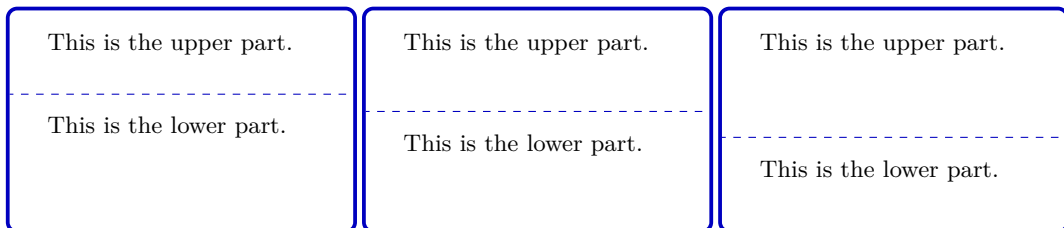
Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

/tcb/space= $\langle fraction \rangle$ (no default, initially 0)

If the height of a `tcolorbox` is not the natural height, the space difference between the forced and the natural size is distributed between the upper and the lower part of the box. This space could also be negative. $\langle fraction \rangle$ with a value between 0 and 1 is the amount of space which is added to the upper part, the rest is added to the lower part. If there is no lower part, then all of the space is added to the upper part always.

```
\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill,
colframe=blue!75!black,colback=white,height=3cm}

\foreach \f in {0.2,0.4,0.7}
{\begin{tcolorbox}[space=\f]
  This is the upper part.
  \tcblower
  This is the lower part.
\end{tcolorbox}}
```



/tcb/space to upper (style)

This is an abbreviation for `space=1`, i. e. all extra space is added to the upper part.

/tcb/space to lower (style, initially set)

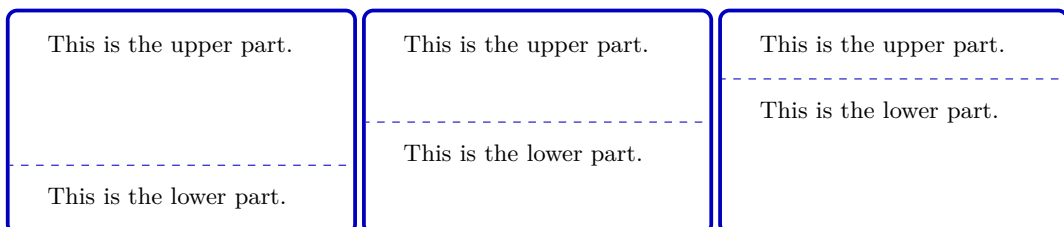
This is an abbreviation for `space=0`, i. e. all extra space is added to the lower part (if there is any).

/tcb/space to both (style)

This is an abbreviation for `space=0.5`, i. e. the extra space equally distributed between the upper and the lower part.

```
\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill,
colframe=blue!75!black,colback=white,height=3cm}

\foreach \myspace in {space to upper,space to both,space to lower}
{\begin{tcolorbox}[\myspace]
  This is the upper part.
  \tcblower
  This is the lower part.
\end{tcolorbox}}
```

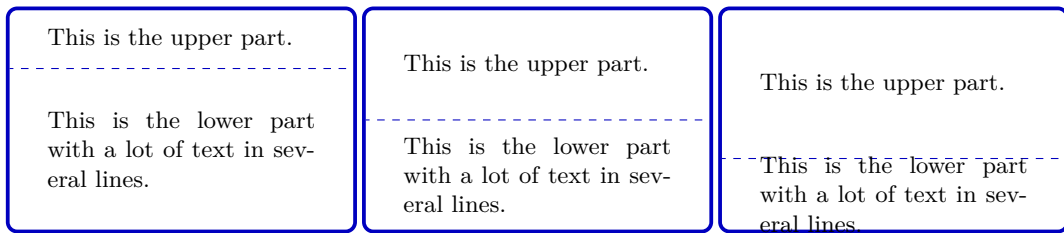


/tcb/split= $\langle fraction \rangle$ (no default)

If the height of a `tcolorbox` is not the natural height, the $\langle fraction \rangle$ with a value between 0 and 1 determines the positioning of the segmentation between the upper and the lower part. Here, 0 stands for top and 1 for bottom. Note that the box is split regardless of the actual dimensions of the text parts!

```
\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill,height=3cm,
colback=white,colframe=blue!75!black,valign=center,valign lower=center}

\foreach \f in {0.1,0.5,0.8}
{\begin{tcolorbox}[split=\f]
This is the upper part.
\tcblower
This is the lower part with a lot of text in several lines.
\end{tcolorbox}}
```

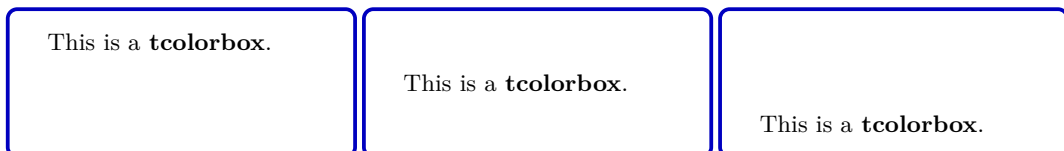


/tcb/valign= $\langle alignment \rangle$ (no default, initially top)

If the height of a `tcolorbox` is not the natural height, `valign` determines the vertical $\langle alignment \rangle$ of the upper part. Feasible values are `top`, `center`, and `bottom`. For a box with natural height, these values are meaningless.

```
\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill,
colframe=blue!75!black,colback=white,height=2cm}

\foreach \myalign in {top,center,bottom}
{\begin{tcolorbox}[valign=\myalign]
This is a \textbf{tcolorbox}.
\end{tcolorbox}}
```



/tcb/valign lower= $\langle alignment \rangle$ (no default, initially top)

This key has the same meaning for the lower part as `valign` for the upper part, i.e. it determines the vertical $\langle alignment \rangle$ of the lower part with feasible values `top`, `center`, and `bottom`.

`/tcb/equal height group=<id>` (no default)

Boxes which are members of an `equal height group` will all get the same height, i.e. the maximum of all their natural heights. The `<id>` serves to distinguish between different height groups. This `<id>` should contain only characters which are feasible for \TeX macro names, typically alphabetic characters but no numerals and spaces. Note that you have to compile twice to see changes and that height groups are global definitions.

```
\tcbset{width=(\linewidth-2mm)/3,before=,after=\hfill,arc=0mm,
colframe=blue!75!black,colback=white,fonttitle=\bfseries}

\begin{tcolorbox}[equal height group=A,adjusted title={One}]
  My smallest box.
\end{tcolorbox}%
\begin{tcolorbox}[equal height group=A,adjusted title={Two}]
  This box is also small.
  \tcblower
  But with a lower part.
\end{tcolorbox}%
\begin{tcolorbox}[equal height group=A,adjusted title={Three}]
  This box contains a lot of text just to fill the space
  with word flowing and flowing and flowing until the box
  is filled with all of it.
\end{tcolorbox}\linebreak
%
\tcbset{width=(\linewidth-1mm)/2,before=,after=\hfill,arc=0mm,
colframe=red!75!black,colback=white}
%
\begin{tcolorbox}[equal height group=B]
  Now, we use another equal height group.
\end{tcolorbox}%
\begin{tcolorbox}[equal height group=B]
  \begin{equation*}
    \int\limits_0^1 x^2 = \frac{1}{3}.
  \end{equation*}
\end{tcolorbox}
```

| One | Two | Three |
|-----------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| My smallest box. | This box is also small. <hr style="border-top: 1px dashed;"/> But with a lower part. | This box contains a lot of text just to fill the space with word flowing and flowing and flowing until the box is filled with all of it. |
| Now, we use another equal height group. | $\int_0^1 x^2 = \frac{1}{3}.$ | |

`/tcb/minimum for equal height group=<id>:<length>` (no default, initially unset)

Plants a $\langle length \rangle$ into the equal height group with the given $\langle id \rangle$. This ensures that the height will not drop below $\langle length \rangle$. Note that you cannot reduce a computed height value by using this key with a small value. The difference to applying `/tcb/height`^{P. 27} directly is that the boxes are never too small for their content.

```
\tcbset{colframe=blue!75!black,colback=white,arc=0mm,
  before=,after=\hfill,fonttitle=\bfseries,left=2mm,right=2mm,
  width=3.5cm,
  equal height group=C,
  minimum for equal height group=C:3.5cm}

\begin{tcolorbox}
  My first box. All boxes will get 3.5cm times 3.5cm
  if the content height is not too large.
\end{tcolorbox}%
\begin{tcolorbox}
  My second box.
  \tcblower
  This is the lower part.
\end{tcolorbox}%
\begin{tcblisting}{\textbf{Mixed}}
  with a listing.
\end{tcblisting}
\begin{tcolorbox}[title={Fourth box}]
  My final box.
\end{tcolorbox}%
```

My first box. All boxes will get 3.5cm times 3.5cm if the content height is not too large.

My second box.

This is the lower part.

\textbf{Mixed}
with a listing.

Mixed with a listing.

Fourth box

My final box.

3.6 Box Content Additions

The following options introduce some arbitrary *<code>* to the content of a `tcolorbox`. These additions can be given at the begin or at the end of the title, the upper part, or the lower part.

`/tcb/before title=<code>` (no default, initially unset)

The given *<code>* is placed *after* the color and font settings and *before* the content of the title.

```
\tcbset{before title={\textcolor{yellow}{\large Important:}~},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```



`/tcb/after title=<code>` (no default, initially unset)

The given *<code>* is placed *after* the content of the title.

```
\tcbset{after title={\hfill\colorbox{Navy}{approved}}},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```



`/tcb/before upper=<code>` (no default, initially unset)

The given *<code>* is placed *after* the color and font settings and *before* the content of the upper part.

```
\tcbset{before upper={\textit{The story:}\par},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```



`/tcb/after upper=<code>` (no default, initially unset)

The given `<code>` is placed *after* the content of the upper part.

```
\tcbset{after upper={\par\hfill\textit{Read more next week}}},
colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My title

This is a **tcolorbox**.

Read more next week

`/tcb/before lower=<code>` (no default, initially unset)

The given `<code>` is placed *after* the color and font settings and *before* the content of the lower part.

```
\tcbset{before lower=\textit{Behold:~},colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

This is a **tcolorbox**.

Behold: This is the lower part.

`/tcb/after lower=<code>` (no default, initially unset)

The given `<code>` is placed *after* the content of the lower part.

```
\tcbset{after lower=\ \textit{This is the end.},
colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

This is a **tcolorbox**.

This is the lower part. *This is the end.*

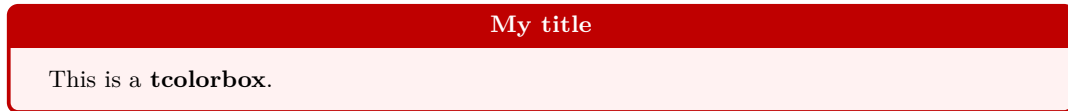
/tcb/center title

(style, no value, initially unset)

This style sets `/tcb/before title`^{→P.33} to `\centering`.

```
\tcbset{center title,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```



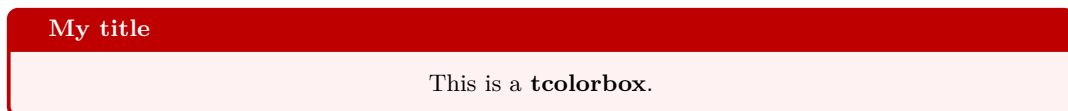
/tcb/center upper

(style, no value, initially unset)

This style sets `/tcb/before upper`^{→P.33} to `\centering`.

```
\tcbset{center upper,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```



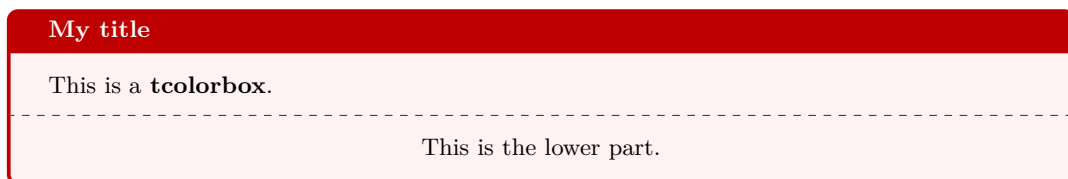
/tcb/center lower

(style, no value, initially unset)

This style sets `/tcb/before lower`^{→P.34} to `\centering`.

```
\tcbset{center lower,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```



`/tcb/flushleft title`

(style, no value, initially unset)

This style sets `/tcb/before title`^{→P.33} to `\raggedright`.

```
\tcbset{flushleft title,colback=red!5!white,
colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title which is
quite long but always flushed left]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

My title which is quite
long but always flushed
left

This is a **tcolorbox**.

`/tcb/flushleft upper`

(style, no value, initially unset)

This style sets `/tcb/before upper`^{→P.33} to `\raggedright`.

```
\tcbset{flushleft upper,colback=red!5!white,
colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}. Here, the
content is flushed left.
You see the effect on the right hand side.
\end{tcolorbox}
```

My title

This is a **tcolorbox**. Here,
the content is flushed left.
You see the effect on the
right hand side.

`/tcb/flushleft lower`

(style, no value, initially unset)

This style sets `/tcb/before lower`^{→P.34} to `\raggedright`.

```
\tcbset{flushleft lower,colback=red!5!white,
colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title]
This is a \textbf{tcolorbox}. The upper part
is not flushed left or right. This could be
unpleasant for small boxes.
\tcblower
This is the lower part. Here, the
content is flushed left.
You see the effect on the right hand side.
\end{tcolorbox}
```

My title

This is a **tcolorbox**. The up-
per part is not flushed left or
right. This could be unpleas-
ant for small boxes.

This is the lower part. Here,
the content is flushed left.
You see the effect on the
right hand side.

`/tcb/flushright title`

(style, no value, initially unset)

This style sets `/tcb/before title` ^{→ P.33} to `\raggedleft`.

```
\tcbset{flushright title,colback=red!5!white,  
colframe=red!75!black,fonttttitle=\bfseries}  
  
\begin{tcolorbox}[title=My title]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}
```

My title

This is a **tcolorbox**.

`/tcb/flushright upper`

(style, no value, initially unset)

This style sets `/tcb/before upper` ^{→ P.33} to `\raggedleft`.

```
\tcbset{flushright upper,colback=red!5!white,  
colframe=red!75!black,fonttttitle=\bfseries}  
  
\begin{tcolorbox}[title=My title]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}
```

My title

This is a **tcolorbox**.

`/tcb/flushright lower`

(style, no value, initially unset)

This style sets `/tcb/before lower` ^{→ P.34} to `\raggedleft`.

```
\tcbset{flushright lower,colback=red!5!white,  
colframe=red!75!black,fonttttitle=\bfseries}  
  
\begin{tcolorbox}[title=My title]  
This is a \textbf{tcolorbox}.  
\tcblower  
This is the lower part.  
\end{tcolorbox}
```

My title

This is a **tcolorbox**.

This is the lower part.

`/tcb/tabularx=⟨preamble⟩` (style)

This style sets `/tcb/before upper`^{→P.33} and `/tcb/after upper`^{→P.34} and several geometry keys to support a `tabularx` with the given `⟨preamble⟩`. The packages `tabularx` [2], `array`, and `colortbl` have to be loaded separately.

```
% \usepackage{array,tabularx}
% \usepackage{colortbl} - or - \usepackage[table]{xcolor}
\newcolumntype{Y}{>\raggedleft\arraybackslashX}% see tabularx
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily,
  colback=yellow!10!white,colframe=red!50!black,colbacktitle=Salmon!30!white,
  coltitle=black,center title}

\begin{tcolorbox}[tabularx={X||Y|Y|Y|Y|Y},title=My table]
Group & One & Two & Three & Four & Sum\\\hline\hline
Red & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00\\\hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00\\\hline
Blue & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00\\\hline\hline
Sum & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00
\end{tcolorbox}
```

| My table | | | | | |
|----------|---------|---------|----------|----------|----------|
| Group | One | Two | Three | Four | Sum |
| Red | 1000.00 | 2000.00 | 3000.00 | 4000.00 | 10000.00 |
| Green | 2000.00 | 3000.00 | 4000.00 | 5000.00 | 14000.00 |
| Blue | 3000.00 | 4000.00 | 5000.00 | 6000.00 | 18000.00 |
| Sum | 6000.00 | 9000.00 | 12000.00 | 15000.00 | 42000.00 |

`/tcb/tabularx*={⟨code⟩}{⟨preamble⟩}` (style)

This is a variant of `/tcb/tabularx` which adds some `⟨code⟩` before the table starts.

```
% \usepackage{array,tabularx}
% \usepackage{colortbl} - or - \usepackage[table]{xcolor}
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily,
  colback=yellow!10!white,colframe=red!50!black,colbacktitle=Salmon!30!white,
  coltitle=black,center title}

\begin{tcolorbox}[tabularx*={\arrayrulewidth0.5mm}{X|X|X},title=My table]
One & Two & Three \\\hline\hline
1000.00 & 2000.00 & 3000.00\\\hline
2000.00 & 3000.00 & 4000.00
\end{tcolorbox}
```

| My table | | |
|----------|---------|---------|
| One | Two | Three |
| 1000.00 | 2000.00 | 3000.00 |
| 2000.00 | 3000.00 | 4000.00 |

`/tcb/tikz upper=<options>`

(style)

This style adds a centered tikzpicture environment to the begin and to the end of the upper part.

```
% \usepackage{tikz}

\begin{tcolorbox}[tikz upper,fonttitle=\bfseries,colback=white,colframe=black,
                 title=TikZ drawing]
  \path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
  \fill[red] (45:5mm) circle (1mm);
  \fill[red] (135:5mm) circle (1mm);
  \draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);
\end{tcolorbox}
```

TikZ drawing



`/tcb/tikz lower=<options>`

(style)

This style adds a centered tikzpicture environment to the begin and to the end of the lower part.

```
% \usepackage{tikz}
% \usetikzlibrary{skins,listings}
\tcbset{tikz lower,listing side text,fonttitle=\bfseries,
        bicolor,colback=LightBlue!50!white,colbacklower=white,colframe=black,
        righthand width=3cm}

\begin{tcblisting}{title=TikZ drawing}
\path[fill=yellow,draw=yellow!75!red]
  (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red]
  (215:5mm) arc (215:325:5mm);
\end{tcblisting}
```

TikZ drawing

```
\path[fill=yellow,draw=yellow!75!red]
  (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red]
  (215:5mm) arc (215:325:5mm);
```



/tcb/code= $\langle code \rangle$ (no default, initially unset)

The given $\langle code \rangle$ is executed immediately. This option is useful to place some arbitrary code into an option list.

```
\tcbset{colback=red!5!white,colframe=red!75!black,  
  code={Useless at this spot but functional.},  
  fonttitle=\bfseries}  
  
\begin{tcolorbox}[code={\newcommand{\mycommand}{\textit{working}}},  
  title=My \mycommand\ title]  
This is a \textbf{tcolorbox}.  
\end{tcolorbox}
```

Useless at this spot but functional.

My *working* title

This is a **tcolorbox**.

3.7 Overlays

With an overlay, arbitrary *graphical code* can be added to a `tcolorbox`. This code is executed *after* the frame and interior are drawn and *before* the text content is drawn. Therefore, you can decorate the `tcolorbox` with your own extensions. Common special cases are *watermarks* which are implemented using overlays. See Subsection 6.4 from page 80 if you want to add *watermarks*.

If you use the core package only, the *graphical code* has to be pgf code and there is not much assistance for positioning. Therefore, the usage of the `/tcb/enhanced`^{P.99} mode from the library skins is recommended which allows `tikz` code and gives access to `/tcb/geometry nodes`^{P.73} for positioning.

`/tcb/overlay`=*graphical code* (no default, initially unset)

Adds *graphical code* to the box drawing process. This *graphical code* is drawn *after* the frame and interior and *before* the text content.

```
% \tcbuselibrary{skins} % preamble
\tcbset{frogbox/.style={enhanced,colback=green!10,colframe=green!65!black,
  enlarge top by=5.5mm,
  overlay={\foreach \x in {2cm,3.5cm} {
    \begin{scope}[shift={([xshift=\x]frame.north west)}]
      \path[draw=green!65!black,fill=green!10,line width=1mm] (0,0) arc (0:180:5mm);
      \path[fill=black] (-0.2,0) arc (0:180:1mm);
    \end{scope}}}}

\begin{tcolorbox}[frogbox,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```



```
% \usetikzlibrary{patterns} % preamble
% \tcbuselibrary{skins} % preamble
\tcbset{ribbonbox/.style={enhanced,colback=red!5!white,colframe=red!75!black,
  fonttitle=\bfseries,
  overlay={\path[fill=blue!75!white,draw=blue,double=white!85!blue,
    preaction={opacity=0.6,fill=blue!75!white},
    line width=0.1mm,double distance=0.2mm,
    pattern=fivepointed stars,pattern color=white!75!blue]
    ([xshift=-0.2mm,yshift=-1.02cm]frame.north east)
    -- ++(-1,1) -- ++(-0.5,0) -- ++(1.5,-1.5) -- cycle;}}}

\begin{tcolorbox}[ribbonbox,title=My title]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```



- /tcb/no overlay** (style, no default, initially set)
Removes the overlay if set before.
- /tcb/overlay broken**= $\langle graphical\ code \rangle$ (no default, initially unset)
If the box is set to be **/tcb/breakable**^{→P.167} and *is* broken actually, then the $\langle graphical\ code \rangle$ is added to the box drawing process. **/tcb/overlay**^{→P.41} overwrites this key.
- /tcb/overlay unbroken**= $\langle graphical\ code \rangle$ (no default, initially unset)
If the box is set to be **/tcb/breakable**^{→P.167} but *is not* broken actually or if the box is set to be **/tcb/unbreakable**^{→P.168}, then the $\langle graphical\ code \rangle$ is added to the box drawing process. **/tcb/overlay**^{→P.41} overwrites this key.
- /tcb/overlay first**= $\langle graphical\ code \rangle$ (no default, initially unset)
If the box is set to be **/tcb/breakable**^{→P.167} and *is* broken actually, then the $\langle graphical\ code \rangle$ is added to the box drawing process for the *first* part of the break sequence. **/tcb/overlay**^{→P.41} overwrites this key.
- /tcb/overlay middle**= $\langle graphical\ code \rangle$ (no default, initially unset)
If the box is set to be **/tcb/breakable**^{→P.167} and *is* broken actually, then the $\langle graphical\ code \rangle$ is added to the box drawing process for the *middle* parts (if any) of the break sequence. **/tcb/overlay**^{→P.41} overwrites this key.
- /tcb/overlay last**= $\langle graphical\ code \rangle$ (no default, initially unset)
If the box is set to be **/tcb/breakable**^{→P.167} and *is* broken actually, then the $\langle graphical\ code \rangle$ is added to the box drawing process for the *last* part of the break sequence. **/tcb/overlay**^{→P.41} overwrites this key.
- /tcb/overlay unbroken and first**= $\langle graphical\ code \rangle$ (no default, initially unset)
This is an optimized abbreviation for setting **/tcb/overlay unbroken** and **/tcb/overlay first** together. **/tcb/overlay**^{→P.41} overwrites this key.
- /tcb/overlay middle and last**= $\langle graphical\ code \rangle$ (no default, initially unset)
This is an optimized abbreviation for setting **/tcb/overlay middle** and **/tcb/overlay last** together. **/tcb/overlay**^{→P.41} overwrites this key.

This example demonstrates the application of break sequence specific overlay options. Here, we define an environment **myexample** based on **tcolorbox** where the visible drawing is done totally by overlay keys.

Here, the first application of **myexample** produces an unbroken **tcolorbox**. The frame is drawn by the code given with **/tcb/overlay unbroken**.

The second application of **myexample** is broken into several parts which are drawn by the codes given with **/tcb/overlay first**, **/tcb/overlay middle**, and **/tcb/overlay last**.

```
% Preamble:
%\usepackage{tikz,lipsum,calc}
%\tcbuselibrary{skins,breakable}
%\newcounter{example}
%\newlength{\examlen}
\colorlet{colexam}{red!75!black}

\newtcolorbox[use counter=example]{myexample}{%
  phantom={\settowidth{\global\examlen}{\Large\bfseries Example \thetcbcounter}},%
  title={Example \thetcbcounter},
  coltitle=colexam,fonttitle=\Large\bfseries,
  enhanced,breakable,before=\par\medskip,parbox=false,
  frame hidden,interior hidden,segmentation hidden,
```

```

boxsep=0pt,left=0pt,right=3mm,toptitle=2mm,pad at break=0mm,
overlay unbroken={\draw[colexam,line width=1pt] (frame.north west)
--([xshift=-0.5pt]frame.north east)--([xshift=-0.5pt]frame.south east)
--(frame.south west);
\draw[colexam,line width=2pt] ([yshift=0.5pt]frame.north west)
-- +(\examlen,0pt);},
overlay first={\draw[colexam,line width=1pt] (frame.north west)
--([xshift=-0.5pt]frame.north east)--([xshift=-0.5pt]frame.south east);
\draw[red!75!black,line width=2pt] ([yshift=0.5pt]frame.north west)
-- +(\examlen,0pt);},
overlay middle={\draw[colexam,line width=1pt] ([xshift=-0.5pt]frame.north east)
--([xshift=-0.5pt]frame.south east); },
overlay last={\draw[colexam,line width=1pt] ([xshift=-0.5pt]frame.north east)
--([xshift=-0.5pt]frame.south east)--(frame.south west);}%
}

\begin{myexample}
\lipsum[1]
\end{myexample}

\begin{myexample}
\lipsum[2-11]
\end{myexample}

\lipsum[12]% following text

```

Example 1

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Example 2

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetur.

Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

Sed commodo posuere pede. Mauris ut est. Ut quis purus. Sed ac odio. Sed vehicula hendrerit sem. Duis non odio. Morbi ut dui. Sed accumsan risus eget odio. In hac habitasse platea dictumst. Pellentesque non elit. Fusce sed justo eu urna porta tincidunt. Mauris felis odio, sollicitudin sed, volutpat a, ornare ac, erat. Morbi quis dolor. Donec pellentesque, erat ac sagittis semper, nunc dui lobortis purus, quis congue purus metus ultricies tellus. Proin et quam. Class aptent taciti sociosqu ad litora torquent per conubia nostra, per inceptos hymenaeos. Praesent sapien turpis, fermentum vel, eleifend faucibus, vehicula eu, lacus.

Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Donec odio elit, dictum in, hendrerit sit amet, egestas sed, leo. Praesent feugiat sapien aliquet odio. Integer vitae justo. Aliquam vestibulum fringilla lorem. Sed neque lectus, consectetur at, consectetur sed, eleifend ac, lectus. Nulla facilisi. Pellentesque eget lectus. Proin eu metus. Sed porttitor. In hac habitasse platea dictumst. Suspendisse eu lectus. Ut mi mi, lacinia sit amet, placerat et, mollis vitae, dui. Sed ante tellus, tristique ut, iaculis eu, malesuada ac, dui. Mauris nibh leo, facilisis non, adipiscing quis, ultrices a, dui.

Morbi luctus, wisi viverra faucibus pretium, nibh est placerat odio, nec commodo wisi enim eget quam. Quisque libero justo, consectetur a, feugiat vitae, porttitor eu, libero. Suspendisse sed mauris vitae elit sollicitudin malesuada. Maecenas ultricies eros sit amet ante. Ut venenatis velit. Maecenas sed mi eget dui varius euismod. Phasellus aliquet volutpat odio. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Pellentesque sit amet pede ac sem eleifend consectetur. Nullam elementum, urna vel imperdiet sodales, elit ipsum pharetra ligula, ac pretium ante justo a nulla. Curabitur tristique arcu eu metus. Vestibulum lectus. Proin mauris. Proin eu nunc eu urna hendrerit faucibus. Aliquam auctor, pede consequat laoreet varius, eros tellus scelerisque quam, pellentesque hendrerit ipsum dolor sed augue. Nulla nec lacus.

Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in, sodales eget, dui. Morbi ultrices rutrum lorem. Nam elementum ullamcorper leo. Morbi dui. Aliquam sagittis. Nunc placerat. Pellentesque tristique sodales est. Maecenas imperdiet lacinia velit. Cras non urna. Morbi eros pede, suscipit ac, varius vel, egestas non, eros.

Praesent malesuada, diam id pretium elementum, eros sem dictum tortor, vel consectetur odio sem sed wisi.

Sed feugiat. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Ut pellentesque augue sed urna. Vestibulum diam eros, fringilla et, consectetur eu, nonummy id, sapien. Nullam at lectus. In sagittis ultrices mauris. Curabitur malesuada erat sit amet massa. Fusce blandit. Aliquam erat volutpat. Aliquam euismod. Aenean vel lectus. Nunc imperdiet justo nec dolor.

Etiam euismod. Fusce facilisis lacinia dui. Suspendisse potenti. In mi erat, cursus id, nonummy sed, ullamcorper eget, sapien. Praesent pretium, magna in eleifend egestas, pede pede pretium lorem, quis consectetur tortor sapien facilisis magna. Mauris quis magna varius nulla scelerisque imperdiet. Aliquam non quam. Aliquam porttitor quam a lacus. Praesent vel arcu ut tortor cursus volutpat. In vitae pede quis diam bibendum placerat. Fusce elementum convallis neque. Sed dolor orci, scelerisque ac, dapibus nec, ultricies ut, mi. Duis nec dui quis leo sagittis commodo.

```
% \tcboxlibrary{skins}
% \newcounter{example}
\newtcolorbox[use counter=example]{FancyTitle}[3][{}{%
  enhanced,colback=blue!10!white,colframe=orange,top=4mm,
  enlarge top by=\baselineskip/2+1mm,
  enlarge top at break by=0mm,pad at break=2mm,
  fontupper=\normalsize,label={#3},
  overlay unbroken and first={%
    \node[rectangle,rounded corners,draw=black,fill=blue!20!white,
      inner sep=1mm,anchor=west,font=\small]
      at ([xshift=4.5mm]frame.north west)
      {\strut\textbf{Example \thetcbcounter: #2}};},
  #1}%

\begin{FancyTitle}{My fancy title}{fancy:title}
  \lipsum[1]
\end{FancyTitle}
```

Example 3: My fancy title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Floating box from `floatplacement`

This floating box is placed at the top of a page.

3.8 Floating Objects

`/tcb/floatplacement`= $\langle values \rangle$ (no default, initially `htb`)

Sets $\langle values \rangle$ as default values for the usage of `float`. Feasible are the usual parameters for floating objects.

```
\tcbset{enhanced,colback=red!5!white,colframe=red!75!black,
  watermark color=red!15!white}

\begin{tcolorbox}[floatplacement=t,float,
  title=Floating box from |floatplacement|,
  watermark text={I am floating}]
  This floating box is placed at the top of a page.
\end{tcolorbox}
```

`/tcb/float`= $\langle values \rangle$ (default from `floatplacement`)

Turns the box to a floating object where $\langle values \rangle$ are the usual parameters for such floating objects. If they are not used, the placement uses the default values given by `floatplacement`.

```
\begin{tcolorbox}[float, title=Floating box from |float|,
  enhanced,watermark text={I'm also floating}]
  This box floats to a feasible place automatically. You do not have to
  use a numbering for this floating object.
\end{tcolorbox}
```

Floating box from `float`

This box floats to a feasible place automatically. You do not have to use a numbering for this floating object.

`/tcb/nofloat` (style, initially set)

Turns the floating behavior off.

3.9 Side by Side

Further side by side options for code examples are `/tcb/listing side text`^{→P.137}, `/tcb/text side listing`^{→P.137}, `/tcb/listing outside text`^{→P.137}, and `/tcb/text outside listing`^{→P.137}.

`/tcb/sidebyside=`*(boolean value)* (default `true`, initially `false`)

Normally, the upper part and the lower part of the box have their positions as their names suggest. If `sidebyside` is set to `true`, the upper part is drawn *left-handed* and the lower part is drawn *right-handed*. Both parts are drawn together with the geometry settings of the upper part but the space is divided horizontally according to the following options. Colors, fonts, and box content additions are used individually. The resulting box is unbreakable.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title,sidebyside]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
```

| My title | |
|------------------------------------------------|-------------------------------------------------|
| This is the upper (<i>left-handed</i>) part. | This is the lower (<i>right-handed</i>) part. |

`/tcb/sidebyside align=`*(alignment value)* (no default, initially `center`)

Sets the vertical alignment for the left-handed and right-handed part. Feasible values are `center`, `top`, and `bottom`.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,nobeforeafter,
left=2mm,right=2mm,sidebyside,sidebyside gap=6mm,width=(\linewidth-2mm)/3}

\begin{tcolorbox}[adjusted title=center,sidebyside align=center]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=top,sidebyside align=top]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=bottom,sidebyside align=bottom]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}
```

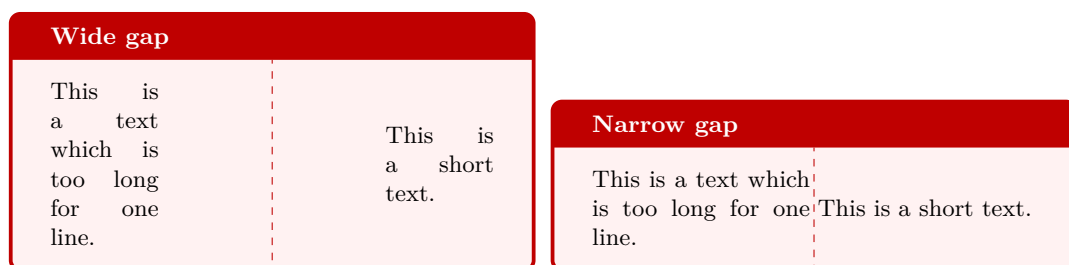
| center | top | bottom |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <div> <div>This is a text which is too long for one line.</div> <div>This is a short text.</div> </div> | <div> <div>This is a text which is too long for one line.</div> <div>This is a short text.</div> </div> | <div> <div>This is a text which is too long for one line.</div> <div>This is a short text.</div> </div> |

`/tcb/sidebyside gap=<length>` (no default, initially 10mm)

Sets the horizontal distance between the left-handed and right-handed part to $\langle length \rangle$.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttttitle=\bfseries,nobeforeafter,
sidebyside,width=(\linewidth-2mm)/2}

\begin{tcolorbox}[adjusted title=Wide gap,sidebyside gap=30mm]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=Narrow gap,sidebyside gap=1mm]
This is a text which is too long for one line.
\tcblower
This is a short text.
\end{tcolorbox}
```

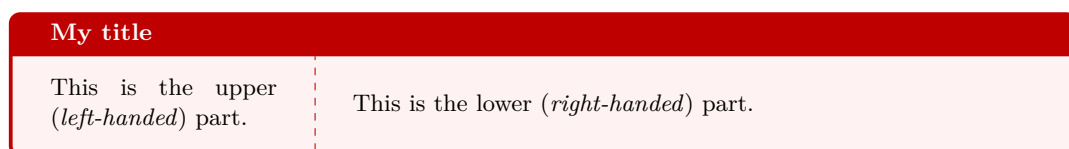


`/tcb/lefthand width=<length>` (no default, initially unset)

Sets the width of the left-handed part to the given $\langle length \rangle$.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttttitle=\bfseries}

\begin{tcolorbox}[title=My title,sidebyside,lefthand width=3cm]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
```



`/tcb/righthand width=<length>` (no default, initially unset)

Sets the width of the right-handed part to the given $\langle length \rangle$.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttttitle=\bfseries}

\begin{tcolorbox}[title=My title,sidebyside,righthand width=3cm]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
```

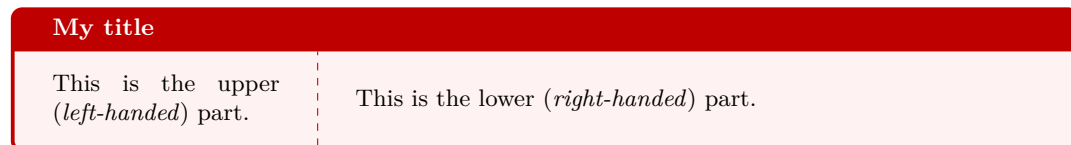


`/tcb/lefthand ratio=<fraction>` (no default, initially 0.5)

Sets the width of the left-handed part to the given $\langle fraction \rangle$ of the available space. $\langle fraction \rangle$ is a value between 0 and 1.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title,sidebyside,lefthand ratio=0.25]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
```



`/tcb/righthand ratio=<fraction>` (no default, initially 0.5)

Sets the width of the right-handed part to the given $\langle fraction \rangle$ of the available space. $\langle fraction \rangle$ is a value between 0 and 1.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title,sidebyside,righthand ratio=0.25]
This is the upper (\textit{left-handed}) part.
\tcblower
This is the lower (\textit{right-handed}) part.
\end{tcolorbox}
```



3.10 Embedding into the Surroundings

Typically, but not necessarily, a `tcolorbox` is put inside a separate paragraph and has some vertical space before and after it. This behavior is controlled by the keys `before` and `after`.

/tcb/before= $\langle code \rangle$ (no default, initially see `/tcb/autoparskip`)
Sets the $\langle code \rangle$ which is executed before the colored box. It is not used for floating boxes.

/tcb/after= $\langle code \rangle$ (no default, initially see `/tcb/autoparskip`)
Sets the $\langle code \rangle$ which is executed after the colored box. It is not used for floating boxes.

/tcb/parskip (style, no value)
Sets the keys `before` and `after` to values which are recommended, if the package `parskip` is used and there is no better idea for `before` and `after`.

```
\tcbset{parskip/.style={before={\par\pagebreak[0]\noindent},
                        after={\par}}}
```

/tcb/noparskip (style, no value)
Sets the keys `before` and `after` to values which are recommended, if the package `parskip` is *not* used and there is no better idea for `before` and `after`.

```
\tcbset{noparskip/.style={before={\par\smallskip\pagebreak[0]\noindent},
                        after={\par\smallskip}}}
```

/tcb/autoparskip (style, no value, initially set)
Tries to detect the usage of the package `parskip` and sets the keys `before` and `after` accordingly. Actually, the following is done:

- If the length of `\parskip` is greater than `0pt` at the begin of the document, `/tcb/parskip` is executed. Here, the usage of package `parskip` is *assumed*.
- Otherwise, if the length of `\parskip` is not greater than `0pt` at the begin of the document, `/tcb/noparskip` is executed. Here, the absence of package `parskip` is *assumed*.

`autoparskip` is the default for the package `tcolorbox`, if `before` or `after` are not changed otherwise.

/tcb/nobeforeafter (style, no value)
Abbreviation for clearing the keys `before` and `after`. The colored box is not put into a paragraph and there is no space before or after the box.

```
\tcbset{myone/.style={colback=LightGreen,colframe=DarkGreen,
                      equal height group=nobefaf,width=\linewidth/4,nobeforeafter}}
\begin{tcolorbox}[myone,title=Box 1]Box 1\end{tcolorbox}%
\begin{tcolorbox}[myone,title=Box 2]Box 2\end{tcolorbox}%
\begin{tcolorbox}[myone,title=Box 3]Box 3\end{tcolorbox}%
\begin{tcolorbox}[myone,title=Box 4]Box 4\end{tcolorbox}%
```

| | | | |
|-------|-------|-------|-------|
| Box 1 | Box 2 | Box 3 | Box 4 |
| Box 1 | Box 2 | Box 3 | Box 4 |

/tcb/baseline= $\langle length \rangle$ (no default, initially `0pt`)
Used to set the `\pgfsetbaseline` value of the resulting `tcolorbox`.

3.11 Bounding Box

Normally, every `tcolorbox` has a bounding box which fits exactly to the dimensions of the outer frame. Therefore, \LaTeX reserves exactly the space needed for the box. This behavior can be changed by enlarging (or shrinking) the bounding box. If the bounding box is enlarged, the `tcolorbox` will get some clearance around it. If the bounding box is shrunk, i. e. enlarged with negative values, the `tcolorbox` will overlap to other parts of the page. For example, the `tcolorbox` could be stretched into the page margin.

`/tcb/enlarge top by=<length>` (no default, initially 0mm)

Enlarges the bounding box distance to the top of the box by `<length>`.

```
\tcbset{colframe=blue!75!black,colback=white}
```

```
\begin{tcolorbox}[enlarge top by=-5mm]
```

```
This is a \textbf{tcolorbox}.
```

```
\end{tcolorbox}
```

```
\begin{tcolorbox}[enlarge top by=5mm]
```

```
This is a \textbf{tcolorbox}.
```

```
\end{tcolorbox}
```

This is a **tcolorbox**.

This is a **tcolorbox**.

`/tcb/enlarge bottom by=<length>` (no default, initially 0mm)

Enlarges the bounding box distance to the bottom of the box by `<length>`.

```
\tcbset{colframe=blue!75!black,colback=white}
```

```
\begin{tcolorbox}[enlarge bottom by=5mm]
```

```
This is a \textbf{tcolorbox}.
```

```
\end{tcolorbox}
```

```
\begin{tcolorbox}[enlarge bottom by=-5mm]
```

```
This is a \textbf{tcolorbox}.
```

```
\end{tcolorbox}
```

This is a **tcolorbox**.

This is a **tcolorbox**.

/tcb/enlarge left by= $\langle length \rangle$ (no default, initially 0mm)
 Enlarges the bounding box distance to the left side of the box by $\langle length \rangle$.

```
\tcbset{colframe=blue!75!black,colback=white}

\begin{tcolorbox}[enlarge left by=2cm,width=\linewidth-2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enlarge left by=-2cm,width=\linewidth+2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

This is a **tcolorbox**.

/tcb/enlarge right by= $\langle length \rangle$ (no default, initially 0mm)
 Enlarges the bounding box distance to the right side of the box by $\langle length \rangle$.

```
\tcbset{colframe=blue!75!black,colback=white}

\begin{tcolorbox}[enlarge right by=-2cm,width=\linewidth+2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[enlarge right by=2cm,width=\linewidth-2cm]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

This is a **tcolorbox**.

This is a **tcolorbox**.

Floating box from toggle enlargement

This page is an odd page. Therefore, the left and right enlargements are not toggled (with some luck; otherwise use `forced`). This box stretches to the right margin on odd pages and to the left margin on even pages. The current document is one-sided – this feature makes sense for two-sided documents only.

`/tcb/toggle enlargement=<toggle preset>` (default `evenpage`, initially `none`)

According to the `<toggle preset>`, the left and the right enlargements of the bounding box are switched or not. Feasible values are:

- `none`: no switching.
- `forced`: the values of the left and right enlargement are switched.
- `evenpage`: if the page is an even page, the values of the left and right enlargement are switched. It is recommended to use this setting in conjunction with `/tcb/check odd page`^{→ P. 63}.

```
% \usepackage{changepage} for 'check odd page'
\tcbset{colframe=blue!75!black,colback=white,
enlarge left by=-20mm,enlarge right by=5mm,width=\linewidth+15mm}

\begin{tcolorbox}[toggle enlargement=none]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[toggle enlargement=forced]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
\begin{tcolorbox}[toggle enlargement=evenpage,check odd page]
This page is an \ifthenelse{\isodd{\thepage}}{odd}{even} page.
Therefore, the left and right enlargements
\ifthenelse{\isodd{\thepage}}{are not}{are} toggled (with some luck).
\end{tcolorbox}
```

This is a `tcolorbox`.

This is a `tcolorbox`.

This page is an odd page. Therefore, the left and right enlargements are not toggled (with some luck).

```
\begin{tcolorbox}[colframe=red!60!black,colback=red!15!white,
fonttitle=\bfseries,title=Floating box from \texttt{toggle enlargement},
width=\textwidth+20mm,enlarge right by=-20mm,
toggle enlargement=evenpage,float=t]
This page is an \ifthenelse{\isodd{\thepage}}{odd}{even} page.
Therefore, the left and right enlargements
\ifthenelse{\isodd{\thepage}}{are not}{are} toggled (with some luck; otherwise
use |forced|). This box stretches to the right margin on odd pages and to the left
margin on even pages. The current document is one-sided -- this feature makes
sense for two-sided documents only.
\end{tcolorbox}
```

`/tcb/shrink tight`

(style, no value, initially unset)

The total colored box is shrunk to the dimensions of the upper part. There should be no lower part and no title. This style sets the `/tcb/boxsep`^{→ P. 19} to 0pt and other geometry keys to fitting values. This option is likely to be used with the following extrusion keys.

```
\tcbset{colframe=blue!75!black,colback=white,arc=0mm,boxrule=0.4pt,
nobeforeafter,tcbbox raise base,shrink tight}
```

```
\begin{tcolorbox}
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

Lorem \tcbbox{ipsum} dolor sit amet, consectetur adipiscing elit.

This is a **tcolorbox**.

Lorem ipsum dolor sit amet, consectetur adipiscing elit.

`/tcb/extrude left by=<length>`

(style, no default, initially unset)

The (upper part of the) colored box is extruded by the given `<length>` to the left side. The inner width and the bounding box is kept unchanged and the operation is additive!

```
\tcbset{enhanced,colframe=red,colback=yellow!25!white,
frame style={opacity=0.25},interior style={opacity=0.5},
nobeforeafter,tcbbox raise base,shrink tight,extrude by=2mm}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.

\tcbbox[extrude left by=1cm]{Curabitur} dictum gravida mauris.

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.

`/tcb/extrude right by=<length>`

(style, no default, initially unset)

The (upper part of the) colored box is extruded by the given `<length>` to the right side. The inner width and the bounding box is kept unchanged and the operation is additive!

```
\tcbset{enhanced,colframe=red,colback=yellow!25!white,
frame style={opacity=0.25},interior style={opacity=0.5},
nobeforeafter,tcbbox raise base,shrink tight,extrude by=2mm}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.

\tcbbox[extrude right by=1cm]{Curabitur} dictum gravida mauris.

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.

/tcb/extrude top by= $\langle length \rangle$ (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given $\langle length \rangle$ to the top side. The inner width and the bounding box is kept unchanged and the operation is additiv!

```
\tcbset{enhanced,colframe=red,colback=yellow!25!white,  
  frame style={opacity=0.25},interior style={opacity=0.5},  
  nobeforeafter,tcbbox raise base,shrink tight,extrude by=2mm}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.

\tcbbox[extrude top by=1cm]{Curabitur} dictum gravida mauris.

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.

/tcb/extrude bottom by= $\langle length \rangle$ (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given $\langle length \rangle$ to the bottom side. The inner width and the bounding box is kept unchanged and the operation is additiv!

```
\tcbset{enhanced,colframe=red,colback=yellow!25!white,  
  frame style={opacity=0.25},interior style={opacity=0.5},  
  nobeforeafter,tcbbox raise base,shrink tight,extrude by=2mm}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis.

\tcbbox[extrude bottom by=1cm]{Curabitur} dictum gravida mauris.

Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna.

/tcb/extrude by= $\langle length \rangle$ (style, no default, initially unset)

The (upper part of the) colored box is extruded by the given $\langle length \rangle$ to all sides. The inner width and the bounding box is kept unchanged and the operation is additiv!

```
\tcbset{enhanced,colframe=red,colback=yellow!25!white,  
  frame style={opacity=0.25},interior style={opacity=0.5},  
  nobeforeafter,tcbbox raise base,shrink tight,extrude by=2mm}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. \tcbbox{Curabitur} dictum gravida mauris. \tcbbox[colframe=Green,interior style={opacity=0.0}]{Nam} arcu libero, nonummy eget, consectetur id, \tcbbox{vulputate} a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. \tcbbox{Mauris ut leo.}

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo.

3.12 Layered Boxes and Every Box Settings

A `tcolorbox` may contain another `tcolorbox` and so on. The package takes track of the nesting level using a counter `tcblayer`. Counter values may be used for doing some fancy things, but you should never change the counter value yourself.

The package takes special care for the first four layers or nesting levels, called managed layers. Here, footnote texts are administrated to find their intended place and specific layer dependent options may be set by changing `/tcb/every box on layer n`^{→P.57}. If needed, the number of managed layers can be increased by setting `\tcbsetmanagedlayer`^{→P.57} to a higher value than 4.

The following styles have a considerable influence on how layered boxes are processed. Note especially that nested boxes are getting a `/tcb/reset`^{→P.64} by default. You can change this, but be prepared for surprises if you do.

If the defaults are *not changed*, a `tcolorbox` gets its options in the following order. Following options overwrite preceding options.

1. On package load, all options are set to default values.
2. Every `\tcbset`^{→P.8} command adds or changes options for the following boxes inside the current \TeX group.
3. While entering a `tcolorbox`, a `/tcb/every box on layer n`^{→P.57} or `/tcb/every box on higher layers`^{→P.57} option list is applied. With default settings this means:
 - For layer 1 (lowest layer), the `/tcb/every box` option list is applied. Not overwritten options given by a preceding `\tcbset`^{→P.8} survive.
 - For layer 2 and above (nested boxes), a `/tcb/reset`^{→P.64} followed by `/tcb/every box` option list is applied. Every resettable options given by a preceding `\tcbset`^{→P.8} and by the surrounding box(es) are reset.
4. The `<options>` given to the `tcolorbox` are applied. Or, if the box was generated by `\newtcolorbox`^{→P.9} or friends, the `<options>` given there are applied.
5. If the box was generated by `\newtcolorbox`^{→P.9} or friends, some automated options are applied.

`/tcb/every box` (style)

By default, this style is empty.

```
% default setting:  
\tcbset{every box/.style={}}
```

It may be changed by redefining this style.

```
% setting all boxes to be enhanced:  
\tcbset{every box/.style={enhanced}}
```


`/tcb/every box on layer n` (style)

Here, n has to be replaced by a number ranging from 1 to the highest managed layer number (4 by default).

```
% default settings:
\tcbset{
  every box on layer 1/.style={every box},
  every box on layer 2/.style={reset,every box},
  every box on layer 3/.style={reset,every box},
  every box on layer 4/.style={reset,every box},
}
```

`/tcb/every box on higher layers` (style)

Higher layers are layers above the highest managed layer number (4 by default).

```
\tcbset{every box on higher layers/.style={reset,every box}}
```

`\tcbsetmanagedlayer{⟨number⟩}`

Replaces the highest managed layer number by $\langle number \rangle$ where 4 is the default. This macro can only be used inside the preamble. Using a $\langle number \rangle$ lower than 4 typically makes no sense, but is not forbidden.

```
% \usepackage{lipsum}
% \tcbuselibrary{skins,breakable}
\tcbset{enhanced,breakable,colframe=red!75!black,fonttitle=\bfseries,
  colback=red!5!white,
  every box/.style={enhanced,watermark text=\thetcbbox,
    before=\par\smallskip,after=\par\smallskip},
  every box on layer 2/.style={reset,every box,colback=yellow!10!white,
    drop fuzzy shadow}}
\begin{tcolorbox}[title=Layer 1 Box]
Here comes a footnote\footnote{Footnote from layer 1 box}.
\lipsum[2]
\begin{tcolorbox}[title=Layer 2 Box]
abc\footnote{The footnote of abc}
\end{tcolorbox}
\begin{tcolorbox}[title=Another Box,ams equation]
\tcbhighmath{\sum\limits_{n=1}^{\infty} \frac{1}{n}} = \infty.
\end{tcolorbox}
Some text\footnote{Footnote from some text}.
\begin{tcolorbox}[title=Yet Another Box]
\tcbboxfit[height=2cm]{\lipsum[1]}
My text.
\begin{tcolorbox}
Another lipsum text\footnote{A lipsum text}. \lipsum[3]
\begin{tcolorbox}[title=Layer 4,colframe=blue,colback=white]
Layer 4\footnote{Layer 4 footnote}
\end{tcolorbox}
The End\footnote{Last footnote}.
\end{tcolorbox}
\end{tcolorbox}
\end{tcolorbox}
```

Layer 1 Box

Here comes a footnote^a. Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies

et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Layer 2 Box

abc^a

^aThe footnote of abc

2

Another Box

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty.$$

(1)

Some text^b.

Yet Another Box

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

My text.

Another lipsum text^a. Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Layer 4

Layer 4^a

^aLayer 4 footnote

4

The End^b.

^aA lipsum text

^bLast footnote

^aFootnote from layer 1 box

^bFootnote from some text

3.13 Capture Mode

/tcb/capture= $\langle mode \rangle$ (no default, initially minipage)

The capture $\langle mode \rangle$ defines how the box content is processed.

Feasible values for $\langle mode \rangle$ are:

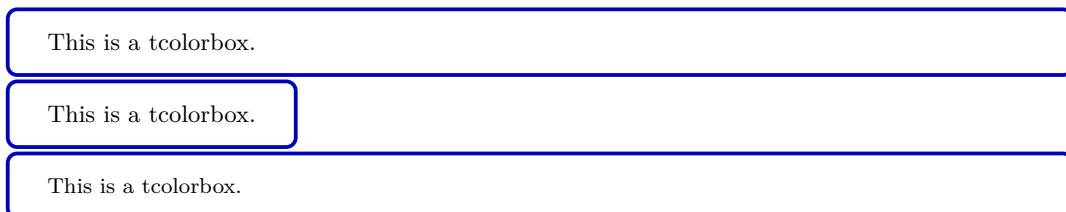
- **minipage**:
This is the default $\langle mode \rangle$ for `tcolorbox`^{P.7}. The content may have an upper and a lower part. Optionally, the box can be `/tcb/breakable`^{P.167}. The box content is put into a minipage or into something similar to a minipage.
- **hbox**:
This is the default $\langle mode \rangle$ for `\tcbox`^{P.8}. The content cannot have a lower part and cannot be broken. The colored box is sized according to the dimensions of the content. A shortcut to set this mode is `/tcb/hbox`.
- **fitbox**: (needs the `fitting` library)
This is the default $\langle mode \rangle$ for `\tcboxfit`^{P.176}. The content cannot have a lower part and cannot be broken. The content is sized according to the dimensions of the colored box. A shortcut to set this mode is `/tcb/fit`^{P.178}.

```
\tcbset{colframe=blue!75!black,colback=white}

\begin{tcolorbox}[capture=minipage]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[capture=hbox]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[capture=fitbox,height=9mm]% needs the 'fitting' library
This is a tcolorbox.
\end{tcolorbox}
```

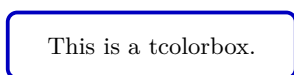


/tcb/hbox (style, no default)

Shortcut for capture=hbox.

```
\tcbset{colframe=blue!75!black,colback=white}

\begin{tcolorbox}[hbox]
This is a tcolorbox.
\end{tcolorbox}
```



/tcb/minipage (style, no default)

Shortcut for capture=minipage.

3.14 Text Characteristics

`/tcb/parbox=<boolean value>` (default `true`, initially `true`)

The text inside a `tcolorbox` is formatted using a `LaTeX minipage` if the box is unbreakable. If breakable, the box tries a mimicry of a `minipage`. In a `minipage` or `parbox`, paragraphs are formatted slightly different as the main text. If the key value is set to `false`, the normal main text behavior is restored. In some situations, this has some unwanted side effects. It is recommended to use this experimental setting only where you really want to have this feature.

```
% \usepackage{lipsum} % preamble
\tcbset{width=(\linewidth-2mm)/2,nobeforeafter,arc=1mm,
  colframe=blue!75!black,colback=white,fonttitle=\bfseries,fontupper=\small,
  left=2mm,right=2mm,top=1mm,bottom=1mm,equal height group=parbox}

\begin{tcolorbox}[parbox,adjusted title={parbox=true (normal)}]
  \lipsum[1-2]
\end{tcolorbox}\hfill%
\begin{tcolorbox}[parbox=false,adjusted title={parbox=false}]
  \lipsum[1-2]
\end{tcolorbox}%
```

parbox=true (normal)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum. Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

parbox=false

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

3.15 Files

/tcb/tempfile= $\langle file\ name \rangle$ (no default, initially `\jobname.tcbtemp`)
Sets $\langle file\ name \rangle$ as name for the temporary file which is used inside `tcbwritetemp`^{→ P. 70}
and `\tcbusetemp`^{→ P. 70} implicitly.

3.16 \tcbbox Specials

The following options are applicable for `\tcbbox`^{→ P. 8} and `\tcbboxmath`^{→ P. 152} only.

/tcb/tcbbox raise= $\langle length \rangle$ (no default, initially 0pt)
Raises the `\tcbbox`^{→ P. 8} by the given $\langle length \rangle$.

```
\tcbset{colframe=blue!50!black,colback=white,colupper=red!50!black,  
fonttitle=\bfseries,before=,after=,center title}
```

```
Test\dotfill  
\tcbbox[tcbbox raise base]{Hello World 1}\dotfill  
\tcbbox{Hello World 2}\dotfill  
\tcbbox[tcbbox raise=5mm]{Hello World 3}
```

Test Hello World 1 Hello World 2 Hello World 3

/tcb/tcbbox raise base (style, no value, initially unset)
Raises the `\tcbbox`^{→ P. 8} such that the base of its content matches the base of the environmental line; see example above.

3.17 Skins

There are additional option keys which change the appearance of a `tcolorbox`. If only the core package is used, there is only one *skin* and these keys are meaningless. The library `\tcb skins` adds more skins. The appropriate option keys for skins of the core package are therefore described in section 6.1 from page 71.

3.18 Counters, Labels and References

/tcb/phantom= $\langle code \rangle$ (no default, initially unset)

The $\langle code \rangle$ is put in a box at the upper left corner of the `tcolorbox`. If the `tcolorbox` is breakable, the $\langle code \rangle$ is executed for the first box of the break sequence only. If there already was some phantom code given, the new $\langle code \rangle$ is appended.

The $\langle code \rangle$ is intended to be used for counter stepping, labelling, and related operations which do not produce visible text.

- The $\langle code \rangle$ is executed before the title and box content, i. e. counter values are ensured to be increased before usage.
- Labels are ensured to reference the correct page number.
- The $\langle code \rangle$ is executed only once even during fitting operations for title and box content.
- In combination with the `hyperref` package, the hyper anchor is set to the upper left corner of the `tcolorbox`, i. e. links inside the pdf document will jump to the box pleasantly.
- Since the $\langle code \rangle$ is executed inside a \TeX group, only global operations can survive this group.

Examples for the `phantom` usage are given in Section 7.8 from page 145, e. g. Example 7.1 on page 146.

/tcb/nophantom (no value, initially set)

Removes the phantom code if set before.

/tcb/label= $\langle marker \rangle$ (no default, initially unset)

The $\langle marker \rangle$ is set as label text for a reference with the `\ref` macro. Typically, this option is used for numbered boxes, see Subsection 4.1 from page 65, e. g. `/tcb/new/automaticcounter`^{→ P. 65}.

/tcb/label type= $\langle type \rangle$ (no default, initially unset)

This option key can be used only in conjunction with the `cleveref` package [4] which has to be loaded separately. $\langle type \rangle$ has to be a cross-reference type *known* to `cleveref` like `theorem`, `algorithm`, `result`, etc. References made with `cleveref` will use this type. Note that using `label type` will result in compilation errors, if `cleveref` is not loaded. For an example, see Theorem 8.3.5 on page 162.

/tcb/no label type (no value, initially set)

Removes a `/tcb/label type`, if set before.

/tcb/step= $\langle counter \rangle$ (no default, initially unset)

Shortcut for `phantom={\refstepcounter{#1}}`. The given $\langle counter \rangle$ is increased and ready for labelling. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 4.1 from page 65.

/tcb/step and label= $\{\langle counter \rangle\}\{\langle marker \rangle\}$ (no default, initially unset)

Shortcut for using `/tcb/step` and `/tcb/label`. This option is not needed when using the convenient automated numbering introduced with version 2.40, see Subsection 4.1 from page 65.

`/tcb/list entry=<text>` (no default, initially unset)

If the «list of tcolorbox(es)» feature described in Subsection 4.2 from page 69 is used, this key describes the *<text>* for an entry into the generated list, e. g.

```
list entry={\numberline{\thetcbcounter}My beautiful Example}
```

See Section 7.8 from page 145 for a complete example.

`/tcb/add to list={<list>}{<type>}` (no default, initially unset)

If the «list of tcolorbox(es)» feature described in Subsection 4.2 from page 69 is used, list entries are generated automatically. With this key, you can enforce an entry to the given *<list>* with the given *<type>*. This issues:

```
\addcontentsline{<list>}{<type>}{<entry text>}
```

`/tcb/check odd page=<boolean value>` (default `true`, initially `false`)

If set to `true`, the even/odd page testing from the package `changepage` is applied. The `/tcb/toggle enlargement`^{→ P. 53} check and the `/tcb/toggle left and right`^{→ P. 25} check will use the `\ifoddpaper` macro from this package. This options is independent from `/tcb/phantom`^{→ P. 62}. Note that you have to include the package `changepage` by hand²:

```
\usepackage{changepage}  
\strictpagecheck
```

The macro `\ifoddpaper` can be used inside overlay or watermark code to test if the box is on an odd page. This will work also for boxes in a break sequence. Note that you cannot use the test inside the normal box content.

```
% \usepackage{changepage}  
\tcbset{colframe=blue!75!black,colback=white}  
  
\begin{tcolorbox}[enhanced,check odd page,  
  watermark text={\ifoddpaper Odd\else Even\fi\ page!}]  
\lipsum[1]  
\end{tcolorbox}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

²If `changepage` is not included, a compilation error will arise.

3.19 Externalization

If the *externalization* library of the `tikz` package is used and `/tcb/graphical environment`^{→P.72} is set to `tikzpicture`, a `tcolorbox` could trigger the externalization process which will arise a compilation error.

To avoid this, there are two possible strategies:

- Ensure, that `\tikzexternaldisable` is set before a `tcolorbox` is used. If you typically use the pattern `\tikzexternalenable some picture \tikzexternaldisable`, there is nothing to care about.
- If *externalization* is enabled globally, use `/tcb/shield externalize` to shield any `tcolorbox`. The preamble code could look like this:

```
\usetikzlibrary{external}  
\tikzexternalize  
\tcbset{shield externalize}
```

`/tcb/shield externalize=`*<boolean value>* (default `true`, initially `false`)

If set to `true`, the drawing part of the `tcolorbox` is not being externalized which is a good thing at the current state of art. Nevertheless, if the `tcolorbox` contains a `tikzpicture`, this picture is still externalized. Pictures drawn with help of `/tcb/tikz upper`^{→P.39} or alike are *not* externalized.

If a `tcolorbox` is used inside a node of an encircling `tikzpicture` which is externalized, do *not* use `\tikzexternaldisable` in front of the `tcolorbox`. `/tcb/shield externalize` is deactivated automatically inside a `tikzpicture`.

3.20 Miscellaneous

`/tcb/reset` (no value, initially set)

Sets (nearly) all `tcolorbox` settings (including loaded libraries) back to their default values. `/tcb/savedelimiter`^{→P.14} and `/tcb/capture`^{→P.59} keep their values. This option is useful for boxes in boxes where the inner box should not inherit the settings of the outer box. Note that for boxes inside boxes the `reset` is done automatically, if the standard settings of the package are used (v2.40 and above), see Section 3.12 from page 56.

4 Initialization Option Keys

The *initialization* options are only applicable for the generation of new environments and commands based on `tcolorbox` and friends. Particularly, they can be used for

- `\newtcolorbox`^{→P.9},
- `\newtcbox`^{→P.10},
- `\newtcblisting`^{→P.130},
- `\newtcbinputlisting`^{→P.131},
- `\newtcbtheorem`^{→P.151}, and
- `\newtcbboxfit`^{→P.177}.

Typically, these options may generate counters and alike. It is **strongly** recommended to use initialization options inside the preamble only. Otherwise, you may get trouble when using L^AT_EX's `\include` features.

4.1 Numbered Boxes

Counters assigned using the initialization options are administrated automatically. Especially, they are increased for each new box. Independent from the real counter name, the counter value can be referenced by `\thetcbcounter`, e.g. inside the title of the box. The real counter name is stored inside `\tcbcounter`.

/tcb/new/auto counter

(no value, initially unset)

Creates a new counter automatically. With `/tcb/new/number format`^{→P.67} and `/tcb/new/number within`^{→P.67}, the appearance and behavior of the counter can be changed. The counter value is referenced by `\thetcbcounter`.

Definition in the preamble:

```
\newtcolorbox[auto counter,number within=section]{pabox}[2][]{%  
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,  
  title=Examp.~\thetcbcounter: #2,#1}
```

```
\begin{pabox}[label={myautocounter}]{Title with number}  
This box is automatically numbered with \ref{myautocounter} on page  
\pageref{myautocounter}. Inside the box, the \thetcbcounter\ can  
also be referenced by |\thetcbcounter|.   
The real counter name is \texttt{\tcbcounter}.  
\end{pabox}
```

Examp. 4.1: Title with number

This box is automatically numbered with 4.1 on page 65. Inside the box, the 4.1 can also be referenced by `\thetcbcounter`. The real counter name is `tcb@cnt@pabox`.

`/tcb/new/use counter from=<tclobox>` (no default, initially unset)

Here, a counter from another `<tclobox>` is reused. Note that the setting for `/tcb/new/number format`^{→ P.67} and `/tcb/new/number within`^{→ P.67} are inherited and cannot be changed. The counter value is referenced by `\thetcbcounter`.

```
\newtcolorbox[use counter from=pabox]{mybox}[2][]{%
colback=blue!5!white,colframe=blue!75!black,fonttitle=\bfseries,
title=Some Box \thetcbcounter: #2,#1}

\begin{mybox}[label={myusecounterfrom}]{Title with continued number}
This box is automatically numbered with \ref{myusecounterfrom} on page
\pageref{myusecounterfrom}. Inside the box, the \thetcbcounter\ can
also be referenced by |\thetcbcounter|.
The real counter name is \texttt{\tcbcounter}.
\end{mybox}
```

Some Box 4.2: Title with continued number

This box is automatically numbered with 4.2 on page 66. Inside the box, the 4.2 can also be referenced by `\thetcbcounter`. The real counter name is `tcb@cnt@pabox`.

`/tcb/new/use counter=<counter>` (no default, initially unset)

Here, an ordinary existing L^AT_EX counter is used for numbering. With `/tcb/new/number format`^{→ P.67} and `/tcb/new/number within`^{→ P.67}, the appearance and behavior of the counter can be changed. The counter value is referenced by `\thetcbcounter`.

```
% \newcounter{myexample}% preamble
\newtcolorbox[use counter=myexample,number format=Alph]{mybox}[2][]{%
colback=green!5!white,colframe=green!55!black,fonttitle=\bfseries,
title=Some Box \thetcbcounter: #2,#1}

\begin{mybox}[label={myusecounter}]{Title with \LaTeX\ number}
This box is automatically numbered with \ref{myusecounter} on page
\pageref{myusecounter}. Inside the box, the \thetcbcounter\ can
also be referenced by |\thetcbcounter|.
The real counter name is \texttt{\tcbcounter}.
\end{mybox}
```

Some Box A: Title with L^AT_EX number

This box is automatically numbered with A on page 66. Inside the box, the A can also be referenced by `\thetcbcounter`. The real counter name is `myexample`.

`/tcb/new/no counter` (no value, initially set)

The created boxes are not numbered. This is the default. The option may be used to overrule a previous option.

`/tcb/new/number within=<counter>` (no default, initially unset)

The automatic counter is set to zero, if `<counter>` is increased. Additionally, during output, the value of `<counter>` is prepended to the value of the automatic counter.

To prepend the automatic counter with the chapter number and to reset it with every new chapter, use:

```
number within=chapter
```

See `/tcb/new/use counter`^{→ P.66} for a complete example.

`/tcb/new/number format=<format macro>` (no default, initially `\arabic`)

Declares the format of the automatic counter. The `<format macro>` can be any valid L^AT_EX number formatting macro like `\arabic`, `\roman`, etc.

To display the counter value in large roman numbers, use:

```
number format=\Roman
```

See `/tcb/new/auto counter`^{→ P.65} for a complete example.

`/tcb/new/number freestyle=<code>` (no default, initially unset)

Allows advanced control over the complete number format. This option overrules the format given by `/tcb/new/number within` and `/tcb/new/number format`. Nevertheless, you can combine it with `/tcb/new/number within` to get the desired reset property.

The `<code>` is some formatting code which should contain `\tcbcounter` to reference the automated counter. Since this `<code>` is expanded, you have to secure each macro with `\noexpand` with exception of `\tcbcounter`.

Definition in the preamble:

```
\newcolorbox[auto counter,number within=section,
  number freestyle={(Q/\noexpand\thesection/\noexpand\Alph{\tcbcounter})},
]{phbox}[2][\%
colback=yellow!15!white,colframe=blue!75!black,fonttitle=\bfseries,
title=Question~\thetcbcounter: #2,#1}
```

```
\begin{phbox}[label={myfreestyle}]{Title with freestyle number}
This box is automatically numbered with \ref{myfreestyle} on page
\pageref{myfreestyle}. Inside the box, the \thetcbcounter can
also be referenced by |\thetcbcounter|.
The real counter name is \texttt{\tcbcounter}.
\end{phbox}
```

Question (Q/4/A): Title with freestyle number

This box is automatically numbered with (Q/4/A) on page 67. Inside the box, the (Q/4/A) can also be referenced by `\thetcbcounter`. The real counter name is `tcb@cnt@phbox`.

/tcb/new/crefname= $\{\langle singular \rangle\}\{\langle plural \rangle\}$ (no default, initially unset)

This option key can be used only in conjunction with the **cleveref** package [4] which has to be loaded separately. It creates a cross-reference type for the new **tcolorbox**'es, where the lowercase $\langle singular \rangle$ and $\langle plural \rangle$ forms of the cross-reference are given. See **/tcb/label type**^{→ P. 62} and [4] for more information.

/tcb/new/Crefname= $\{\langle singular \rangle\}\{\langle plural \rangle\}$ (no default, initially unset)

This option key can be used only in conjunction with the **cleveref** package [4] which has to be loaded separately. It creates a cross-reference type for the new **tcolorbox**'es, where the uppercase $\langle singular \rangle$ and $\langle plural \rangle$ forms of the cross-reference are given. See **/tcb/label type**^{→ P. 62} and [4] for more information.

4.2 Lists of tcolorboxes

For figures and tables, L^AT_EX provides the `\listoffigures` and `\listoftables` commands to create lists of these numbered entities. Also, a `tcolorbox` can be part of such a kind of list.

1. Assign a list $\langle name \rangle$ by the *initialization* option `/tcb/new/list inside`.
2. Optionally, a new $\langle type \rangle$ for list entries may be assigned by the *initialization* option `/tcb/new/list type`.
3. List entries are generated automatically within each new `tcolorbox` using the above initialization.
 - If `/tcb/list entry`^{→ P.63} is set, the entry is generated with it.
 - Otherwise, if `/tcb/title`^{→ P.11} is set, the entry is generated with it.
 - Otherwise, the entry is generated with the current number and the environment name.
4. The generated list is displayed by `\tcblistof`.

`/tcb/new/list inside`= $\langle name \rangle$ (no default, initially unset)
 Assigns a list or contents file to the generated `tcolorboxes`. Entries to this list are saved to a file which gets the $\langle name \rangle$ as file name extension. The list is referenced by this name in `\tcblistof`. For example:

```
list inside=exam
```

See Section 7.8 from page 145 for a complete example.

`/tcb/new/list type`= $\langle type \rangle$ (no default, initially `tcolorbox`)
 Optionally, some $\langle type \rangle$ can be assigned to the list entries. For a new $\langle type \rangle$, a macro `\l@ $\langle type \rangle$` has to exist which controls the format of the list entry. The default type is defined by

```
\newcommand*\l@tcolorbox{\@dottedtocline{1}{1.5em}{2.3em}}
```

This is identical to the `\l@section` setting of L^AT_EX. `\l@tcolorbox` can be redefined or a new $\langle type \rangle$ can be assigned.

`\tcblistof`[$\langle macro \rangle$]{ $\langle name \rangle$ }{ $\langle title text \rangle$ }

Displays the generated list of `tcolorboxes` with the given $\langle name \rangle$. The heading is generated by $\langle macro \rangle$ { $\langle title text \rangle$ } where `\section` is the default setting for $\langle macro \rangle$.

To display the list inside a subsection, use for example:

```
\tcblistof[\subsection]{exam}{List of Exercises}
```

The result of the example is found as Subsection 7.9 on page 148.

The core of the list is generated by `\@starttoc`{ $\langle name \rangle$ } which can be wrapped into an own macro.

5 Saving and Loading of Verbatim Texts

The following macros are slightly modified versions of the original macros from the known packages `moreverb` and `verbatim`. They are used implicitly inside of a `tcolorbox` environment, but they can be used outside also.

```
\begin{tcbverbatimwrite}{\file name}  
  \environment content  
\end{tcbverbatimwrite}
```

Saves the `\environment content` to a file named by `\file name`. `TeX` macros inside the environment are not expanded.

```
\begin{tcbverbatimwrite}{\jobname_verbexp.tex}  
  This text is saved \textit{as is}.  
\end{tcbverbatimwrite}
```

```
Now, we are using the file:\par  
\input{\jobname_verbexp.tex}
```

Now, we are using the file:
This text is saved *as is*.

This environment may be used inside an own environment. Note, that inside the environment definition `\tcbverbatimwrite` has to be used instead of `\begin{tcbverbatimwrite}` and `\end{tcbverbatimwrite}` instead of `\end{tcbverbatimwrite}`.

```
\newenvironment{myverbatim}{%  
  \begin{tcbverbatimwrite}{\jobname_myverb.tex}%  
  {\end{tcbverbatimwrite}\endgroup}
```

```
\begin{myverbatim}  
  This is the text which is saved by my own environment.  
\end{myverbatim}
```

```
Now, we are using the file:\par  
\input{\jobname_myverb.tex}
```

Now, we are using the file:
This is the text which is saved by my own environment.

```
\begin{tcbwritetemp}  
  \environment content  
\end{tcbwritetemp}
```

Has the same function as `tcbverbatimwrite`, but uses the key value of `tempfile` for the file name.

```
\begin{tcbwritetemp}  
  This text is saved \textit{as is}.  
\end{tcbwritetemp}
```

```
Now, we are using the file:\par  
\tcbusetemp
```

Now, we are using the file:
This text is saved *as is*.

```
\tcbusetemp
```

Loads the current temporary file which was saved by `tcbwritetemp`.


6 Library

The library is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{skins}
```

This also loads the package `tikz` [17]. Typically but not necessarily, the following skins use `tikz` instead of `pgf`.

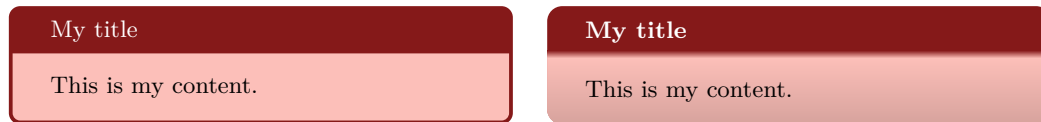
6.1 Technical Overview and Core Package Option Keys

From a technical point of view, a *skin* is a style definition for the appearance of a `tcolorbox`. The core package provides some additional option keys for skins but only a single skin called `standard`^{P. 98}. The  library adds several more skins. To change a skin, only one option from the core package has to be set.

/tcb/skin= $\langle name \rangle$ (style, no default, initially `standard`)
Sets the current skin to $\langle name \rangle$. This is a style definition which sets all the following keys, i.e. for many use cases there is nothing more to do.

```
\tcbset{colback=Salmon!50!white,colframe=FireBrick!75!black,
width=(\linewidth-8mm)/2,before=,after=\hfill,equal height group=ske}

\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}
\begin{tcolorbox}[skin=beamer,beamer,adjusted title=My title]
  This is my content.
\end{tcolorbox}
```



On first read, you may skip the rest of this subsection and proceed to Subsection 6.2 on page 74. All following keys in this subsection are automatically set by the selected skin and you may never have to temper with them. Nevertheless, they can be used after a skin was selected to modify this skin.

/tcb/skin first= $\langle name \rangle$ (style, no default, initially `standard`)
If the box is set to be `/tcb/breakable`^{P. 167} and *is* broken actually, then the skin for the *first* part of the break sequence is set to $\langle name \rangle$, see Subsection 9.5 on page 171. Typically, this key is set by a `/tcb/skin`.

/tcb/skin middle= $\langle name \rangle$ (style, no default, initially `standard`)
If the box is set to be `/tcb/breakable`^{P. 167} and *is* broken actually, then the skin for the *middle* parts (if any) of the break sequence is set to $\langle name \rangle$, see Subsection 9.5 on page 171. Typically, this key is set by a `/tcb/skin`.

/tcb/skin last= $\langle name \rangle$ (style, no default, initially `standard`)
If the box is set to be `/tcb/breakable`^{P. 167} and *is* broken actually, then the skin for the *last* part of the break sequence is set to $\langle name \rangle$, see Subsection 9.5 on page 171. Typically, this key is set by a `/tcb/skin`.

/tcb/graphical environment= $\langle name \rangle$ (no default, initially **pgfpicture**)

Sets the graphical environment for the **tcolorbox** to $\langle name \rangle$. Feasible values are **pgfpicture** and **tikzpicture** or environments which inherit from one of these two. This key is set by a **/tcb/skin**^{→P.71} and may seldom be used directly.

The skin of a **tcolorbox** is drawn by up to four *engines*. Afterwards, the text content is drawn which is not part of a skin. The four steps are:

1. The *frame* of the box.
2. The *interior* of the box. The interior of a box with title is drawn differently from a box without title.
3. The *segmentation* (line) of the box, if there is a lower part.
4. The *title area* of the box, if there is a title.

Every engine for the up to four steps can be set to one of the following types:

1. **standard**: the original code from the core package.
2. **path**: a **tikz** path which can be controlled by options.
3. **pathfirst**: a **tikz** path which can be controlled by options.
4. **pathmiddle**: a **tikz** path which can be controlled by options.
5. **pathlast**: a **tikz** path which can be controlled by options.
6. **freelance**: arbitrary user code.

/tcb/frame engine= $\langle name \rangle$ (no default, initially **standard**)

Sets the *frame* drawing engine for a box to $\langle name \rangle$. Typically, this key is set by a **/tcb/skin**^{→P.71}. Feasible values for $\langle name \rangle$ are:

- **standard**: the original code from the core package,
- **path**: a **tikz** path which is controlled by **/tcb/frame style**^{→P.74},
- **pathfirst**: a **tikz** path which is controlled by **/tcb/frame style**^{→P.74},
- **pathmiddle**: a **tikz** path which is controlled by **/tcb/frame style**^{→P.74},
- **pathlast**: a **tikz** path which is controlled by **/tcb/frame style**^{→P.74},
- **freelance**: arbitrary user code which is given by **/tcb/frame code**^{→P.77}.

/tcb/interior titled engine= $\langle name \rangle$ (no default, initially **standard**)

Sets the *interior* drawing engine for a titled box to $\langle name \rangle$. Typically, this key is set by a **/tcb/skin**^{→P.71}. Feasible values for $\langle name \rangle$ are:

- **standard**: the original code from the core package,
- **path**: a **tikz** path which is controlled by **/tcb/interior style**^{→P.74},
- **pathfirst**: a **tikz** path which is controlled by **/tcb/interior style**^{→P.74},
- **pathmiddle**: a **tikz** path which is controlled by **/tcb/interior style**^{→P.74},
- **pathlast**: a **tikz** path which is controlled by **/tcb/interior style**^{→P.74},
- **freelance**: arbitrary user code which is given by **/tcb/interior titled code**^{→P.77}.

/tcb/interior engine= $\langle name \rangle$ (no default, initially **standard**)

Sets the *interior* drawing engine for an untitled box to $\langle name \rangle$. Typically, this key is set by a **/tcb/skin**^{→P.71}. Feasible values for $\langle name \rangle$ are:

- **standard**: the original code from the core package,
- **path**: a **tikz** path which is controlled by **/tcb/interior style**^{→P.74},
- **pathfirst**: a **tikz** path which is controlled by **/tcb/interior style**^{→P.74},
- **pathmiddle**: a **tikz** path which is controlled by **/tcb/interior style**^{→P.74},
- **pathlast**: a **tikz** path which is controlled by **/tcb/interior style**^{→P.74},
- **freelance**: arbitrary user code which is given by **/tcb/interior code**^{→P.78}.

/tcb/segmentation engine= $\langle name \rangle$ (no default, initially **standard**)

Sets the *segmentation* (line) drawing engine for a box to $\langle name \rangle$. Typically, this key is set by a **/tcb/skin**^{→P.71}. Feasible values for $\langle name \rangle$ are:

- **standard**: the original code from the core package,
- **path**: a tikz path which is controlled by **/tcb/segmentation style**^{→P.75},
- **freelance**: arbitrary user code which is given by **/tcb/segmentation code**^{→P.78}.

/tcb/title engine= $\langle name \rangle$ (no default, initially **standard**)

Sets the *title area* drawing engine for a titled box to $\langle name \rangle$. Typically, this key is set by a **/tcb/skin**^{→P.71}. Feasible values for $\langle name \rangle$ are:

- **standard**: the original code from the core package,
- **path**: a tikz path which is controlled by **/tcb/title style**^{→P.76},
- **pathfirst**: a tikz path which is controlled by **/tcb/title style**^{→P.76},
- **pathmiddle**: a tikz path which is controlled by **/tcb/title style**^{→P.76},
- **pathlast**: a tikz path which is controlled by **/tcb/title style**^{→P.76},
- **freelance**: arbitrary user code which is given by **/tcb/title code**^{→P.79}.

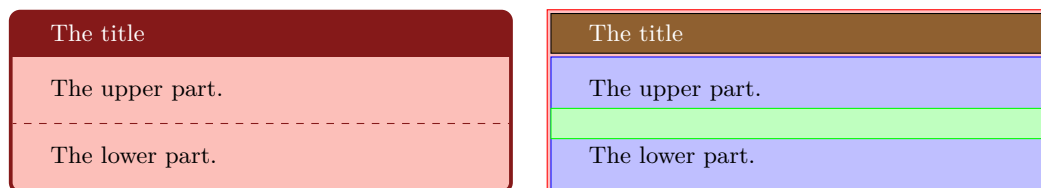
/tcb/geometry nodes= $\langle boolean value \rangle$ (default **true**, initially **false**)

If set to **true**, up to four tikz nodes are defined for a **tcolorbox** which are named **frame**, **interior**, **segmentation**, and **title**. These nodes describe the boundaries of the equally named parts of a **tcolorbox**. They are used by all engines of type **path** and they may be used by engines of type **freelance**. Typically, this key is set by a **/tcb/skin**^{→P.71}.

```
\tcbset{colback=Salmon!50!white,colframe=FireBrick!75!black,
width=(\linewidth-8mm)/2,before=,after=\hfill,equal height group=geon}

\begin{tcolorbox}[adjusted title=The title]
  The upper part.\tcblower The lower part.
\end{tcolorbox}

\begin{tcolorbox}[adjusted title=The title,skin=freelance,
frame code={\path[draw=red,fill=red!25]
  (frame.south west) rectangle (frame.north east);},
interior titled code={\path[draw=blue,fill=blue!25]
  (interior.south west) rectangle (interior.north east);},
segmentation code={\path[draw=green,fill=green!25]
  (segmentation.south west) rectangle (segmentation.north east);},
title code={\path[draw=black,fill=brown!75!black]
  (title.south west) rectangle (title.north east);}]
  The upper part.\tcblower The lower part.
\end{tcolorbox}
```



6.2 Style Option Keys

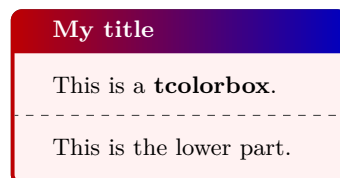
The following style options are applicable for all skins which use engines of type `path`, `pathfirst`, `pathmiddle`, or `pathlast`. Especially, the skin `enhanced`^{→ P.99} supports *all* of them and `standard`^{→ P.98} *none*.

/tcb/frame style= \langle tikz keys \rangle (style, no default)

The \langle tikz keys \rangle are used inside the `tikz` path command for drawing the *frame* of the box. This option is available if the `/tcb/frame engine`^{→ P.72} is set to `path`, `pathfirst`, `pathmiddle`, or `pathlast`. It is *not* available for `standard` and it *may* be applicable for `freelance`.

```
\tcbset{colback=red!5!white,fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,title=My title,
  frame style={left color=red!75!black,
    right color=blue!75!black}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```



/tcb/frame hidden (style, no value)

This is a shortcut for `frame style={draw=none,fill=none}`. Depending on the skin, this option switches off the drawing of the frame.

```
\tcbset{colback=red!5!white,colframe=red!75!black,
  fonttitle=\bfseries,coltitle=black}

\begin{tcolorbox}[enhanced,title=My title,
  frame hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title

This is a **tcolorbox**.

This is the lower part.

/tcb/interior style= \langle tikz keys \rangle (style, no default)

The \langle tikz keys \rangle are used inside the `tikz` path command for drawing the *interior* of the box. They are used for the titled and for the untitled version as well.

This option is available if the `/tcb/interior titled engine`^{→ P.72} or `/tcb/interior engine`^{→ P.72} is set to `path`, `pathfirst`, `pathmiddle`, or `pathlast`. It is *not* available for `standard` and it *may* be applicable for `freelance`.

```
\tcbset{colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,title=My title,
  interior style={left color=red!20!white,
    right color=yellow!50!white}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title

This is a **tcolorbox**.

This is the lower part.

`/tcb/interior hidden`

(style, no value)

This is a shortcut for `interior style={draw=none,fill=none}`. Depending on the skin, this option switches off the drawing of the interior.

```
\tcbset{frame style={top color=red!20!white,
  bottom color=red!20!white!75!black},
  fonttitle=\bfseries,coltitle=black}

\begin{tcolorbox}[enhanced,title=My title,
  interior hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title

This is a **tcolorbox**.

This is the lower part.

`/tcb/segmentation style=<tikz keys>`

(style, no default)

The `<tikz keys>` are used inside the `tikz` path command for drawing the *segmentation* line of the box.

This option is available if the `/tcb/segmentation engine`^{→P. 73} is set to `path`. It is *not* available for `standard` and it *may* be applicable for `freelance`.

```
\tcbset{colback=red!5!white,colframe=red!75!black,
  fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,title=My title,
  segmentation style={double=white,draw=blue,
    double distance=1pt,solid}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title

This is a **tcolorbox**.

This is the lower part.

`/tcb/segmentation hidden`

(style, no value)

This is a shortcut for `segmentation style={draw=none,fill=none}`. Depending on the skin, this option switches off the drawing of the segmentation line. See also `/tcb/lower separated`^{→P. 13} which has the same effect for most skins.

```
\tcbset{colback=red!5!white,colframe=red!75!black,
  fonttitle=\bfseries}

\begin{tcolorbox}[title=My title,
  enhanced,segmentation hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

My title

This is a **tcolorbox**.

This is the lower part.

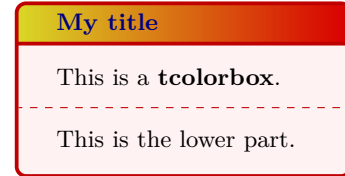
`/tcb/title style=<tikz keys>` (style, no default)

The `<tikz keys>` are used inside the `tikz` path command for drawing the *title area* of the box.

This option is available if the `/tcb/title engine`^{→P.73} is set to `path`, `pathfirst`, `pathmiddle`, or `pathlast`. It is *not* available for `standard` and it *may* be applicable for `freelance`.

```
\tcbset{colback=red!5!white,colframe=red!75!black,
coltitle=blue!50!black,fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,title=My title,
title style={left color=blue!15!yellow,
right color=red!85!black}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```



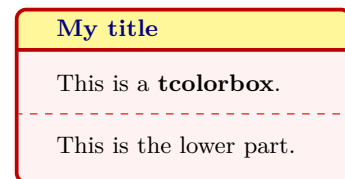
`/tcb/colbacktitle=<color>` (style, no default, initially unset)

Abbreviation for setting `/tcb/title style` to `fill=<color>`. This fills the background of the title area with the given `<color>`.

This option is available if the `/tcb/title engine`^{→P.73} is set to `path`, `pathfirst`, `pathmiddle`, or `pathlast`. It is *not* available for `standard` and it *may* be applicable for `freelance`.

```
\tcbset{colback=red!5!white,colframe=red!75!black,
coltitle=blue!50!black,fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,title=My title,
colbacktitle=yellow!50!white]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```

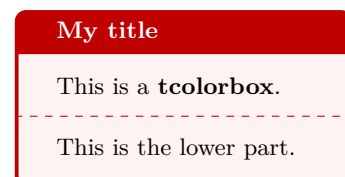


`/tcb/title hidden` (style, no value)

This is a shortcut for `title style={draw=none,fill=none}`. Depending on the skin, this option switches off the drawing of the title background. This is the default behavior for `standard`^{→P.98} and `enhanced`^{→P.99}.

```
\tcbset{colback=red!5!white,colframe=red!75!black,
fonttitle=\bfseries}

\begin{tcolorbox}[title=My title,
enhanced,title hidden]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```



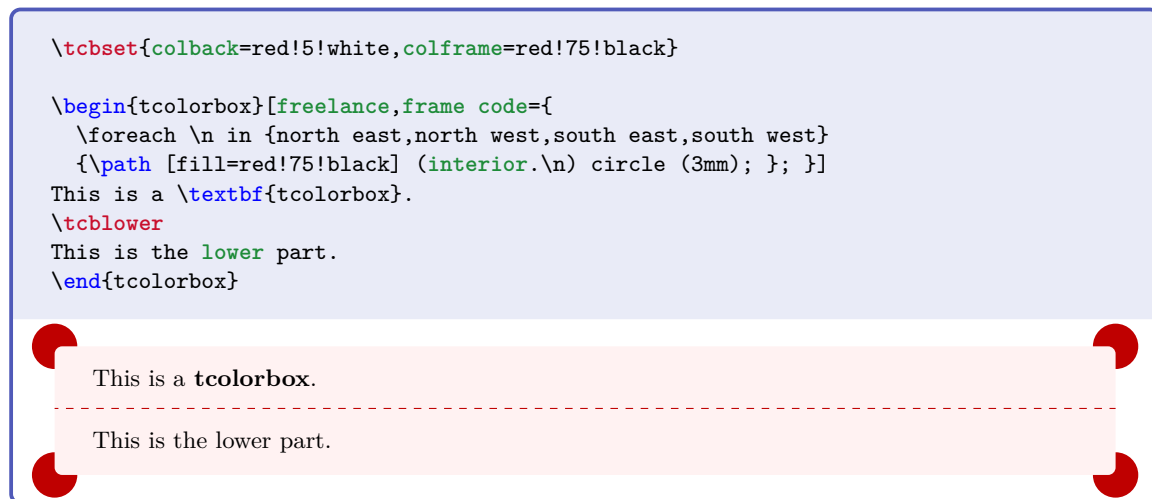
6.3 Code Option Keys

The following code options are applicable for all skins which use engines of type **freelance**. Especially, the skin **freelance**^{→P.108} supports *all* of them, **standard**^{→P.98} and **enhanced**^{→P.99} *none* of them.

/tcb/frame code=*<graphical code>* (code, default from **standard**)

The given *<graphical code>* is used for drawing the *frame* of the box.

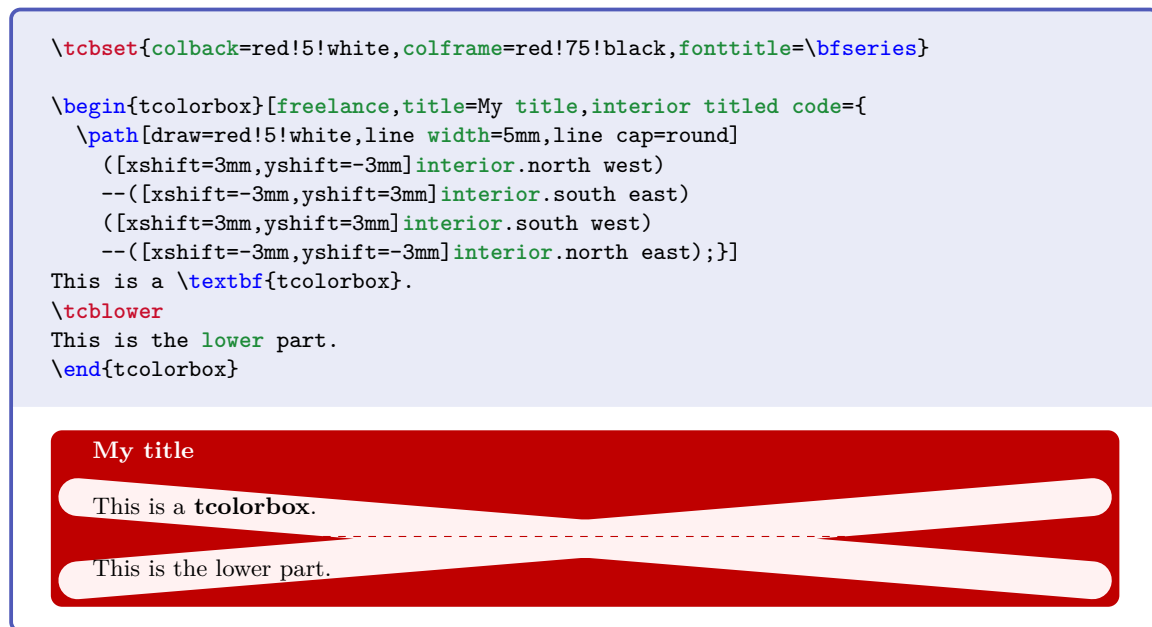
This option is available only if the **/tcb/frame engine**^{→P.72} is set to **freelance**.



/tcb/interior titled code=*<graphical code>* (code, default from **standard**)

The given *<graphical code>* is used for drawing the *interior* of the box, if the box comes with a title.

This option is available only if the **/tcb/interior titled engine**^{→P.72} is set to **freelance**.



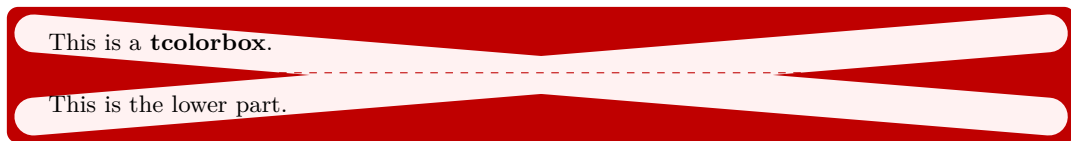
`/tcb/interior code=<graphical code>` (code, default from `standard`)

The given `<graphical code>` is used for drawing the *interior* of the box, if the box is without a title.

This option is available only if the `/tcb/interior engine`^{P.72} is set to `freelance`.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[freelance,interior code={
  \path[draw=red!5!white,line width=5mm,line cap=round]
    ([xshift=3mm,yshift=-3mm]interior.north west)
    --([xshift=-3mm,yshift=3mm]interior.south east)
    ([xshift=3mm,yshift=3mm]interior.south west)
    --([xshift=-3mm,yshift=-3mm]interior.north east);}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```



`/tcb/segmentation code=<graphical code>` (code, default from `standard`)

The given `<graphical code>` is used for drawing the *segmentation* area of the box.

This option is available only if the `/tcb/segmentation engine`^{P.73} is set to `freelance`.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[freelance,title=My title,segmentation code={
  \path[top color=red!5!white,bottom color=red!5!white,middle color=blue]
    (segmentation.south west) rectangle (segmentation.north east);}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```



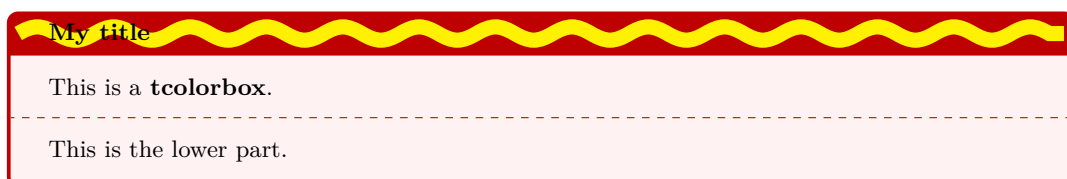
`/tcb/title code=<graphical code>` (code, default from `standard`)

The given `<graphical code>` is used for drawing the *title* area of the box.

This option is available only if the `/tcb/title engine`^{→P.73} is set to `freelance`.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
coltitle=black}

\begin{tcolorbox}[freelance,title=My title,title code={
  \path[draw=yellow,solid,decorate,line width=2mm,
    decoration={coil,aspect=0,segment length=10.1mm}]
    ([xshift=1mm]title.west) -- ([xshift=-1mm]title.east);}]
This is a \textbf{tcolorbox}.
\tcblower
This is the lower part.
\end{tcolorbox}
```



6.4 Watermark Option Keys

The following watermark options are applicable for all skins which use `tikzpicture` as `/tcb/graphical environment`^{→ P.72}. Therefore, the skin `standard`^{→ P.98} does not support these watermarks, but all other skins, e.g. `enhanced`^{→ P.99}.

The watermark options rely on the more general overlay options described in Section 3.7 from page 41. Therefore, *watermarks* and *overlays* cannot be used mixed. But a mixture is possible with the `lib hooks` library, see Section 11.

`/tcb/watermark text=<text>` (no default, initially unset)

Writes some *<text>* in the center of the interior region of a `tcolorbox`. This *<text>* is written *after* the frame and interior are drawn and *before* the text content is drawn. It is zoomed or stretched according the values of `/tcb/watermark zoom`^{→ P.83} or `/tcb/watermark stretch`^{→ P.85}.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark]
\lipsum[1]
\tcblower
\lipsum[2]
\end{tcolorbox}
```

My title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

`/tcb/watermark text on=<part>` *<text>* (no default, initially unset)

This option writes some *<text>* in the center of the interior region of a `tcolorbox` as described for `/tcb/watermark text`. But this is done only for boxes named *<part>* of a break sequence, see `/tcb/breakable`^{→ P.167}.

Feasible values for *<part>* are:

- **broken**: all broken box parts,
- **unbroken**: unbroken boxes only,
- **first**: first parts of a break sequence,
- **middle**: middle parts of a break sequence,
- **last**: last parts of a break sequence,
- **unbroken and first**: unbroken boxes and first parts of a break sequence,
- **middle and last**: middle and last parts of a break sequence.

/tcb/watermark graphics= $\langle file name \rangle$ (no default, initially unset)

Draws an external picture referenced by $\langle file name \rangle$ in the center of the interior region of a `tcolorbox`. The picture is drawn *after* the frame and interior are drawn and *before* the text content is drawn. It is zoomed or stretched according the values of `/tcb/watermark zoom`^{→ P. 83} or `/tcb/watermark stretch`^{→ P. 85}.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,title=My title,watermark graphics=Basilica_5.png,
  watermark opacity=0.15]
\lipsum[1-2]
\tcblower
This example uses a public domain picture from\
\url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}
\end{tcolorbox}
```

My title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

This example uses a public domain picture from
http://commons.wikimedia.org/wiki/File:Basilica_5.png

/tcb/watermark graphics on= $\langle part \rangle$ is $\langle file name \rangle$ (no default, initially unset)

This option draws a picture referenced by $\langle file name \rangle$ in the center of the interior region of a `tcolorbox` as described for `/tcb/watermark graphics`. But this is done only for boxes named $\langle part \rangle$ of a break sequence, see `/tcb/breakable`^{→ P. 167}.

Feasible values for $\langle part \rangle$ are:

- **broken**: all broken box parts,
- **unbroken**: unbroken boxes only,
- **first**: first parts of a break sequence,
- **middle**: middle parts of a break sequence,
- **last**: last parts of a break sequence,
- **unbroken and first**: unbroken boxes and first parts of a break sequence,
- **middle and last**: middle and last parts of a break sequence.

`/tcb/watermark tikz=<graphical code>` (no default, initially unset)

Draws the given `tikz` *<graphical code>* in the center of the interior region of a `tcolorbox`. The code is executed *after* the frame and interior are drawn and *before* the text content is drawn. The result is zoomed or stretched according the values of `/tcb/watermark zoom`^{→ P. 83} or `/tcb/watermark stretch`^{→ P. 85}.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,title=My title,
  watermark tikz={\draw[line width=2mm] circle (1cm)
    node{\fontfamily{ptm}\fontseries{b}\fontsize{20mm}{20mm}\selectfont ?};}]
\lipsum[1]
\tcblower
\lipsum[2]
\end{tcolorbox}
```

My title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

`/tcb/watermark tikz on=<part>` *<graphical code>* (no default, initially unset)

This option draws the given `tikz` *<graphical code>* in the center of the interior region of a `tcolorbox` as described for `/tcb/watermark tikz`. But this is done only for boxes named *<part>* of a break sequence, see `/tcb/breakable`^{→ P. 167}.

Feasible values for *<part>* are:

- **broken**: all broken box parts,
- **unbroken**: unbroken boxes only,
- **first**: first parts of a break sequence,
- **middle**: middle parts of a break sequence,
- **last**: last parts of a break sequence,
- **unbroken and first**: unbroken boxes and first parts of a break sequence,
- **middle and last**: middle and last parts of a break sequence.

`/tcb/no watermark` (style, no default, initially set)

Removes the watermark if set before. This is an alias for `/tcb/no overlay`^{→ P. 42}.

`/tcb/watermark opacity=<fraction>`

(no default, initially 1.00)

Sets the opacity value $\in [0, 1]$ for a watermark.

```
\tcbset{enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  watermark text=Watermark,nobeforeafter,width=(\linewidth-2mm)/2}

\begin{tcolorbox}[title=Opacity 1.00,watermark opacity=1.00]
\lipsum[2]
\end{tcolorbox}\hfill%
\begin{tcolorbox}[title=Opacity 0.50,watermark opacity=0.50]
\lipsum[2]
\end{tcolorbox}%
```

Opacity 1.00

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Opacity 0.50

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

`/tcb/watermark zoom=<fraction>`

(no default, initially 0.75)

Sets the zoom value for a watermark. The zoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches the frame.

```
\tcbset{enhanced,colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  watermark text=Watermark,nobeforeafter,width=(\linewidth-2mm)/2}

\begin{tcolorbox}[title=Zoom 1.0,watermark zoom=1.0]
\lipsum[2]
\end{tcolorbox}\hfill%
\begin{tcolorbox}[title=Zoom 0.5,watermark zoom=0.5]
\lipsum[2]
\end{tcolorbox}%
```

Zoom 1.0

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Zoom 0.5

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

`/tcb/watermark overzoom=<fraction>`

(no default, initially unset)

Sets the overzoom value for a watermark. The overzoom respects the aspect ratio. The value 1.0 means to fill the whole box until the watermark touches all four sides of the frame.

```
\tcbset{enhanced,colback=white,colframe=blue!50!black,fonttitle=\bfseries,
watermark opacity=0.5,
watermark graphics=lichtspiel.jpg,nobeforeafter,width=(\linewidth-2mm)/2}

\begin{tcolorbox}[title=Zoom 1.0,watermark zoom=1.0]
\lipsum[1]
\end{tcolorbox}\hfill%
\begin{tcolorbox}[title=Overzoom 1.0,watermark overzoom=1.0]
\lipsum[1]
\end{tcolorbox}%
```

Zoom 1.0

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Overzoom 1.0

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

If a `/tcb/watermark overzoom` value of 1.0 is used in connection with invisible top and bottom rules which still have a thickness greater than 0pt, the space of these invisible rules may not be covered by the watermark. For example, this situation may occur during the breaking of `/tcb/enhanced`^{P.99} boxes. To avoid this optical glitch, just set `/tcb/pad at break`^{P.169} to any desired value.

/tcb/watermark stretch= $\langle fraction \rangle$ (no default, initially unset)

Sets the stretch value for a watermark. The stretch value is applied to width and height in relation to the box dimensions. It does not respect the aspect ratio. The value 1.0 means to fill the whole box.

```
\tcbset{enhanced,colback=white,colframe=blue!50!black,fonttitle=\bfseries,
  watermark graphics=lichtspiel.jpg,watermark opacity=0.5,
  nobeforeafter,width=(\linewidth-2mm)/2}

\begin{tcolorbox}[title=Stretch 1.00,watermark stretch=1.00]
\lipsum[2]
\end{tcolorbox}\hfill%
\begin{tcolorbox}[title=Stretch 0.50,watermark stretch=0.50]
\lipsum[2]
\end{tcolorbox}%
```

Stretch 1.00

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Stretch 0.50

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

/tcb/watermark color= $\langle color \rangle$ (no default, initially mixed background and frame color)

Sets the color for the watermark.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,title=My title,watermark text=My Watermark,
  watermark color=yellow!50!red]
\lipsum[1]
\end{tcolorbox}
```

My title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

`/tcb/clip watermark=<boolean value>`

(default true, initially true)

Sets the watermark to be clipped to the interior area.

```
\tcbset{enhanced,colback=white,colframe=blue!50!white,fonttitle=\bfseries,
  watermark opacity=0.5,watermark stretch=1.00,arc=3mm,
  watermark graphics=lichtspiel.jpg}

\begin{tcolorbox}[title=Clip (default),clip watermark]
\lipsum[1]
\end{tcolorbox}

\begin{tcolorbox}[title=No clip,clip watermark=false]
\lipsum[1]
\end{tcolorbox}%
```

Clip (default)

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

No clip

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

6.5 Clip Environments

The following clip environments are applicable for all skins which use engines of type `path`, `pathfirst`, `pathmiddle`, or `pathlast`. Especially, the skin `enhanced`^{→ P.99} supports *all* of them and `standard`^{→ P.98} *none*. The typical area of application is inside overlay code, see Section 3.7 from page 41.

```
\begin{tcbclipframe}  
  <environment content>  
\end{tcbclipframe}
```

Defines a Tikz scope which clips to the frame area path.

```
\makeatletter  
\newtcolorbox{picturebox}[2][{%  
  enhanced,frame hidden,interior hidden,fonttitle=\bfseries,  
  overlay={\begin{tcbclipframe}\node at (frame)  
    {\includegraphics[width=\tcb@width,height=\tcb@height]{#2}};\end{tcbclipframe}}%  
  \begin{tcbclipinterior}\fill[white,opacity=0.75]  
    (frame.south west) rectangle (frame.north east);\end{tcbclipinterior}},#1}  
\makeatother  
  
\begin{picturebox}[title=My Picture Box]{lichtspiel.jpg}  
  \lipsum[1]  
\end{picturebox}
```

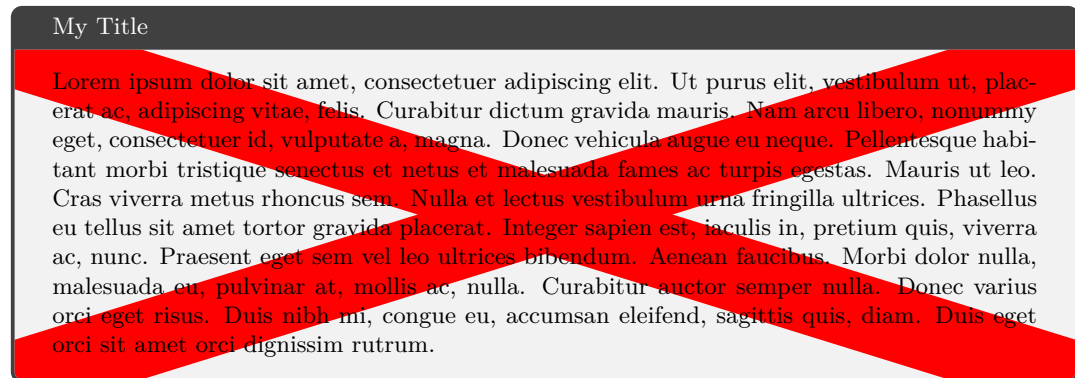
My Picture Box

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

```
\begin{tcbclipinterior}
  <environment content>
\end{tcbclipinterior}
```

Defines a Tikz scope which clips to the interior area path.

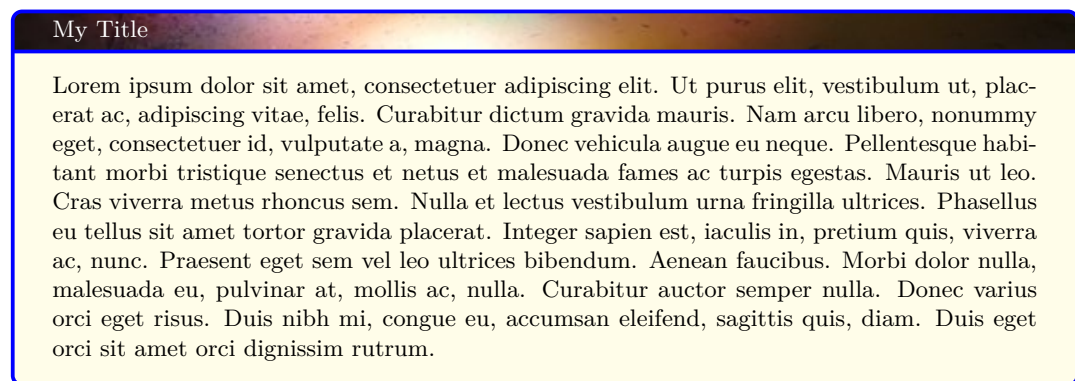
```
\begin{tcolorbox}[enhanced,title=My Title,
  overlay={\begin{tcbclipinterior}
    \draw[red,line width=1cm] (interior.north west)--(interior.south east);
    \draw[red,line width=1cm] (interior.south west)--(interior.north east);
  \end{tcbclipinterior}}]
\lipsum[1]
\end{tcolorbox}
```



```
\begin{tcbcliptitle}
  <environment content>
\end{tcbcliptitle}
```

Defines a Tikz scope which clips to the title area path.

```
\begin{tcolorbox}[enhanced,title=My Title,colframe=blue,colback=yellow!10!white,
  overlay={\begin{tcbcliptitle}\node at (title)
    {\includegraphics[width=\linewidth]{lichtspiel.jpg}};\end{tcbcliptitle}}]
\lipsum[1]
\end{tcolorbox}
```



`/tcb/clip title=<boolean value>`

(default true, initially false)

Sets the title to be clipped to the title area.

```
\tcbset{enhanced,width=5cm,colframe=red!50!white,coltitle=black}

\begin{tcolorbox}[title=\mbox{This is a title which is unbreakable and far too long}]
This is a tcolorbox.
\end{tcolorbox}

\begin{tcolorbox}[title=\mbox{This is a title which is unbreakable and far too long},
clip title]
This is a tcolorbox.
\end{tcolorbox}
```

This is a title which is unbreakable and far too long

This is a tcolorbox.

This is a title which is unbreak

This is a tcolorbox.

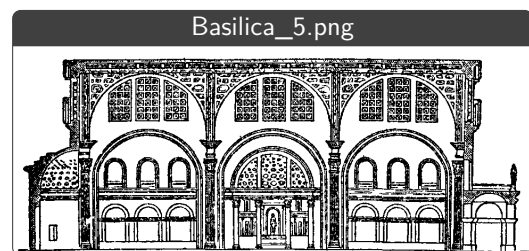
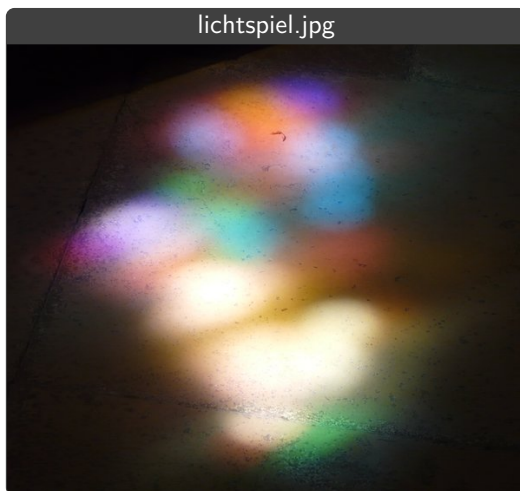
`/tcb/clip upper=<boolean value>`

(default true, initially false)

Sets the upper part to be clipped to the interior area.

```
\newcommand{\mygraphics}[2][\]{%
\tcbbox[enhanced,boxsep=0pt,top=0pt,bottom=0pt,left=0pt,
right=0pt,boxrule=0.4pt,drop fuzzy shadow,clip upper,
colback=black!75!white,toptitle=2pt,bottomtitle=2pt,nobeforeafter,
center title,fonttitle=\small\sffamily,title=\detokenize{#2}]
{\includegraphics[width=\the\dimexpr(\linewidth-4mm)/2\relax]{#2}}}%

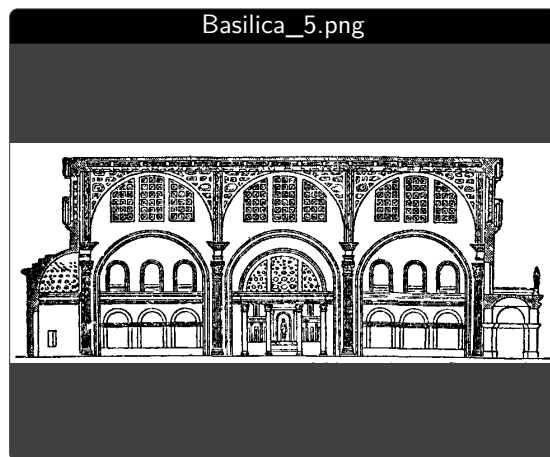
\mygraphics{lichtspiel.jpg}\hfill
\mygraphics{Basilica_5.png}
```



The example for `/tcb/clip upper`^{→ P. 89} sizes the box according to the dimensions of the picture. To do it the other way around, the watermark options provide an easy solution.

```
\newcommand{\mygraphics}[2][\%
  \tcbbox[enhanced,capture=minipage,boxsep=0pt,top=0pt,bottom=0pt,left=0pt,
    right=0pt,boxrule=0.4pt,drop fuzzy shadow,nobeforeafter,
    colback=black!75!white,toptitle=2pt,bottomtitle=2pt,
    center title,fonttitle=\small\sffamily,title=\detokenize{#2},
    width=(\linewidth-4mm)/2,height=6cm,colbacktitle={black},
    watermark zoom=1.0,watermark graphics={#2}]{%}

\mygraphics{lichtspiel.jpg}\hfill
\mygraphics{Basilica_5.png}
```



`/tcb/clip lower` = *(boolean value)* (default true, initially false)
Sets the lower part to be clipped to the interior area.

```
\tcbset{enhanced,width=5cm,colframe=red!50!black,text and listing}

\begin{tcblisting}{}
Donau\~dampf\~schiff\~fahrts\~ka\~pi\~t\~"ans\~m\~"ut\~zen\~fran\~sen
\end{tcblisting}

\begin{tcblisting}{clip lower}
Donau\~dampf\~schiff\~fahrts\~ka\~pi\~t\~"ans\~m\~"ut\~zen\~fran\~sen
\end{tcblisting}
```

Donaudampfschiffahrtska-
pitänsmützenfransen

Donau\~dampf\~schiff\~fahrts\~ka\~pi\~t\~"ans\~m\~"ut\~zen\~fran\~sen

Donaudampfschiffahrtska-
pitänsmützenfransen

Donau\~dampf\~schiff\~fa

6.6 Border Line Option Keys

The following border line options are applicable for most skins which use `tikzpicture` as `/tcb/graphical environment`^{→ P. 72}. Therefore, the skin `standard`^{→ P. 98} does not support these border lines, but most other skins, e. g. `enhanced`^{→ P. 99}.

The border lines are independent from the normal `tcolorbox` rules. They may be used with or without the `/tcb/segmentation engine`^{→ P. 73}.

The border lines are stackable, i.e. several different border lines can be used on the same `tcolorbox`. They are drawn *after* the box frame and box interior and *before* overlays or watermarks.

Technically, the normal `tcolorbox` rules result from a TikZ *filling* process. The border lines are created by a TikZ *drawing* process. This can be used to apply different effects.

`/tcb/borderline={⟨width⟩}{⟨offset⟩}{⟨options⟩}` (no default, initially unset)

Adds a new border line to the stack of border lines. This border line is drawn with the given `⟨width⟩` and gets a `⟨offset⟩` computed from the frame outline. A positive `⟨offset⟩` value moves the borderline inside the `tcolorbox` and a negative `⟨offset⟩` value moves it outside without changing the bounding box.

The border line is drawn along a TikZ path with the given TikZ `⟨options⟩`. Note that the TikZ `line width` option should not be used here.

The border lines adapt to the rounded corners of the `tcolorbox`. An inside border line will switch to sharp corners if necessary, an outside border line will always be rounded if not set to `sharp corners`.

```
\begin{tcolorbox}[enhanced,title=Rounded corners,fonttitle=\bfseries,boxsep=5pt,
  arc=8pt,
  borderline={0.5pt}{0pt}{red},
  borderline={0.5pt}{5pt}{blue,dotted},
  borderline={0.5pt}{-5pt}{green,dashed} ]
This is a tcolorbox.
\end{tcolorbox}
\bigskip
\begin{tcolorbox}[enhanced,title=Sharp corners,fonttitle=\bfseries,boxsep=5pt,
  arc=0pt,outer arc=0pt,
  borderline={0.5pt}{0pt}{red},
  borderline={0.5pt}{5pt}{blue,dotted},
  borderline={0.5pt}{-5pt}{green,dashed,sharp corners} ]
This is a tcolorbox.
\end{tcolorbox}
```

Rounded corners

This is a tcolorbox.

Sharp corners

This is a tcolorbox.

```
% \usepackage{lipsum}
\begin{tcolorbox}[enhanced,arc=3mm,boxrule=1.5mm,boxsep=1.5mm,
  colback=yellow!20!white,
  colframe=blue,
  borderline={1mm}{1mm}{white},
  borderline={1mm}{2mm}{red} ]
  \lipsum[1]
\end{tcolorbox}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

```
% \usepackage{lipsum}
\begin{tcolorbox}[enhanced,arc=3mm,boxrule=1.5mm,
  frame hidden,colback=blue!10!white,
  borderline={1mm}{0mm}{blue,dotted} ]
  \lipsum[2]
\end{tcolorbox}
```

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

```
% \usepackage{lipsum}
\begin{tcolorbox}[enhanced,skin=enhancedmiddle,
  frame hidden,interior hidden,top=0mm,bottom=0mm,boxsep=0mm,
  borderline={0.75mm}{0mm}{red},
  borderline={0.75mm}{0.75mm}{red!50!yellow},
  borderline={0.75mm}{1.5mm}{yellow}, ]
  \lipsum[3]
\end{tcolorbox}
```

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

```
% \usepackage{lipsum}
\newtcolorbox{mygreenbox}[2][]{%
  enhanced,width=\linewidth-6pt,
  enlarge top by=3pt,enlarge bottom by=3pt,
  enlarge left by=3pt,enlarge right by=3pt,
  title={#2},frame hidden,boxrule=0pt,top=1mm,bottom=1mm,
  colframe=green!30!black, colbacktitle=green!50!yellow,
  coltitle=black, colback=green!25!white,
  borderline={0.5pt}{-0.5pt}{green!75!blue},
  borderline={1pt}{-3pt}{green!50!blue},#1}

\begin{mygreenbox}{My title}
  \lipsum[4]
\end{mygreenbox}
```

My title

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

/tcb/no borderline

Removes all border lines if set before.

(no default, initially set)

6.7 Shadow Option Keys

The following shadow options are applicable for most skins which use `tikzpicture` as `/tcb/graphical environment`^{→ P.72}. Therefore, the skin `standard`^{→ P.98} does not support these shadows, but most other skins, e.g. `enhanced`^{→ P.99}.

The shadows are stackable, i.e. several different shadows can be used on the same `tcolorbox`. They are drawn *before* the box frame is drawn.

`/tcb/shadow={⟨xshift⟩}{⟨yshift⟩}{⟨offset⟩}{⟨options⟩}` (no default)

Adds a new shadow to the stack of shadows. This shadow follows the outline of the `tcolorbox` but is shifted by `⟨xshift⟩` and `⟨yshift⟩`. The `⟨offset⟩` value is a distance value from the frame outline. A positive `⟨offset⟩` value shrinks the shadow and a negative `⟨offset⟩` value enlarges the shadow. The shadow is filled along a TikZ path with the given TikZ `⟨options⟩`.

The shadows adapt to the rounded corners of the `tcolorbox`. An shrunk shadow will switch to sharp corners if necessary, an enlarged shadow may become more rounded depending on several factors.

Shadows are not considered for the bounding box computation by default. Large shadows may be overlapped by the following content. But, the bounding box can be adapted if necessary.

```
\tcbset{enhanced,colback=red!5!white,
  colframe=red!75!black,fonttttitle=\bfseries}

\begin{tcolorbox}[title=My own shadow,
  shadow={2mm}{-1mm}{0mm}{black!50!white}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Another shadow,
  shadow={-1mm}{-2mm}{0mm}{fill=blue,
  opacity=0.5}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Double shadow,
  shadow={-1.5mm}{-1.5mm}{0mm}{fill=blue,
  opacity=0.25},
  shadow={1.5mm}{-1.5mm}{0mm}{fill=red,
  opacity=0.25}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Far shadow,
  shadow={5.5mm}{-3.5mm}{2mm}{fill=black,
  opacity=0.25}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip\bigskip
\begin{tcolorbox}[title=Halo shadow,
  shadow={0mm}{0mm}{-1.5mm}%
  {fill=yellow!75!red,opacity=0.5}]
This is a tcolorbox.
\end{tcolorbox}
```

My own shadow

This is a tcolorbox.

Another shadow

This is a tcolorbox.

Double shadow

This is a tcolorbox.

Far shadow

This is a tcolorbox.

Halo shadow

This is a tcolorbox.

/tcb/fuzzy shadow= $\{\langle xshift \rangle\}\{\langle yshift \rangle\}\{\langle offset \rangle\}\{\langle step \rangle\}\{\langle options \rangle\}$ (no default)

Adds a new fuzzy shadow to the stack of shadows. Actually, this option adds several shadows which appear like a shadow with a fuzzy border. This fuzzy shadow follows the outline of the `tcolorbox` but is shifted by $\langle xshift \rangle$ and $\langle yshift \rangle$. The $\langle offset \rangle$ value is a distance value from the frame outline. A positive $\langle offset \rangle$ value shrinks the shadow and a negative $\langle offset \rangle$ value enlarges the shadow. The $\{\langle step \rangle\}$ value describes a shrink offset used for the combination of the partial shadows. The shadow is filled along a TikZ path with the given TikZ $\langle options \rangle$ but any opacity value will be ignored.

```
\tcbset{enhanced,colback=red!5!white,
colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My own shadow,
fuzzy shadow={2mm}{-1mm}{0mm}{0.1mm}%
{black!50!white}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Another shadow,
fuzzy shadow={-1mm}{-2mm}{0mm}{0.2mm}%
{fill=blue}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Double shadow,
fuzzy shadow={-1.5mm}{-1.5mm}{0mm}{0.1mm}%
{blue},
fuzzy shadow={1.5mm}{-1.5mm}{0mm}{0.1mm}%
{red}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Far shadow,
fuzzy shadow={5.5mm}{-3.5mm}{0mm}{0.3mm}%
{black}]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip\bigskip
\begin{tcolorbox}[title=Glow shadow,
fuzzy shadow={0mm}{0mm}{-1.5mm}{0.15mm}%
{yellow!75!red}]
This is a tcolorbox.
\end{tcolorbox}
```

My own shadow

This is a tcolorbox.

Another shadow

This is a tcolorbox.

Double shadow

This is a tcolorbox.

Far shadow

This is a tcolorbox.

Glow shadow

This is a tcolorbox.

```
\newtcolorbox{mybox}[1][\{enhanced,
fuzzy shadow={1.0mm}{-1.0mm}{0.12mm}{0mm}{blue!50!white},
fuzzy shadow={-1.0mm}{-1.0mm}{0.12mm}{0mm}{red!50!white},
fuzzy shadow={-1.0mm}{1.0mm}{0.12mm}{0mm}{green!50!white},
fuzzy shadow={1.0mm}{1.0mm}{0.12mm}{0mm}{yellow!50!white},#1
}

\begin{mybox}[title=A multi shadow box]
This is a tcolorbox.
\end{mybox}
```

A multi shadow box

This is a tcolorbox.

`/tcb/drop shadow=<color>`

(style, default black!50!white)

Adds a new shadow with standard dimensions to the stack of shadows. Optionally, the `<color>` for the shadow can be changed.

```
\tcbset{enhanced,colback=red!5!white,
  colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My own shadow,
  drop shadow]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Another shadow,
  drop shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
```

My own shadow

This is a tcolorbox.

Another shadow

This is a tcolorbox.

`/tcb/drop fuzzy shadow=<color>`

(style, default black!50!white)

Adds a new fuzzy shadow with standard dimensions to the stack of shadows. Optionally, the `<color>` for the shadow can be changed.

```
\tcbset{enhanced,colback=red!5!white,
  colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My own shadow,
  drop fuzzy shadow]
This is a tcolorbox.
\end{tcolorbox}
\par\bigskip
\begin{tcolorbox}[title=Another shadow,
  drop fuzzy shadow=blue]
This is a tcolorbox.
\end{tcolorbox}
```

My own shadow

This is a tcolorbox.

Another shadow

This is a tcolorbox.

/tcb/ halo= $\langle size \rangle$ with $\langle color \rangle$ (style, default 0.9mm with yellow)

Adds a new halo shadow with the given $\langle color \rangle$ which overlaps the colorbox an all sides by $\langle size \rangle$.

```
\tcbset{enhanced,colback=red!5!white,
  colframe=red!75!black,fonttttitle=\bfseries}

\begin{tcolorbox}[title=My own halo,halo]
This is a tcolorbox.
\end{tcolorbox}

\par\bigskip\bigskip
\begin{tcolorbox}[title=Another halo,
  halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}
```

My own halo

This is a tcolorbox.

Another halo

This is a tcolorbox.

/tcb/ fuzzy halo= $\langle size \rangle$ with $\langle color \rangle$ (style, default 0.9mm with yellow)

Adds a new fuzzy halo shadow with the given $\langle color \rangle$ which overlaps the colorbox an all sides by $\langle size \rangle$ plus 0.48mm.

```
\tcbset{enhanced,colback=red!5!white,
  colframe=red!75!black,fonttttitle=\bfseries}

\begin{tcolorbox}[title=My own halo,fuzzy halo]
This is a tcolorbox.
\end{tcolorbox}

\par\bigskip\bigskip
\begin{tcolorbox}[title=Another halo,
  fuzzy halo=2mm with green]
This is a tcolorbox.
\end{tcolorbox}
```

My own halo

This is a tcolorbox.

Another halo

This is a tcolorbox.

```
\begin{tcolorbox}[blank,
  fuzzy halo=2mm with red!50!white,
  fuzzy halo=1mm with white,]
\lipsum[1]
\end{tcolorbox}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

/tcb/ no shadow (no default)

Removes all shadows if set before.

6.8 Skin 'standard'

Note that the option keys `/tcb/frame style`^{→P.74}, `/tcb/interior style`^{→P.74}, `/tcb/segmentation style`^{→P.75}, and `/tcb/title style`^{→P.76} are not applicable to the standard skin. Also, watermarks (see Subsection 6.4) are not usable with the standard skin.

`/tcb/skin=standard` (skin)

This is the standard skin from the core package. All drawing engines are set to type standard. The drawing is based on pgf commands and does not need the tikz package.

Environment and engines for the skin 'standard'

```
/tcb/graphical environment→P.72: pgfpicture
/tcb/frame engine→P.72: standard
/tcb/interior titled engine→P.72: standard
/tcb/interior engine→P.72: standard
/tcb/segmentation engine→P.73: standard
/tcb/title engine→P.73: standard
```

`/tcb/standard` (style, no value)

This is an abbreviation for setting `skin=standard`.

```
\tcbset{standard,equal height group=standard,
  colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
  width=(\linewidth-6mm)/4,nobeforeafter,
  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}
```

This is my content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

More content.

6.9 Skin Family 'enhanced'

If you like the standard appearance of a `tcolorbox` but you want to have some 'enhanced' features, the `enhanced` skin is what you are looking for.

`/tcb/skin=enhanced` (skin)

This skin translates the drawing commands of the core package into `tikz` path commands. Therefore, it allows all `tikz` high level options for these paths and has more flexibility compared to the `standard`^{→P.98} skin. You pay for this with some prolonged compilation time. The `tikz` path options can be given with the option keys `/tcb/frame style`^{→P.74}, `/tcb/interior style`^{→P.74}, `/tcb/segmentation style`^{→P.75}, and `/tcb/title style`^{→P.76}.

Environment and engines for the skin 'enhanced'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: path
/tcb/interior titled engine→P.72: path
/tcb/interior engine→P.72: path
/tcb/segmentation engine→P.73: path
/tcb/title engine→P.73: path
```

`/tcb/enhanced` (style, no value)

This is an abbreviation for setting `skin=enhanced`.

```
\tcbset{enhanced,equal height group=enhanced,
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.

```
% \usetikzlibrary{shadings} % preamble
\tcbset{skin=enhanced,fonttitle=\bfseries,
  frame style={upper left=blue,upper right=red,lower left=yellow,lower right=green},
  interior style={white,opacity=0.5},
  segmentation style={black,solid,opacity=0.2,line width=1pt}}

\begin{tcolorbox}[title=Nice box in rainbow colors]
  With the 'enhanced' skin, it is quite easy to produce fancy looking effects.
  \tcblower
  Note that this is still a \texttt{tcolorbox}.
\end{tcolorbox}
```

Nice box in rainbow colors

With the 'enhanced' skin, it is quite easy to produce fancy looking effects.

Note that this is still a `tcolorbox`.

```
% \usetikzlibrary{decorations.pathmorphing} % preamble
\tcbset{skin=enhanced,fonttitle=\bfseries,boxrule=1mm,
  frame style={draw=FireBrick,fill=Salmon},drop fuzzy shadow,
  interior style={draw=FireBrick,top color=Salmon!10,bottom color=Salmon!20},
  segmentation style={draw=FireBrick,solid,decorate,
    decoration={coil,aspect=0,segment length=10.1mm}}}}

\begin{tcblisting}[title=A listing box with shadow and some specials]
Of course, skins can be used for listings also.
\begin{equation}
\int\limits_1^2 \frac{1}{x} dx = \ln(2).
\end{equation}
\end{tcblisting}
```

A listing box with shadow and some specials

Of course, skins can be used for listings also.

```
\begin{equation}
\int\limits_1^2 \frac{1}{x} dx = \ln(2).
\end{equation}
```

Of course, skins can be used for listings also.

$$\int_1^2 \frac{1}{x} dx = \ln(2). \quad (2)$$

`/tcb/enhanced standard`

(style, no value)

For unbreakable boxes, this is identical to using `/tcb/enhanced`^{P.99}. But, for breakable boxes, the *break sequence* is identical to the `standard`^{P.98} skin, see Section 9.5 from page 171.

This style relies on the skin `enhanced`^{→ P. 99}. All drawing operations are disabled and all margins are set to 0pt.

```
\begin{tcolorbox}[blank,watermark text=A blank box]
\lipsum[1]
\end{tcolorbox}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

```
% \tcbuselibrary{fitting}
\newtcbboxfit{\mybox}[1]{blank,width=4cm,height=7cm,top=4pt,
  watermark text=#1}

\begin{tabular}{|c|c|c|}\hline
A & B & C\\\hline
\mybox{A}{\lipsum[1]} & \mybox{B}{\lipsum[2]} & \mybox{C}{\lipsum[3]}\\\hline
\end{tabular}
```

| A | B | C |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.</p> | <p>Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.</p> | <p>Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.</p> |

`\tcbline`

Sometimes, a line is only a line. With `\tcblower`^{→P.7} you separate the box content into two functional units. `\tcbline` draws only a line which looks like the segmentation line between upper and lower part. Furthermore, you can use `\tcbline` more than just once. `\tcbline` always uses the `path` drawing engine. Therefore, the `/tcb/segmentation` style^{→P.75} can be applied.

```
\tcbset{enhanced,colframe=blue!50!black,colback=white}  
  
\begin{tcolorbox}[colupper=red!50!black,collower=green!50!black]  
  \lipsum[1]  
  \tcbline  
  \lipsum[2]  
  \tcblower  
  \lipsum[3]  
  \tcbline  
  \lipsum[4]  
\end{tcolorbox}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

/tcb/skin=**enhancedfirst** (skin)

This is a flavor of **enhanced**^{→P.99} which is used as a *first* part in a break sequence for **enhanced**^{→P.99}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'enhancedfirst'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: pathfirst
/tcb/interior titled engine→P.72: pathfirst
/tcb/interior engine→P.72: pathfirst
/tcb/segmentation engine→P.73: path
/tcb/title engine→P.73: pathfirst
```

```
\tcbset{skin=enhancedfirst,equal height group=enhancedfirst,
colback=LightGreen,colframe=DarkGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
```

This is my content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

More content.

`/tcb/skin=enhancedmiddle` (skin)

This is a flavor of `enhanced`^{→P.99} which is used as a *middle* part in a break sequence for `enhanced`^{→P.99}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'enhancedmiddle'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: pathmiddle
/tcb/interior titled engine→P.72: pathmiddle
/tcb/interior engine→P.72: pathmiddle
/tcb/segmentation engine→P.73: path
/tcb/title engine→P.73: pathmiddle
```

```
\tcbset{skin=enhancedmiddle,equal height group=enhancedmiddle,
colback=LightGreen,colframe=DarkGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
```

This is my content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

More content.

`/tcb/marker` (style, no value)

This style relies on the skin `enhancedmiddle`. It is intended to be used as an optical marker like a highlighter pen.

```
\begin{tcolorbox}[marker]
\lipsum[2]
\end{tcolorbox}
```

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

This examples demonstrates the creation of several *text marker* environments based on `enhancedmiddle` → P. 104.

```
\tcbset{textmarker/.style={%
    skin=enhancedmiddle,breakable,parbox=false,
    boxrule=0mm,leftrule=5mm,rigtrule=5mm,boxsep=0mm,arc=0mm,outer arc=0mm,
    left=3mm,right=3mm,top=1mm,bottom=1mm,enlarge left by=-8mm,enlarge right by=-8mm,
    toptitle=1mm,bottomtitle=1mm,width=\the\dimexpr\linewidth+1.6cm\relax}}

\newtcolorbox{yellow}{textmarker,colback=yellow!5!white,colframe=yellow}
\newtcolorbox{orange}{textmarker,colback=DarkOrange!5!white,
    colframe=DarkOrange!75!yellow}
\newtcolorbox{red}{textmarker,colback=red!5!white,colframe=red}
\newtcolorbox{blue}{textmarker,colback=DeepSkyBlue!5!white,colframe=DeepSkyBlue}
\newtcolorbox{green}{textmarker,colback=Chartreuse!5!white,colframe=Chartreuse}

\begin{yellow}
  \lipsum[1]
\end{yellow}

\begin{orange}
  \lipsum[2]
\end{orange}

\begin{red}
  \lipsum[3]
\end{red}

\begin{green}
  \lipsum[4]
\end{green}

\begin{blue}
  \lipsum[5]
\end{blue}
\lipsum[6]% following text
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat

a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetur.

Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

/tcb/skin=**enhancedlast** (skin)

This is a flavor of `enhanced`^{→P.99} which is used as a *last* part in a break sequence for `enhanced`^{→P.99}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'enhancedlast'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: pathlast
/tcb/interior titled engine→P.72: pathlast
/tcb/interior engine→P.72: pathlast
/tcb/segmentation engine→P.73: path
/tcb/title engine→P.73: pathlast
```

```
\tcbset{skin=enhancedlast,equal height group=enhancedlast,
colback=LightGreen,colframe=DarkGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}
```

This is my content.

This is my content.

More content.

My title

This is my content.

My title

This is my content.

More content.

6.10 Skin 'freelance'

`/tcb/skin=freelance` (skin)

This skin gives full freedom for the appearance of the `tcolorbox`. All drawing engines are set to type `freelance`; they use the `tikz` package and compute the `/tcb/geometry nodes`^{→P.73}. This skin is useful for boxes which should differ much from the normal appearance. Note that this difference has to be programmed by the user. The drawing code can be given with the following option keys. As default value, the code from the `standard` skin is set.

Environment and engines for the skin 'freelance'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: freelance
/tcb/interior titled engine→P.72: freelance
/tcb/interior engine→P.72: freelance
/tcb/segmentation engine→P.73: freelance
/tcb/title engine→P.73: freelance
```

`/tcb/freelance` (style, no value)

This is an abbreviation for setting `skin=freelance`.

```
\tcbset{freelance,equal height group=freelance,
colback=LightGreen,colframe=DarkGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

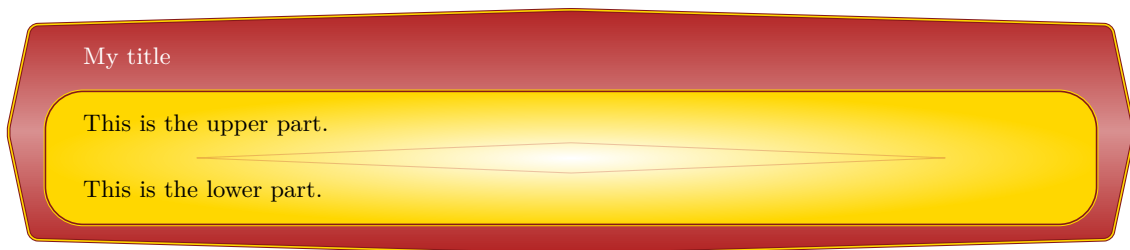
More content.

```

\tcbset{skin=freelance,boxrule=2mm,enlarge top by=2mm,enlarge bottom by=2mm,
  enlarge left by=3mm,enlarge right by=3mm,width=\linewidth-6mm,
frame code={\path[top color=FireBrick,bottom color=FireBrick,middle color=FireBrick!50,
draw=FireBrick!75!black,double=Gold,rounded corners=1mm]
  (frame.south west) -- ([xshift=-3mm]frame.west) -- (frame.north west)
  -- ([yshift=2mm]frame.north) -- (frame.north east) -- ([xshift=3mm]frame.east)
  -- (frame.south east) -- ([yshift=-2mm]frame.south) -- cycle;},
interior titled code={\path[outer color=Gold,inner color=white,draw=Gold,
double=FireBrick!75!black,rounded corners=5mm]
  (interior.south west) rectangle (interior.north east);},
segmentation code={\path[draw=FireBrick,opacity=0.25] ([xshift=2cm]segmentation.west)
  -- (segmentation.north) -- ([xshift=-2cm]segmentation.east)
  -- (segmentation.south) -- cycle;}}

\begin{tcolorbox}[title=My title]
  This is the upper part.
  \tcblower
  This is the lower part.
\end{tcolorbox}

```



6.11 Skin Family 'bicolor'

`/tcb/skin=bicolor` (skin)

This skin is quite similar to the `standard`^{→P.98} and `enhanced`^{→P.99} skin. But instead of a segmentation line, the optional lower part of the box is filled with a different color or drawn with a different style.

Environment and engines for the skin 'bicolor'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: path
/tcb/interior titled engine→P.72: freelance
/tcb/interior engine→P.72: freelance
/tcb/segmentation engine→P.73: freelance
/tcb/title engine→P.73: path
```

- The most basic usage of this skin is to set the background color of the lower part by `/tcb/colbacklower`^{→P.111} and all other options like for the `standard`^{→P.98} skin.

```
\begin{tcolorbox}[skin=bicolor,title=The title,
  colframe=FireBrick!75!black,colback=Salmon!50!white,colbacklower=Salmon]
  The upper part.
\tcblower
  The lower part.
\end{tcolorbox}
```

The title

The upper part.

The lower part.

- The more advanced usage of this skin is to apply the `/tcb/frame style`^{→P.74} and the `/tcb/interior style`^{→P.74} like for the `enhanced`^{→P.99} skin. Also, the `/tcb/segmentation style`^{→P.75} can be used, but it is applied to the whole lower part.

```
\begin{tcolorbox}[skin=bicolor,title=The title,
  frame style={top color=FireBrick,
    bottom color=FireBrick!15!white,draw=black},
  interior style={left color=Salmon,right color=Salmon!50!white},
  segmentation style={right color=Salmon,left color=Salmon!50!white}]
  The upper part.
\tcblower
  The lower part.
\end{tcolorbox}
```

The title

The upper part.

The lower part.

`/tcb/bicolor`

(style, no value)

This is an abbreviation for setting `skin=bicolor`.

```

\tcbset{bicolor,equal height group=bicolor,
  colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
  width=(\linewidth-6mm)/4,nobeforeafter,
  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}

```

This is my content.

This is my content.
More content.

My title
This is my content.

My title
This is my content.
More content.

`/tcb/colbacklower=<color>` (no default, initially black!15!white)
Sets the background `<color>` of the lower part. It depends on the skin, if this value is used.

```

\tcbset{gitexample/.style={listing and comment,comment={#1},
  skin=bicolor,boxrule=1mm,fonttitle=\bfseries,coltitle=black,
  frame style={draw=black,left color=Gold,right color=Goldenrod!50!Gold},
  colback=black,colbacklower=Goldenrod!75!Gold,
  colupper=white,collower=black,
  listing options={language={bash},aboveskip=0pt,belowskip=0pt,nolol,
  basicstyle=\ttfamily\bfseries,extendedchars=true}}}

\begin{tcblisting}{title={Snapshot of the staging area},
  gitexample={The option '-a' automatically stages all tracked and modified
    files before the commit.\par
    This can be combined with the message option '-m'
    as seen in the third line.}}

git commit
git commit -a
git commit -am 'changes to my example'
\end{tcblisting}

```

Snapshot of the staging area

```

git commit
git commit -a
git commit -am 'changes to my example'

```

The option '-a' automatically stages all tracked and modified files before the commit.
This can be combined with the message option '-m' as seen in the third line.

/tcb/skin=**bicolorfirst** (skin)

This is a flavor of `bicolor`^{→P.110} which is used as a *first* part in a break sequence for `bicolor`^{→P.110}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'bicolorfirst'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: pathfirst
/tcb/interior titled engine→P.72: freelance
/tcb/interior engine→P.72: freelance
/tcb/segmentation engine→P.73: freelance
/tcb/title engine→P.73: pathfirst
```

```
\tcbset{skin=bicolorfirst,equal height group=bicolorfirst,
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.

/tcb/skin=**bicolormiddle** (skin)

This is a flavor of `bicolor`^{→P.110} which is used as a *middle* part in a break sequence for `bicolor`^{→P.110}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'bicolormiddle'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: pathmiddle
/tcb/interior titled engine→P.72: freelance
/tcb/interior engine→P.72: freelance
/tcb/segmentation engine→P.73: freelance
/tcb/title engine→P.73: pathmiddle
```

```
\tcbset{skin=bicolormiddle,equal height group=bicolormiddle,
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.

/tcb/skin=**bicolorlast** (skin)

This is a flavor of `bicolor`^{→P.110} which is used as a *last* part in a break sequence for `bicolor`^{→P.110}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'bicolorlast'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: pathlast
/tcb/interior titled engine→P.72: freelance
/tcb/interior engine→P.72: freelance
/tcb/segmentation engine→P.73: freelance
/tcb/title engine→P.73: pathlast
```

```
\tcbset{skin=bicolorlast,equal height group=bicolorlast,
colback=LightGreen,colframe=DarkGreen,colbacklower=LimeGreen!75!LightGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.

6.12 Skin Family 'beamer'

`/tcb/skin=beamer` (skin)

This skin resembles boxes known from the `beamer` class and therefore is called 'beamer'. It uses the normal colors from the core package but shades them a little bit. To use this skin, the `tikz` library `shadings` has to be included in the preamble by:

```
\usetikzlibrary{shadings}
```

The appearance of the skin can be controlled by `/tcb/frame style`^{→P.74} and `/tcb/interior style`^{→P.74}, if needed. Here, the *segmentation* cannot be controlled by a style.

Environment and engines for the skin 'beamer'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: path
/tcb/interior titled engine→P.72: freelance
/tcb/interior engine→P.72: freelance
/tcb/segmentation engine→P.73: freelance
/tcb/title engine→P.73: path
```

`/tcb/beamer` (style, no value)

This is an abbreviation for setting `skin=beamer`.

It also changes the geometry and some style options.

```
\tcbset{beamer,equal height group=beamer,
colback=LightGreen,colframe=DarkGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.

```
\begin{tcolorbox}[beamer,colback=Salmon!50!white,colframe=FireBrick!75!black,
adjusted title=A colored box with the 'beamer' skin]
This box looks like a box provided by the \texttt{beamer} class.
\end{tcolorbox}
```

A colored box with the 'beamer' skin

This box looks like a box provided by the beamer class.

```
\begin{tcolorbox}[beamer,colframe=blue,colback=black,
watermark graphics=lichtspiel.jpg,
coltext=white,watermark opacity=0.75,watermark stretch=1.0,
title=Beamer Box with background picture]
\lipsum[1]
\end{tcolorbox}
```

Beamer Box with background picture

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

```
\newtcolorbox{myblock}[2][\%
beamer,breakable,colback=LightBlue,colframe=DarkBlue,#1,title=#2]\%

\begin{myblock}{Beamerish \texttt{block}: \texttt{myblock}}
\lipsum[1]
\end{myblock}
```

Beamerish block: myblock

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

/tcb/skin=beamerfirst (skin)

This is a flavor of `beamer`^{→P.115} which is used as a *first* part in a break sequence for `beamer`^{→P.115}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'beamerfirst'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: pathfirst
/tcb/interior titled engine→P.72: freelance
/tcb/interior engine→P.72: freelance
/tcb/segmentation engine→P.73: freelance
/tcb/title engine→P.73: pathfirst
```

```
\tcbset{beamer,skin=beamerfirst,equal height group=beamerfirst,
colback=LightGreen,colframe=DarkGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.

/tcb/skin=**beamermiddle** (skin)

This is a flavor of **beamer**^{→P.115} which is used as a *middle* part in a break sequence for **beamer**^{→P.115}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'beamermiddle'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: pathmiddle
/tcb/interior titled engine→P.72: freelance
/tcb/interior engine→P.72: freelance
/tcb/segmentation engine→P.73: freelance
/tcb/title engine→P.73: pathmiddle
```

```
\tcbset{beamer,skin=beamermiddle,equal height group=beamermiddle,
colback=LightGreen,colframe=DarkGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.

/tcb/skin=beamerlast (skin)

This is a flavor of beamer^{→P.115} which is used as a *last* part in a break sequence for beamer^{→P.115}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'beamerlast'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: pathlast
/tcb/interior titled engine→P.72: freelance
/tcb/interior engine→P.72: freelance
/tcb/segmentation engine→P.73: freelance
/tcb/title engine→P.73: pathlast
```

```
\tcbset{beamer,skin=beamerlast,equal height group=beamerlast,
colback=LightGreen,colframe=DarkGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.

6.13 Skin Family 'widget'

`/tcb/skin=widget` (skin)

This skin uses the normal colors from the core package but shades them a little bit. To use this skin, the `tikz` library `shadings` has to be included in the preamble by:

```
\usetikzlibrary{shadings}
```

The appearance of the skin can be controlled by `/tcb/frame style`^{P.74}, `/tcb/interior style`^{P.74}, and `/tcb/segmentation style`^{P.75}, if needed.

Environment and engines for the skin 'widget'

```
/tcb/graphical environmentP.72: tikzpicture
/tcb/frame engineP.72: path
/tcb/interior titled engineP.72: path
/tcb/interior engineP.72: path
/tcb/segmentation engineP.73: freelance
/tcb/title engineP.73: freelance
```

`/tcb/widget` (style, no value)

This is an abbreviation for setting `skin=widget`.

It also changes the geometry and some style options.

```
\tcbset{widget,equal height group=widget,
colback=LightGreen,colframe=DarkGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.


```

\begin{tcolorbox}[widget,colback=Salmon!50!white,colframe=FireBrick!75!black,
  adjusted title=A colored box with the 'widget' skin]
This is my content.
\end{tcolorbox}

```

A colored box with the 'widget' skin

This is my content.

/tcb/skin=**widgetfirst**

(skin)

This is a flavor of `widget`^{→P.120} which is used as a *first* part in a break sequence for `widget`^{→P.120}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'widgetfirst'

```

/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: pathfirst
/tcb/interior titled engine→P.72: pathfirst
/tcb/interior engine→P.72: pathfirst
/tcb/segmentation engine→P.73: freelance
/tcb/title engine→P.73: freelance

```

```

\tcbset{widget,skin=widgetfirst,equal height group=widgetfirst,
  colback=LightGreen,colframe=DarkGreen,
  width=(\linewidth-6mm)/4,nobeforeafter,
  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}

```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.

/tcb/skin=**widgetmiddle** (skin)

This is a flavor of `widget`^{→P.120} which is used as a *middle* part in a break sequence for `widget`^{→P.120}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'widgetmiddle'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: pathmiddle
/tcb/interior titled engine→P.72: pathmiddle
/tcb/interior engine→P.72: pathmiddle
/tcb/segmentation engine→P.73: freelance
/tcb/title engine→P.73: freelance
```

```
\tcbset{widget,skin=widgetmiddle,equal height group=widgetmiddle,
colback=LightGreen,colframe=DarkGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
This is my content.
\tcblower
More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcblower
More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.

/tcb/skin=**widgetlast** (skin)

This is a flavor of `widget`^{→P. 120} which is used as a *last* part in a break sequence for `widget`^{→P. 120}. Nevertheless, this skin can be applied independently.

Environment and engines for the skin 'widgetlast'

```
/tcb/graphical environment→P. 72: tikzpicture
/tcb/frame engine→P. 72: pathlast
/tcb/interior titled engine→P. 72: pathlast
/tcb/interior engine→P. 72: pathlast
/tcb/segmentation engine→P. 73: freelance
/tcb/title engine→P. 73: freelance
```

```
\tcbset{widget,skin=widgetlast,equal height group=widgetlast,
colback=LightGreen,colframe=DarkGreen,
width=(\linewidth-6mm)/4,nobeforeafter,
left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
This is my content.
\tcbblower
More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
This is my content.
\tcbblower
More content.
\end{tcolorbox}
```

This is my content.

This is my content.

My title

My title

More content.

This is my content.

This is my content.

More content.

6.14 Skin 'draft'

`/tcb/skin=draft` (skin)

This skin is intended to be used while drafting new geometric settings for a `tcolorbox`.

Environment and engines for the skin 'draft'

```
/tcb/graphical environment→P.72: tikzpicture
/tcb/frame engine→P.72: freelance
/tcb/interior titled engine→P.72: freelance
/tcb/interior engine→P.72: freelance
/tcb/segmentation engine→P.73: path
/tcb/title engine→P.73: path
```

`/tcb/draft`

(style, no value)

This is an abbreviation for setting `skin=draft`.

```
\tcbset{draft,equal height group=draft,
  colback=LightGreen,colframe=DarkGreen,
  width=(\linewidth-6mm)/4,nobeforeafter,
  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
\end{tcolorbox}\hfill
\begin{tcolorbox}[adjusted title=My title]
  This is my content.
  \tcblower
  More content.
\end{tcolorbox}
```

frame: w=101.71863pt, h=56.11296pt, h=56.11296pt, h=56.11296pt, h=56.11296pt, h=56.11296pt, h=56.11296pt

upper: w=87.49234pt, h=7.941pt, h=7.941pt, h=7.941pt, h=7.941pt, h=7.941pt, h=7.941pt
 upper: w=87.49234pt, h=41.8866pt, h=41.8866pt, h=41.8866pt, h=41.8866pt, h=41.8866pt, h=41.8866pt
 lower: w=87.49234pt, h=22.5531pt, h=22.5531pt, h=22.5531pt, h=22.5531pt, h=22.5531pt, h=22.5531pt
 interior: w=98.87338pt, h=53.2677pt, h=53.2677pt, h=53.2677pt, h=53.2677pt, h=53.2677pt, h=53.2677pt

```

\vspace*{3mm}
\begin{tcolorbox}[draft,title=A colored box with the 'draft' skin]
\lipsum[1-3]
\tcblower
\lipsum[4-6]
\end{tcolorbox}

```

frame: w=423.94617pt, h=506.20157pt

title: w=392.64822pt, h=6.2pt

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquam.

upper: w=392.64822pt, h=249.95pt

Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula. Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in.

lower: w=392.64822pt, h=205.95pt





sagittis dui, et vehicula libero dui, cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetur.

Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

interior: w=421.10092pt, h=490.04318pt

7 Libraries , , and

7.1 Loading the Libraries

In contrast to other `tcolorbox` libraries, the libraries , , and  are concurrent in the sense that they all do the same thing, i. e. displaying listings with or without typesetting the listing in \LaTeX parallel. The difference is the underlying \LaTeX package which does the core job for displaying a listing. So, typically, you need just *one* of these libraries. If you do not have a clue, which one of them you should use, you should take .

The order in which the libraries are included influences the default settings and the `/tcb/reset`^{→ P. 64} behavior. The settings of a later loaded library overwrite the settings of a previous loaded library. A library is never loaded twice.

7.1.1 Loading

This library uses the package `listings` [5] to typeset listings. It is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{listings}
```

This also loads the package `listings` [5].


The `/tcb/listing engine`^{→ P. 135} is set to `listings` by the library. To reactivate this setting, if overwritten by other libraries, use

```
\tcbset{listing engine=listings}
```

7.1.2 Loading

To extend `listings` for UTF-8 encoded sources, you can use the support from the package `listingsutf8` [8] by loading the library variant .

```
\tcbuselibrary{listingsutf8}  
\tcbset{listing utf8=latin1}% optional; 'latin1' is the default.
```

This also loads the library  and the packages `listings` [5] and `listingsutf8` [8].

The `/tcb/listing engine`^{→ P. 135} is set to `listings` by the library. To reactivate this setting, if overwritten by other libraries, use


```
\tcbset{listing engine=listings}
```

7.1.3 Loading `minted`

This library uses the package `minted` [11] to typeset listings. It is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{minted}
```

This also loads the package `minted` [11].

The `minted` package uses the external tool `Pygments` [9] to apply syntax highlighting. It has to be installed and set up, before the library can be used, see [11] and [9]. The `tcolorbox` library  `minted` does not work, if the package `minted` [11] does not work.

The `/tcb/listing engine` ^{P.135} is set to `minted` by the library. To reactivate this setting, if overwritten by other libraries, use

```
\tcbset{listing engine=minted}
```

7.2 Common Macros of the Libraries

```
\begin{tcblisting}{\langle options \rangle}
\langle environment content \rangle
\end{tcblisting}
```

Creates a colored box based on a `tcolorbox` ^{P.7}. Controlled by the given *options*, the environment content is typeset normally and/or as a listing. Furthermore, the *options* control appearance and functions of the `tcolorbox`. By default, the listing is interpreted as a \LaTeX listing.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black}
This is a \LaTeX\ example which displays the text as source code
and in compiled form.
\end{tcblisting}
```

This is a \LaTeX example which displays the text as source code
and in compiled form.

This is a \LaTeX example which displays the text as source code and in compiled form.

```
% \usetikzlibrary{listings} /or/ \usetikzlibrary{listingsutf8}
\begin{tcblisting}{colback=yellow!5,colframe=yellow!50!black,listings only,
  title=This is source code in another language (XML), fonttitle=\bfseries,
  listings options={language=XML,columns=fullflexible,keywordstyle=\color{red}}}
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=". ">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>
\end{tcblisting}
```

This is source code in another language (XML)

```
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=". ">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>
```

```
% \usetikzlibrary{minted}
\begin{tcblisting}{colback=yellow!5,colframe=yellow!50!black,listings only,
  title=This is source code in another language (XML), fonttitle=\bfseries,
  listings engine=minted,minted language=xml}
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=". ">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>
\end{tcblisting}
```

This is source code in another language (XML)

```
<?xml version="1.0"?>
<project name="Package tcolorbox" default="documentation" basedir=". ">
  <description>
    Apache Ant build file (http://ant.apache.org/)
  </description>
</project>
```

```
% This box is as wide as needed (listing only !!)
% \usetikzlibrary{skins}
\begin{tcblisting}{colback=green!5!white,colframe=green!50!black,listings only,
  hbox,enhanced,drop fuzzy shadow,before=\begin{center},after=\end{center}}
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
\end{tcblisting}
```

```
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
```


`\begin{tcboutputlisting}`

<environment content>

`\end{tcboutputlisting}`

Saves the environment content to a file which is named by the key value of `listing` file. Later, this file can be loaded by `\tcbinputlisting` or `\tcbuselistingtext` or `\tcbuselistinglisting`.

```
\begin{tcboutputlisting}
```

This `\textbf{text}` is written to a standardized file for later usage.

```
\end{tcboutputlisting}
```

`\tcbinputlisting{<options>}`

Creates a colored boxed based on a `tcolorbox`. The text content is read from a file named by the key value of `listing` file. Apart from that, the function is equal to that of `tcblisting` ^{→ P. 127}.

```
\tcbinputlisting{colback=red!5!white,colframe=red!75!black,text only}
```

```
\tcbinputlisting{colback=green!5,colframe=green!75!black,listing only}
```



```
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
```

`\tcbuselistingtext`

Loads text from a file named by the key value of `listing` file.

```
\tcbuselistingtext
```



`\tcbuselistinglisting`

Typesets text as listing from a file named by the key value of `listing` file.

```
\tcbuselistinglisting
```

```
\begin{tikzpicture}
\fill[red] (0,0) rectangle (1,1);
\end{tikzpicture}
```

`\tcbusetemplisting`

Typesets text as listing from a temporary file which was written by `tcbwritetemp` ^{→ P. 70}.

`\newtcblisting`[*<init options>*]{*<name>*}[*<number>*][*<default>*]{*<options>*}

Creates a new environment *<name>* based on `tcblisting`^{→P.127}. Basically, `\newtcblisting` operates like `\newenvironment`. This means, the new environment *<name>* optionally takes *<number>* arguments, where *<default>* is the default value for the optional first argument. The *<options>* are given to the underlying `tcblisting`. Note that `/tcb/savedelimiter`^{→P.14} is set to the given *<name>* automatically. The *<init options>* allow to set up automatic numbering, see Section 4 from page 65.

```
\newtcblisting{mybox}{%
  colback=red!5!white,
  colframe=red!75!black}

\begin{mybox}
This is my \LaTeX\ box.
\end{mybox}
```

This is my \LaTeX\ box.

This is my L^AT_EX box.

```
\newtcblisting{mybox}[1]{%
  colback=red!5!white,
  colframe=red!75!black,
  fonttitle=\bfseries,
  title=#1}

\begin{mybox}{Listing Box}
This is my \LaTeX\ box.
\end{mybox}
```

Listing Box

This is my \LaTeX\ box.

This is my L^AT_EX box.

```
\newtcblisting{mybox}[2][1]{%
  colback=red!5!white,
  colframe=red!75!black,
  fonttitle=\bfseries,
  title=#2,#1}

\begin{mybox}[listing only]
{Listing Box}
This is my \LaTeX\ box.
\end{mybox}
\bigskip

\begin{mybox}[listing side text]
{Listing Box}
This is my
\LaTeX\ box.
\end{mybox}
```

Listing Box

This is my \LaTeX\ box.

Listing Box

This is my
\LaTeX\ box.

This is my
L^AT_EX box.

Definition in the preamble:

```
\newtcblisting[auto counter]{mycbox}[1]{%
  colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
  title=Listing \thetcbcounter: #1}
```

```
\begin{mycbox}{Listing Box}
This is my \LaTeX\ box.
\end{mycbox}
```

Listing 1: Listing Box

This is my \LaTeX\ box.

This is my L^AT_EX box.

`\newtcbinputlisting` [*init options*] {*<name>*} [*<number>*] [*<default>*] {*<options>*}

Creates a new macro `\<name>` based on `\tcbinputlisting`^{P. 129}. Basically, `\newtcbinputlisting` operates like `\newcommand`. The new macro `\<name>` optionally takes *<number>*+1 arguments, where *<default>* is the default value for the optional first argument. The *<options>* are given to the underlying `tcbinputlisting`. The *<init options>* allow to set up automatic numbering, see Section 4 from page 65.

```
\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%
  listing file={#2},
  title=Listing (\thetcbcounter) of \texttt{#2},
  colback=red!5!white,colframe=red!75!black,fonttttitle=\bfseries,
  listing only,breakable,#1}

\mylisting[before upper=\textit{This is the included file content:}]
{\jobname.tcbtemp}
```

Listing (2) of `tcolorbox.tcbtemp`

This is the included file content:

```
\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%
  listing file={#2},
  title=Listing (\thetcbcounter) of \texttt{#2},
  colback=red!5!white,colframe=red!75!black,fonttttitle=\bfseries,
  listing only,breakable,#1}

\mylisting[before upper=\textit{This is the included file content:}]
{\jobname.tcbtemp}
```

```
\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%
  listing engine=minted,minted language=latex,minted style=colorful,
  listing file={#2},
  title=Listing (\thetcbcounter) of \texttt{#2},
  colback=red!5!white,colframe=red!75!black,fonttttitle=\bfseries,
  listing only,breakable,#1}

\mylisting[before upper=\textit{This is the included file content:}]
{\jobname.tcbtemp}
```

Listing (3) of `tcolorbox.tcbtemp`

This is the included file content:

```
\newtcbinputlisting[use counter from=mycbox]{\mylisting}[2][]{%
  listing engine=minted,minted language=latex,minted style=colorful,
  listing file={#2},
  title=Listing (\thetcbcounter) of \texttt{#2},
  colback=red!5!white,colframe=red!75!black,fonttttitle=\bfseries,
  listing only,breakable,#1}

\mylisting[before upper=\textit{This is the included file content:}]
{\jobname.tcbtemp}
```

7.3 Option Keys of the `listings` Library

`/tcb/listing options=<key list>` (no default, initially `style=tcblatex`)

Sets the options from the package `listings` [5] which are used during typesetting of the listing. For \LaTeX listings, there is a predefined `listings` style named `tcblatex` which can be used.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!25,left=6mm,
listing options={style=tcblatex,numbers=left,numberstyle=\tiny\color{red!75!black}}}
This is a \LaTeX\ example which displays the text as source code
and in compiled form. Additionally, we use line numbers here.
\end{tcblisting}
```

```
1 This is a \LaTeX\ example which displays the text as source code
2 and in compiled form. Additionally, we use line numbers here.
```

This is a \LaTeX example which displays the text as source code and in compiled form. Additionally, we use line numbers here.

`/tcb/no listing options` (no value, initially unset)

Abbreviation for `listing options={}`. This removes all options for the `listings` package. This includes the `tcblisting` standard style `tcblatex` and the encoding presets. Use this option, if you want to set the `listings` options outside of `tcblisting`, e.g. globally in the preamble.

```
\begin{tcblisting}{no listing options}
All \textit{listings} options removed.
\end{tcblisting}
```

All `\textit{listings}` options removed.

All *listings* options removed.

`/tcb/listing style=<style>` (no default, initially `tcblatex`)

Abbreviation for `listing options={style=...}`. This key sets a `<style>` for the `listings` package, see [5]. For \LaTeX , there is a predefined style named `tcblatex`.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,
listing style=tcblatex}
Here, we use the predefined style.
\end{tcblisting}
```

Here, we use the predefined style.

Here, we use the predefined style.

/tcb/listing inputencoding= $\langle encoding \rangle$ (no default, initially `\inputencodingname`)
 Sets the input encoding value for the predefined listing style `tcb-latex` and `tcb-documentation` from the library `documentation`. The initial value is derived from the package `inputenc` if used.

/tcb/listing remove caption= $\langle boolean\ value \rangle$ (default `true`, initially `true`)
 If set to `true`, some part of the caption building code of the `listings` package is silenced to prevent some unwanted interaction with the `hyperref` package resulting in additional vertical space. If set to `false`, the `listings` package code is kept unchanged. Note that listings outside `tcb-listing`^{→ P.127} and `\tcbinputlisting`^{→ P.129} are always processed normally. Typically, a user is not expected to use this key at all.

See further options in Section 7.6 on page 135.

7.4 Option Keys of the `listingsutf8` Library

The `listingsutf8` library is an extension of the `listings` library, so all options from Section 7.3 on the previous page are applicable.

/tcb/listing utf8= $\langle one-byte-encoding \rangle$ (style, no default, initially `latin1`)
 Abbreviation for using `/tcb/listing inputencoding` together with UTF-8 support from the package `listingsutf8` [8]. This option is available only for the library variant `listingsutf8`. The $\langle one-byte-encoding \rangle$ is one of the applicable encodings from [8], e.g. `latin1`.

See further options in Section 7.6 on page 135.

7.5 Option Keys of the `minted` Library

/tcb/minted language= $\langle programming\ language \rangle$ (no default, initially `latex`)
 Sets a $\langle programming\ language \rangle$ known to Pygments [9].

```
\begin{tcblisting}{listing engine=minted,minted style=trac,
  minted language=java,
  colback=red!5!white,colframe=red!75!black,listing only}
public class HelloWorld {
  // A 'Hello World' in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
}
\end{tcblisting}
```

```
public class HelloWorld {
  // A 'Hello World' in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
}
```

/tcb/minted options=*<key list>* (no default, initially `tabsize=2,fontsize=\small`)

Sets the options from the package `minted` [11] which are used during typesetting of the listing.

```
% \tcbuselibrary{skins}
\newtcblisting{myjava}{listing engine=minted,minted style=colorful,
  minted language=java,minted options={fontsize=\small,linenos,numbersep=3mm},
  colback=blue!5!white,colframe=blue!75!black,listing only,
  left=5mm,enhanced,
  overlay={\begin{tcbclipinterior}\fill[red!20!blue!20!white] (frame.south west)
    rectangle ([xshift=5mm]frame.north west);\end{tcbclipinterior}}}}

\begin{myjava}
public class HelloWorld {
  // A 'Hello World' in Java
  public static void main(String[] args) {
    System.out.println("Hello World!");
  }
}
\end{myjava}
```

```
1 public class HelloWorld {
2   // A 'Hello World' in Java
3   public static void main(String[] args) {
4     System.out.println("Hello World!");
5   }
6 }
```

/tcb/minted style=*<style>* (no default, initially unset)

Sets a *<style>* known to Pygments [9]. This is independent from `/tcb/minted options`. Note that styles are always applied globally; all following examples will be set in the given *<style>* until a new style is set. Also note that setting `\usemintedstyle{<style>}` only once per document is more economic, if all styles in a document are the same. For examples of different styles, see `/tcb/minted language`^{→P.133} and `/tcb/minted options`.

See further options in Section 7.6 on the next page.

7.6 Common Option Keys of all Libraries

For the $\langle options \rangle$ in `tcblisting`^{→ P. 127} respectively `\tcbinputlisting`^{→ P. 129} the following pgf keys can be applied. The key tree path `/tcb/` is not to be used inside these macros.

/tcb/listing engine= $\langle engine \rangle$ (no default)

Sets the $\langle engine \rangle$ which typesets the listings. Feasible values are

- `listings`, if library `\lib listings` or `\lib listingsutf8` is loaded.
- `minted`, if library `\lib minted` is loaded.

/tcb/listing file= $\langle file name \rangle$ (no default, initially `\jobname.listing`)

Sets the $\langle file name \rangle$ of the file which is used to save listings.

/tcb/listing and text (no value, initially set)

Typesets the environment content as listing in the upper part and as compiled text in the lower part.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and text}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is a \LaTeX\ example.

This is a L^AT_EX example.

/tcb/text and listing (no value)

Typesets the environment content as compiled text in the upper part and as listing in the lower part.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text and listing}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is a L^AT_EX example.

This is a \LaTeX\ example.

/tcb/listing only (no value)

Typesets the environment content as listing.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing only}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is a \LaTeX\ example.

`/tcb/text only`

(no value)

Typesets the environment content as compiled text.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text only}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is a \LaTeX example.

`/tcb/comment=<text>`

(no default, initially empty)

Records a comment with `<text>` as content. The comment is displayed only in conjunction with `/tcb/listing and comment` and `/tcb/comment and listing`.

```
\begin{tcblisting}{comment={This comment is really only a comment},
colback=red!5!white,colframe=red!75!black}
This is a \textbf{tcolorbox}.
\end{tcblisting}
```

This is a `\textbf{tcolorbox}`.

This is a `tcolorbox`.

`/tcb/listing and comment`

(no value)

Typesets the environment content as listing in the upper part and a given comment in the lower part.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing and comment,
comment={This is my comment. It may contain line breaks.\par
It can even use the environment content
\flqq\ignorespaces\tcbuselistingtext\unskip\frqq}}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is a `\LaTeX` example.

This is my comment. It may contain line breaks.
It can even use the environment content «This is a \LaTeX example.»

`/tcb/comment and listing`

(no value)

Typesets a given comment in the upper part and the environment content as listing in the lower part.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,comment and listing,
comment={This is my comment.}}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is my comment.

This is a `\LaTeX` example.

`/tcb/listing side text`

(no value)

Typesets the environment content side by side as listing in the left (upper) part and as compiled text in the right (lower) part.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing side text}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is a \LaTeX\ example.

This is a L^AT_EX example.

`/tcb/text side listing`

(no value)

Typesets the environment content side by side as compiled text in the left (upper) part and as listing in the right (lower) part.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text side listing}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is a L^AT_EX example.

This is a \LaTeX\ example.

`/tcb/listing outside text`

(no value)

Typesets the environment content side by side as listing in a `tcolorbox` and as compiled text outside the box in the right part of the page. Nevertheless, the outside text is treated as *lower* part of the `tcolorbox` and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 3.9, see page 47.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,listing outside text}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is a \LaTeX\ example.

This is a L^AT_EX example.

`/tcb/text outside listing`

(no value)

Typesets the environment content side by side as listing in a `tcolorbox` and as compiled text outside the box in the left part of the page. Nevertheless, the outside text is treated as *lower* part of the `tcolorbox` and can be formatted with all lower part options. The space partitioning is done with the side by side options from Section 3.9, see page 47.

```
\begin{tcblisting}{colback=red!5!white,colframe=red!75!black,text outside listing}
This is a \LaTeX\ example.
\end{tcblisting}
```

This is a L^AT_EX example.

This is a \LaTeX\ example.

7.7 Creation of L^AT_EX Tutorials

The following source code gives a guideline for the creation of L^AT_EX tutorials. In the next section, a framework for L^AT_EX exercises is described. All examples shall be numbered optionally.

Firstly, some additional tcb keys are defined for the appearance. For the examples, three environments `texexp`, `texexptitled`, and `texexptitledspec` are defined with automatic numbering.

- `texexp` is used for untitled examles,
- `texexptitled` is used for titled examles,
- `texexptitledspec` is used for titled examles with special treatment.

Definition in the preamble:

```
\tcbsset{
  texexp/.style={colframe=red!50!yellow!50!black, colback=red!50!yellow!5!white,
    coltitle=red!50!yellow!3!white,
    fonttitle=\small\sffamily\bfseries, fontupper=\small, fontlower=\small},
  example/.style 2 args={texexp,
    title={Example \thetcbcounter: #1,label={#2}},
  }

\newtcblisting{texexp}[1]{texexp,#1}
\newtcblisting[auto counter,number within=section]{texexptitled}[3][]{%
  example={#2}{#3},#1}
\newtcolorbox[use counter from=texexptitled]{texexptitledspec}[3][]{%
  example={#2}{#3},#1}
```

```
\begin{tcblisting}{texexp}
This is a \LaTeX\ example which displays the text as source code
and in compiled form.
\end{tcblisting}
```

This is a \LaTeX\ example which displays the text as source code
and in compiled form.

This is a L^AT_EX example which displays the text as source code and in compiled form.

```
\begin{texexptitled}{First example with a title line}{firstExample}
Here, we use Example \ref{firstExample} with a title line.
\end{texexptitled}
```

Example 7.1: First example with a title line

Here, we use Example \ref{firstExample} with a title line.

Here, we use Example 7.1 with a title line.

```
\begin{texexp}{}  
This is a \LaTeX\ example which displays the text as source code  
and in compiled form.  
\end{texexp}
```

This is a \LaTeX\ example which displays the text as source code
and in compiled form.

This is a L^AT_EX example which displays the text as source code and in compiled form.

```
\begin{texexp}{text and listing}  
This is a \LaTeX\ example which displays the text as source code  
and in compiled form.  
\end{texexp}
```

This is a L^AT_EX example which displays the text as source code and in compiled form.

This is a \LaTeX\ example which displays the text as source code
and in compiled form.

```
\begin{texexp}{listing only}  
This is a \LaTeX\ example which displays the text as source code only.  
\end{texexp}
```

This is a \LaTeX\ example which displays the text as source code only.

```
\begin{texexp}{text only}  
This is a \LaTeX\ example which displays the text in compiled form only.  
\end{texexp}
```

This is a L^AT_EX example which displays the text in compiled form only.

```
\begin{texexptitled}{An Example with a Heading}{heading1}
This is a \LaTeX\ example with a numbered heading line
which can be referred to.
\end{texexptitled}
Here, we see Example \ref{heading1}.
```

Example 7.2: An Example with a Heading

This is a \LaTeX\ example with a numbered heading line which can be referred to.

This is a L^AT_EX example with a numbered heading line which can be referred to.

Here, we see Example 7.2.

```
\begin{texexptitled}[listing only]{Another Example with a Heading}{heading2}
The keys can be used in combination. Here, an example with a heading line
and source code only is given.
\end{texexptitled}
Here, we see Example \ref{heading2}.
```

Example 7.3: Another Example with a Heading

The keys can be used in combination. Here, an example with a heading line and source code only is given.

Here, we see Example 7.3.

```
\begin{texexptitled}[float]{A floating Example with a Heading}{heading3}
This is another \LaTeX\ example with numbered heading line.
But now, the box is a floating object.
\end{texexptitled}
```

Example 7.4: A floating Example with a Heading

This is another \LaTeX\ example with numbered heading line. But now, the box is a floating object.

This is another L^AT_EX example with numbered heading line. But now, the box is a floating object.

The floating box of the last example is seen as Example \ref{heading3} on page \pageref{heading3}.

The floating box of the last example is seen as Example 7.4 on page 140.

```

\begin{texeptitledspec}[Special application]{texexpbox1}
\begin{lstlisting}[style=tcblatex]
Some \LaTeX\ source code.
\end{lstlisting}
\tcblower

```

For special cases, the environment `texeptitledspec` with style `example` can be used directly. As one can see, the upper and the lower part of the box can be used uncoupled also.

```

\end{texeptitledspec}

```

Example 7.5: Special application

Some `\LaTeX` source code.

For special cases, the environment `texeptitledspec` with style `example` can be used directly. As one can see, the upper and the lower part of the box can be used uncoupled also.

The following series of examples demonstrate the application of `tcolorbox`^{→P.7} options for diversification.

```

\begin{texeptitled}{How to use options (1):\par The basic example}{options1}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{texeptitled}

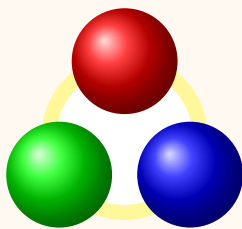
```

Example 7.6: How to use options (1): The basic example

```

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}

```



```

\begin{texexptitled}[center lower,enhanced,segmentation hidden,middle=0mm]
  {How to use options (2):\par The text output is centered and the
    segmentation line has vanished.}{options2}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{texexptitled}

```

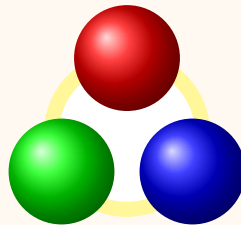
Example 7.7: How to use options (2):

The text output is centered and the segmentation line has vanished.

```

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{tikzpicture}

```



```

\begin{texexptitled}[tikz lower,bicolor,colbacklower=white]
  {How to use options (3):\par Here, the |tikzpicture| is totally hidden.
    The |bicolor| skin highlights the output.}{options3}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}
\end{texexptitled}

```

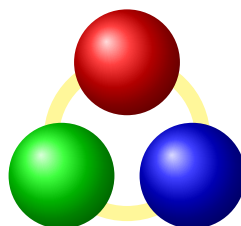
Example 7.8: How to use options (3):

Here, the tikzpicture is totally hidden. The bicolor skin highlights the output.

```

\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c] (\w:1cm) circle (7mm);}

```



```

\begin{texexptitled}[center lower,listing side text,righthand width=3.5cm,
  bicolor,colbacklower=white]
  {How to use options (4):\par The |bicolor| skin also works with side
    by side mode}{options4}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
  (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{texexptitled}

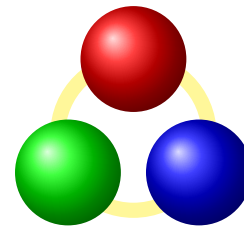
```

Example 7.9: How to use options (4):
The bicolor skin also works with side by side mode

```

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
  (\w:1cm) circle (7mm);}
\end{tikzpicture}

```



```

\begin{texexptitled}[center lower,listing outside text,righthand width=3.5cm]
  {How to use options (5):\par Putting our picture outside is just
    a matter of one word.}{options5}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
  (\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{texexptitled}

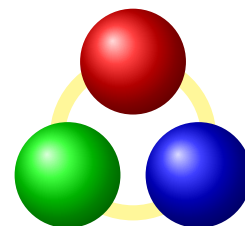
```

Example 7.10: How to use options (5):
Putting our picture outside is just a matter of one word.

```

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
  (\w:1cm) circle (7mm);}
\end{tikzpicture}

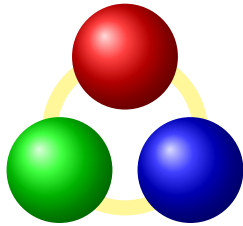
```



```

\begin{texeptitled}[beamer,center lower,text outside listing,lefthand width=3.5cm]
{How to use options (6):\par Our style is easily transformed into
a beamerish one.}{options6}
\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
(\w:1cm) circle (7mm);}
\end{tikzpicture}
\end{texeptitled}

```



Example 7.11: How to use options (6):

Our style is easily transformed into a beamerish one.

```

\begin{tikzpicture}
\path[fill=yellow!50!white] (0,0) circle (11mm);
\path[fill=white] (0,0) circle (9mm);
\foreach \w/\c in {90/red,210/green,330/blue}
{\path[shading=ball,ball color=\c]
(\w:1cm) circle (7mm);}
\end{tikzpicture}

```


7.8 Creation of L^AT_EX Exercises

In the following, a guideline is given for the creation of L^AT_EX exercises with solutions. These solutions are saved to disk for application at a place of choice. Therefore, all used exercises are logged to a file `\jobname.sol` for automatic processing. The solution contents themselves are saved to a subdirectory named `solutions`.

```
%\newcounter{texercise} % preamble

\newwrite\solout
\def\openoutsol{\immediate\openout\solout\jobname.sol}
\def\solfile#1{solutions/texercise#1.tex}
\def\writesol#1{\immediate\write\solout{\noexpand\processsol{\thetcbcounter}{#1}}}%
\def\closeoutsol{\immediate\closeout\solout}
\def\inputsol{\IfFileExists{\jobname.sol}{\input{\jobname.sol}}{}}
```

- Before the first exercise is given, `\openoutsol` has to be called to start logging.
- The solution is given as content of a `tcboutputlisting`^{→ P. 129} environment. Note, that you can use this content also inside the exercise with `\tcbuselistingtext`^{→ P. 129} in compiled form.
- After the last exercise is given (and before using the solutions), `\closeoutsol` has to be called to stop logging.
- The solutions are loaded by `\inputsol`.

Inside the exercise text, there may be text parts which are needed as L^AT_EX source code and as compiled text as well. These parts can be saved by `tcbwritetemp`^{→ P. 70} and used in compiled form by `\tcbusetemp`^{→ P. 70} or as source code by `\tcbusetemplisting`^{→ P. 129}.

At first, we generate some a common style for the exercises and the solutions. Further, since exercises and solutions should be numbered, we force to use a label `<marker>`. Automatically, the label `exe:<marker>` is used to mark the exercise and the label `sol:<marker>` is used to mark the solution.

```
\tcbset{texercisestyle/.style={arc=0.5mm, colframe=blue!25!yellow!90!white,
colback=blue!25!yellow!5!white, coltitle=blue!25!yellow!40!black,
fonttitle=\small\sffamily\bfseries, fontupper=\small, fontlower=\small}}
```

With these preparations, the kernel environment `texercise` for our exercises is created quickly:

Definition in the preamble:

```
\newcolorbox[auto counter,number within=section,list inside=exam]%
{texercise}[2][\texercisestyle,
listing file={\solfile\thetcbcounter},label={exe:#2},
phantom={\writesol{#2}},
title={Exercise \thetcbcounter\hfill\mdseries Solution on page \pageref{sol:#2}},
list entry={\numberline{\thetcbcounter}Exercise with solution on
page \pageref{sol:#2}},#1}
```

```
\newcolorbox{texercise}[2][\texercisestyle,
listing file={\solfile\thetexercise},
phantom={\refstepcounter{texercise}\label{exe:#2}\writesol{#2}},
title={Exercise \arabic{texercise}%
\hfill\mdseries Solution on page \pageref{sol:#2}},#1}
```

The following examples demonstrate the application.

```
\begin{texercise}{tabular_example}
\textit{Create the following table:}\par\smallskip%
\begin{tcboutputlisting}
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}\hline
\multicolumn{4}{|c|}{\bfseries\itshape Das alte Italien}\hline
\multicolumn{2}{|c|}{\bfseries Antike} & & \\
\multicolumn{2}{|c|}{\bfseries Mittelalter}\hline
\multicolumn{1}{|c|}{\itshape Republik}& & & \\
\multicolumn{1}{|c|}{\itshape Kaiserreich}& & & \\
\multicolumn{1}{|c|}{\itshape Franken}& & & \\
\multicolumn{1}{|c|}{\itshape Teilstaaten}\hline
In den Zeiten der r\{"o}mischen Republik standen dem Staat jeweils zwei
Konsuln vor, deren Machtbefugnisse identisch waren. & & & \\
Das r\{"o}mische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser,
regiert.
& In der V\{"o}lkerwanderungszeit \{"u}bernahmen die Goten und sp\{a}ter die
Franken die Vorherrschaft.
& Im sp\{a}teren Mittelalter regierten F\{"u}rsten einen Fleckenteppich
von Einzelstaaten.\hline
\end{tabular}
\end{tcboutputlisting}
\tcbuselistingtext%
\end{texercise}
```

Exercise 7.1

Solution on page 149

Create the following table:

| <i>Das alte Italien</i> | | | |
|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <i>Antike</i> | | <i>Mittelalter</i> | |
| <i>Republik</i> | <i>Kaiserreich</i> | <i>Franken</i> | <i>Teilstaaten</i> |
| In den Zeiten der römischen Republik standen dem Staat jeweils zwei Konsuln vor, deren Machtbefugnisse identisch waren. | Das römische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser, regiert. | In der Völkerwanderungszeit übernahmen die Goten und später die Franken die Vorherrschaft. | Im späteren Mittelalter regierten Fürsten einen Fleckenteppich von Einzelstaaten. |

```

\begin{texercise}{macro_oneparam}
\begin{tcboutputlisting}
\newcommand{\headingline}[1]{%
  \begin{center}\Large\bfseries #1\end{center}}
\end{tcboutputlisting}
\tcbuselistingtext%

```

Create a new macro `\verb+\headingline+` which produces the following output: `\par\smallskip`

```

\begin{tcbwritetemp}
\headingline{Very important heading}
\end{tcbwritetemp}
\tcbusetemplisting\tcbusetemp%
\end{texercise}

```

Exercise 7.2

Solution on page 149

Create a new macro `\headingline` which produces the following output:

```
\headingline{Very important heading}
```

Very important heading

```

\begin{texercise}{macro_twoparam}
\begin{tcboutputlisting}
\newcommand{\minitable}[2]{%
  \begin{center}\begin{tabular}{p{10cm}}\hline%
    \multicolumn{1}{c}{\bfseries#1}\hline%
    #2\hline%
  \end{tabular}\end{center}}
\end{tcboutputlisting}
\tcbuselistingtext%

```

Create a new macro `\verb+\minitable+` which produces the following output: `\par\smallskip`

```

\begin{tcbwritetemp}
\minitable{My heading}{In this tiny tabular, there is only a heading
  and some text below which has a width of ten centimeters.}
\end{tcbwritetemp}
\tcbusetemplisting\par\smallskip\tcbusetemp%
\end{texercise}

```

Exercise 7.3

Solution on page 149

Create a new macro `\minitable` which produces the following output:

```
\minitable{My heading}{In this tiny tabular, there is only a heading
  and some text below which has a width of ten centimeters.}
```

My heading

In this tiny tabular, there is only a heading and some text below
which has a width of ten centimeters.

```

\begin{texercise}{macro_threeparam}
\begin{tcboutputlisting}
\newcommand{\synop}[3]{%
  \begin{tabular}{@{}p{(\linewidth-\tabcolsep*2-\arrayrulewidth)/2}|%
    p{(\linewidth-\tabcolsep*2-\arrayrulewidth)/2}@{}}\hline
    \multicolumn{2}{c}{\bfseries #1}\\\hline
    \multicolumn{1}{c|}{\itshape English}&
    \multicolumn{1}{c}{\itshape German}\\hline
    #2 & #3
  \end{tabular}}
\end{tcboutputlisting}
\tcbuselistingtext%
Create a new macro \verb+\synop+ which typesets a synoptic text according
to the following example. Base your macro on a tabular which takes the
total line width.\par\smallskip
\begin{tcbwritetemp}
\synop{Neil Armstrong}%
{That's one small step for a man, one giant leap for mankind.}%
{Das ist ein kleiner Schritt f\"{u}r einen Mann,
  ein riesiger Sprung f\"{u}r die Menschheit.}
\end{tcbwritetemp}
\tcbusetemplisting\par\smallskip\tcbusetemp%
\end{texercise}

```

Exercise 7.4

Solution on page 150

Create a new macro `\synop` which typesets a synoptic text according to the following example. Base your macro on a tabular which takes the total line width.

```

\synop{Neil Armstrong}%
{That's one small step for a man, one giant leap for mankind.}%
{Das ist ein kleiner Schritt f\"{u}r einen Mann,
  ein riesiger Sprung f\"{u}r die Menschheit.}

```

| Neil Armstrong | |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <i>English</i> | <i>German</i> |
| That's one small step for a man, one giant leap for mankind. | Das ist ein kleiner Schritt für einen Mann, ein riesiger Sprung für die Menschheit. |

Now, we give a list of all exercises with:

```

\tcblistof[\subsection]{exam}{List of Exercises%
  \label{listofexercises}}

```

7.9 List of Exercises

| | | |
|-----|------------------------------------|-----|
| 7.1 | Exercise with solution on page 149 | 146 |
| 7.2 | Exercise with solution on page 149 | 147 |
| 7.3 | Exercise with solution on page 149 | 147 |
| 7.4 | Exercise with solution on page 150 | 148 |

7.10 Solutions for the given L^AT_EX Exercises

For all solutions, a macro `\processsol` was written to the file `\jobname.sol`. Now, we need a definition for this macro to use the solutions.

```
% \usepackage{hyperref} % for \phantomsection
\newcommand{\processsol}[2]{%
  \tcbinputlisting{texercisestyle,listing only,
    phantom={\phantomsection\label{sol:#2}},%
    title={Solution for Exercise \ref{exe:#2} on page \pageref{exe:#2}},
    listing file={\solfile{#1}}}}
```

The loading of all solutions is done by:

```
\inputsol
```

With this, we get:

Solution for Exercise 7.1 on page 146

```
\begin{tabular}{|p{3cm}|p{3cm}|p{3cm}|p{3cm}|}\hline
\multicolumn{4}{|c|}{\bfseries\itshape Das alte Italien}\hline
\multicolumn{2}{|c|}{\bfseries Antike} &
\multicolumn{2}{c|}{\bfseries Mittelalter}\hline
\multicolumn{1}{|c|}{\itshape Republik}&
\multicolumn{1}{c|}{\itshape Kaiserreich}&
\multicolumn{1}{c|}{\itshape Franken}&
\multicolumn{1}{c|}{\itshape Teilstaaten}\hline
In den Zeiten der r"\{o}mischen Republik standen dem Staat jeweils zwei
Konsuln vor, deren Machtbefugnisse identisch waren. &
Das r"\{o}mische Kaiserreich wurde von einem Alleinherrscher, dem Kaiser,
regiert.
& In der V"\{o}lkerwanderungszeit "\{u}bernahmen die Goten und sp"\{a}ter die
Franken die Vorherrschaft.
& Im sp"\{a}teren Mittelalter regierten F"\{u}rsten einen Fleckenteppich
von Einzelstaaten.\hline
\end{tabular}
```

Solution for Exercise 7.2 on page 147

```
\newcommand{\headingline}[1]{%
  \begin{center}\Large\bfseries #1\end{center}}
```

Solution for Exercise 7.3 on page 147

```
\newcommand{\minitable}[2]{%
  \begin{center}\begin{tabular}{p{10cm}}\hline%
  \multicolumn{1}{c}{\bfseries#1}\hline%
  #2\hline%
  \end{tabular}\end{center}}
```

```

\newcommand{\synop}[3]{%
  \begin{tabular}{@{}p{(\linewidth-\tabcolsep*2-\arrayrulewidth)/2}|%
    p{(\linewidth-\tabcolsep*2-\arrayrulewidth)/2}@{}}\hline
    \multicolumn{2}{c}{\bfseries #1}\\\hline
    \multicolumn{1}{c|}{\itshape English}&
    \multicolumn{1}{c}{\itshape German}\\\hline
    #2 & #3
  \end{tabular}}

```

8 Library LIB **theorems**

The library is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{theorems}
```

This also loads the package `amsmath`.

8.1 Macros of the Library

\newtcbtheorem[*<init options>*]{*<name>*}{*<display name>*}{*<options>*}{*<prefix>*}

Creates a new environment *<name>* based on `tcolorbox` to frame a (mathematical) theorem. The *<display name>* is used in the title line with a number, e.g. «Theorem 5.1». The *<options>* are given to the underlying `tcolorbox` to control the appearance. The *<init options>* allow to set up automatic numbering, see Section 4 from page 65.

The new environment *<name>* takes one optional and two mandatory parameters. The optional parameter supplements the options and should be used only in rare cases. The first mandatory parameter is the title text for the theorem and the second mandatory parameter is a *<marker>*. The theorem is automatically labeled with *<prefix>*:*<marker>*.

Definition in the preamble:

```
\newtcbtheorem[number within=section]{mytheo}{My Theorem}%  
  {colback=green!5,colframe=green!35!black,fonttitle=\bfseries}{th}
```

```
\begin{mytheo}{This is my title}{theoexample}  
  This is the text of the theorem. The counter is automatically assigned and,  
  in this example, prefixed with the section number. This theorem is numbered with  
  \ref{th:theoexample} and is given on page \pageref{th:theoexample}.  
\end{mytheo}
```

My Theorem 8.1: This is my title

This is the text of the theorem. The counter is automatically assigned and, in this example, prefixed with the section number. This theorem is numbered with 8.1 and is given on page 151.

```
\begin{mytheo}[label=myownlabel]{This is my title}{}  
  The label parameter can be left empty without \LaTeX error.  
  Or you may use an own label to reference Theorem \ref{myownlabel}.  
\end{mytheo}
```

My Theorem 8.2: This is my title

The label parameter can be left empty without `LATEX` error. Or you may use an own label to reference Theorem 8.2.

```
\begin{mytheo}{}{}  
  The title can also be left empty without problem. Note that the ':'  
  vanished magically.  
\end{mytheo}
```

My Theorem 8.3

The title can also be left empty without problem. Note that the ':' vanished magically.

`\tcbmaketheorem`{ $\langle name \rangle$ }{ $\langle display name \rangle$ }{ $\langle options \rangle$ }{ $\langle counter \rangle$ }{ $\langle prefix \rangle$ }

`\newtcbtheorem`^{P. 151} supersedes this macro.

Creates a new environment $\langle name \rangle$ based on `tcolorbox` to frame a (mathematical) theorem. The $\langle display name \rangle$ is used in the title line with a number, e.g. «Theorem 5.1». The $\langle options \rangle$ are given to the underlying `tcolorbox` to control the appearance. The $\langle counter \rangle$ is used for automatic numbering. The new environment $\langle name \rangle$ takes one optional and two mandatory parameters. The optional parameter supplements the options and should be used only in rare cases. The first mandatory parameter is the title text for the theorem and the second mandatory parameter is a $\langle marker \rangle$. The theorem is automatically labeled with $\langle prefix \rangle:\langle marker \rangle$.

`\tcbboxmath`[$\langle options \rangle$]{ $\langle mathematical box content \rangle$ }

Creates a `tcolorbox`^{P. 7} which is fitted to the width of the given $\langle mathematical box content \rangle$. This box is intended to be applied as part of a larger formula and may be used as replacement for the `\boxed` macro of `amsmath`.

```
\begin{equation}
\tcbset{fonttitle=\scriptsize}
\tcbboxmath[colback=LightBlue!25!white,colframe=blue]{ a^2 = 16 }
\quad \rightarrow \quad
\tcbboxmath[colback=Salmon!25!white,colframe=red,title=Implication]{
  { a = 4 ~\vee~ a=-4. }
}
\end{equation}
```

$$a^2 = 16$$

\Rightarrow

Implication

$$a = 4 \vee a = -4.$$

(3)

`\tcbhighmath[\langle options \rangle]{\langle mathematical box content \rangle}`

This is a special case of the `\tcboxmath`^{P. 152} macro which uses the style `/tcb/highlight math`^{P. 155}. It is intended to provide context sensitive highlighting of formula parts. The color settings via `/tcb/highlight math style`^{P. 155} may be different inside theorems or other colored areas and outside.

```
\tcbset{myformula/.style={colback=yellow!10!white,colframe=red!50!black,
highlight math style={colback=LightBlue!50!white,colframe=Navy}}}

\begin{align}
\tcbhighmath{\sum\limits_{n=1}^{\infty} \frac{1}{n}} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{align}

\begin{tcolorbox}[ams align,myformula]
\tcbhighmath{\sum\limits_{n=1}^{\infty} \frac{1}{n}} &= \infty. \\
\int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \quad (4)$$

$$\int x^2 \, dx = \frac{1}{3} x^3 + c. \quad (5)$$

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \quad (6)$$

$$\int x^2 \, dx = \frac{1}{3} x^3 + c. \quad (7)$$

8.2 Option Keys of the Library

/tcb/separator sign= $\langle sign \rangle$ (no default, initial :)

The given $\langle sign \rangle$ is used inside the title text of a theorem as separator between display name combined with number and the specific title text. It is omitted, if there is no specific title text.

```
% \usepackage{amssymb}
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries,
 separator sign={\ $\blacktriangleright$}}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

Theorem 8.4 ▶ My example

My theorem text.

/tcb/separator sign colon (style, no value, initially set)

Sets /tcb/separator sign to the default colon : sign.

/tcb/separator sign dash (style, no value)

Sets /tcb/separator sign to an en-dash sign.

```
\newtcbtheorem[use counter from=mytheo]{sometheorem}{Theorem}%
{colback=white,colframe=red!50!black,fonttitle=\bfseries,
 separator sign dash}{theo}
\begin{sometheorem}{My example}{}
My theorem text.
\end{sometheorem}
```

Theorem 8.5 – My example

My theorem text.

/tcb/theorem= $\{\langle display name \rangle\}\{\langle counter \rangle\}\{\langle title \rangle\}\{\langle marker \rangle\}$ (no default)

This key is internally used by `\tcbmaketheorem`^{→ P. 152}, but can be used directly in a `tcolorbox` for a more flexible approach. The $\langle display name \rangle$ is used together with the increased $\langle counter \rangle$ value and the $\langle title \rangle$ for the title line of the box. Additionally, a `\label` with the given $\langle marker \rangle$ is created.

```
% \newcounter{texercise}% preamble
\begin{tcolorbox}[colback=green!10,colframe=green!50!black,arc=4mm,
 theorem={Test}{texercise}{Direct usage}{myMarker}]
Here, we see the test \ref{myMarker}.
\end{tcolorbox}
```

Test 1: Direct usage

Here, we see the test 1.

For a common appearance inside the document, the key `theorem` should not be used directly as in the example above, but as part of a new environment created by hand or using `\tcbmaketheorem`^{→ P. 152} or using its successor `\newtcbtheorem`^{→ P. 151}.

`/tcb/highlight math` (style, no value)

Predefined style which is used for `\tcbhighmath`^{→P.153}. It can be changed comfortably with `/tcb/highlight math style`.

`/tcb/highlight math style=<style definition>` (style, no default)

Changes the definition for `/tcb/highlight math` to the given *<style definition>*. See `\tcbhighmath`^{→P.153} for an example.

`/tcb/math upper` (style, no value)

Sets the upper part to mathematical mode with font `\displaystyle`.

`/tcb/math lower` (style, no value)

Sets the lower part to mathematical mode with font `\displaystyle`.

`/tcb/math` (style, no value)

Sets the upper part *and* lower part to mathematical mode with font `\displaystyle`.

```
\begin{tcolorbox}[math,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty.$$

The following styles are only tested to work with the original `amsmath` environments. If e.g. the `equation` environment is redefined as `gather`, then `/tcb/ams equation` should / could not be used. Obviously, you are encouraged to use `/tcb/ams gather`^{→ P. 158} in this case.

`/tcb/ams equation upper` (style, no value)

Adds an `amsmath equation` environment to the begin and to the end if the upper part.

`/tcb/ams equation lower` (style, no value)

Adds an `amsmath equation` environment to the begin and to the end if the lower part.

`/tcb/ams equation` (style, no value)

Adds an `amsmath equation` environment to the begin and to the end if the upper *and* lower part.

```
\begin{tcolorbox}[ams equation,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \quad (8)$$

`/tcb/ams equation* upper` (style, no value)

Adds an `amsmath equation*` environment to the begin and to the end if the upper part.

`/tcb/ams equation* lower` (style, no value)

Adds an `amsmath equation*` environment to the begin and to the end if the lower part.

`/tcb/ams equation*` (style, no value)

Adds an `amsmath equation*` environment to the begin and to the end if the upper *and* lower part.

```
\begin{tcolorbox}[ams equation*,colback=yellow!10!white,colframe=red!50!black]
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty.$$

`/tcb/ams align upper` (style, no value)

Adds an `amsmath align` environment to the begin and to the end if the upper part.

`/tcb/ams align lower` (style, no value)

Adds an `amsmath align` environment to the begin and to the end if the lower part.

`/tcb/ams align` (style, no value)

Adds an `amsmath align` environment to the begin and to the end if the upper *and* lower part.

```
\begin{tcolorbox}[ams align,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} &= \infty.\\\
  \int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \quad (9)$$

$$\int x^2 \, dx = \frac{1}{3} x^3 + c. \quad (10)$$

`/tcb/ams align* upper` (style, no value)

Adds an `amsmath align*` environment to the begin and to the end if the upper part.

`/tcb/ams align* lower` (style, no value)

Adds an `amsmath align*` environment to the begin and to the end if the lower part.

`/tcb/ams align*` (style, no value)

Adds an `amsmath align*` environment to the begin and to the end if the upper *and* lower part.

```
\begin{tcolorbox}[ams align*,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} &= \infty.\\\
  \int x^2 \, dx &= \frac{1}{3} x^3 + c.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty.$$

$$\int x^2 \, dx = \frac{1}{3} x^3 + c.$$

`/tcb/ams gather upper` (style, no value)

Adds an `amsmath gather` environment to the begin and to the end if the upper part.

`/tcb/ams gather lower` (style, no value)

Adds an `amsmath gather` environment to the begin and to the end if the lower part.

`/tcb/ams gather` (style, no value)

Adds an `amsmath gather` environment to the begin and to the end if the upper *and* lower part.

```
\begin{tcolorbox}[ams gather,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\.
  \int x^2 \, dx = \frac{1}{3} x^3 + c.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \quad (11)$$

$$\int x^2 \, dx = \frac{1}{3} x^3 + c. \quad (12)$$

`/tcb/ams gather* upper` (style, no value)

Adds an `amsmath gather*` environment to the begin and to the end if the upper part.

`/tcb/ams gather* lower` (style, no value)

Adds an `amsmath gather*` environment to the begin and to the end if the lower part.

`/tcb/ams gather*` (style, no value)

Adds an `amsmath gather*` environment to the begin and to the end if the upper *and* lower part.

```
\begin{tcolorbox}[ams gather*,colback=yellow!10!white,colframe=red!50!black]
  \sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\.
  \int x^2 \, dx = \frac{1}{3} x^3 + c.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty.$$

$$\int x^2 \, dx = \frac{1}{3} x^3 + c.$$

`/tcb/ams nodisplayskip upper` (style, no value)

Neutralizes the `\abovedisplayskip` of a following `align` or `gather` environment for the upper part. Note that the text content has to start with such a formula.

`/tcb/ams nodisplayskip lower` (style, no value)

Neutralizes the `\abovedisplayskip` of a following `align` or `gather` environment for the lower part. Note that the text content has to start with such a formula.

`/tcb/ams nodisplayskip` (style, no value)

Neutralizes the `\abovedisplayskip` of a following `align` or `gather` environment for the upper part *and* lower part. Note that the text content has to start with such a formula.

```
\begin{tcolorbox}[ams nodisplayskip,colback=yellow!10!white,colframe=red!50!black]
\begin{gather}
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\\
\int x^2 \sim \text{d}x = \frac{1}{3} x^3 + c.
\end{gather}
And now for something completely different.
\end{tcolorbox}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \quad (13)$$

$$\int x^2 \, dx = \frac{1}{3} x^3 + c. \quad (14)$$

And now for something completely different.

New colored mathematical environments are easily created using `\newtcolorbox`^{→ P.9}:

```
\newtcolorbox{mymath}{ams gather*,colback=yellow!10!white,colframe=red!50!black}

\begin{mymath}
\sum\limits_{n=1}^{\infty} \frac{1}{n} = \infty.\\
\int x^2 \sim \text{d}x = \frac{1}{3} x^3 + c.
\end{mymath}
```

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty.$$

$$\int x^2 \, dx = \frac{1}{3} x^3 + c.$$

All described options like `/tcb/ams gather upper`^{→ P.158}, `/tcb/ams gather lower`^{→ P.158}, `/tcb/ams gather`^{→ P.158} are (partially) setting (overwriting) the keys `/tcb/before upper`^{→ P.33}, `/tcb/after upper`^{→ P.34}, `/tcb/before lower`^{→ P.34}, `/tcb/after lower`^{→ P.34}.

Therefore, e.g. `\tcbset{ams gather,before upper={\text{Pythagoras:}}}` produces an invalid result. For this case, you are invited to use

`\tcbset{ams gather,before upper app={\text{Pythagoras:}}}`,
see `/tcb/before upper app`^{→ P.186}.

8.3 Examples for Definitions and Theorems

In the following, the application of `\tcbmaketheorem`^{→ P. 152} to highlight mathematical definitions, theorems, or the like is demonstrated.

At first, additional `tcb` keys are created for the appearance of the colored boxes. It is assumed that theorems and corollaries should be identically colored. All following environments are numbered with a common counter, but this can be changed easily. Here, the counter output is supplemented by the subsection number.

Definition in the preamble:

```
\tcbset{
  defstyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape,
    arc=0mm, colback=blue!5!white,colframe=blue!75!black},
  theostyle/.style={fonttitle=\bfseries\upshape, fontupper=\slshape,
    colback=red!10!white,colframe=red!75!black},
}
\newtcbtheorem[number within=subsection]{Definition}{Definition}{defstyle}{def}
\newtcbtheorem[use counter from=Definition]{Theorem}{Theorem}{theostyle}{theo}
\newtcbtheorem[use counter from=Definition]{Corollary}{Corollary}{theostyle}{cor}
```

By `\newtcbtheorem`^{→ P. 151}, commonly numbered theorem environments are created now. `defstyle` and `theostyle` are used for the appearance.

Now, everything is prepared for the following examples.

The following `theorem` is numbered as Theorem `\ref{theo:diffbarstetig}` and referenced with the marker `\texttt{theo:diffbarstetig}.\bigskip`

```
\begin{Theorem}{Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung
  zu Testzwecken ungewöhnlich lang ist}{diffbarstetig}%
  Eine Funktion  $f:I\rightarrow\mathbb{R}$  ist in  $x_0\in I$  stetig, wenn  $f$  in
   $x_0$  differenzierbar ist.
\end{Theorem}
```

The following theorem is numbered as Theorem 8.3.1 and referenced with the marker `theo:diffbarstetig`.

Theorem 8.3.1: Differenzierbarkeit bedingt Stetigkeit, wobei diese Benennung zu Testzwecken ungewöhnlich lang ist

Eine Funktion $f : I \rightarrow \mathbb{R}$ ist in $x_0 \in I$ stetig, wenn f in x_0 differenzierbar ist.

The following definition is numbered as Definition \ref{def:diffbarkeit} and referenced with the marker \texttt{def:diffbarkeit}.\bigskip

```
\begin{Definition}{Differenzierbarkeit}{diffbarkeit}
  Eine Funktion  $f: I \rightarrow \mathbb{R}$  auf einem Intervall  $I$  hei\ss{}t in
   $x_0 \in I$  differenzierbar oder linear approximierbar,
  wenn der Grenzwert
  \begin{equation*}
    \lim_{x \rightarrow x_0} \frac{f(x) - f(x_0)}{x - x_0} =
    \lim_{h \rightarrow 0} \frac{f(x_0 + h) - f(x_0)}{h}
  \end{equation*}
  existiert. Bei Existenz hei\ss{}t dieser Grenzwert Ableitung
  oder Differentialquotient von  $f$  in  $x_0$  und man
  schreibt  $f'(x_0)$  f\ur ihn
  \begin{equation*}
    f'(x_0) \quad \text{oder} \quad \frac{df}{dx}(x_0).
  \end{equation*}
\end{Definition}
```

The following definition is numbered as Definition 8.3.2 and referenced with the marker def:diffbarkeit.

Definition 8.3.2: Differenzierbarkeit

Eine Funktion $f : I \rightarrow \mathbb{R}$ auf einem Intervall I hei\ss{}t in $x_0 \in I$ differenzierbar oder linear approximierbar, wenn der Grenzwert

$$\lim_{x \rightarrow x_0} \frac{f(x) - f(x_0)}{x - x_0} = \lim_{h \rightarrow 0} \frac{f(x_0 + h) - f(x_0)}{h}$$

existiert. Bei Existenz hei\ss{}t dieser Grenzwert Ableitung oder Differentialquotient von f in x_0 und man schreibt f\ur ihn

$$f'(x_0) \quad \text{oder} \quad \frac{df}{dx}(x_0).$$

The following corollary is numbered as Corollary \ref{cor:nullstellen} and referenced with the marker \texttt{cor:nullstellen}.\bigskip

```
\begin{Corollary}{Nullstellenexistenz}{nullstellen}
  Ist  $f: [a, b] \rightarrow \mathbb{R}$  stetig und haben  $f(a)$  und  $f(b)$  entgegengesetzte
  Vorzeichen, also  $f(a)f(b) < 0$ , so besitzt  $f$  eine Nullstelle  $x_0 \in ]a, b[$ ,
  also  $f(x_0) = 0$ .
\end{Corollary}
```

The following corollary is numbered as Corollary 8.3.3 and referenced with the marker cor:nullstellen.

Corollary 8.3.3: Nullstellenexistenz

Ist $f : [a, b] \rightarrow \mathbb{R}$ stetig und haben $f(a)$ und $f(b)$ entgegengesetzte Vorzeichen, also $f(a)f(b) < 0$, so besitzt f eine Nullstelle $x_0 \in]a, b[$, also $f(x_0) = 0$.

```
\begin{Theorem}[boxrule=2mm,toptitle=-1.5mm,bottomtitle=-1.5mm]{%
  Hinreichende Bedingung f\u{r} Wendepunkte}{wendehinreichend}%
  $$$ sei eine auf einem Intervall $]a,b[$ dreimal stetig differenzierbare Funktion.
  Ist $f''(x_0)=0$ in $x_0\in]a,b[$ und $f'''(x_0)\neq 0$, so ist
  $(x_0,f(x_0))$ ein Wendepunkt von $f$.
\end{Theorem}
```

Theorem 8.3.4: Hinreichende Bedingung für Wendepunkte

f sei eine auf einem Intervall $]a,b[$ dreimal stetig differenzierbare Funktion. Ist $f''(x_0) = 0$ in $x_0 \in]a,b[$ und $f'''(x_0) \neq 0$, so ist $(x_0, f(x_0))$ ein Wendepunkt von f .

```
% \usepackage{varioref}
% \usepackage{cleveref}
% \tcbuselibrary{skins}
\newtcbtheorem[use counter from=Definition]{YetAnotherTheorem}{Theorem}%
{label type=theorem,enhanced,frame hidden,
 boxrule=2mm,titlerule=0mm,toptitle=1mm,bottomtitle=1mm,
 fonttitle=\bfseries\large,fontupper=\normalsize,
 coltitle=green!35!black,colbacktitle=green!15!white,
 colback=green!50!yellow!15!white,borderline={1pt}{0pt}{green!25!blue},
 }{theo}

\begin{YetAnotherTheorem}{Mittelwertsatz f\u{r} $n$ Variable}{meanvaluetheorem}%
  Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und
  $f\in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke
  $[x_0,x]$ einen Punkt $\xi\in[x_0,x]$, so dass gilt
  \begin{equation*}
    f(x)-f(x_0) = \operatorname{grad} f(\xi)^\top(x-x_0)
  \end{equation*}
\end{YetAnotherTheorem}

\medskip
Here, |cleveref| support is used to reference \Cref{theo:meanvaluetheorem}
on \Cpageref{theo:meanvaluetheorem}. This \namecref{theo:meanvaluetheorem}
can also be referenced by |\Vref| resulting in \Vref{theo:meanvaluetheorem}.
```

Theorem 8.3.5: Mittelwertsatz für n Variable

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0, x] \subset D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt

$$f(x) - f(x_0) = \operatorname{grad} f(\xi)^\top (x - x_0)$$

Here, `cleveref` support is used to reference Theorem 8.3.5 on Page 162. This theorem can also be referenced by `\Vref` resulting in Theorem 8.3.5.

Note that `/tcb/label type`^{P. 62} was used in the example above to feed `cleveref` [4] with the needed name information.

Here, using `\Vref` resulting in `\Vref{theo:meanvaluetheorem}` is more interesting`\ldots`

Here, using `\Vref` resulting in Theorem 8.3.5 on the previous page is more interesting...

```
% \tcbuselibrary{skins}
\newtcbtheorem[use counter from=Definition]{YetAnotherTheorem}{Theorem}%
{enhanced,arc=0mm,outer arc=0mm,
boxrule=0mm,toprule=1mm,bottomrule=1mm,left=1mm,right=1mm,
titlerule=0mm,toptitle=0mm,bottomtitle=1mm,top=0mm,
colframe=red!50!black,colback=red!5!white,coltitle=red!50!black,
title style={top color=yellow!50!white,bottom color=red!5!white,
middle color=yellow!50!white},
fonttitle=\bfseries\sffamily\normalsize,fontupper=\normalsize\itshape,
}{theo}

\begin{YetAnotherTheorem}{Mittelwertsatz f"\{u\}r $n$ Variable}{mittelwertsatz_n2}%
Es sei $n\in\mathbb{N}$, $D\subseteq\mathbb{R}^n$ eine offene Menge und
$f\in C^1(D,\mathbb{R})$. Dann gibt es auf jeder Strecke
$[x_0,x]\subseteq D$ einen Punkt $\xi\in[x_0,x]$, so dass gilt
\begin{equation*}
f(x)-f(x_0) = \operatorname{grad} f(\xi)^{\top}(x-x_0)
\end{equation*}
\end{YetAnotherTheorem}
```

Theorem 8.3.6: Mittelwertsatz für n Variable

Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0, x] \subset D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt

$$f(x) - f(x_0) = \operatorname{grad} f(\xi)^{\top}(x - x_0)$$

You need more attention for your theorems? Here, you are ...

```
% tcbuselibrary{skins} % preamble
\begin{Theorem}[enhanced,
  fuzzy halo=3mm with yellow,
  fuzzy halo=2mm with red,
  fuzzy halo=1mm with yellow,
  watermark color=red!35!white,
  watermark text={Overacting\\Fundamental Theorem}]%
{Fundamental Theorem of Theorems}{fundamental}%
\lipsum[1-2]
\end{Theorem}
```

Theorem 8.3.7: Fundamental Theorem of Theorems

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Using `\newtcbtheorem`^{→ P. 151} is a convenient way to generate a new theorem type. On the other hand, it enforces to use a titled `tcolorbox`. If you prefer to have an embedded title, you may create a new theorem type with the more flexible `\newtcolorbox`^{→ P. 9} macro:

```
% \tcbuselibrary{skins}
\newtcolorbox[use counter from=Definition]{YetAnotherTheorem}[3][%
  enhanced,colframe=blue!50!black,colback=yellow!20!white,
  drop fuzzy shadow=blue!50!black!50!white,boxrule=0.4pt,
  fontupper=\itshape]{%
  before upper={\textcolor{red!50!black}{\upshape\bfseries
    Theorem~\thetcbcounter\ (#2)}\quad},
  list entry={\numberline{\thetcbcounter}#2},%
  label={theo:#3},#1}

\begin{YetAnotherTheorem}{Mittelwertsatz f}"{u}r $n$ Variable}{mittelwertsatz_n3}%
Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und
$f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke
$[x_0, x] \subseteq D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt
\begin{equation*}
f(x) - f(x_0) = \operatorname{grad} f(\xi)(x - x_0)
\end{equation*}
\end{YetAnotherTheorem}
```

Theorem 8.3.8 (Mittelwertsatz für n Variable) Es sei $n \in \mathbb{N}$, $D \subseteq \mathbb{R}^n$ eine offene Menge und $f \in C^1(D, \mathbb{R})$. Dann gibt es auf jeder Strecke $[x_0, x] \subset D$ einen Punkt $\xi \in [x_0, x]$, so dass gilt

$$f(x) - f(x_0) = \operatorname{grad} f(\xi)^T (x - x_0)$$

9 Library LIB breakable

The library is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{breakable}
```

9.1 Technical Overview

The library LIB breakable supports the automatic breaking of a `tcolorbox`. This feature is enabled by `/tcb/breakable`^{→P.167} and disabled by `/tcb/unbreakable`^{→P.168}.

If a `tcolorbox` is set to be `/tcb/breakable`^{→P.167}, then the following algorithm is executed:

1. The box content is read to a box register similar but not identical to the unbreakable case.
2. If the total box fits into the current page, it is shipped out visibly unbroken and the algorithm stops.

Unbroken Box

The box.

unbroken

3. Otherwise, it is checked if at least `/tcb/lines before break`^{→P.168} of the upper box can be placed on the current page. If not, a page break is inserted and the algorithm goes back to Step 2.
4. Now, the *break sequence* starts. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named *first part* of the *break sequence* and shipped out.

Broken Box

The box.

first

5. If the remaining content of the total box fits into the current page, the algorithm continues with Step 7, else with Step 6.
6. The upper box part or the lower box part is split such that it fits into the current page. The fitting part is named *middle part* of the *break sequence* and shipped out. Then, the algorithm goes back to Step 5.

The box.

middle

7. The remaining part is named *last part* of the *break sequence* and shipped out. The algorithm stops.

The box.

last

The algorithm takes care that the optional segmentation line never appears at the end of a box. The optional lower box part is also checked to have at least `/tcb/lines before break`^{→P.168}.

In principal, all boxes of the *break sequence* share the same geometric parameters. The differences are:

- The given `/tcb/before→P.50` and `/tcb/after→P.50` values are used only before the *first* and after the *last* part of the *break sequence*.
- A special behavior between the parts of the *break sequence* can be given by `/tcb/toprule at break→P.169`, `/tcb/bottomrule at break→P.169`, `/tcb/enlarge top at break by→P.170`, and `/tcb/enlarge bottom at break by→P.170`.
- The `/tcb/skin→P.71` decides *how* the *first*, *middle*, and *last* part look like. Actually, every part type has its own skin given by the options `/tcb/skin first→P.71`, `/tcb/skin middle→P.71`, and `/tcb/skin last→P.71`. Typically, these options are set automatically by the main skin, see Subsection 9.5 from page 171.

9.2 Limitations and Known Bugs

- The box content is a \TeX `\vbox` register which has a restricted capacity. Therefore, you cannot place hundreds of pages inside a `tcolorbox`.
- You can nest an unbreakable `tcolorbox` inside another `tcolorbox`, even inside a breakable one. But you should not nest a breakable box inside a breakable box since this will give a mess. Inside a breakable box, the further breaking is disabled by default. If you really want to or have to use the keys `/tcb/breakable→P.167` or `/tcb/unbreakable→P.168` inside the content of an outer `tcolorbox`, you have to guard this with a \TeX group.
- If your text content contains some text color changing commands, your color will not survive the break to the next box³.

³The reason is that I am too dumb to catch the current color at the split point. If you know the trick, let me know.

9.3 Main Option Keys

`/tcb/breakable`

(no value)

Allows the `tcolorbox` to be breakable. If the box is larger than the available space at the current page, the box is automatically broken and continued to the next next page. All sorts of `tcolorbox` can be made breakable. It depends on the skin how the breaking looks like. If you do not know better, use `/tcb/enhanced`^{P.99} for breaking a box. The parts of the *break sequence* are numbered by the counter `tcbbreakpart`.

```
% \usepackage{lipsum} % preamble
\tcbset{colback=red!5!white,colframe=red!75!black,
  watermark color=yellow!25!white,watermark text=\arabic{tcbbreakpart},
  fonttitle=\bfseries}

\begin{tcolorbox}[breakable,enhanced,title=My breakable box]
\lipsum[1-6]
\end{tcolorbox}
```

My breakable box

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.

Fusce mauris. Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper,

leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam. Aliquam pellentesque, augue quis sagittis posuere, turpis lacus congue quam, in hendrerit risus eros eget felis. Maecenas eget erat in sapien mattis porttitor. Vestibulum porttitor. Nulla facilisi. Sed a turpis eu lacus commodo facilisis. Morbi fringilla, wisi in dignissim interdum, justo lectus sagittis dui, et vehicula libero dui cursus dui. Mauris tempor ligula sed lacus. Duis cursus enim ut augue. Cras ac magna. Cras nulla. Nulla egestas. Curabitur a leo. Quisque egestas wisi eget nunc. Nam feugiat lacus vel est. Curabitur consectetur.

Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus. Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

/tcb/unbreakable (no value, initially set)

Sets the `tcolorbox` to be unbreakable.

/tcb/title after break= $\langle text \rangle$ (no default, initially empty)

The `/tcb/title`^{P.11} is used only for the *first* part of a *break sequence*. Use `title after break` to create a heading line with $\langle text \rangle$ as content for all following parts.

/tcb/notitle after break (no value, initially set)

Removes the title line or following parts in a *break sequence* if set before.

/tcb/adjusted title after break= $\langle text \rangle$ (style, no default, initially unset)

Works like `/tcb/adjusted title`^{P.11} but applied to `/tcb/title after break`.

/tcb/lines before break= $\langle number \rangle$ (no default, initially 2)

Assures that the given $\langle number \rangle$ of lines of the upper box part or the lower box part are placed before a break happens.

/tcb/enlargepage= $\langle length \rangle / \langle length \rangle \dots / \langle length \rangle$ (no default, initially 0pt)

Inserts a `\enlargethispage{\langle length \rangle}` to the pages of the break sequence, i.e. allows to enlarge (or shrink) partial boxes. The first $\langle length \rangle$ is applied to the first partial box, the second $\langle length \rangle$ is applied to the second partial box, and so on. The last $\langle length \rangle$ value is applied to all following partial boxes if any. Note that floating boxes will not be enlarged.

```
\begin{tcolorbox}[breakable,enlargepage=0mm/\baselineskip/2\baselineskip/0mm,...
```

The example code enlarged the second partial box by one line, the third partial box by two lines, and all following parts are not enlarged.

If an automated page break occurs before the first partial box, the page enlargement is applied to the page before the first partial box *and* again to the page of the first partial box. Insert a manual break to prevent this.

In general, `enlargepage` should be used at the final stage of a document for fine-tuning only.

/tcb/shrink break goal= $\langle length \rangle$ (no default, initially 0pt)

This is an emergency parameter if the break algorithm produces unpleasant breaks. It shrinks the goal height of the current box part by $\langle length \rangle$ which may result in smaller boxes. Never use negative values.

9.4 Option Keys for the Break Appearance

/tcb/toprule at break= $\langle length \rangle$ (no default, initially 0.5mm)

Sets the line width of the top rule to $\langle length \rangle$ if the box is **/tcb/breakable**^{→P.167}.

In this case, it is applied to *middle* and *last* parts in a break sequence. Note that **/tcb/toprule**^{→P.17} overwrites this value if used afterwards.

/tcb/bottomrule at break= $\langle length \rangle$ (no default, initially 0.5mm)

Sets the line width of the bottom rule to $\langle length \rangle$ if the box is **/tcb/breakable**^{→P.167}.

In this case, it is applied to *first* and *middle* parts in a break sequence. Note that **/tcb/bottomrule**^{→P.17} overwrites this value if used afterwards.

/tcb/topsep at break= $\langle length \rangle$ (no default, initially 0mm)

Additional vertical space of $\langle length \rangle$ which is added at the top of *middle* and *last* parts in a break sequence. In general, it is not advisable to change this value if these parts start with a rule or a title.

/tcb/bottomsep at break= $\langle length \rangle$ (no default, initially 0mm)

Additional vertical space of $\langle length \rangle$ which is added at the bottom of *first* and *middle* parts in a break sequence. In general, it is not advisable to change this value if these parts end with a rule.

/tcb/pad before break= $\langle length \rangle$ (style, no default, initially 3.5mm)

Sets the total amount of vertical space after the text content and before the break point to $\langle length \rangle$. This style sets **/tcb/toprule at break** to 0pt and changes **/tcb/topsep at break** as required. In general, it is not advisable to change this value if the *middle* and *last* parts in a break sequence start with a rule or a title.

/tcb/pad after break= $\langle length \rangle$ (style, no default, initially 3.5mm)

Sets the total amount of vertical space after the break point and before the text content to $\langle length \rangle$. This style sets **/tcb/bottomrule at break** to 0pt and changes **/tcb/bottomsep at break** as required. In general, it is not advisable to change this value if the *first* and *middle* parts in a break sequence end with a rule.

/tcb/pad at break= $\langle length \rangle$ (style, no default, initially 3.5mm)

Abbreviation for setting $\langle length \rangle$ to **/tcb/pad before break** and **/tcb/pad after break**.

```
% \usepackage{lipsum} % preamble
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,breakable,pad at break=0mm,
  title={For this box, the pad space at the break point is set to 0mm}]
  \lipsum[1-2]
\end{tcolorbox}
```

For this box, the pad space at the break point is set to 0mm

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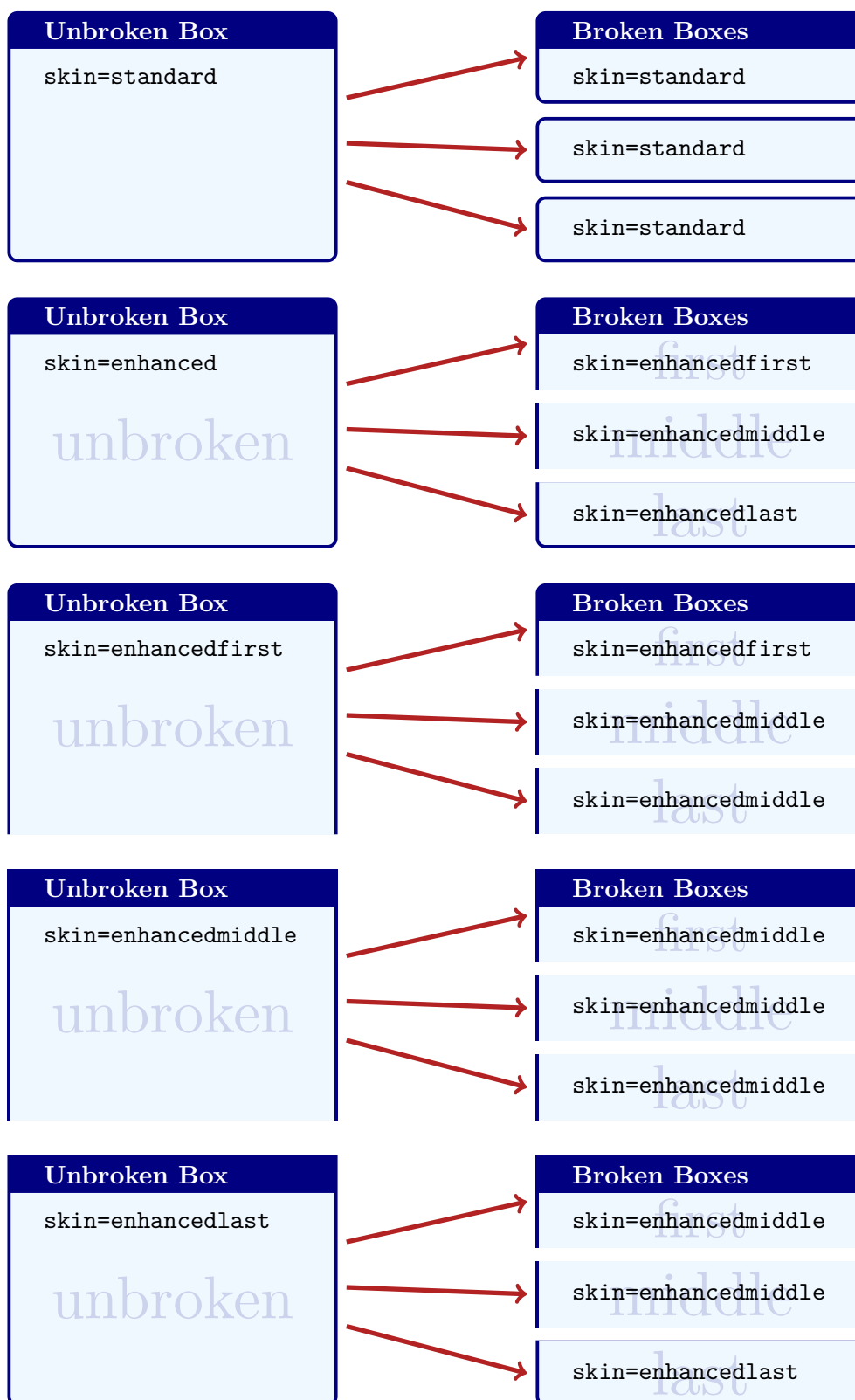
eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum. Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

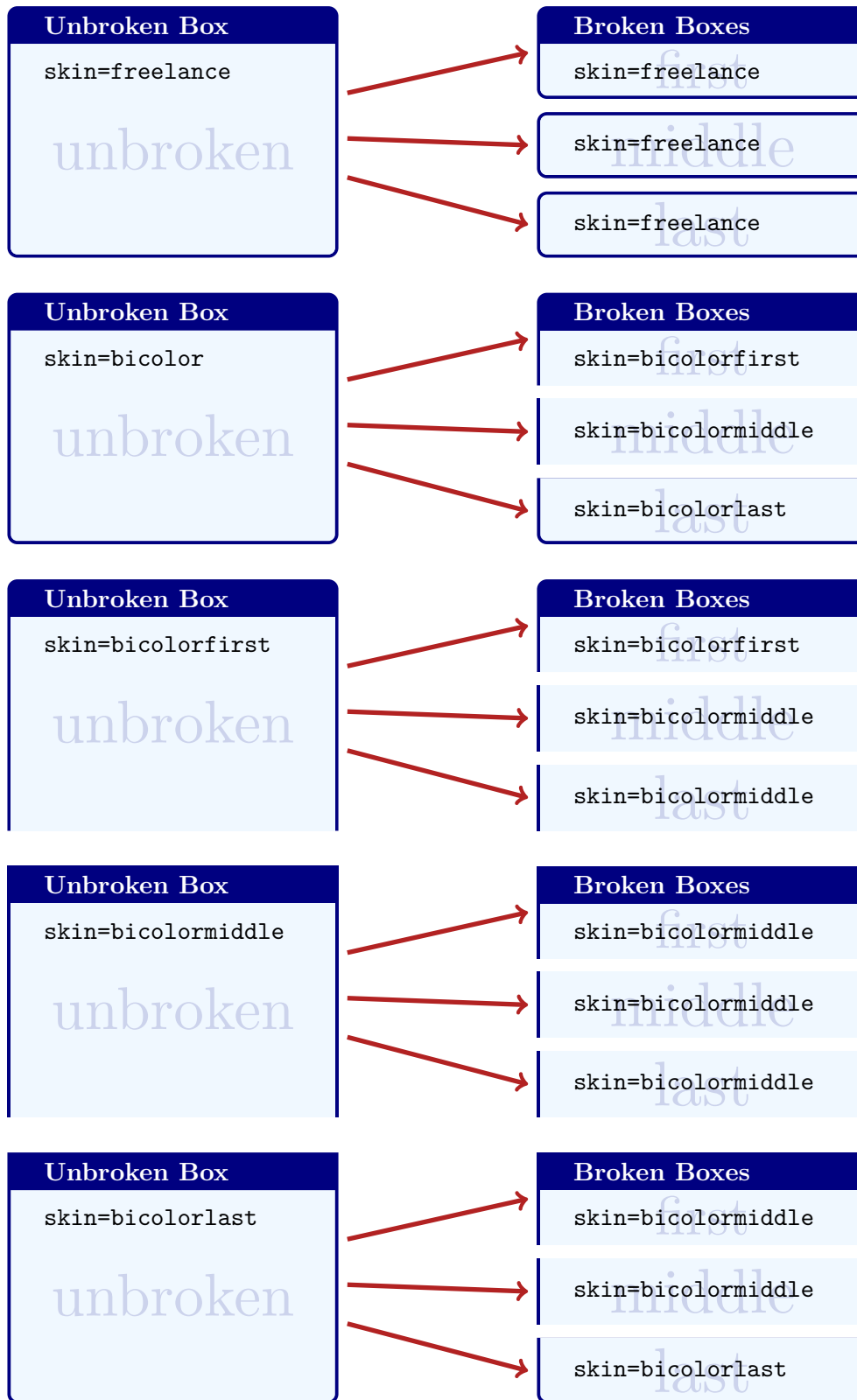
/tcb/enlarge top at break by= $\langle length \rangle$ (no default, initially 0mm)
 Enlarges the bounding box distance to the top of the box by $\langle length \rangle$ if the box is **/tcb/breakable**^{→P.167}. In this case, it is applied to *middle* and *last* parts in a break sequence. **/tcb/enlarge top by**^{→P.51} overwrites this key.

/tcb/enlarge bottom at break by= $\langle length \rangle$ (no default, initially 0mm)
 Enlarges the bounding box distance to the bottom of the box by $\langle length \rangle$ if the box is **/tcb/breakable**^{→P.167}. In this case, it is applied to *first* and *middle* parts in a break sequence. **/tcb/enlarge bottom by**^{→P.51} overwrites this key.

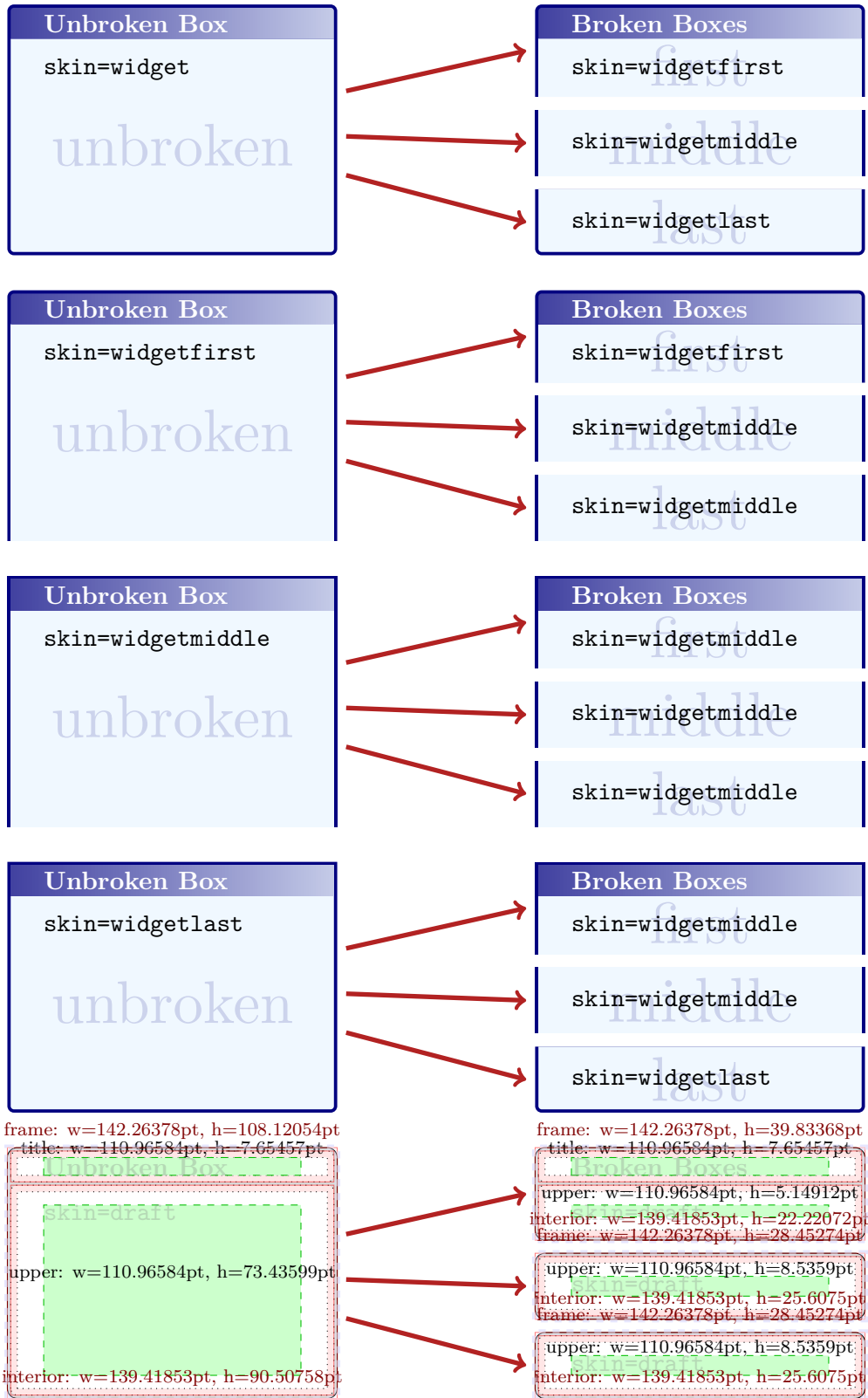
9.5 Break Sequence for the Skins

The following diagrams document the *break sequence* for different skins. Depending on the main skin of a `tcolorbox`, the actual skins of the *break sequence* parts are displayed.









9.6 Break by Hand (Faked Break)

Since the appearance of broken boxes is done by skins, it is quite easy to 'fake a break'. For this, you actually don't need the `\usepackage{breakable}` library at all.

```
\tcbset{enhanced,equal height group=fakedbreak,
  colback=LightGreen,colframe=DarkGreen,
  width=(\linewidth-6mm)/3,nobeforeafter,
  left=1mm,right=1mm,top=1mm,bottom=1mm,middle=1mm}
%
\begin{tcolorbox}[title=My broken box,skin=enhancedfirst]
This is a box which breaks from one column to another
\end{tcolorbox}\hfill
\begin{tcolorbox}[skin=enhancedmiddle]
column. I am sorry to say that this is a trick.
Nevertheless, you may use this trick for your
\end{tcolorbox}\hfill
\begin{tcolorbox}[skin=enhancedlast]
own purposes.
\end{tcolorbox}
```

My broken box

This is a box which breaks
from one column to another

column. I am sorry to say that
this is a trick. Nevertheless,
you may use this trick for your

own purposes.

10 Library

The library is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{fitting}
```

10.1 Macros of the Library

`\tcbboxfit`[*options*]{*box content*}

Creates a colored box where the given *box content* is fitted to the width and height of the box. A `tcbboxfit` has to have a fixed height. If no fixed height is given, a square box is constructed. In principal, most *options* for a `tcolorbox`^{→P.7} can be used for `\tcbboxfit` with some restrictions. A `\tcbboxfit` cannot have a lower part and cannot be broken.

```
% \usepackage{lipsum}
\tcbset{colframe=blue!50!black,colback=red!10!white,
        boxsep=0pt,top=1mm,bottom=1mm,left=1mm,right=1mm,
        nobeforeafter,width=(\linewidth-2mm)/3}

\tcbboxfit[height=8cm]{\lipsum[1]}\hfill
\tcbboxfit[height=4cm]{\lipsum[1]}\hfill
\tcbboxfit[height=2cm]{\lipsum[1]}

\medskip
\tcbset{width=(\linewidth-2mm)/2,colback=green!10!white,boxsep=1mm}
\tcbboxfit[height=4cm]{\lipsum[2]}\hfill
\tcbboxfit[height=4cm,title=With a title]{\lipsum[2]}
```

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With a title

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

\newtcboxfit [*<init options>*] {<name>} [*<number>*] [*<default>*] {<options>}

Creates a new macro `\<name>` based on `\tcboxfit` ^{P. 176}. Basically, `\newtcboxfit` operates like `\newcommand`. The new macro `\<name>` optionally takes *<number>*+1 arguments, where *<default>* is the default value for the optional first argument. The *<options>* are given to the underlying `tcboxfit`. The *<init options>* allow to set up automatic numbering, see Section 4 from page 65.

```
\newtcboxfit{\mybox}{colback=red!5!white,
colframe=red!75!black,width=4cm,
height=1.5cm,center upper}

\mybox{This is my own box.}\par
\mybox{This is my own box with more text
to be written.}
```

This is my own
box.

This is my own box
with more text to be
written.

```
% \usepackage{lipsum}
\newtcboxfit{\mybox}[2]{colback=red!5!white,
colframe=red!75!black,fonttitle=\bfseries,
boxsep=1mm,left=0mm,right=0mm,top=0mm,
bottom=0mm,center upper,valign=center,
nobeeforeafter,width=#1,height=#2}

\mybox{2.5cm}{1cm}{First box}%
\mybox{2.5cm}{1cm}{Second box with more text}\\
\mybox{5cm}{2cm}{Third box with text}\\
\mybox{5cm}{3cm}{\lipsum[1]}
```

First box

Second box
with more text

Third box with text

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 Ut purus elit, vestibulum ut, placerat ac, adipiscing
 vitae, fells. Curabitur dictum gravida mauris. Nam arcu
 libero, nonummy eget, consectetur id, vulputate a,
 magna. Donec vehicula augue eu neque. Pellentesque
 habitant morbi tristique senectus et netus et malesuada
 fames ac turpis egestas. Mauris ut leo. Cras viverra
 metus rhoncus sem. Nulla et lectus vestibulum urna
 fringilla ultrices. Phasellus eu tellus sit amet tortor
 gravida placerat. Integer sapien est, iaculis in, pretium
 quis, viverra ac, nunc. Praesent eget sem vel leo ultrices
 bibendum. Aenean faucibus. Morbi dolor nulla,
 malesuada eu, pulvinar at, mollis ac, nulla. Curabitur
 auctor semper nulla. Donec varius orci eget risus. Duis
 nibh mi, congue eu, accumsan eleifend, sagittis quis,
 diam. Duis eget orci sit amet orci dignissim rutrum.

```
% \usepackage{lipsum}
\newtcboxfit{\mybox}[2][]{colback=red!5!white,
colframe=red!75!black,
width=#2,height=#2/3*2,#1}

\mybox[colback=yellow]{5cm}%
{\lipsum[2]}
```

Nam dui ligula, fringilla a, euismod so-
 dales, sollicitudin vel, wisi. Morbi auc-
 tor lorem non justo. Nam lacus libero,
 pretium at, lobortis vitae, ultricies et, tel-
 lus. Donec aliquet, tortor sed accumsan
 bibendum, erat ligula aliquet magna, vi-
 tae ornare odio metus a mi. Morbi ac
 orci et nisl hendrerit mollis. Suspendisse
 ut massa. Cras nec ante. Pellentesque
 a nulla. Cum sociis natoque penatibus
 et magnis dis parturient montes, nascetur
 ridiculus mus. Aliquam tincidunt urna.
 Nulla ullamcorper vestibulum turpis. Pel-
 lentesque cursus luctus mauris.

\tcbfontsize {<factor>}

Selects a font size inside a `tcolorbox` which is scaled with the given *<factor>* relative to `\tcbfitdim`.

```
\tcbset{colback=red!5!white,colframe=red!75!black}
\begin{tcolorbox}[fit basedim=10pt]
{\tcbfontsize{0.25} Very tiny,}\\
{\tcbfontsize{0.5} Small,}\\
{\tcbfontsize{1} Normal,}\\
{\tcbfontsize{2} Large,}\\
{\tcbfontsize{4} Huge.}
\end{tcolorbox}
```

Very tiny,

Small,

Normal,

Large,

Huge.

10.2 Option Keys of the Library

The font size for the content of a box with fixed width and fixed height can be adjusted automatically. This is called the *fitbox capture mode*. Note that the fit control algorithm constructs a series of versions for the box and selects the 'best'. Therefore, the compilation time is quite longer than for a normal box. The algorithm will fail, if a different selected font size does not change the overall size of the box content. The `\tcboxfit`^{→P.176} macro uses this algorithm by default.

The fit control keys are only applicable to unbreakable boxes without a lower part. The box content should not change counters.

/tcb/fit

(style, initially unset)

Sets the `/tcb/capture`^{→P.59} mode to `fitbox`, i.e. enables the font size adjustment algorithm. Thereby, a `tcolorbox`^{→P.7} acts like `\tcboxfit`^{→P.176} where the given *box content* is fitted to the width and height of the box. Therefore, the box has to have a fixed height. If no fixed height is given, a square box is constructed. The font dimension `\tcbfitdim` can also be used to adjust the margins of the box since a box with a tiny font may not need large margins. The number of constructed boxes is saved to the macro `\tcbfitsteps` for analysis.

```
% \usepackage{lipsum}
% \tcbuselibrary{skins}
\newtcolorbox{fitting}[2][]{fit,height=#2,boxsep=1pt,valign=center,
  top=0.4\tcbfitdim,bottom=0.4\tcbfitdim,
  left=0.75\tcbfitdim,right=0.75\tcbfitdim,
  enhanced,watermark text={\tcbfitsteps},
  colframe=blue!75!black,colback=white,#1}

\begin{fitting}{4cm}
\lipsum[1]
\end{fitting}

\begin{fitting}{2cm}
\lipsum[2]
\end{fitting}

\begin{fitting}{1cm}
\lipsum[3]
\end{fitting}
```

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Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

`/tcb/fit to=<width>` and `<height>` (style, initially unset)
 Shortcut for using `/tcb/fit`^{P.178} and setting the `<width>` and `<height>` values separately.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[fit to=3cm and 2cm]
  This box content is fitted to the given
  dimensions.
\end{tcolorbox}
```

This box content is fitted to the given dimensions.

`/tcb/fit to height=<height>` (style, initially unset)
 Shortcut for using `/tcb/fit`^{P.178} and setting the `<height>` value separately.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[fit to height=2cm]
  This box content is fitted to the given
  height.
\end{tcolorbox}
```

This box content is fitted to the given height.

`/tcb/fit basedim=<length>` (no default, initially 10pt)
 Sets the starting font dimension for the font size adjustment algorithm to `<length>`. The algorithm never enlarges this dimension.

```
\tcbset{colback=red!5!white,colframe=red!75!black}

\begin{tcolorbox}[fit to=4cm and 2cm]
  Too few words for the box.
\end{tcolorbox}

\begin{tcolorbox}[fit to=4cm and 2cm,
  fit basedim=50pt]
  Enough words for the box.
\end{tcolorbox}
```

Too few words for the box.

Enough words for the box.

`/tcb/fit skip=<real value>` (no default, initially 1.2)
 Sets the skip value of the selected font to `<real value>` times `\tcbfitdim`.

```
% \usepackage{lipsum}
\tcbset{colback=red!5!white,
  colframe=red!75!black,left=1mm,
  right=1mm,boxsep=0mm}

\begin{tcolorbox}[fit to=5cm and 4cm,
  fit skip=1.0 ]
  \lipsum[1]
\end{tcolorbox}
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Redefines the standard L^AT_EX font size macros `\tiny`, `\scriptsize`, `\footnotesize`, `\small`, `\normalsize`, `\large`, `\Large`, `\LARGE`, `\huge`, and `\Huge`, to set font sizes relative to the current `\tcbfitdim`. Note that the display skip values for mathematical formulas are respected by the redefined macros.

```
% \usepackage{lipsum}
\tcbset{colback=red!5!white,
  colframe=red!75!black,left=1mm,
  right=1mm,boxsep=0mm}

\begin{tcolorbox}[fit to height=4cm]
  {\Large\bfseries This text is
    not adapted:\par}

  \lipsum[2]
\end{tcolorbox}

\begin{tcolorbox}[fit to height=4cm,
  fit fontsize macros ]
  {\Large\bfseries This text is adapted:\par}
  \lipsum[2]
\end{tcolorbox}
```

This text is not adapted:

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

This text is adapted:

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```
\tcbset{colback=red!5!white,
  colframe=red!75!black,left=1mm,
  right=1mm,boxsep=0mm}

\let\realHuge=\Huge

\begin{tcolorbox}[fit basedim=7pt,
  fontupper=\normalsize,
  fit fontsize macros]
  The relative relative font size macros
  are also usable without the
  \textit{fit} algorithm.\par
  {\Huge Adapted Huge} ---
  {\realHuge Original Huge}
\end{tcolorbox}
```

The relative relative font size macros are also usable without the *fit* algorithm.

Adapted Huge –
Original Huge

`/tcb/fit height plus=<dimension>`

(no default, initially 0pt)

The box is allowed to enlarge the fixed height up to the given $\langle dimension \rangle$, before a font size fit is applied. An optional `/tcb/fit width plus` is tried after the height adaption.

```
% \usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm,
right=1mm,boxsep=0mm,width=3cm,height=3cm,nobeforeafter}

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit,fit height plus=1cm]
\lipsum[2]
\end{tcolorbox}
```

This is a tcolorbox.

This is a tcolorbox.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

`/tcb/fit width plus=<dimension>`

(no default, initially 0pt)

The box is allowed to enlarge the fixed width up to the given $\langle dimension \rangle$, before a font size fit is applied. An optional `/tcb/fit height plus` is tried before the width adaption.

```
% \usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm,
right=1mm,boxsep=0mm,width=3cm,height=3cm,nobeforeafter}

\begin{tcolorbox}[fit]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm]
This is a tcolorbox.
\end{tcolorbox}
\begin{tcolorbox}[fit]
\lipsum[2]
\end{tcolorbox}
\begin{tcolorbox}[fit,fit width plus=1cm]
\lipsum[2]
\end{tcolorbox}
```

This is a tcolorbox.

This is a tcolorbox.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Typically, the optional title of a `tcolorbox` is not part of the fit operation. If a `/tcb/fit width plus` is applied, the title is also adapted to the new width. If counters are increased inside the title text, they may be increased more than one time. To avoid this, you are encouraged to use `/tcb/phantom`^{→ P. 62} or `/tcb/step and label`^{→ P. 62} to set counters or use automatic numbering, see Subsection 4.1 from page 65.

`/tcb/fit width from=<min> to <max>` (style, no default)
Sets the box width to `<min>` and allows the width to grow up to `<max>`.

```
% \usepackage{lipsum}
\tcbset{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,bottom=1mm,
right=1mm,boxsep=0mm,height=4cm}

\begin{tcolorbox}[fit,width=\linewidth/2]
\lipsum[2]
\end{tcolorbox}\par
\begin{tcolorbox}[fit width from=\linewidth/2 to \linewidth]
\lipsum[2]
\end{tcolorbox}\par
```

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

`/tcb/fit height from=<min> to <max>` (style, no default)

Sets the box height to $\langle min \rangle$ and allows the height to grow up to $\langle max \rangle$.

```
% \usepackage{lipsum}
\newtcolorbox{mybox}{colback=red!5!white,colframe=red!75!black,left=1mm,top=1mm,
  bottom=1mm,right=1mm,boxsep=0mm,width=4cm,nobeforeafter,
  fit height from=1cm to 8cm}

\begin{mybox}
This is a tcolorbox.
\end{mybox}
\begin{mybox}
This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.
\end{mybox}
\begin{mybox}
\lipsum[2]
\end{mybox}
```

This is a tcolorbox.

This is a tcolorbox. This is a tcolorbox. This is a tcolorbox.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

The following options set control parameters for the fit algorithm. The algorithm is a bisection method which stops if certain stop conditions are fulfilled. The options should be seen as experimental and are likely to change in future versions, if necessary.

/tcb/fit maxstep= $\langle number \rangle$ (no default, initially 20)

Sets the maximal step size for the font size adjustment algorithm. In normal situations, the algorithm stops before reaching the initial value of 20 steps. If the box content does not shrink, this value prevents an endless loop.

/tcb/fit maxfontdiff= $\langle dimension \rangle$ (no default, initially 0.1pt)

The algorithm stops, if the font size is determined within a deviation of $\langle dimension \rangle$.

/tcb/fit maxfontdiffgap= $\langle dimension \rangle$ (no default, initially 1pt)

The algorithm stops, if the number of lines is determined and the font size is determined within a deviation of $\langle dimension \rangle$.

/tcb/fit maxwidthdiff= $\langle dimension \rangle$ (no default, initially 1pt)

The algorithm stops, if the (optionally) flexible box width is determined within a deviation of $\langle dimension \rangle$.

/tcb/fit maxwidthdiffgap= $\langle dimension \rangle$ (no default, initially 10pt)

The algorithm stops, if the number of lines is determined and the (optionally) flexible box width is determined within a deviation of $\langle dimension \rangle$.

11 Library LIB hooks

The library is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{hooks}
```

For the skin related options, the library LIB skins has to be loaded separately.

11.1 Concept of Hooks

A hook is a placeholder in some L^AT_EX code where additional code can be added. For example, the L^AT_EX macro `\AtBeginDocument` adds code to a hook which is placed at the begin of every document.

Several option keys of `tcolorbox` allow to provide some code which is added to specific places of a colored box. For example, `/tcb/before upper`^{→P. 33} places code before the content of the upper part. A following usage of this key overwrites any prior settings.

The library LIB hooks extends `/tcb/before upper`^{→P. 33} and several more existing keys to 'hookable' versions, e.g. `/tcb/before upper app`^{→P. 186} and `/tcb/before upper pre`^{→P. 186}. The 'hookable' keys don't overwrite prior settings but either *append* or *prepend* the newly given code to the existing code.

The general naming convention (with some small exceptions) is:

- `<option key> app`: works like `<option key>` but *appends* its code to the existing code.
- `<option key> pre`: works like `<option key>` but *prepends* its code to the existing code.

If the original `<option key>` is used (again), all code will be overwritten. Therefore, the order of the option key usage is crucial.

```
% \usepackage{array, tabularx}
\newcolumntype{Y}{>{\raggedleft\arraybackslash}X}% see tabularx
\tcbset{enhanced,fonttitle=\bfseries\large,fontupper=\normalsize\sffamily,
colback=yellow!10!white,colframe=red!50!black,colbacktitle=Salmon!30!white,
coltitle=black,center title,
tabularx={X||Y|Y|Y|Y|Y},% this sets 'before upper' and 'after upper'
before upper app={Group & One & Two & Three & Four & Sum\\ \hline \hline} }

\begin{tcolorbox}[title=My table]
Red   & 1000.00 & 2000.00 & 3000.00 & 4000.00 & 10000.00\\ \hline
Green & 2000.00 & 3000.00 & 4000.00 & 5000.00 & 14000.00\\ \hline
Blue  & 3000.00 & 4000.00 & 5000.00 & 6000.00 & 18000.00\\ \hline \hline
Sum   & 6000.00 & 9000.00 & 12000.00 & 15000.00 & 42000.00
\end{tcolorbox}
```

| My table | | | | | |
|----------|---------|---------|----------|----------|----------|
| Group | One | Two | Three | Four | Sum |
| Red | 1000.00 | 2000.00 | 3000.00 | 4000.00 | 10000.00 |
| Green | 2000.00 | 3000.00 | 4000.00 | 5000.00 | 14000.00 |
| Blue | 3000.00 | 4000.00 | 5000.00 | 6000.00 | 18000.00 |
| Sum | 6000.00 | 9000.00 | 12000.00 | 15000.00 | 42000.00 |

11.2 Box Content Additions

The following option keys extend the options given in Subsection 3.6 from page 33.

/tcb/before title app= $\langle code \rangle$ (no default)
 Appends the given $\langle code \rangle$ to **/tcb/before title**^{→P.33} *after* the color and font settings and *before* the content of the title.

/tcb/before title pre= $\langle code \rangle$ (no default)
 Prepends the given $\langle code \rangle$ to **/tcb/before title**^{→P.33} *after* the color and font settings and *before* the content of the title.

/tcb/after title app= $\langle code \rangle$ (no default)
 Appends the given $\langle code \rangle$ to **/tcb/after title**^{→P.33} *after* the content of the title.

/tcb/after title pre= $\langle code \rangle$ (no default)
 Prepends the given $\langle code \rangle$ to **/tcb/after title**^{→P.33} *after* the content of the title.

/tcb/before upper app= $\langle code \rangle$ (no default)
 Appends the given $\langle code \rangle$ to **/tcb/before upper**^{→P.33} *after* the color and font settings and *before* the content of the upper part.

/tcb/before upper pre= $\langle code \rangle$ (no default)
 Prepends the given $\langle code \rangle$ to **/tcb/before upper**^{→P.33} *after* the color and font settings and *before* the content of the upper part.

/tcb/after upper app= $\langle code \rangle$ (no default)
 Appends the given $\langle code \rangle$ to **/tcb/after upper**^{→P.34} *after* the content of the upper part.

/tcb/after upper pre= $\langle code \rangle$ (no default)
 Prepends the given $\langle code \rangle$ to **/tcb/after upper**^{→P.34} *after* the content of the upper part.

```
% \tcbuselibrary{theorems}
\tcbset{ams align,% this sets 'before upper' and 'after upper'
  colback=yellow!10!white,colframe=red!50!black,
  before upper app={\frac{2}{\sqrt{2}}&=\sqrt{2}.\\},
  after upper pre={\\sin\left(\frac{\pi}{2}\right)&=1.},
}

\begin{tcolorbox}
  \sum\limits_{n=1}^{\infty} \frac{1}{n} &= \infty.\\
  \int x^2 dx &= \frac{1}{3}x^3 + c.
\end{tcolorbox}
```

$$\frac{2}{\sqrt{2}} = \sqrt{2}. \quad (15)$$

$$\sum_{n=1}^{\infty} \frac{1}{n} = \infty. \quad (16)$$

$$\int x^2 dx = \frac{1}{3}x^3 + c. \quad (17)$$

$$\sin\left(\frac{\pi}{2}\right) = 1. \quad (18)$$

- `/tcb/before lower app=<code>` (no default)
 Appends the given `<code>` to `/tcb/before lower`^{→ P. 34} *after* the color and font settings and *before* the content of the lower part.
- `/tcb/before lower pre=<code>` (no default)
 Prepends the given `<code>` to `/tcb/before lower`^{→ P. 34} *after* the color and font settings and *before* the content of the lower part.
- `/tcb/after lower app=<code>` (no default)
 Appends the given `<code>` to `/tcb/after lower`^{→ P. 34} *after* the content of the lower part.
- `/tcb/after lower pre=<code>` (no default)
 Prepends the given `<code>` to `/tcb/after lower`^{→ P. 34} *after* the content of the lower part.

11.3 Embedding into the Surroundings

The following option keys extend the options given in Subsection 3.10 from page 50.

The 'hookable' versions are usable inside the document. In the preamble, they can only be used after explicit setting of `/tcb/before`^{→ P. 50} and `/tcb/after`^{→ P. 50} or by e.g. `/tcb/parskip`^{→ P. 50}.

- `/tcb/before app=<code>` (no default)
 Appends the given `<code>` to `/tcb/before`^{→ P. 50} before the colored box.
- `/tcb/before pre=<code>` (no default)
 Prepends the given `<code>` to `/tcb/before`^{→ P. 50} before the colored box.
- `/tcb/after app=<code>` (no default)
 Appends the given `<code>` to `/tcb/after`^{→ P. 50} after the colored box.
- `/tcb/after pre=<code>` (no default)
 Prepends the given `<code>` to `/tcb/after`^{→ P. 50} after the colored box.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[title=My title,before app={The box follows:\\[4pt]},
  after app={This is the end.}]
This is a \textbf{tcolorbox}.
\end{tcolorbox}
```

The box follows:

My title

This is a **tcolorbox**.

This is the end.

11.4 Overlays

The following option keys extend the options given in Subsection 3.7 from page 41.

/tcb/overlay app= \langle graphical code \rangle (no default)

Appends the given \langle graphical code \rangle to /tcb/overlay^{→ P. 41}.

```
% \usetikzlibrary{patterns} % preamble
% \tcbuselibrary{skins} % preamble
\tcbset{frogbox/.style={enhanced,colback=green!10,colframe=green!65!black,
  enlarge top by=5.5mm,
  overlay={\foreach \x in {2cm,3.5cm} {
    \begin{scope}[shift={([xshift=\x]frame.north west)}]
      \path[draw=green!65!black,fill=green!10,line width=1mm] (0,0) arc (0:180:5mm);
      \path[fill=black] (-0.2,0) arc (0:180:1mm);
    \end{scope}}}}
\tcbset{ribbon/.style={overlay app={%
  \path[fill=blue!75!white,draw=blue,double=white!85!blue,
    preaction={opacity=0.6,fill=blue!75!white},
    line width=0.1mm,double distance=0.2mm,
    pattern=fivepointed stars,pattern color=white!75!blue]
    ([xshift=-0.2mm,yshift=-1.02cm]frame.north east)
    -- ++(-1,1) -- ++(-0.5,0) -- ++(1.5,-1.5) -- cycle;}}}

\begin{tcolorbox}[frogbox,title=My title]
This is a \textbf{tcolorbox}.
\end{tcolorbox}

\begin{tcolorbox}[frogbox,ribbon,title=My title]
This is a \textbf{tcolorbox}.\par
Here, we apply a second overlay.
\end{tcolorbox}
```



/tcb/overlay pre= \langle graphical code \rangle (no default)

Prepends the given \langle graphical code \rangle to /tcb/overlay^{→ P. 41}.

/tcb/overlay unbroken app= \langle graphical code \rangle (no default)

Appends the given \langle graphical code \rangle to /tcb/overlay unbroken^{→ P. 42}.

/tcb/overlay unbroken pre= \langle graphical code \rangle (no default)

Prepends the given \langle graphical code \rangle to /tcb/overlay unbroken^{→ P. 42}.

/tcb/overlay first app= \langle graphical code \rangle (no default)

Appends the given \langle graphical code \rangle to /tcb/overlay first^{→ P. 42}.

/tcb/overlay first pre= \langle graphical code \rangle (no default)

Prepends the given \langle graphical code \rangle to /tcb/overlay first^{→ P. 42}.

| | |
|-------------------------------------------------------------------------------------------------------------------|--------------|
| /tcb/overlay middle app = $\langle graphical\ code \rangle$ | (no default) |
| Appends the given $\langle graphical\ code \rangle$ to /tcb/overlay middle ^{→P.42} . | |
| /tcb/overlay middle pre = $\langle graphical\ code \rangle$ | (no default) |
| Prepends the given $\langle graphical\ code \rangle$ to /tcb/overlay middle ^{→P.42} . | |
| /tcb/overlay last app = $\langle graphical\ code \rangle$ | (no default) |
| Appends the given $\langle graphical\ code \rangle$ to /tcb/overlay last ^{→P.42} . | |
| /tcb/overlay last pre = $\langle graphical\ code \rangle$ | (no default) |
| Prepends the given $\langle graphical\ code \rangle$ to /tcb/overlay last ^{→P.42} . | |
| /tcb/overlay broken app = $\langle graphical\ code \rangle$ | (no default) |
| Appends the given $\langle graphical\ code \rangle$ to /tcb/overlay broken ^{→P.42} . | |
| /tcb/overlay broken pre = $\langle graphical\ code \rangle$ | (no default) |
| Prepends the given $\langle graphical\ code \rangle$ to /tcb/overlay broken ^{→P.42} . | |
| /tcb/overlay unbroken and first app = $\langle graphical\ code \rangle$ | (no default) |
| Appends the given $\langle graphical\ code \rangle$ to /tcb/overlay unbroken and first ^{→P.42} . | |
| /tcb/overlay unbroken and first pre = $\langle graphical\ code \rangle$ | (no default) |
| Prepends the given $\langle graphical\ code \rangle$ to /tcb/overlay unbroken and first ^{→P.42} . | |
| /tcb/overlay middle and last app = $\langle graphical\ code \rangle$ | (no default) |
| Appends the given $\langle graphical\ code \rangle$ to /tcb/overlay middle and last ^{→P.42} . | |
| /tcb/overlay middle and last pre = $\langle graphical\ code \rangle$ | (no default) |
| Prepends the given $\langle graphical\ code \rangle$ to /tcb/overlay middle and last ^{→P.42} . | |

11.5 Watermarks

The following option keys extend the options given in Subsection 6.4 from page 80.

Watermarks are special overlays. The `\hook` library allows the combination of several watermarks and overlays.

`/tcb/watermark text app=<text>` (no default)

Appends a `/tcb/watermark text` ^{→ P. 80} to the colored box.

```
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries}

\begin{tcolorbox}[enhanced,title=My title,watermark graphics=Basilica_5.png,
  watermark opacity=0.25,
  watermark text app=Basilica,watermark color=Navy
]
\lipsum[1-2]
\tcblower
This example uses a public domain picture from\
\url{http://commons.wikimedia.org/wiki/File:Basilica_5.png}
\end{tcolorbox}
```

My title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

This example uses a public domain picture from
http://commons.wikimedia.org/wiki/File:Basilica_5.png

`/tcb/watermark text pre=<text>` (no default)

Prepends a `/tcb/watermark text` ^{→ P. 80} to the colored box.

`/tcb/watermark text app on=<part> is <text>` (no default)

Appends a `/tcb/watermark text on` ^{→ P. 80} the named `<part>` of a break sequence.

`/tcb/watermark text pre on=<part> is <text>` (no default)

Prepends a `/tcb/watermark text on` ^{→ P. 80} the named `<part>` of a break sequence.

`/tcb/watermark graphics app=<file name>` (no default)

Appends a `/tcb/watermark graphics` ^{→ P.81} referenced by `<file name>` to the colored box.

`/tcb/watermark graphics pre=<file name>` (no default)

Prepends a `/tcb/watermark graphics` ^{→ P.81} referenced by `<file name>` to the colored box.

`/tcb/watermark graphics app on=<part>` is `<file name>` (no default)

Appends a `/tcb/watermark graphics on` ^{→ P.81} the named `<part>` of a break sequence. The picture is referenced by `<file name>`.

`/tcb/watermark graphics pre on=<part>` is `<file name>` (no default)

Prepends a `/tcb/watermark graphics on` ^{→ P.81} the named `<part>` of a break sequence. The picture is referenced by `<file name>`.

`/tcb/watermark tikz app=<graphical code>` (no default)

Appends a `/tcb/watermark tikz` ^{→ P.82} with the given `tikz <graphical code>` to the colored box.

`/tcb/watermark tikz pre=<graphical code>` (no default)

Prepends a `/tcb/watermark tikz` ^{→ P.82} with the given `tikz <graphical code>` to the colored box.

```
% \usepackage{tikz}
\tcbset{colback=red!5!white,colframe=red!75!black,fonttitle=\bfseries,
watermark color=Navy,watermark opacity=0.25,
smiley/.style={watermark tikz pre={%
\path[fill=yellow,draw=yellow!75!red] (0,0) circle (1cm);
\fill[red] (45:5mm) circle (1mm);
\fill[red] (135:5mm) circle (1mm);
\draw[line width=1mm,red] (215:5mm) arc (215:325:5mm);}}}

\begin{tcolorbox}[enhanced,title=My title, watermark text=Watermark,
smiley]
\lipsum[1-2]
\end{tcolorbox}
```

My title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

`/tcb/watermark tikz app on=<part>` is `<graphical code>` (no default)

Appends a `/tcb/watermark tikz on` ^{→ P.82} the named `<part>` of a break sequence.

`/tcb/watermark tikz pre on=<part>` is `<graphical code>` (no default)

Prepends a `/tcb/watermark tikz on` ^{→ P.82} the named `<part>` of a break sequence.

11.6 Skin Code

The following option keys extend the options given in Subsection 6.3 from page 77.

The following code options are applicable only for skins which use engines of type **freelance**. If you intend to add only a few things to an existing skin, you should consider using overlays instead.

/tcb/frame code app=*<graphical code>* (no default)

Appends the given *<graphical code>* to */tcb/frame code*^{→P. 77}.

/tcb/frame code pre=*<graphical code>* (no default)

Prepends the given *<graphical code>* to */tcb/frame code*^{→P. 77}.

/tcb/interior titled code app=*<graphical code>* (no default)

Appends the given *<graphical code>* to */tcb/interior titled code*^{→P. 77}.

```
\begin{tcolorbox}[title=My title,freelance,colframe=Navy,
  frame code app={\draw[yellow,line width=1cm] (
    frame.south west)--(frame.north east);},
  interior titled code app={\draw[red,line width=1cm]
    (frame.north west)--(frame.south east);},
]
\lipsum[1]
\end{tcolorbox}
```

My title

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

/tcb/interior titled code pre=*<graphical code>* (no default)

Prepends the given *<graphical code>* to */tcb/interior titled code*^{→P. 77}.

/tcb/interior code app=*<graphical code>* (no default)

Appends the given *<graphical code>* to */tcb/interior code*^{→P. 78}.

/tcb/interior code pre=*<graphical code>* (no default)

Prepends the given *<graphical code>* to */tcb/interior code*^{→P. 78}.

/tcb/segmentation code app=*<graphical code>* (no default)

Appends the given *<graphical code>* to */tcb/segmentation code*^{→P. 78}.

/tcb/segmentation code pre=*<graphical code>* (no default)

Prepends the given *<graphical code>* to */tcb/segmentation code*^{→P. 78}.

/tcb/title code app=*<graphical code>* (no default)

Appends the given *<graphical code>* to */tcb/title code*^{→P. 79}.

/tcb/title code pre=*<graphical code>* (no default)

Prepends the given *<graphical code>* to */tcb/title code*^{→P. 79}.

12 Library LIB documentation

This library has the single purpose to support L^AT_EX package documentations like this one. Actually, the visual nature follows the approach from Till Tantau’s `pgf` [17] documentation. Typically, this library is assumed to be used in conjunction with the class `ltxdoc` or alike.

The library is loaded by a package option or inside the preamble by:

```
\tcbuselibrary{documentation}
```

This also loads the library LIB `listings`, see section 7, and a bunch of packages, namely `doc`, `pifont`, `marvosym`, `hyperref`, `makeidx`, and `refcount`.

For UTF-8 support, load:

```
\tcbuselibrary{listingsutf8,documentation}
```

For `minted` [11] support, load:

```
\tcbuselibrary{documentation,minted}
\tcbset{listing engine=minted}
```

12.1 Macros of the Library

```
\begin{docCommand}[<options>]{<name>}{<parameters>}
  <command description>
\end{docCommand}
```

Documents a L^AT_EX macro with given $\langle name \rangle$ where $\langle name \rangle$ is written without backslash. The given $\langle options \rangle$ are set with `\tcbset`^{P. 8}. This macro takes mandatory or optional $\langle parameters \rangle$. It is automatically indexed and can be referenced with `\refCom`^{P. 198}{ $\langle name \rangle$ }.

```
\begin{docCommand}{foomakedocSubKey}{\marg{name}\marg{key path}}
  Creates a new environment \meta{name} based on \refEnv{docKey} for the
  documentation of keys with the given \meta{key path}.
\end{docCommand}
```

```
\foomakedocSubKey{<name>}{<key path>}
  Creates a new environment <name> based on docKeyP. 194 for the documentation of keys with
  the given <key path>.
```

```
\begin{docCommand}[color definition=blue]{foomakedocSubKey*}%
  {\marg{name}\marg{key path}}
  Creates a new environment \meta{name} based on \refEnv{docKey} for the
  documentation of keys with the given \meta{key path}.
\end{docCommand}
```

```
\foomakedocSubKey*{<name>}{<key path>}
  Creates a new environment <name> based on docKeyP. 194 for the documentation of keys with
  the given <key path>.
```

```
\begin{docEnvironment}[\langle options \rangle]{\langle name \rangle}{\langle parameters \rangle}
  \langle environment description \rangle
```

```
\end{docEnvironment}
```

Documents a L^AT_EX environment with given $\langle name \rangle$. The given $\langle options \rangle$ are set with $\backslash\text{tcbset}$ ^{→ P. 8}. This environment takes mandatory or optional $\langle parameters \rangle$. It is automatically indexed and can be referenced with $\backslash\text{refEnv}$ ^{→ P. 198} $\{\langle name \rangle\}$.

```
\begin{docEnvironment}{foocolorbox}{\oarg{options}}
```

This is the main **environment** to create an accentuated colored **text box** with rounded corners and, optionally, two parts.

```
\end{docEnvironment}
```

```
\begin{foocolorbox}[\langle options \rangle]
```

$\langle environment content \rangle$

```
\end{foocolorbox}
```

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

```
\begin{docEnvironment}%
```

[doclang/**environment** content=My content **text**]

```
{foocolorbox*}{\oarg{options}}
```

This is the main **environment** to create an accentuated colored **text box** with rounded corners and, optionally, two parts.

```
\end{docEnvironment}
```

```
\begin{foocolorbox*}[\langle options \rangle]
```

$\langle My content text \rangle$

```
\end{foocolorbox*}
```

This is the main environment to create an accentuated colored text box with rounded corners and, optionally, two parts.

```
\begin{docKey}[\langle key path \rangle]{\langle name \rangle}{\langle parameters \rangle}{\langle description \rangle}
  \langle key description \rangle
```

```
\end{docKey}
```

Documents a key with given $\langle name \rangle$ and an optional $\langle key path \rangle$. This key takes mandatory or optional $\langle parameters \rangle$ as value with a short $\langle description \rangle$. It is automatically indexed and can be referenced with $\backslash\text{refKey}$ ^{→ P. 199} $\{\langle name \rangle\}$.

```
\begin{docKey}[foo]{footitle}{=\meta{text}}{no default, initially empty}
```

Creates a heading line with $\backslash\text{meta}\{\text{text}\}$ as content.

```
\end{docKey}
```

```
/foo/footitle=\langle text \rangle
```

(no default, initially empty)

Creates a heading line with $\langle text \rangle$ as content.

```
\docAuxCommand{\langle name \rangle}
```

Documents an auxiliary or minor L^AT_EX macro with given $\langle name \rangle$ where $\langle name \rangle$ is written without backslash. This macro is automatically indexed.

The macro $\backslash\text{docAuxCommand}\{\text{fooaux}\}$ holds some interesting data.

The macro $\backslash\text{fooaux}$ holds some interesting data.

`\docColor{<name>}`

Documents a color with given `<name>`. The color is automatically indexed.

The `color` `\docColor{foocolor}` is available.

The color `foocolor` is available.

`\cs{<name>}`

Macro from `ltxdoc` [3] to typeset a command word `<name>` where the backslash is prefixed. The library overwrites the original macro.

This is a `\cs{foocommand}`.

This is a `\foocommand`.

`\meta{<text>}`

Macro from `doc` [7] to typeset a meta `<text>`.

This is a `\meta{text}`.

This is a `<text>`.

`\marg{<text>}`

Macro from `ltxdoc` [3] to typeset a `<text>` with curly brackets as a mandatory argument. The library overwrites the original macro.

This is a mandatory `\marg{argument}`.

This is a mandatory `{<argument>}`.

`\oarg{<text>}`

Macro from `ltxdoc` [3] to typeset a `<text>` with square brackets as an optional argument. The library overwrites the original macro.

This is an optional `\oarg{argument}`.

This is an optional `[<argument>]`.

`\brackets{<text>}`

Sets the given `<text>` with curly brackets.

Here we use `\brackets{some text}`.

Here we use `{some text}`.

```
\begin{dispExample}
  <environment content>
\end{dispExample}
```

Creates a colored box based on a `tcolorbox`^{→P.7}. It displays the environment content as source code in the upper part and as compiled text in the lower part of the box. The appearance is controlled by `/tcb/documentation listing style`^{→P.200} and the style `/tcb/docexample`^{→P.200}. It may be changed by redefining this style.

```
\begin{dispExample}
This is a \LaTeX\ example.
\end{dispExample}
```

This is a \LaTeX\ example.

This is a L^AT_EX example.

```
\begin{dispExample*}{<options>}
  <environment content>
\end{dispExample*}
```

The starred version of `dispExample` takes `tcolorbox`^{→P.7} `<options>` as parameter. These `<options>` are executed after `/tcb/docexample`^{→P.200}.

```
\begin{dispExample*}{sidebyside}
This is a \LaTeX\ example.
\end{dispExample*}
```

This is a \LaTeX\ example.

This is a L^AT_EX example.

```
\begin{disListing}
  <environment content>
\end{disListing}
```

Creates a colored box based on a `tcolorbox`^{→P.7}. It displays the environment content as source code. The appearance is controlled by `/tcb/documentation listing style`^{→P.200} and the style `/tcb/docexample`^{→P.200}. It may be changed by redefining this style.

```
\begin{disListing}
This is a \LaTeX\ example.
\end{disListing}
```

This is a \LaTeX\ example.

```
\begin{disListing*}[<options>]
  <environment content>
\end{disListing*}
```

The starred version of `disListing` takes `tcolorbox`^{→P.7} `<options>` as parameter. These `<options>` are executed after `/tcb/docexample`^{→P.200}.

```
\begin{disListing*}[title=My listing]
This is a \LaTeX\ example.
\end{disListing*}
```

My listing

This is a \LaTeX\ example.

```
\begin{absquote}
  <environment content>
\end{absquote}
```

Used to typeset an abstract as quoted and small text.

```
\begin{absquote}
|tcolorbox| provides an environment for colored and framed text boxes with a
heading line. Optionally, such a box can be split in an upper and a lower part.
\end{absquote}
```

`tcolorbox` provides an environment for colored and framed text boxes with a heading line. Optionally, such a box can be split in an upper and a lower part.

`\tcbmakedocSubKey`{ $\langle name \rangle$ }{ $\langle key path \rangle$ }

Creates a new environment $\langle name \rangle$ based on `docKey`^{→ P. 194} for the documentation of keys with the given $\langle key path \rangle$ as default. The new environment $\langle name \rangle$ takes the same parameters as `docKey`^{→ P. 194} itself.

```
\tcbmakedocSubKey{docFooKey}{foo}

\begin{docFooKey}{foodummy}{=\meta{nothing}}{no default, initially empty}
Some key.
\end{docFooKey}

/foo/foodummy= $\langle nothing \rangle$  (no default, initially empty)
    Some key.
```

`\refCom`{ $\langle name \rangle$ }

References a documented L^AT_EX macro with given $\langle name \rangle$ where $\langle name \rangle$ is written without backslash. The page reference is suppressed if it links to the same page.

```
We have created \refCom{foomakedocSubKey} as an example.

We have created \foomakedocSubKey→ P. 193 as an example.
```

`\refCom*`{ $\langle name \rangle$ }

References a documented L^AT_EX macro with given $\langle name \rangle$ where $\langle name \rangle$ is written without backslash. There is no page reference.

```
We have created \refCom*{foomakedocSubKey} as an example.

We have created \foomakedocSubKey as an example.
```

`\refEnv`{ $\langle name \rangle$ }

References a documented L^AT_EX environment with given $\langle name \rangle$. The page reference is suppressed if it links to the same page.

```
We have created \refEnv{foocolorbox} as an example.

We have created foocolorbox→ P. 194 as an example.
```

`\refEnv*`{ $\langle name \rangle$ }

References a documented L^AT_EX environment with given $\langle name \rangle$. There is no page reference.

```
We have created \refEnv*{foocolorbox} as an example.

We have created foocolorbox as an example.
```

`\refKey{⟨name⟩}`

References a documented key with given $\langle name \rangle$ where $\langle name \rangle$ is the full path name of the key. The page reference is suppressed if it links to the same page.

We have created `\refKey{/foo/footitle}` as an example.

We have created `/foo/footitle`^{→ P. 194} as an example.

`\refKey*{⟨name⟩}`

References a documented key with given $\langle name \rangle$ where $\langle name \rangle$ is the full path name of the key. There is no page reference.

We have created `\refKey*{/foo/footitle}` as an example.

We have created `/foo/footitle` as an example.

`\colDef{⟨text⟩}`

Sets $\langle text \rangle$ with the definition color, see `/tcb/color definition`^{→ P. 200}.

This is my `\colDef{text}`.

This is my text.

`\colOpt{⟨text⟩}`

Sets $\langle text \rangle$ with the option color, see `/tcb/color option`^{→ P. 200}.

This is my `\colOpt{text}`.

This is my text.

12.2 Option Keys of the Library

- /tcb/docexample** (style, no value)
Sets the style for `dispExample`^{→ P. 196} and `dispListing`^{→ P. 197} with the colors `ExampleBack` and `ExampleFrame`. To change the appearance of the examples, this style can be redefined.
- /tcb/documentation listing style**=*<listing style>* (no default, initially `tcbdocumentation`)
Sets a *<listing style>* for the `listings` package [5]. It is used inside `dispExample`^{→ P. 196} and `dispListing`^{→ P. 197} to typeset the listings. Note that this is not identical to the key `/tcb/listing style`^{→ P. 132} which is used for 'normal' listings.
- /tcb/documentation minted style**=*<key list>* (no default, initially unset)
Sets a *<style>* known to `Pygments` [9] for the package `minted` [11], if used. Note that this is not identical to the key `/tcb/minted style`^{→ P. 134} which is used for 'normal' listings.
- /tcb/documentation minted options**=*<minted style>* (no default, initially `tabsize=2, fontsize=\small`)
Sets the options from the package `minted` [11] which are used during typesetting of the listing, if used. Note that this is not identical to the key `/tcb/minted options`^{→ P. 134} which is used for 'normal' listings.
- /tcb/color definition**=*<color>* (no default, initially `Definition`)
Sets the highlight color used by macro and key definitions.
- /tcb/color option**=*<color>* (no default, initially `Option`)
Sets the color used for optional arguments.
- /tcb/color hyperlink**=*<color>* (no default, initially `Hyperlink`)
Sets the color for all hyper-links, i. e. all internal and external links.
- /tcb/before example**=*<macros>* (no default, initially `\par\smallskip`)
Sets the *<macros>* which are executed before `dispExample`^{→ P. 196} and `dispListing`^{→ P. 197} additional to `/tcb/before`^{→ P. 50}.
- /tcb/after example**=*<macros>* (no default, initially empty)
Sets the *<macros>* which are executed after `dispExample`^{→ P. 196} and `dispListing`^{→ P. 197} additional to `/tcb/after`^{→ P. 50}.
- /tcb/index format**=*<format>* (no default, initially `pgf`)
Determines the basic *<format>* of the generated index. Feasible values are:
- `pgf`: The index is formatted like in the `pgf` documentation.
 - `doc`: The index assumed to be formatted by `doc/ltxdoc`. A usage of `makeindex` with `-s gind.ist` is assumed. The package `hydoc` has to be loaded *before* `tcolorbox`.
- /tcb/index actual**=*<character>* (no default, initially `@`)
Sets the character for 'actual' in automatic indexing.
- /tcb/index quote**=*<character>* (no default, initially `"`)
Sets the character for 'quote' in automatic indexing.
- /tcb/index level**=*<character>* (no default, initially `!`)
Sets the character for 'level' in automatic indexing.
- /tcb/index default settings** (style, no value)
Sets the `makeindex` default values for `/tcb/index actual`, `/tcb/index quote`, and `/tcb/index level`.
- /tcb/index german settings** (style, no value)
Sets the `makeindex` values recommended for German language texts. This is identical to setting the following:


```
\tcbset{index actual={=},index quote={!},index level={>}}
```


The following keys are provided for language specific settings. The English language is predefined.

| | |
|------------------------------------------------------------------|---------------------------------------------|
| /tcb/english language | (style, no value) |
| Sets all language specific settings to English. | |
| /tcb/doclang/color = $\langle text \rangle$ | (no default, initially color) |
| Text used in the index for colors. | |
| /tcb/doclang/colors = $\langle text \rangle$ | (no default, initially Colors) |
| Heading text in the index for colors. | |
| /tcb/doclang/environment content = $\langle text \rangle$ | (no default, initially environment content) |
| Text used in docEnvironment ^{→ P. 194} . | |
| /tcb/doclang/environment = $\langle text \rangle$ | (no default, initially environment) |
| Text used in the index for environments. | |
| /tcb/doclang/environments = $\langle text \rangle$ | (no default, initially Environments) |
| Heading text in the index for environments. | |
| /tcb/doclang/key = $\langle text \rangle$ | (no default, initially key) |
| Text used in the index for keys. | |
| /tcb/doclang/index = $\langle text \rangle$ | (no default, initially Index) |
| Heading text for the index. | |
| /tcb/doclang/pageshort = $\langle text \rangle$ | (no default, initially P.) |
| Short text for page references. | |

12.3 Predefined Colors of the Library

The following colors are predefined. They are used as default colors in some library commands.

Option , **Definition** , **ExampleFrame** , **ExampleBack** , **Hyperlink** .

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