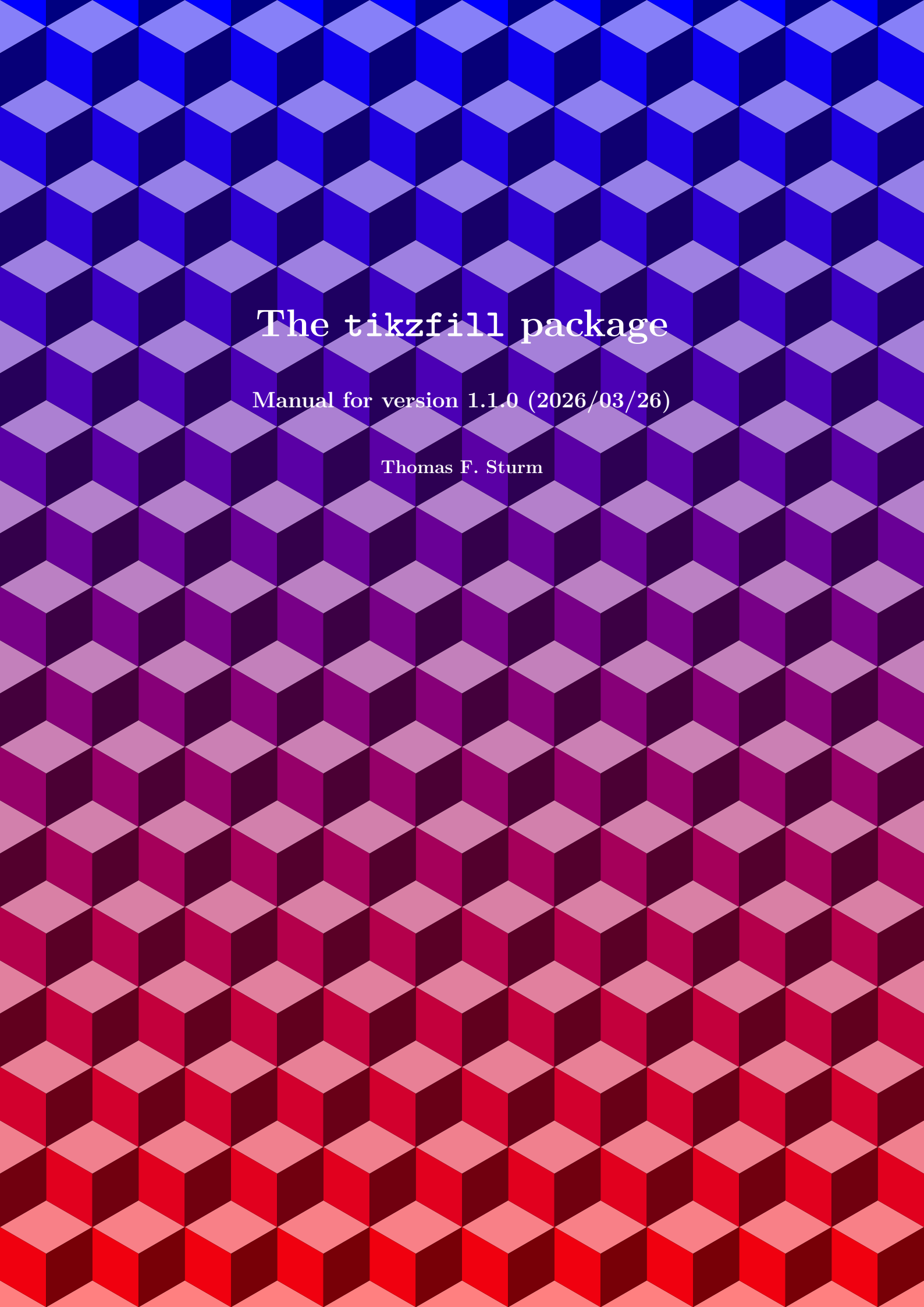


The tikzfill package

Manual for version 1.1.0 (2026/03/26)

Thomas F. Sturm

Cover code

```
% \documentclass[a4paper]{article}
% \usepackage{tikzfill}
% \usepackage[skins,breakable]{tcolorbox}
% \begin{document}
\begin{tcolorbox}[spread,blankest,phantom={\thispagestyle{empty}}]
\begin{tikzpicture}
\path
    [
      preaction={fill=black},
      fill gea Weihmichl =
      {
        scale fixed = 1,
        xstep = 21mm,
        ystep equidistance,
        init-row< = \TFRowColorLet{mycolor}{red}{blue},
        freeze-row,
        style 1 = {fill=mycolor!50!white},
        style 2 = {fill=mycolor},
        style 3 = {fill=mycolor!50!black},
      },
    ]
    (-\tcbtextwidth/2,-\tcbtextheight/2) rectangle
    (\tcbtextwidth/2,\tcbtextheight/2);
\node[white,font=\Huge\bfseries] (title) at (0,\tcbtextheight/4)
     {The \texttt{tikzfill} package};
\node[white,font=\Large\bfseries,below=8mm] (title) at (title.south)
     {Manual for version \version\ (\datum)};
\node[white,font=\large\bfseries,below=8mm] (title) at (title.south)
     {Thomas F.~Sturm};
\end{tikzpicture}
\end{tcolorbox}
% \end{document}
```

The `tikzfill` package

Manual for version 1.1.0 (2026/03/26)

Thomas F. Sturm[1]

https://www.ctan.org/pkg/tikzfill

https://github.com/T-F-S/tikzfill

Abstract

The `tikzfill` package is a collection of Ti*k*Z libraries that provide additional options for filling Ti*k*Z paths with images and patterns. The libraries support fillings based on external image files as well as Ti*k*Z pictures. They also include patterns of hexagons and rhombi.

In addition, the package offers fillings composed of similar, though not necessarily identical, small pictures arranged on a grid, providing greater flexibility than usual Ti*k*Z patterns.

[1]Prof. Dr. Dr. Thomas F. Sturm, Institut für Mathematik und Informatik, University of the Bundeswehr Munich, D-85577 Neubiberg, Germany; email: thomas.sturm@unibw.de

Contents

1 Short Introduction

Ti*k*Z is a very advanced and comprehensive graphics package for LaTeX. The package `tikzfill` comprises a collection of libraries for Ti*k*Z which add further options to fill Ti*k*Z paths with images and patterns.

For LaTeX, the provided libraries can be loaded using the preferred Ti*k*Z mechanism by

```
\usetikzlibrary{fill.***} % LaTeX (primary choice) and plain TeX
```

where *** is to be replaced by the actual library name found on the following pages.

Alternatively, the libraries can be loaded using LaTeX style files

```
\usepackage{tikzfill.***} % LaTeX (secondary choice)
```

If you want to load all Ti*k*Z libraries of this package, you can use the following LaTeX style file

```
\usepackage{tikzfill} % load all libraries
```

2 Image and Picture Fill Library

TikZ Library `fill.image`

```
\usetikzlibrary{fill.image} % LaTeX (primary choice) and plain TeX
\usetikzlibrary[fill.image] % ConTeXt
\usepackage{tikzfill.image} % LaTeX (secondary choice)
```

This library defines options to fill graphs with images or arbitrary pictures.

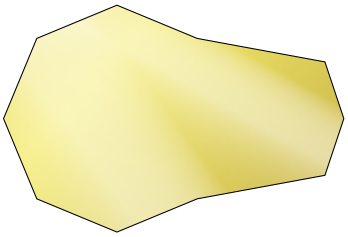
Until `tcolorbox` version 5.1.1 (2022/06/24), the code of this library was part of `tcolorbox`. Now, on suggestion of muzimuzhi, it is a separate library usable without `tcolorbox`. Also, the code is completely rewritten with `expl3`.

2.1 Fill Plain

`/tikz/fill plain image=`⟨*file name*⟩ (no default, initially unset)

Fills the current path with an external image referenced by ⟨*file name*⟩. The image is put in the center of the path, but it is not resized to fit into the path area.

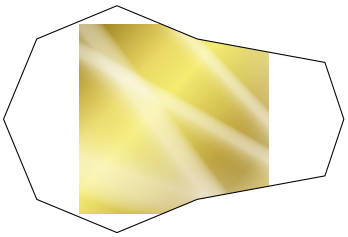
```
\begin{tikzpicture}
\path[draw,fill plain image=goldshade.png]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill plain image*=`⟨*file name*⟩ (no default, initially unset)

Fills the current path with an external image referenced by ⟨*file name*⟩. The image is put in the center of the path, but it is not resized to fit into the path area. The ⟨*graphics options*⟩ are given to the underlying `\includegraphics` command.

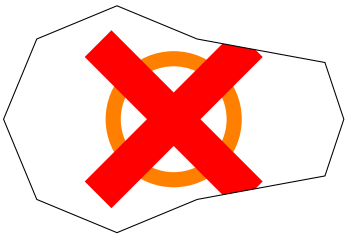
```
\begin{tikzpicture}
\path[draw,
    fill plain image*={width=2.5cm}{goldshade.png}]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill plain picture=`⟨*graphical code*⟩ (no default, initially unset)

Fills the current path with the given ⟨*graphical code*⟩. The result is put in the center of the path, but it is not resized to fit into the path area. Note that this is almost identical to the standard `path picture` option.

```
\begin{tikzpicture}
\path[draw,fill plain picture={%
  \draw[red!50!yellow,line width=2mm]
    (0,0) circle (8mm);
  \draw[red,line width=5mm] (-1,-1) -- (1,1);
  \draw[red,line width=5mm] (-1,1) -- (1,-1);
  }]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```

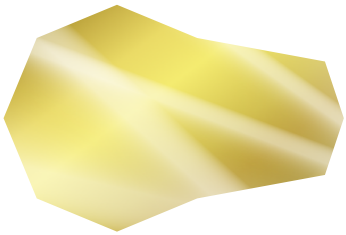


2.2 Fill Stretch

`/tikz/fill stretch image=`⟨*file name*⟩ (no default, initially unset)

Fills the current path with an external image referenced by ⟨*file name*⟩. The image is stretched to fill the path area.

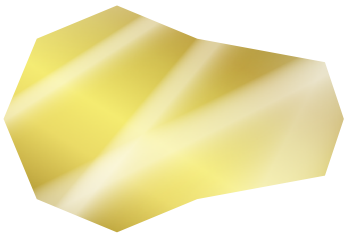
```
\begin{tikzpicture}
\path[fill stretch image=goldshade.png]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill stretch image*=`{⟨*graphics options*⟩}{⟨*file name*⟩} (no default, initially unset)

Fills the current path with an external image referenced by ⟨*file name*⟩. The ⟨*graphics options*⟩ are given to the underlying `\includegraphics` command. The image is stretched to fill the path area.

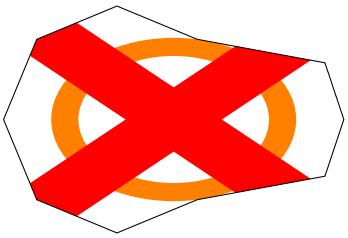
```
\begin{tikzpicture}
\path[fill stretch image*=
  {angle=90,origin=c}{goldshade.png}]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill stretch picture=`⟨*graphical code*⟩ (no default, initially unset)

Fills the current path with the given ⟨*graphical code*⟩. The result is stretched to fill the path area.

```
\begin{tikzpicture}
\path[draw,fill stretch picture={%
  \draw[red!50!yellow,line width=2mm]
    (0,0) circle (8mm);
  \draw[red,line width=5mm] (-1,-1) -- (1,1);
  \draw[red,line width=5mm] (-1,1) -- (1,-1);
  }]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```

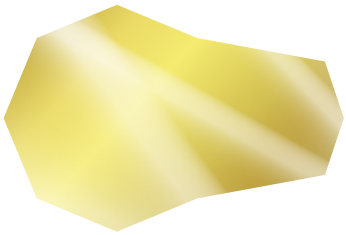


2.3 Fill Overzoom

`/tikz/fill overzoom image=`⟨*file name*⟩ (no default, initially unset)

Fills the current path with an external image referenced by ⟨*file name*⟩. The image is zoomed such that the path area fills the image.

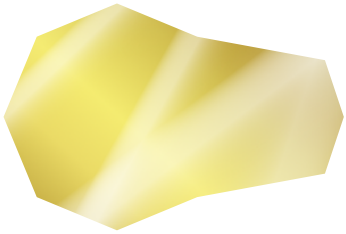
```
\begin{tikzpicture}
\path[fill overzoom image=goldshade.png]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill overzoom image*={`⟨*graphics options*⟩`}{`⟨*file name*⟩`}` (no default, initially unset)

Fills the current path with an external image referenced by ⟨*file name*⟩. The ⟨*graphics options*⟩ are given to the underlying `\includegraphics` command. The image is zoomed such that the path area fills the image.

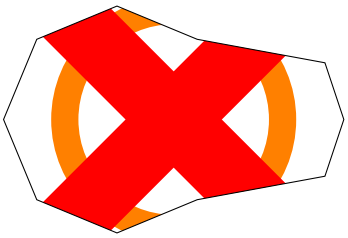
```
\begin{tikzpicture}
\path[fill overzoom image*=
  {angle=90,origin=c}{goldshade.png}]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill overzoom picture=`⟨*graphical code*⟩ (no default, initially unset)

Fills the current path with the given ⟨*graphical code*⟩. The result is zoomed such that the path area fills the image.

```
\begin{tikzpicture}
\path[draw,fill overzoom picture={%
  \draw[red!50!yellow,line width=2mm]
    (0,0) circle (8mm);
  \draw[red,line width=5mm] (-1,-1) -- (1,1);
  \draw[red,line width=5mm] (-1,1) -- (1,-1);
  }]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```

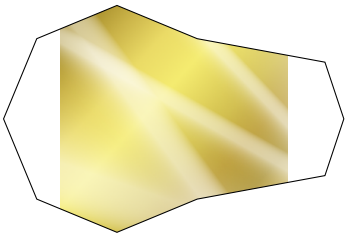


2.4 Fill Zoom

`/tikz/fill zoom image=`⟨*file name*⟩ (no default, initially unset)

Fills the current path with an external image referenced by ⟨*file name*⟩. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

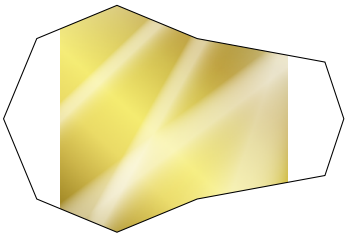
```
\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill zoom image*={`⟨*graphics options*⟩`}{`⟨*file name*⟩`}` (no default, initially unset)

Fills the current path with an external image referenced by ⟨*file name*⟩. The ⟨*graphics options*⟩ are given to the underlying `\includegraphics` command. The image is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

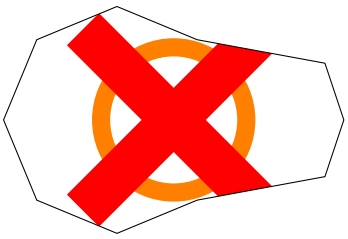
```
\begin{tikzpicture}
\path[draw,fill zoom image*=
  {angle=90,origin=c}{goldshade.png}]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill zoom picture=`⟨*graphical code*⟩ (no default, initially unset)

Fills the current path with the given ⟨*graphical code*⟩. The result is zoomed such that it fits inside the path area. Typically, some parts of the path area will stay unfilled.

```
\begin{tikzpicture}
\path[draw,fill zoom picture={%
  \draw[red!50!yellow,line width=2mm]
    (0,0) circle (8mm);
  \draw[red,line width=5mm] (-1,-1) -- (1,1);
  \draw[red,line width=5mm] (-1,1) -- (1,-1);
  }]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```

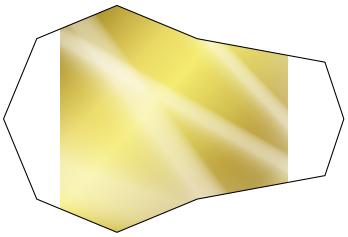


2.5 Fill Shrink

`/tikz/fill shrink image=`⟨*file name*⟩ (no default, initially unset)

Fills the current path with an external image referenced by ⟨*file name*⟩. The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

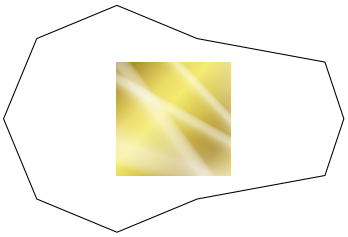
```
\begin{tikzpicture}
\path[draw,fill shrink image=goldshade.png]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill shrink image*=`⟨*file name*⟩ (no default, initially unset)

Fills the current path with an external image referenced by ⟨*file name*⟩. The ⟨*graphics options*⟩ are given to the underlying `\includegraphics` command. The image is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

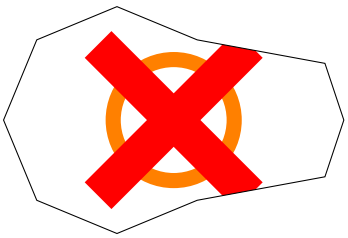
```
\begin{tikzpicture}
\path[draw,
    fill shrink image*={width=1.5cm}{goldshade.png}]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill shrink picture=`⟨*graphical code*⟩ (no default, initially unset)

Fills the current path with the given ⟨*graphical code*⟩. The result is zoomed such that it fits inside the path area, but it never gets enlarged. Typically, some parts of the path area will stay unfilled.

```
\begin{tikzpicture}
\path[draw,fill shrink picture={%
  \draw[red!50!yellow,line width=2mm]
    (0,0) circle (8mm);
  \draw[red,line width=5mm] (-1,-1) -- (1,1);
  \draw[red,line width=5mm] (-1,1) -- (1,-1);
  }]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



2.6 Fill Tile

`/tikz/fill tile image`=⟨*file name*⟩ (no default, initially unset)

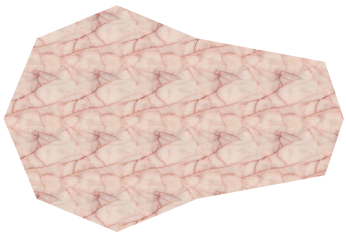
Fills the current path with a tile pattern using an external image referenced by ⟨*file name*⟩.

```
\begin{tikzpicture}
\path[fill tile image=pink_marble.png]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```

`/tikz/fill tile image*`={⟨*graphics options*⟩}{⟨*file name*⟩} (no default, initially unset)

Fills the current path with a tile pattern using an external image referenced by ⟨*file name*⟩. The ⟨*graphics options*⟩ are given to the underlying `\includegraphics` command.

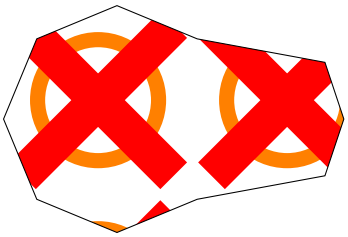
```
\begin{tikzpicture}
\path[fill tile image*={width=8mm}{pink_marble.png}]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill tile picture`=⟨*graphical code*⟩ (no default, initially unset)

Fills the current path with a tile pattern using the given ⟨*graphical code*⟩.

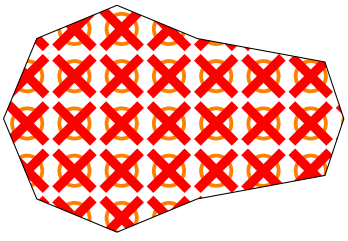
```
\begin{tikzpicture}
\path[draw,fill tile picture={%
  \draw[red!50!yellow,line width=2mm]
    (0,0) circle (8mm);
  \draw[red,line width=5mm] (-1,-1) -- (1,1);
  \draw[red,line width=5mm] (-1,1) -- (1,-1);
  }]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



`/tikz/fill tile picture*`={⟨*fraction*⟩}{⟨*graphical code*⟩} (no default, initially unset)

Fills the current path with a tile pattern using the given ⟨*graphical code*⟩. The graphic is resized by ⟨*fraction*⟩.

```
\begin{tikzpicture}
\path[draw,fill tile picture*={0.25}{%
  \draw[red!50!yellow,line width=2mm]
    (0,0) circle (8mm);
  \draw[red,line width=5mm] (-1,-1) -- (1,1);
  \draw[red,line width=5mm] (-1,1) -- (1,-1);
  }]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```



2.7 Filling Options

`/tikz/fill image opacity`=⟨*fraction*⟩ (no default, initially `1.0`)

Sets the fill opacity for the image or picture fill options to the given ⟨*fraction*⟩.

```
\begin{tikzpicture}
\path[fill stretch image=goldshade.png] (0,0) circle (8mm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.75]
  (2,0) circle (8mm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.5]
  (4,0) circle (8mm);
\path[fill=red,fill stretch image=goldshade.png,fill image opacity=0.25]
  (6,0) circle (8mm);
\path[fill=red] (8,0) circle (8mm);
\end{tikzpicture}
```

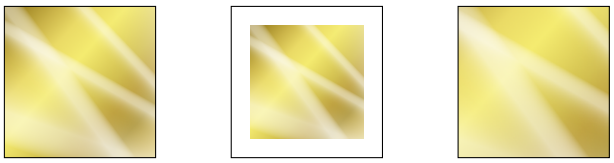
`/tikz/fill image scale`=⟨*fraction*⟩ (no default, initially `1.0`)

Stretches, zooms, overzooms or shrinks the image or picture to the given ⟨*fraction*⟩ of the width and height of the current path.

```
\begin{tikzpicture}
\path[draw,fill zoom image=goldshade.png]
  (0,0) rectangle +(2,2);

\path[draw,fill zoom image=goldshade.png,fill image scale=0.75]
  (3,0) rectangle +(2,2);

\path[draw,fill zoom image=goldshade.png,fill image scale=1.5]
  (6,0) rectangle +(2,2);
\end{tikzpicture}
```



`/tikz/fill image options`=⟨*graphics options*⟩ (no default, initially empty)

The ⟨*graphics options*⟩ are given to the underlying `\includegraphics` command for the image fill options. This can be just together with `/tikz/fill stretch image` → P. 7, `/tikz/fill overzoom image` → P. 8, `/tikz/fill zoom image` → P. 9, and `/tikz/fill tile image` → P. 11.

```
\begin{tikzpicture}
\path[fill image options={width=8mm},
  fill tile image=pink_marble.png]
  (2.75,-0.75) -- (3,0) -- (2.75,0.75)
  \foreach \w in {45,90,...,315}
    { -- (\w:1.5cm) } -- cycle;
\end{tikzpicture}
```

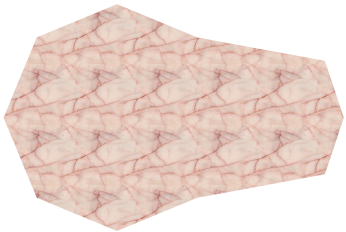
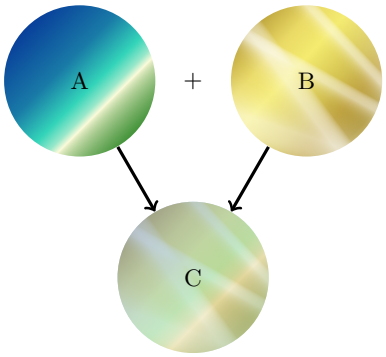


Image blending example

```
\begin{tikzpicture}[every node/.style=
  {circle,minimum width=2cm}]
\node[fill stretch image=blueshade.png]
  (A) at (120:3cm) {A};
\node[fill stretch image=goldshade.png]
  (B) at (60:3cm) {B};
\node[
  preaction={fill stretch image=blueshade.png},
  fill stretch image=goldshade.png,
  fill image opacity=0.5] (C) {C};
\path (A) -- node{$+$} (B);
\draw[->,very thick] (A)--(C);
\draw[->,very thick] (B)--(C);
\end{tikzpicture}
```



3 Hexagon Pattern Library

TikZ Library `fill.hexagon`

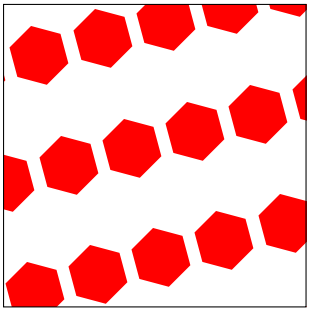
```
\usetikzlibrary{fill.hexagon} % LaTeX (primary choice) and plain TeX
\usetikzlibrary[fill.hexagon] % ConTeXt
\usepackage{tikzfill.hexagon} % LaTeX (secondary choice)
```

Based on `patterns.meta`, this library defines new hexagon patterns to fill graphs.

3.1 Hexagon

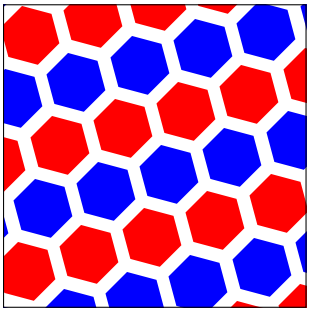
The `hexagon` pattern draws hexagons which may be filled or outlined. A single pattern is one of two different *bands*, called band 0 and band 1.

```
\begin{tikzpicture}
\draw[
  pattern = { hexagon
    [
      size = 5mm, angle = 15, line width = 1mm
    ]},
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



Both bands together build a uniform combined pattern.

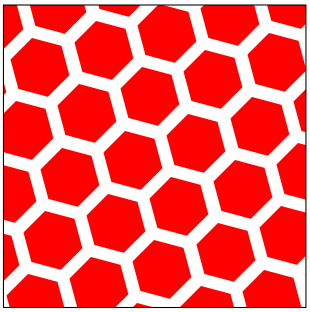
```
\begin{tikzpicture}
\draw[
  preaction = {
    pattern = { hexagon
      [
        size = 5mm, angle = 15, line width = 1mm, band = 1
      ]},
    pattern color=blue },
  pattern = { hexagon
    [
      size = 5mm, angle = 15, line width = 1mm, band = 0
    ]},
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/pattern hexagon={`⟨*pattern keys*⟩`}` (style, no default)

Convenience shortcut for setting the combined pattern (in one color).

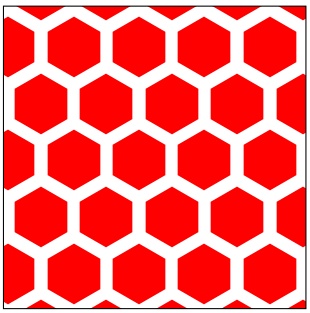
```
\begin{tikzpicture}
\draw[
  pattern hexagon =
    {
      size = 5mm, angle = 15, line width = 1mm
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/size`=⟨*size*⟩ (no default, initially `8mm`)

The given ⟨*size*⟩ denotes the length of an edge of one hexagonical tile where the (possibly smaller) hexagon is located in.

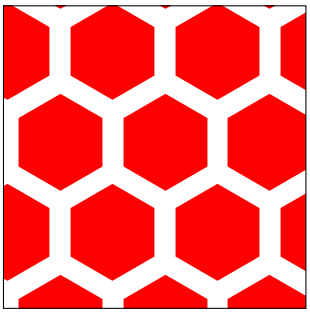
```
\begin{tikzpicture}
\draw[
  pattern hexagon =
    {
      size = 5mm,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/fill` (no value, initially set)

Sets the hexagons to be filled. `fill` and `draw` are mutually exclusionary.

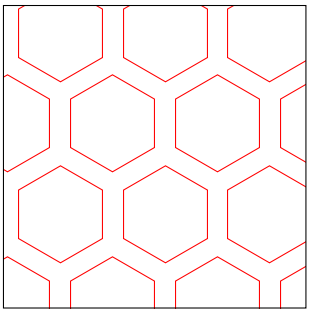
```
\begin{tikzpicture}
\draw[
  pattern hexagon =
    {
      fill,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/draw` (no value, initially unset)

Sets the hexagons to be outlined. `fill` and `draw` are mutually exclusionary.

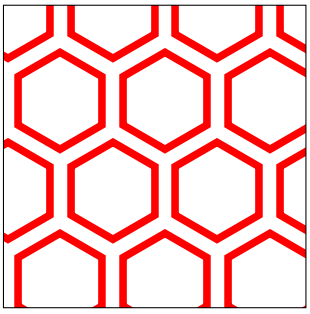
```
\begin{tikzpicture}
\draw[
  pattern hexagon =
    {
      draw,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/line width`=⟨*length*⟩ (no default, initially `0.4pt`)

Sets the ⟨*length*⟩ value of the line width. This is only relevant, if the hexagons are not filled.

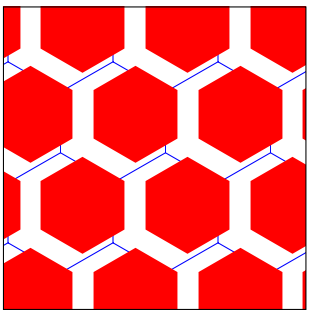
```
\begin{tikzpicture}
\draw[
  pattern hexagon =
    {
      draw, line width = 1mm,
    },
  pattern color=red
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/xshift=`⟨*xshift*⟩ (no default, initially `0pt`)
`/pgf/pattern keys/yshift=`⟨*yshift*⟩ (no default, initially `0pt`)

The pattern is shifted by ⟨*xshift*⟩ and ⟨*yshift*⟩.
Note that for **hexagon** is valid, that a pattern is shifted first and rotated afterwards.

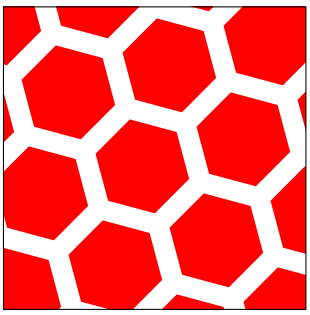
```
\begin{tikzpicture}
\draw[
  preaction={pattern hexagon grid, pattern color=blue},
  pattern hexagon =
    {
      xshift=3mm, yshift=1mm,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/angle=`⟨*angle*⟩ (no default, initially `0`)

The pattern is rotated by the given ⟨*angle*⟩.
Note that for **hexagon** is valid, that a pattern is shifted first and rotated afterwards.

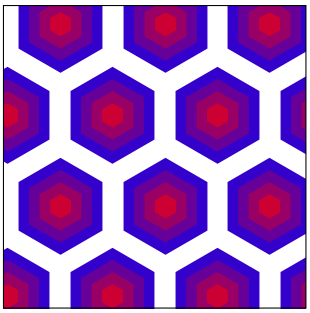
```
\begin{tikzpicture}
\draw[
  pattern hexagon =
    {
      angle = 15,
    },
  pattern color=red
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/pos=`⟨*value*⟩ (no default, initially `0.8`)

Sets the edge position with a ⟨*value*⟩ between 0 and 1, where 0 is the center and 1 the outer rim of the hexagonical tile. 1 is a less efficient way to either fill the whole graph or to draw a **hexagon grid**.

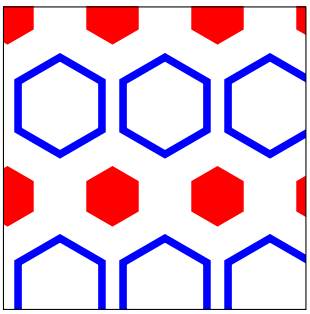
```
\begin{tikzpicture}
\draw[
  preaction={ pattern hexagon={pos=0.8},
    pattern color=blue!80!red },
  preaction={ pattern hexagon={pos=0.6},
    pattern color=blue!60!red },
  preaction={ pattern hexagon={pos=0.4},
    pattern color=blue!40!red },
  pattern hexagon={pos=0.2},
    pattern color=blue!20!red,
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/band`=⟨*number*⟩ (no default, initially `0`)

⟨*number*⟩ can take 0 or 1 and denotes one of two different bands of the pattern.

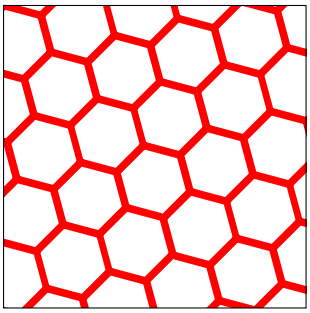
```
\begin{tikzpicture}
\draw[
  preaction = { pattern={hexagon[band=1,draw,
      line width=1mm]},
    pattern color=blue },
  pattern={hexagon[band=0,pos=0.5]},
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



3.2 Hexagon Grid

The **hexagon grid** pattern draws a grid made of hexagons. It is a single pattern und more efficient than **hexagon** with settings `draw,pos=1`.

```
\begin{tikzpicture}
\draw[
  pattern = { hexagon grid
    [
      size = 5mm, angle = 15, line width = 1mm
    ]},
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```

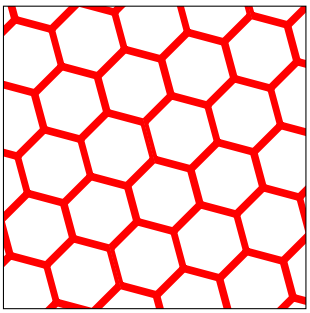


/tikz/pattern hexagon grid={⟨*pattern keys*⟩} (style, no default)

Convenience shortcut for setting the pattern to **hexagon grid**:

```
pattern = { hexagon grid [ ... ] }
```

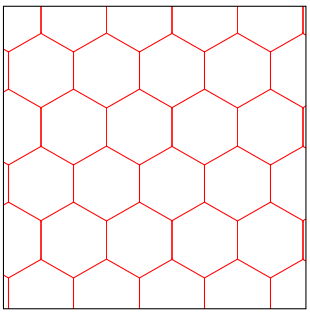
```
\begin{tikzpicture}
\draw[
  pattern hexagon grid =
    {
      size = 5mm, angle = 15, line width = 1mm
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



/pgf/pattern keys/size=⟨*size*⟩ (no default, initially `8mm`)

The given ⟨*size*⟩ denotes the length of an edge of one hexagon.

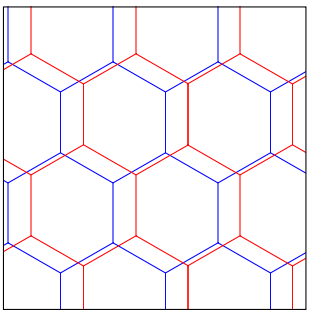
```
\begin{tikzpicture}
\draw[
  pattern hexagon grid =
    {
      size = 5mm,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/xshift=`⟨*xshift*⟩ (no default, initially `0pt`)
`/pgf/pattern keys/yshift=`⟨*yshift*⟩ (no default, initially `0pt`)

The pattern is shifted by ⟨*xshift*⟩ and ⟨*yshift*⟩.
Note that for **hexagon grid** is valid, that a pattern is shifted first and rotated afterwards.

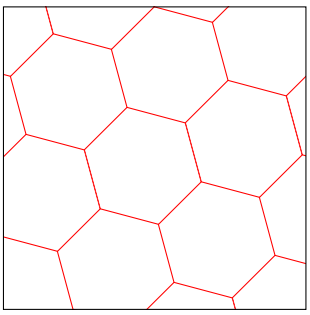
```
\begin{tikzpicture}
\draw[
  preaction={pattern={hexagon grid}, pattern color=blue},
  pattern hexagon grid =
    {
      xshift=3mm, yshift=1mm,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/angle=`⟨*angle*⟩ (no default, initially `0`)

The pattern is rotated by the given ⟨*angle*⟩.
Note that for **hexagon grid** is valid, that a pattern is shifted first and rotated afterwards.

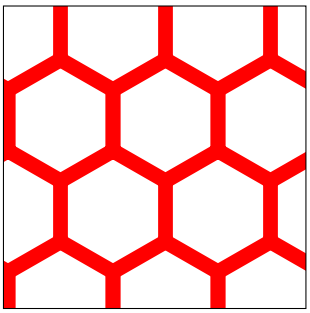
```
\begin{tikzpicture}
\draw[
  pattern hexagon grid =
    {
      angle = 15,
    },
  pattern color=red
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/line width=`⟨*length*⟩ (no default, initially `0.4pt`)

Sets the ⟨*length*⟩ value of the line width.

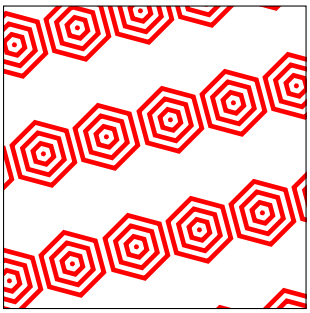
```
\begin{tikzpicture}
\draw[
  pattern hexagon grid =
    {
      line width = 2mm,
    },
  pattern color=red
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```



3.3 Hexagon Cycle

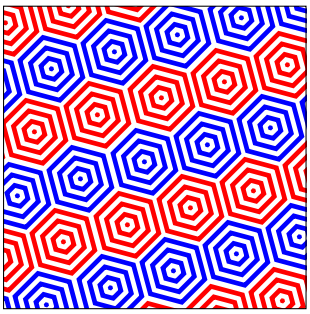
The **hexagon cycle** pattern draws several hexagon rings in a cyclic manor. A single pattern is one of two different *bands*, called band 0 and band 1.

```
\begin{tikzpicture}
\draw[
  pattern = { hexagon cycle
    [
      size = 5mm, angle = 15
    ]},
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



Both bands together build a uniform combined pattern.

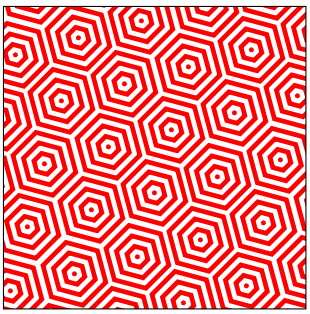
```
\begin{tikzpicture}
\draw[
  preaction = {
    pattern = { hexagon cycle
      [
        size = 5mm, angle = 15, band = 1
      ]},
    pattern color=blue },
  pattern = { hexagon cycle
    [
      size = 5mm, angle = 15, band = 0
    ]},
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



/tikz/pattern hexagon cycle={⟨*pattern keys*⟩} (style, no default)

Convenience shortcut for setting the combined pattern (in one color).

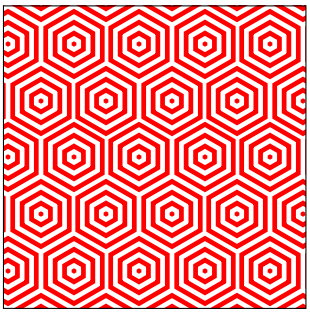
```
\begin{tikzpicture}
\draw[
  pattern hexagon cycle =
    {
      size = 5mm, angle = 15
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/size`=⟨*size*⟩ (no default, initially `8mm`)

The given ⟨*size*⟩ denotes the length of an edge of one hexagonical tile where the (smaller) hexagons are located in.

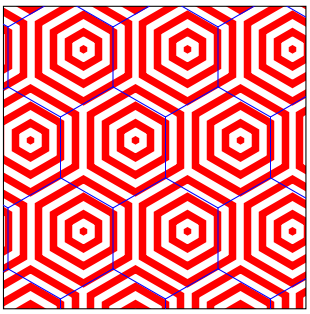
```
\begin{tikzpicture}
\draw[
  pattern hexagon cycle =
    {
      size = 5mm,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/xshift`=⟨*xshift*⟩ (no default, initially `0pt`)
`/pgf/pattern keys/yshift`=⟨*yshift*⟩ (no default, initially `0pt`)

The pattern is shifted by ⟨*xshift*⟩ and ⟨*yshift*⟩.
Note that for `hexagon cycle` is valid, that a pattern is shifted first and rotated afterwards.

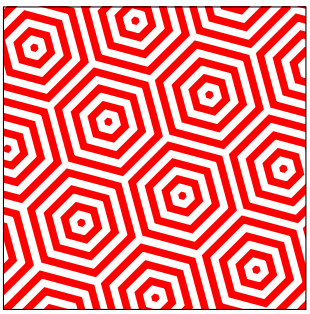
```
\begin{tikzpicture}
\draw[
  postaction={pattern={hexagon grid}, pattern color=blue},
  pattern hexagon cycle =
    {
      xshift=3mm, yshift=1mm,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/angle`=⟨*angle*⟩ (no default, initially `0`)

The pattern is rotated by the given ⟨*angle*⟩.
Note that for `hexagon cycle` is valid, that a pattern is shifted first and rotated afterwards.

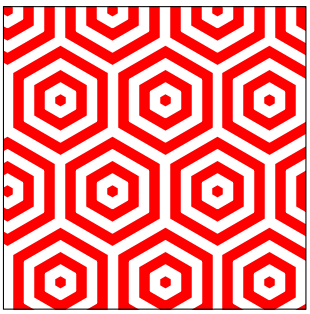
```
\begin{tikzpicture}
\draw[
  pattern hexagon cycle =
    {
      angle = 15,
    },
  pattern color=red
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/rings`=⟨*number*⟩ (no default, initially `3`)

Sets the ⟨*number*⟩ of rings as $0, 1, 2, 3, \ldots$

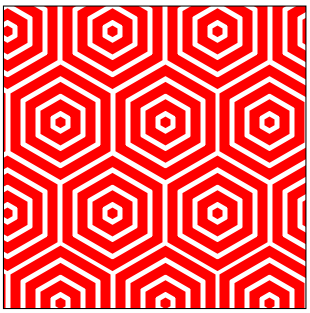
```
\begin{tikzpicture}
\draw[
  pattern hexagon cycle =
    {
      rings = 2,
    },
  pattern color=red
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/gap`=⟨*value*⟩ (no default, initially `1`)

Sets the gap between two rings as ⟨*value*⟩ times the line width of a ring. ⟨*value*⟩ has to be greater or equal 0.01.

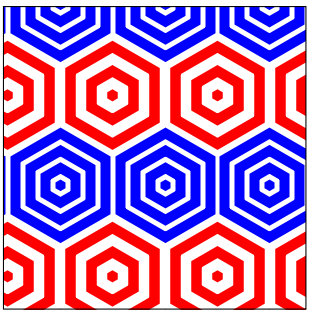
```
\begin{tikzpicture}
\draw[
  pattern hexagon cycle =
    {
      gap = 0.5,
    },
  pattern color=red
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/band`=⟨*number*⟩ (no default, initially `0`)

⟨*number*⟩ can take 0 or 1 and denotes one of two different bands of the pattern.

```
\begin{tikzpicture}
\draw[
  preaction = { pattern={hexagon cycle[
    band=1, gap=0.5 ]}, pattern color=blue },
  pattern={hexagon cycle[band=0,rings=2]},
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



4 Rhombus Pattern Library

TikZ Library `fill.rhombus`

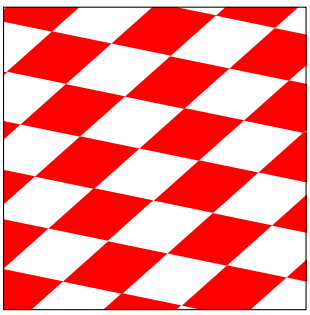
```
\usetikzlibrary{fill.rhombus} % LaTeX (primary choice) and plain TeX
\usetikzlibrary[fill.rhombus] % ConTeXt
\usepackage{tikzfill.rhombus} % LaTeX (secondary choice)
```

Based on `patterns.meta`, this library defines new rhombus patterns to fill graphs.

4.1 Rhombus

The `rhombus` pattern draws rhombi or diamonds. The rhombi may be filled or outlined and can be arranged in different *bands*, called band 0, band 1, and band 2.

```
\begin{tikzpicture}
\draw[
  pattern = { rhombus
    [
      size = 8mm, angle = 15
    ]},
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```

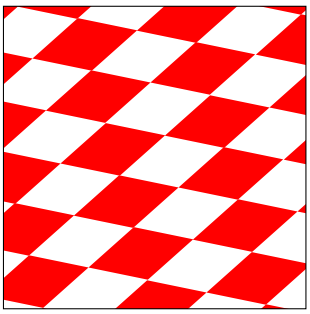


`/tikz/pattern rhombus={`⟨*pattern keys*⟩`}` (style, no default)

Convenience shortcut for setting the pattern to `rhombus`:

```
pattern = { rhombus [ ... ] }
```

```
\begin{tikzpicture}
\draw[
  pattern rhombus =
    {
      size = 8mm, angle = 15
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/size=`⟨*size*⟩ (no default, initially `10mm`)

The given ⟨*size*⟩ denotes the length of an edge of one rhombical tile where the (possibly smaller) rhombus is located in.

```
\begin{tikzpicture}
\draw[
  pattern rhombus =
    {
      size = 5mm,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```

`/pgf/pattern keys/fill` (no value, initially set)

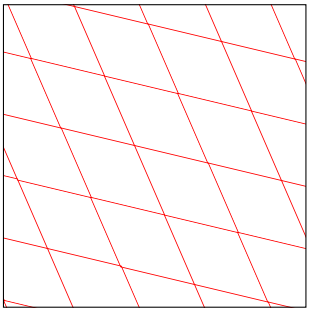
Sets the rhombi to be filled. `fill` and `draw` are mutually exclusionary.

```
\begin{tikzpicture}
\draw[
  pattern rhombus =
    {
      fill,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```

`/pgf/pattern keys/draw` (no value, initially unset)

Sets the rhombi to be outlined. `fill` and `draw` are mutually exclusionary.

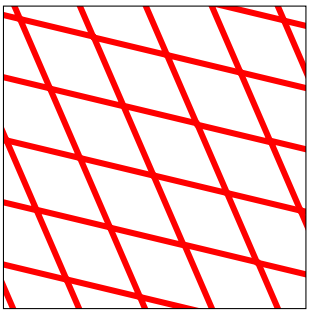
```
\begin{tikzpicture}
\draw[
  pattern rhombus =
    {
      draw,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/line width=`⟨*length*⟩ (no default, initially `0.4pt`)

Sets the ⟨*length*⟩ value of the line width. This is only relevant, if the rhombi are not filled.

```
\begin{tikzpicture}
\draw[
  pattern rhombus =
    {
      line width = 1mm, draw
    },
  pattern color=red
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```

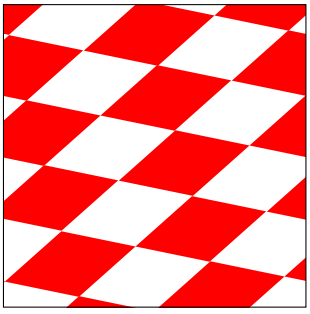


`/pgf/pattern keys/angle=`⟨*angle*⟩ (no default, initially `-40`)

The pattern is rotated by the given ⟨*angle*⟩.

Note that for `rhombus` is valid, that a pattern is rotated first and shifted afterwards.

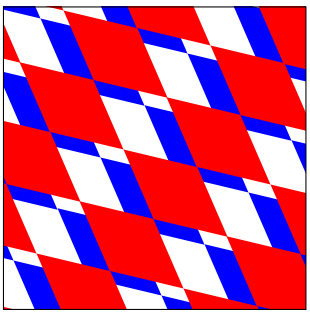
```
\begin{tikzpicture}
\draw[
  pattern rhombus =
    {
      angle = 15,
    },
  pattern color=red
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/xshift=`⟨*xshift*⟩ (no default, initially `0pt`)
`/pgf/pattern keys/yshift=`⟨*yshift*⟩ (no default, initially `0pt`)

The pattern is shifted by ⟨*xshift*⟩ and ⟨*yshift*⟩.
Note that for **rhombus** is valid, that a pattern is rotated first and shifted afterwards.

```
\begin{tikzpicture}
\draw[
  preaction={pattern rhombus, pattern color=blue},
  pattern rhombus =
    {
      xshift=3mm, yshift=1mm,
    },
  pattern color=red
  ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/pgf/pattern keys/ratio=`⟨*value*⟩ (no default, initially `2`)

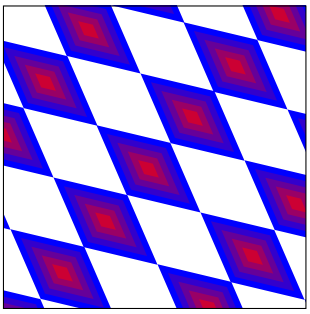
Sets the ⟨*value*⟩ of the ratio between the longer diagonal and the shorter diagonal. Therefore, ⟨*value*⟩ ≥ 1.

```
\begin{tikzpicture}
\draw[
  pattern rhombus =
    {
      ratio = 4
    },
  pattern color=red
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```

`/pgf/pattern keys/pos=`⟨*value*⟩ (no default, initially `1`)

Sets the edge position with a ⟨*value*⟩ between 0 and 1, where 0 is the center and 1 the outer rim of the rhombical tile.

```
\begin{tikzpicture}
\draw[
  preaction={ pattern rhombus={pos=1},
    pattern color=blue },
  preaction={ pattern rhombus={pos=0.8},
    pattern color=blue!80!red },
  preaction={ pattern rhombus={pos=0.6},
    pattern color=blue!60!red },
  preaction={ pattern rhombus={pos=0.4},
    pattern color=blue!40!red },
  pattern rhombus={pos=0.2},
    pattern color=blue!20!red,
  ]
(0,0) rectangle (4,4);
\end{tikzpicture}
```

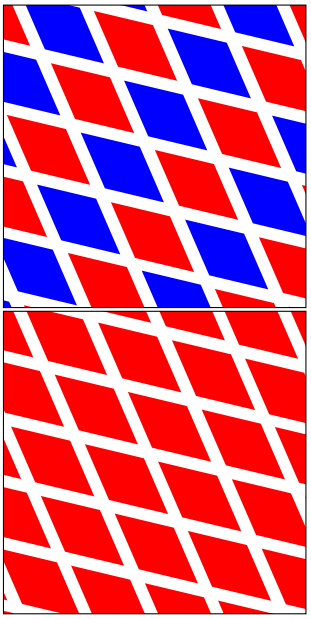


`/pgf/pattern keys/band`=⟨*number*⟩ (no default, initially 0)

⟨*number*⟩ can take 0, 1, or 2. Here, 0 and 1 denote one of two different bands of the pattern, while 2 denotes the combination of both.

```
\begin{tikzpicture}
\draw[
  preaction = {
    pattern rhombus = {
      pos = 0.8, band = 0 },
    pattern color=red },
  pattern rhombus = {
      pos = 0.8, band = 1
    },
  pattern color=blue
  ] (0,0) rectangle (4,4);
\end{tikzpicture}

\begin{tikzpicture}
\draw[
  pattern rhombus = {
      pos = 0.8, band = 2
    },
  pattern color=red
  ] (0,0) rectangle (4,4);
\end{tikzpicture}
```



5 Geometric Array Library

TikZ Library `fill.geomarray`

```
\usetikzlibrary{fill.geomarray} % LaTeX (primary choice) and plain TeX
\usetikzlibrary[fill.geomarray] % ConTeXt
\usepackage{tikzfill.geomarray} % LaTeX (secondary choice)
```

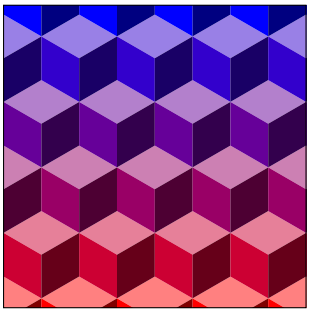
The fillings provided by this library consist of similar, though not necessarily identical, small pictures arranged on a grid. These pictures are conceptually similar to TikZ pic objects and are referred to as "items" in the following. Unlike TikZ tiling patterns, which are fixed in form, these pictures *may* vary. Note that this flexibility comes at the cost of increased compilation time.

Since TikZ already uses terms such as grid and pattern, we refer to such a pattern-like grid of pic-like objects as a "geometric array" of "items".

Each geometric array consists of rows and columns of items arranged in either a rectangular or triangular grid. Built-in support is provided for scaling items from row to row, enabling fading-like effects.

The most common use case is to employ a predefined template (see Section 5.4) and adjust its geometry and colors.

```
\begin{tikzpicture}
\draw[ fill gea Weihmichl = {
  scale fixed = 1,
  ystep equidistance,
  init-row< = \TFRowColorLet{mycolor}{red}{blue},
  style 1 = {fill=mycolor!50!white},
  style 2 = {fill=mycolor},
  style 3 = {fill=mycolor!50!black},
  freeze-row,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```

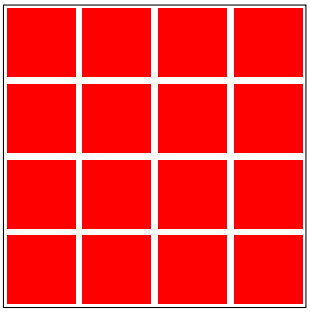


5.1 Base Settings

`/tikz/fill geomarray`={⟨*options*⟩} (initially unset) N 2026-03-18

Applies a TikZ `path picture` with geometric array settings customized by varios ⟨*options*⟩ to the current path. Without additional settings, this produces a default filling. Templates from Section 5.4 apply `/tikz/fill geomarray`.
Note that the following keys are reset by this key: `/tikz/geomarray/init` →P. 33, `/tikz/geomarray/init-row` →P. 34, `/tikz/geomarray/init-item` →P. 34, and `/tikz/geomarray/draw-item` →P. 34.

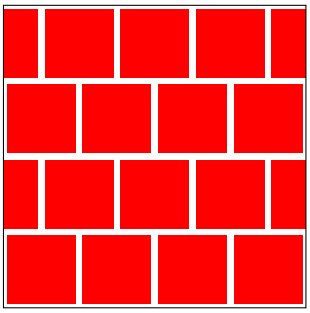
```
\begin{tikzpicture}
\draw[ fill geomarray ]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/triangular=true|false` (default `true`, initially `false`) N 2026-03-18

Geometric arrays can be either rectangular or triangular grids. Triangular grids shift every second row by half of a horizontal step.

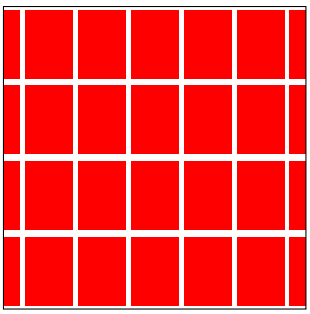
```
\begin{tikzpicture}
\draw[
  fill geomarray = { triangular },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/xstep={`⟨*length*⟩`}` (initially `10mm`) N 2026-03-18

Sets the horizontal step distance between two columns to ⟨*length*⟩. This value can be used read-only as `\l_tikzfill_gea_xstep_dim` for item drawing.

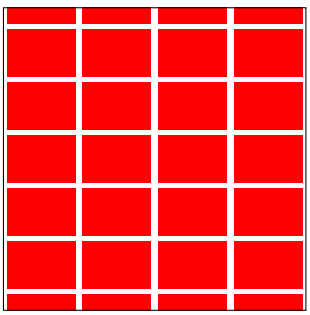
```
\begin{tikzpicture}
\draw[
  fill geomarray = { xstep = 7mm },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/ystep={`⟨*length*⟩`}` (initially `10mm`) N 2026-03-18

Sets the vertical step distance between two rows to ⟨*length*⟩. This value can be used read-only as `\l_tikzfill_gea_ystep_dim` for item drawing.

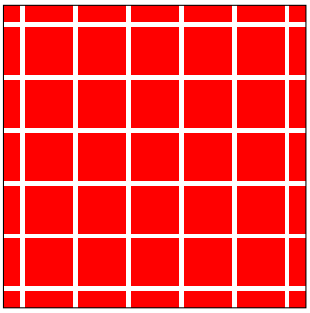
```
\begin{tikzpicture}
\draw[
  fill geomarray = { ystep = 7mm },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/step`={⟨*length*⟩} (style) N 2026-03-20

Sets both `/tikz/geomarray/xstep` →P. 28 and `/tikz/geomarray/ystep` →P. 28 to ⟨*length*⟩.

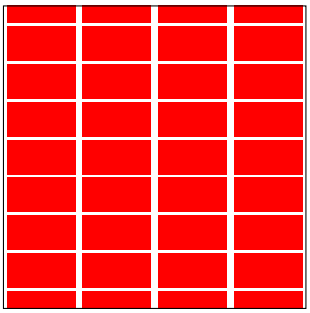
```
\begin{tikzpicture}
\draw[
  fill geomarray = { step = 7mm },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/step half`={⟨*length*⟩} (style) N 2026-03-23

Sets `/tikz/geomarray/xstep` →P. 28 to ⟨*length*⟩ and `/tikz/geomarray/ystep` →P. 28 to half of ⟨*length*⟩.

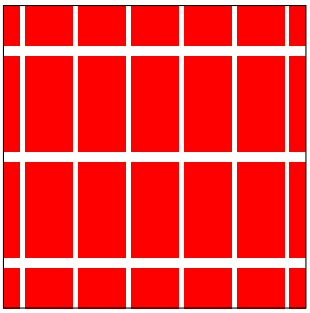
```
\begin{tikzpicture}
\draw[
  fill geomarray = { step half = 10mm },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/step double`={⟨*length*⟩} (style) N 2026-03-23

Sets `/tikz/geomarray/xstep` →P. 28 to ⟨*length*⟩ and `/tikz/geomarray/ystep` →P. 28 to double of ⟨*length*⟩.

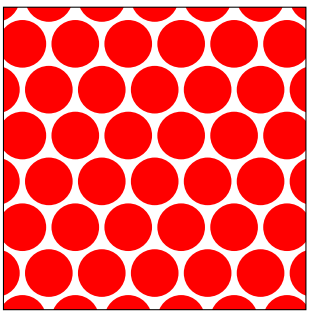
```
\begin{tikzpicture}
\draw[
  fill geomarray = { step double = 7mm },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



/tikz/geomarray/ystep equidistance (style, no value) N 2026-03-18
/tikz/geomarray/ystep equidistance* (style, no value) N 2026-03-25

For rectangular geometric arrays, this sets /tikz/geomarray/ystep →P. 28 to /tikz/geomarray/xstep →P. 28. For triangular geometric arrays, /tikz/geomarray/ystep →P. 28 is set such that the centers of the items become equidistant. Note that /tikz/geomarray/triangular →P. 28 has to be set beforehand.
/tikz/geomarray/ystep equidistance* switches rectangular and triangular computation.

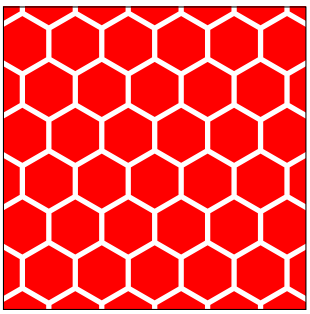
```
\begin{tikzpicture}
\draw[
  fill gea Furth = {
    triangular,
    xstep = 7mm,
    ystep equidistance,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



/tikz/geomarray/step equi={⟨length⟩} (style) N 2026-03-20
/tikz/geomarray/step equi*={⟨length⟩} (style) N 2026-03-25

Sets /tikz/geomarray/xstep →P. 28 to ⟨length⟩ and applies /tikz/geomarray/ystep equidistance or /tikz/geomarray/ystep equidistance*, respectively.

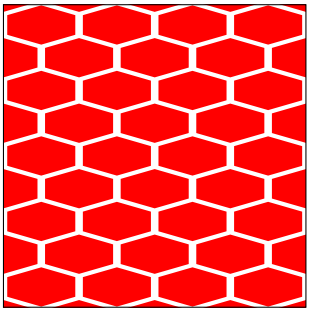
```
\begin{tikzpicture}
\draw[
  fill gea Bruckberg = { step equi = 7mm },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



/tikz/geomarray/step equi half={⟨length⟩} (style) N 2026-03-23
/tikz/geomarray/step equi* half={⟨length⟩} (style) N 2026-03-23

Sets /tikz/geomarray/xstep →P. 28 to ⟨length⟩ and applies /tikz/geomarray/ystep equidistance or /tikz/geomarray/ystep equidistance*, respectively, but halve ystep.

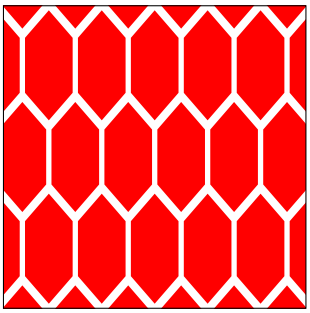
```
\begin{tikzpicture}
\draw[
  fill gea Bruckberg = { step equi half = 10mm },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/step equi double={⟨length⟩}` (style) N 2026-03-23
`/tikz/geomarray/step equi* double={⟨length⟩}` (style) N 2026-03-23

Sets `/tikz/geomarray/xstep` → P. 28 to ⟨*length*⟩ and applies `/tikz/geomarray/ystep equidistance` → P. 30 or `/tikz/geomarray/ystep equidistance*` → P. 30, respectively, but double ystep.

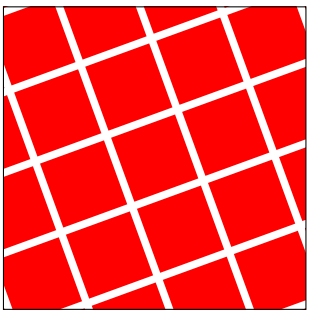
```
\begin{tikzpicture}
\draw[
  fill gea Bruckberg = { step equi double = 7mm },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/angle={⟨angle⟩}` (initially 0) N 2026-03-18

Rotates the whole geometric array by ⟨*angle*⟩.

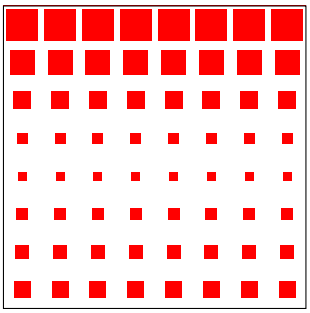
```
\begin{tikzpicture}
\draw[
  fill geomarray = { angle = 20 },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/scale={⟨data points⟩}` (initially `0/0.9,1/0.9`) N 2026-03-18

Defines a comma-separated list of interpolation ⟨*data points*⟩ of type *t*/*scale*. The *t* values must be strictly monotonically increasing from 0 to 1 (including both endpoints). They represent relative row positions.
The *scale* values are piecewise linearly interpolated and specify the actual scale of an item in a given row, where 1 typically denotes full scale (though not necessarily).
During item drawing, `\l_tikzfill_gea_row_frac_fp` represents the current relative row position, while `\l_tikzfill_gea_scale_fp` represents the interpolated scale value according to the specified interpolation ⟨*data points*⟩.

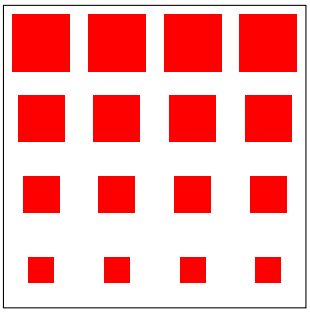
```
\begin{tikzpicture}
\draw[
  fill geomarray = {
    step equi = 5mm,
    scale = {0/0.5,0.5/0.2,1/1},
  },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/scale linear={⟨scale0⟩}{⟨scale1⟩}` (initially `{0.9}{0.9}`) N 2026-03-23

This is a shortcut for setting `/tikz/geomarray/scale={0/⟨scale0⟩,1/⟨scale1⟩}`, i.e. the scale changes linearly from ⟨*scale0*⟩ to ⟨*scale1*⟩ from the first to the last row of the geometric array.

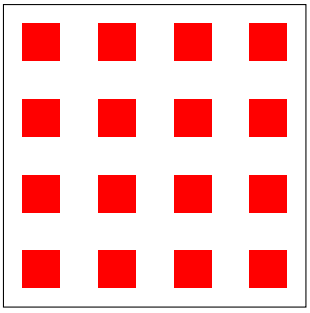
```
\begin{tikzpicture}
\draw[
  fill geomarray = {
    scale linear = {0.2}{0.9},
  },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/scale fixed={⟨scale⟩}` (initially `0.9`) N 2026-03-18

This is a shortcut for setting `/tikz/geomarray/scale={0/⟨scale⟩,1/⟨scale⟩}`, i.e. a fixed ⟨*scale*⟩ is used for all rows of the geometric array.

```
\begin{tikzpicture}
\draw[
  fill geomarray = { scale fixed = 0.5 },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



5.2 Custom Creation of Geometric Arrays

The following pseudocode illustrates how a geometric array is constructed, including four hook positions for inserting custom code.

Pseudo code for geometric array creation

```
init                    % (1) initialize before looping
                        %     Usable values:
                        %     \l_tikzfill_gea_xstep_dim   \l_tikzfill_gea_ystep_dim
                        %     \l_tikzfill_gea_cols_in     \l_tikzfill_gea_rows_int
\loop_over_rows
  {
    init-row            % (2) initialize at begin of a row
                        %     Usable values:
                        %     \l_tikzfill_gea_row_tl
                        %     \l_tikzfill_gea_row_frac_fp \l_tikzfill_gea_scale_fp
    \loop_over_columns
      {
        init-item       % (3) initialize before drawing an item
                        %     Usable values:
                        %     \l_tikzfill_gea_col_tl
        draw-item       % (4) item drawing code
      }
  }
```

Code can be inserted at these four positions using the following options:

- The most important position is the last one, addressed by /tikz/geomarray/draw-item → P. 34. Here, the actual Ti*k*Z drawing code for the item must be provided.
- The first three positions, addressed by /tikz/geomarray/init, /tikz/geomarray/init-row → P. 34, and /tikz/geomarray/init-item → P. 34, may contain optional initialization code to prepare for subsequent drawing. No Ti*k*Z drawing code should be placed here; instead, these positions are intended, for example, for calculations affecting the entire array or a single row.
- In addition to providing fully custom code, a practical and convenient approach is to apply a template (see Section 5.4) and adjust only selected settings at one of the four positions.

/tikz/geomarray/init={⟨*code*⟩} (initially empty) N 2026-03-18
/tikz/geomarray/init<={⟨*code*⟩}
/tikz/geomarray/init>={⟨*code*⟩}

This code position is executed before the loop over rows begins. The following read-only values are available: the grid step sizes **\l_tikzfill_gea_xstep_dim** and **\l_tikzfill_gea_ystep_dim**, as well as the number of columns and rows given by **\l_tikzfill_gea_cols_int** and **\l_tikzfill_gea_rows_int** (the actual counts are one greater, since indexing starts at 0).

- /tikz/geomarray/init replaces the contents by ⟨*code*⟩.
- /tikz/geomarray/init< appends ⟨*code*⟩.
- /tikz/geomarray/init> prepends ⟨*code*⟩.

`/tikz/geomarray/init-row={`⟨*code*⟩`}` (initially empty) N 2026-03-18
`/tikz/geomarray/init-row<={`⟨*code*⟩`}`
`/tikz/geomarray/init-row>={`⟨*code*⟩`}`

This code position is inside the main loop over rows, at the beginning of row `\l_tikzfill_gea_row_tl`. Here, `\l_tikzfill_gea_row_frac_fp` denotes the relative row position as a fractional value between 0 and 1. The macro `\l_tikzfill_gea_scale_fp` represents the current scale value for the row, as defined by `/tikz/geomarray/scale` → P. 32.

- `/tikz/geomarray/init-row` replaces the contents by ⟨*code*⟩.
- `/tikz/geomarray/init-row<` appends ⟨*code*⟩.
- `/tikz/geomarray/init-row>` prepends ⟨*code*⟩.

`/tikz/geomarray/init-item={`⟨*code*⟩`}` (initially empty) N 2026-03-18
`/tikz/geomarray/init-item<={`⟨*code*⟩`}`
`/tikz/geomarray/init-item>={`⟨*code*⟩`}`

This code position is inside the inner loop over columns, at the beginning of column `\l_tikzfill_gea_col_tl`. Here, final calculations or settings may be applied before the current item is drawn.

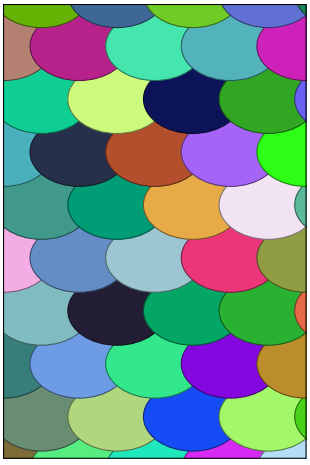
- `/tikz/geomarray/init-item` replaces the contents by ⟨*code*⟩.
- `/tikz/geomarray/init-item<` appends ⟨*code*⟩.
- `/tikz/geomarray/init-item>` prepends ⟨*code*⟩.

`/tikz/geomarray/draw-item={`⟨*code*⟩`}` (initially special) N 2026-03-18
`/tikz/geomarray/draw-item<={`⟨*code*⟩`}`
`/tikz/geomarray/draw-item>={`⟨*code*⟩`}`

This code position contains the Ti*k*Z drawing code for the current item. All previously mentioned read-only values are available for use in drawing. The center of the item corresponds to the Ti*k*Z position $(0, 0)$. The style settings `/tikz/fill-gea-style-1` to `/tikz/fill-gea-style-9` may be used as drawing options.

- `/tikz/geomarray/draw-item` replaces the contents by ⟨*code*⟩.
- `/tikz/geomarray/draw-item<` appends ⟨*code*⟩.
- `/tikz/geomarray/draw-item>` prepends ⟨*code*⟩.

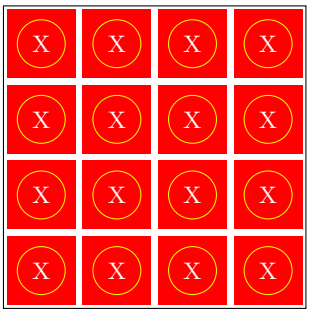
```
\ExplSyntaxOn
\begin{tikzpicture}
\draw[ fill~geomarray = {
  scale~fixed = 1.3,
  triangular,
  ystep = 7mm,
  init  = \sys_gset_rand_seed:n {1701},
  init-item = { \TFDefineRandomColor{mycolor} },
  draw-item = {
    \path[fill=mycolor,draw=mycolor!50!black]
    circle [
      x~radius=\fp_to_dim:n {\l_tikzfill_gea_xstep_dim / 2
                  * \l_tikzfill_gea_scale_fp },
      y~radius=\fp_to_dim:n {\l_tikzfill_gea_ystep_dim / 2
                  * \l_tikzfill_gea_scale_fp },
    ];
  },
}]
  (0,0) rectangle (4,6);
\end{tikzpicture}
\ExplSyntaxOff
```



/tikz/geomarray/node={⟨*options*⟩}{⟨*text*⟩} N 2026-03-26
/tikz/geomarray/node<={⟨*options*⟩}{⟨*text*⟩}
/tikz/geomarray/node>={⟨*options*⟩}{⟨*text*⟩}

This is a shortcut for drawing a Ti*k*Z `node` applying /tikz/geomarray/draw-item → P. 34, /tikz/geomarray/draw-item< → P. 34, or /tikz/geomarray/draw-item> → P. 34, respectively. The node contents are set by ⟨*text*⟩ and any Ti*k*Z ⟨*options*⟩ for the node can be applied.

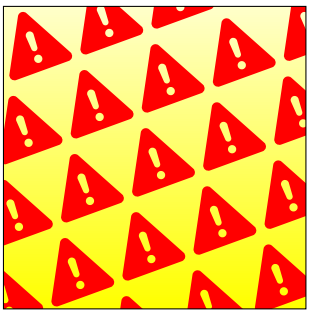
```
\begin{tikzpicture}
\draw[
  fill geomarray =
    {
      node< = {white,draw=yellow,circle}{X}
    },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



/tikz/geomarray/text={⟨*text*⟩} N 2026-03-26
/tikz/geomarray/text<={⟨*text*⟩}
/tikz/geomarray/text>={⟨*text*⟩}

This is a shortcut for setting ⟨*text*⟩ with `\pgftext` applying /tikz/geomarray/draw-item → P. 34, /tikz/geomarray/draw-item< → P. 34, or /tikz/geomarray/draw-item> → P. 34, respectively. In contrast to /tikz/geomarray/node, there are no drawing options, but /tikz/geomarray/text is much faster.

```
% \usepackage{fontawesome7}
\begin{tikzpicture}
\draw[
  preaction = {top color=yellow!20,bottom color=yellow},
  fill geomarray =
    {
      triangular,
      text = {\Huge\color{red}\faTriangleExclamation},
      angle = 20,
    },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



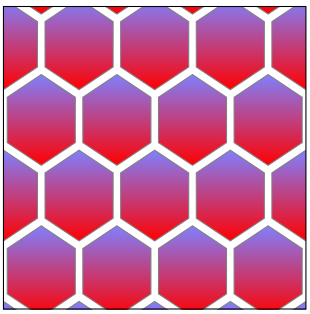
N 2026-03-18

/tikz/geomarray/style 1={⟨path style⟩} (initially fill=red)
/tikz/geomarray/style 2={⟨path style⟩} (initially fill=green)
/tikz/geomarray/style 3={⟨path style⟩} (initially fill=blue)
/tikz/geomarray/style 4={⟨path style⟩} (initially fill=cyan)
/tikz/geomarray/style 5={⟨path style⟩} (initially fill=magenta)
/tikz/geomarray/style 6={⟨path style⟩} (initially fill=yellow)
/tikz/geomarray/style 7={⟨path style⟩} (initially fill=lightgray)
/tikz/geomarray/style 8={⟨path style⟩} (initially fill=orange)
/tikz/geomarray/style 9={⟨path style⟩} (initially fill=purple)

These convenience options generate styles named /tikz/fill-gea-style-1, /tikz/fill-gea-style-2, /tikz/fill-gea-style-3, /tikz/fill-gea-style-4, /tikz/fill-gea-style-5, /tikz/fill-gea-style-6, /tikz/fill-gea-style-7, /tikz/fill-gea-style-8, and /tikz/fill-gea-style-9.

Styles of this kind are used within templates (see Section 5.4) for drawing. The style /tikz/fill-gea-style-1 is also used in the default configuration. Modifying these styles is the simplest way to customize the appearance.

```
\begin{tikzpicture}
\draw[ fill gea Bruckberg =
  {
    style 1 =
      {
        draw         = gray,
        top color    = blue!50,
        bottom color = red
      },
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/debug text=`⟨*color*⟩ (default `black`, initially `black`) N 2026-03-18

Prints the row and column numbers in the specified ⟨*color*⟩. Note that this option appends drawing code; therefore, it should be specified after other drawing settings. It is intended for debugging or for identifying a specific item.

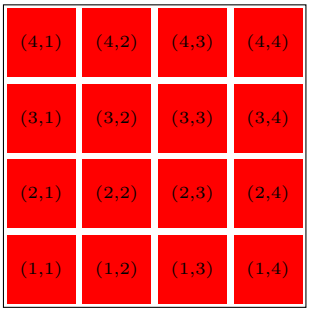
During item drawing, the following values are available (read-only):

- `\l_tikzfill_gea_rows_int`: total number of rows minus one.
- `\l_tikzfill_gea_cols_int`: total number of columns minus one.
- `\l_tikzfill_gea_row_tl`: current row index, with $0 \leq$`\l_tikzfill_gea_row_tl`$\leq$`\l_tikzfill_gea_rows_int`.
- `\l_tikzfill_gea_col_tl`: current column index, with $0 \leq$`\l_tikzfill_gea_col_tl`$\leq$`\l_tikzfill_gea_cols_int`.

`/tikz/geomarray/debug text` displays the current pair consisting of `\l_tikzfill_gea_row_tl` and `\l_tikzfill_gea_col_tl`.

Note that at least the first and last row or column may lie partially or entirely outside the clipping area.

```
\begin{tikzpicture}
\draw[
  fill geomarray = { debug text },
]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/geomarray/freeze-row` (experimental) N 2026-03-18

This is an experimental compile-time optimization for geometric arrays in which each row contains uniform items. For each row, an item is drawn only once into a box (“frozen”), and this box is then copied to fill the row.

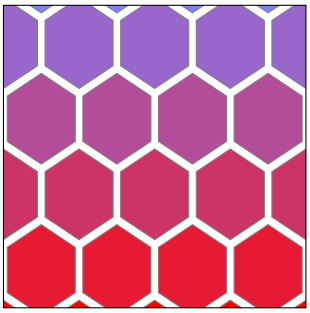
Depending on the complexity of the graphical code, this can reduce compilation time. However, note the restriction that all items within a row must be uniform.

5.3 Auxiliary Macros

`\TFRowColorLet{`⟨*name*⟩`}{`⟨*color1*⟩`}{`⟨*color2*⟩`}` N 2026-03-18

Creates a new color with given ⟨*name*⟩ which mixes the colors ⟨*color1*⟩ and ⟨*color2*⟩. On the first row, ⟨*color1*⟩ is used, on the last row ⟨*color2*⟩, and a linear mixture in between.

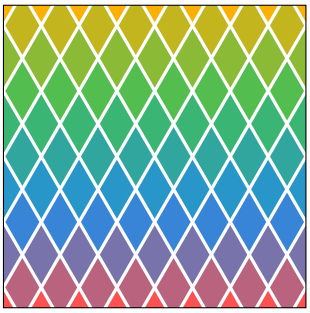
```
\begin{tikzpicture}
\draw[
  fill gea Bruckberg = {
    init-row< =
      \TFRowColorLet{mycolor}{red}{blue!50!white},
    style 1 = {draw=gray, fill=mycolor},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`\TFRowColorLetSeq{`⟨*name*⟩`}{`⟨*comma-list*⟩`}` N 2026-03-18

Creates a new color with given ⟨*name*⟩ which mixes the colors given by the ⟨*comma-list*⟩ from the first row (first color) to the last row (last color) and a linear mixture in between.

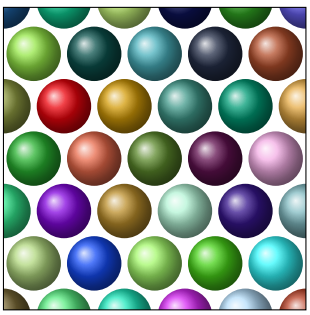
```
% \usepackage{opencolor}
\begin{tikzpicture}
\draw[
  fill gea Essenbach = {
    init-row< = \TFRowColorLetSeq{mycolor}
      {oc-red-6,oc-blue-6,oc-green-6,oc-yellow-6},
    style 1   = {fill=mycolor},
    step equi = 5mm,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`\TFDefineRandomColor{`⟨*name*⟩`}` N 2026-03-18

Defines a random color with given ⟨*name*⟩. Random numbers are taken from the L3 programming layer.

```
\ExplSyntaxOn
\sys_gset_rand_seed:n {1701}
\ExplSyntaxOff
\begin{tikzpicture}
\draw[
  fill gea Furth = {
    triangular,
    step equi  = 8mm,
    init-item< = \TFDefineRandomColor{mycolor},
    style 1    = {ball color=mycolor},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```

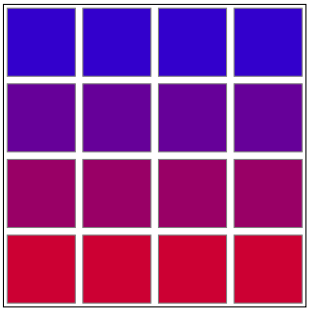


5.4 Templates

`/tikz/fill gea Altdorf`={⟨*options*⟩} (initially unset) N 2026-03-18

The basic item shape of this template is a rectangle. `/tikz/geomarray/style 1` → P. 36 is used for graph drawing.

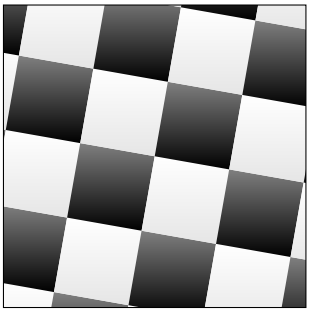
```
\begin{tikzpicture}
\draw[
  fill gea Altdorf = {
    init-row< =
      \TFRowColorLet{mycolor}{red}{blue},
    style 1 =
      {draw=gray, fill=mycolor},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Loeschenbrand`={⟨*options*⟩} (initially unset) N 2026-03-20

This is a variation of `/tikz/fill gea Altdorf` where `/tikz/geomarray/style 1` → P. 36 and `/tikz/geomarray/style 2` → P. 36 are used in a checkerboard pattern.

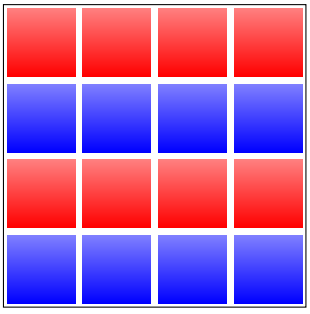
```
\begin{tikzpicture}
\draw[
  fill gea Loeschenbrand = {
    scale fixed = 1,
    style 1 =
      {bottom color=black, top color=black!50},
    style 2 =
      {bottom color=black!10, top color=white},
    angle = -10,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Ganslberg`={⟨*options*⟩} (initially unset) N 2026-03-18

This is a variation of `/tikz/fill gea Altdorf` in which `/tikz/geomarray/style 1` → P. 36 and `/tikz/geomarray/style 2` → P. 36 are used for odd and even rows, respectively.

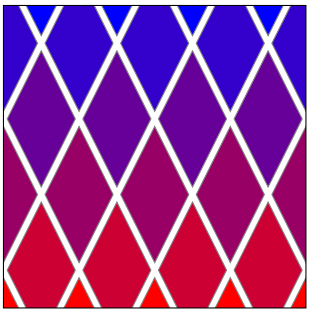
```
\begin{tikzpicture}
\draw[
  fill gea Ganslberg = {
    style 1 =
      {bottom color=red, top color=red!50},
    style 2 =
      {bottom color=blue, top color=blue!50},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Essenbach={⟨options⟩}` (initially unset) N 2026-03-18

The basic item shape of this template is a rhombus. `/tikz/geomarray/style 1` → P. 36 is used for graph drawing.

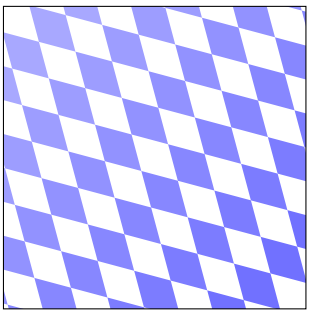
```
\begin{tikzpicture}
\draw[
  fill gea Essenbach = {
    init-row< =
      \TFRowColorLet{mycolor}{red}{blue},
    style 1 =
      {draw=gray, fill=mycolor},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Mirskofen={⟨options⟩}` (initially unset) N 2026-03-18

This is a variation of `/tikz/fill gea Essenbach` in which `/tikz/geomarray/style 1` → P. 36 and `/tikz/geomarray/style 2` → P. 36 are used for odd and even rows, respectively.

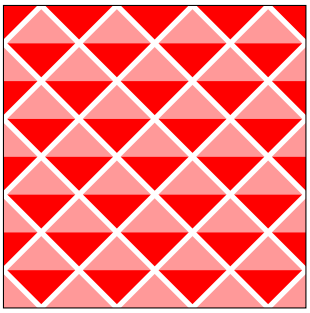
```
\begin{tikzpicture}
\draw[
  fill gea Mirskofen = {
    scale fixed = 1,
    step equi = 5mm,
    init-row< =
      \TFRowColorLet{mycolor}{blue!60}{blue!30},
    style 1 = {fill=mycolor},
    style 2 = {},
    angle = 45,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



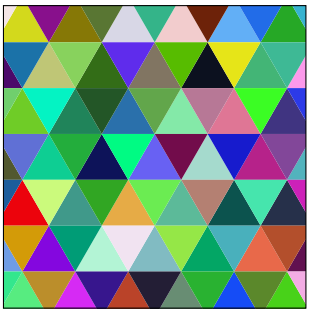
`/tikz/fill gea Pfettrach`={⟨*options*⟩} (initially unset) N 2026-03-18

The basic item shape of this template is a rhombus divided into two parts. `/tikz/geomarray/style 1` → P. 36 and `/tikz/geomarray/style 2` → P. 36 are used for the two parts.

```
\begin{tikzpicture}
\draw[
  fill gea Pfettrach = {
    step half = 10mm,
    style 1 = { fill = red!40 },
    style 2 = { fill = red },
    freeze-row,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



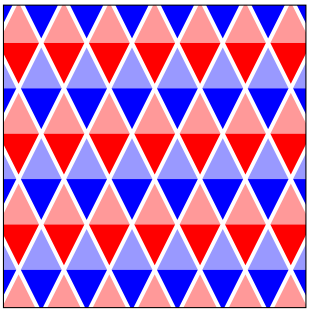
```
\ExplSyntaxOn
\sys_gset_rand_seed:n {1701}
\ExplSyntaxOff
\begin{tikzpicture}
\draw[
  fill gea Pfettrach = {
    scale fixed = 1,
    step equi = 7mm,
    init-item< = \TFDefineRandomColor{col1}%
      \TFDefineRandomColor{col2},
    style 1 = { fill = col1 },
    style 2 = { fill = col2 },
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Kolmhub`={⟨*options*⟩} (initially unset) N 2026-03-18

This is a variation of `/tikz/fill gea Pfettrach` in which `/tikz/geomarray/style 1` → P. 36, `/tikz/geomarray/style 2` → P. 36, `/tikz/geomarray/style 3` → P. 36, and `/tikz/geomarray/style 4` → P. 36, are used for odd and even rows, respectively.

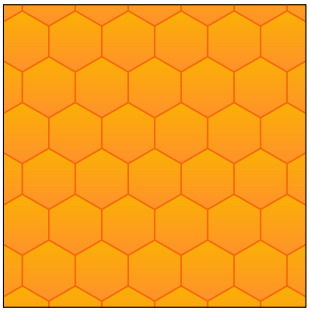
```
\begin{tikzpicture}
\draw[
  fill gea Kolmhub = {
    step = 6mm,
    style 1 = { fill = red!40 },
    style 2 = { fill = red },
    style 3 = { fill = blue!40 },
    style 4 = { fill = blue },
    freeze-row,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



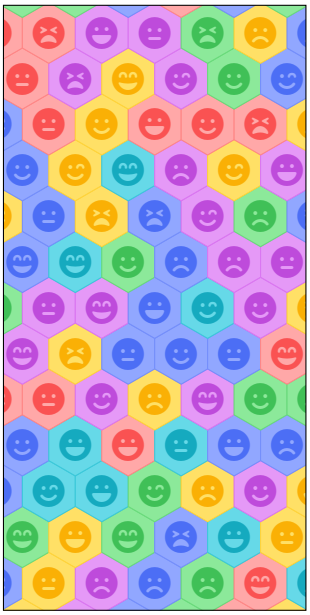
`/tikz/fill gea Bruckberg={⟨options⟩}` (initially unset) N 2026-03-18

The basic item shape of this template is a hexagon. `/tikz/geomarray/style 1` → P. 36 is used for graph drawing.

```
% \usepackage{opencolor}
\begin{tikzpicture}
\draw[
  preaction = {fill=oc-orange-7},
  fill gea Bruckberg = {
    scale fixed = 0.97,
    step equi = 7mm,
    style 1 = {
      top color    = oc-yellow-6,
      bottom color = oc-orange-5  },
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



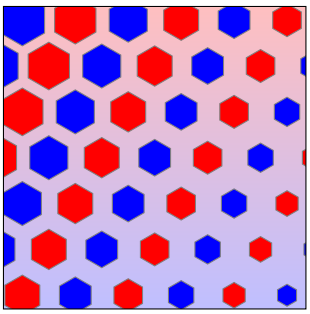
```
% \usepackage{opencolor}
% \usepackage{fontawesome7}
\ExplSyntaxOn
\begin{tikzpicture}
\draw[
  preaction = {fill=oc-orange-7},
  fill~gea~Bruckberg = {
    scale~fixed = 1,
    step~equi = 7mm,
    init< = \sys_gset_rand_seed:n {101},
    init-item< = \tl_set:Ne \l_tmpa_tl
      {oc-\clist_rand_item:n {red,grape,indigo,cyan,
        green,yellow} },
    style~1 = {draw=\l_tmpa_tl-4,fill=\l_tmpa_tl-3},
    text< = {
        \color{\l_tmpa_tl-6}\large
        \faIcon{face-\clist_rand_item:n {smile,frown,
          grin-beam,meh,tired,laugh,smile-wink}}
      },
}]
  (0,0) rectangle (4,8);
\end{tikzpicture}
\ExplSyntaxOff
```



`/tikz/fill gea Bachhorn={⟨options⟩}` (initially unset) N 2026-03-18

This is a variation of `/tikz/fill gea Bruckberg` → P. 42 in which `/tikz/geomarray/style 1` → P. 36 and `/tikz/geomarray/style 2` → P. 36 are used for odd and even rows, respectively.

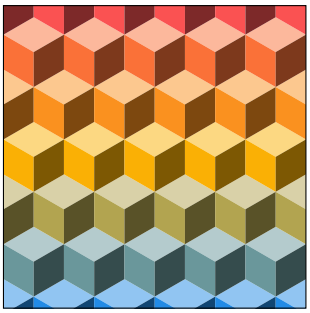
```
\begin{tikzpicture}
\draw[
  preaction = {top color=red!25,bottom color=blue!25},
  fill gea Bachhorn = {
    scale = {0/0.3,1/0.9},
    step equi = 7mm,
    style 1 = { draw=gray, fill=red },
    style 2 = { draw=gray, fill=blue },
    angle = 60,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Weihmichl={⟨options⟩}` (initially unset) N 2026-03-18

The basic item shape of this template is a hexagon divided into three parts. `/tikz/geomarray/style 1` → P. 36, `/tikz/geomarray/style 2` → P. 36, and `/tikz/geomarray/style 3` → P. 36, are used for the three parts.

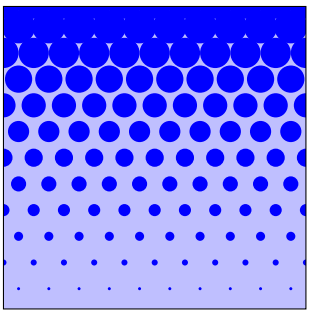
```
% \usepackage{opencolor}
\begin{tikzpicture}
\draw[
  fill gea Weihmichl = {
    scale fixed = 1,
    step equi = 8mm,
    init-row< = \TFRowColorLetSeq{mycolor}{
      oc-blue-6,oc-yellow-6,oc-red-6},
    style 1 = {fill=mycolor!50!white},
    style 2 = {fill=mycolor},
    style 3 = {fill=mycolor!50!black},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Furth={⟨options⟩}` (initially unset) N 2026-03-18

The basic item shape of this template is a circle. `/tikz/geomarray/style 1` → P. 36 is used for graph drawing.

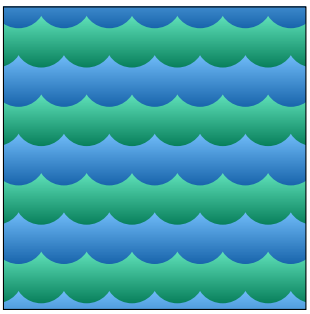
```
\begin{tikzpicture}
\draw[
  preaction = {fill=blue!25},
  fill gea Furth = {
    triangular,
    step equi = 4mm,
    scale = {0/0,1/1.2},
    style 1 = { fill=blue },
    freeze-row,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Schatzhofen={⟨options⟩}` (initially unset) N 2026-03-18

This is a variation of `/tikz/fill gea Furth` in which `/tikz/geomarray/style 1` → P. 36 and `/tikz/geomarray/style 2` → P. 36 are used for odd and even rows, respectively.

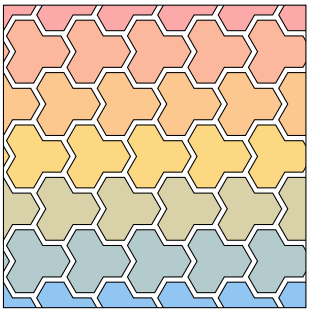
```
% \usepackage{opencolor}
\begin{tikzpicture}
\draw[
  fill gea Schatzhofen = {
    triangular,
    scale fixed=1.2,
    step equi = 6mm,
    style 1 = { top color=oc-blue-3,
      bottom color=oc-blue-9},
    style 2 = { top color=oc-teal-3,
      bottom color=oc-teal-9},
    freeze-row,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Ergolding`={⟨*options*⟩} (initially unset) N 2026-03-24

The basic item shape of this template is a tripod. `/tikz/geomarray/style 1` → P. 36 is used for graph drawing.

```
% \usepackage{opencolor}
\begin{tikzpicture}
\draw[
  fill gea Ergolding = {
    step equi = 8mm,
    init-row< = \TFRowColorLetSeq{mycolor}{
      oc-blue-6,oc-yellow-6,oc-red-6},
    style 1 = {draw,fill=mycolor!50!white},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Hascherkeller`={⟨*options*⟩} (initially unset) N 2026-03-24

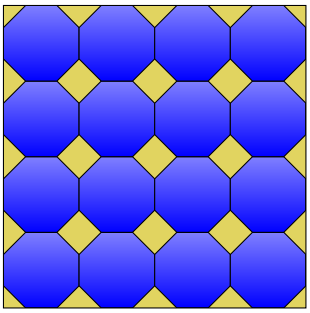
The basic item shape of this template is a tripod divided into three parts. `/tikz/geomarray/style 1` → P. 36, `/tikz/geomarray/style 2` → P. 36, and `/tikz/geomarray/style 3` → P. 36, are used for the three parts.

```
\ExplSyntaxOn
\sys_gset_rand_seed:n {42}
\ExplSyntaxOff
\begin{tikzpicture}
\draw[
  fill gea Hascherkeller = {
    scale fixed = 1,
    step equi = 8mm,
    init-item< = \TFDefineRandomColor{mycolor},
    style 1 = {fill=mycolor!50!white},
    style 2 = {fill=mycolor},
    style 3 = {fill=mycolor!50!black},
    angle=30,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```

`/tikz/fill gea Unterglaim`={⟨*options*⟩} (initially unset) N 2026-03-24

The basic item shape of this template is an octogon. `/tikz/geomarray/style 1` → P. 36 is used for graph drawing.

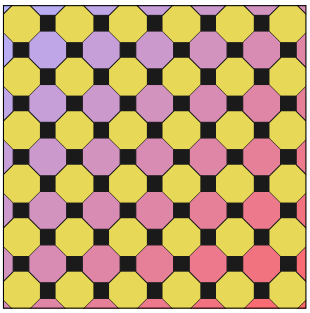
```
\begin{tikzpicture}
\draw[
  preaction = {fill=yellow!70!gray},
  fill gea Unterglaim = {
    scale fixed = 1,
    style 1 =
      {draw, top color=blue!50,bottom color=blue},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Grandsberg`={⟨*options*⟩} (initially unset) N 2026-03-20

This is a variation of `/tikz/fill gea Unterglaim` where `/tikz/geomarray/style 1` → P. 36 and `/tikz/geomarray/style 2` → P. 36 are used in a checkerboard pattern.

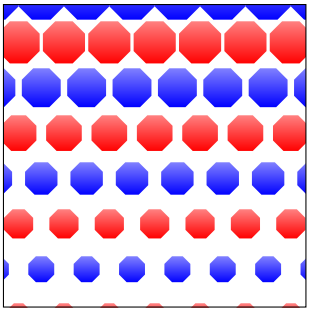
```
\begin{tikzpicture}
\draw[
  preaction = {fill=black!90},
  fill gea Grandsberg = {
    scale fixed = 1,
    step = 5mm,
    init-row< =
      \TFRowColorLet{mycolor}{red!60}{blue!30},
    style 1 = {draw=black!90,fill=mycolor},
    style 2 = {fill=yellow!75!gray},
    angle   = 45,
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Kottingrohr`={⟨*options*⟩} (initially unset) N 2026-03-18

This is a variation of `/tikz/fill gea Unterglaim` in which `/tikz/geomarray/style 1` → P. 36 and `/tikz/geomarray/style 2` → P. 36 are used for odd and even rows, respectively.

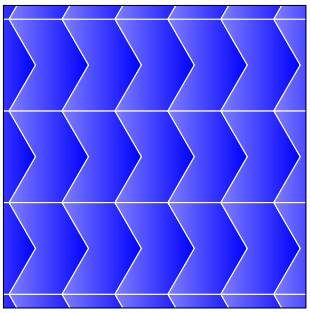
```
\begin{tikzpicture}
\draw[
  fill gea Kottingrohr = {
    triangular,
    scale linear = {0.5}{1},
    step = 6mm,
    style 1 = {bottom color=red, top color=red!50},
    style 2 = {bottom color=blue, top color=blue!50},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Hohenthann={⟨options⟩}` (initially unset) N 2026-03-25

The basic item shape of this template is an arrow. `/tikz/geomarray/style 1` → P. 36 is used for graph drawing.

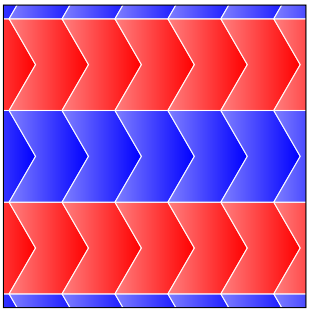
```
\begin{tikzpicture}
\draw[
  fill gea Hohenthann = {
    scale fixed = 1,
    step equi* double = 7mm,
    style 1 = {draw=white,
      left color=blue!50,right color=blue},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Bibelsbach={⟨options⟩}` (initially unset) N 2026-03-25

This is a variation of `/tikz/fill gea Hohenthann` in which `/tikz/geomarray/style 1` → P. 36 and `/tikz/geomarray/style 2` → P. 36 are used for odd and even rows, respectively.

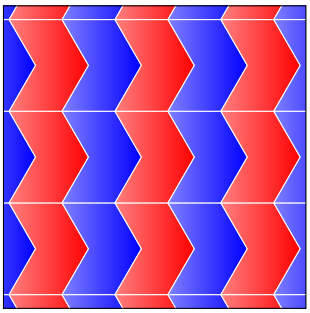
```
\begin{tikzpicture}
\draw[
  fill gea Bibelsbach = {
    scale fixed = 1,
    step equi* double = 7mm,
    style 1 = {draw=white,
      left color=blue!50,right color=blue},
    style 2 = {draw=white,
      left color=red!50,right color=red},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Roseneck={⟨options⟩}` (initially unset) N 2026-03-25

This is a variation of `/tikz/fill gea Hohenthann` in which `/tikz/geomarray/style 1` → P. 36 and `/tikz/geomarray/style 2` → P. 36 are used for odd and even columns, respectively.

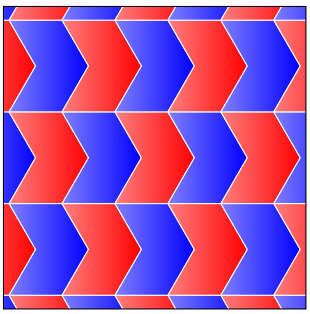
```
\begin{tikzpicture}
\draw[
  fill gea Roseneck = {
    scale fixed = 1,
    step equi* double = 7mm,
    style 1 = {draw=white,
      left color=blue!50,right color=blue},
    style 2 = {draw=white,
      left color=red!50,right color=red},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Altenkofen`={⟨*options*⟩} (initially unset) N 2026-03-25

This is a variation of `/tikz/fill gea Hohenthann` →P. 47 in which `/tikz/geomarray/style 1` →P. 36 and `/tikz/geomarray/style 2` →P. 36 are used are used in a checkerboard pattern.

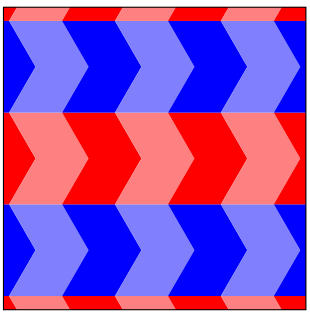
```
\begin{tikzpicture}
\draw[
  fill gea Altenkofen = {
    scale fixed = 1,
    step equi* double = 7mm,
    style 1 = {draw=white,
      left color=blue!50,right color=blue},
    style 2 = {draw=white,
      left color=red!50,right color=red},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Irlmuehle`={⟨*options*⟩} (initially unset) N 2026-03-25

This is a variation of `/tikz/fill gea Hohenthann` →P. 47 in which `/tikz/geomarray/style 1` →P. 36, `/tikz/geomarray/style 2` →P. 36, `/tikz/geomarray/style 3` →P. 36, and `/tikz/geomarray/style 4` →P. 36 are used are used.

```
\begin{tikzpicture}
\draw[
  fill gea Irlmuehle = {
    scale fixed = 1,
    step equi* double = 7mm,
    style 1 = {fill=red},
    style 2 = {fill=red!50},
    style 3 = {fill=blue},
    style 4 = {fill=blue!50},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Gammelsdorf`={⟨*options*⟩} (initially unset) N 2026-03-25

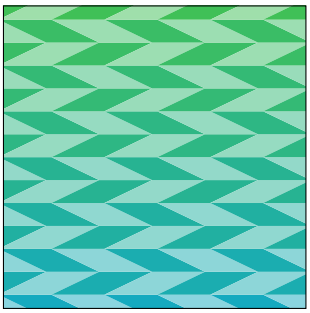
The basic item shape of this template is an arrow divided into two parts. `/tikz/geomarray/style 1` →P. 36 and `/tikz/geomarray/style 2` →P. 36 are used for the two parts.

```
% \usepackage{opencolor}
\begin{tikzpicture}
\draw[
  preaction = {fill=oc-teal-9},
  fill gea Gammelsdorf = {
    step equi* double = 6mm,
    init-row< =
      \TFRowColorLet{mycolor}{oc-cyan-6}{oc-green-6},
    style 1 = {fill=mycolor},
    style 2 = {fill=mycolor!50},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```

`/tikz/fill gea Traich`={⟨*options*⟩} (initially unset) N 2026-03-25

This is a variation of `/tikz/fill gea Gammelsdorf` in which `/tikz/geomarray/style 1` →P. 36 and `/tikz/geomarray/style 2` →P. 36 are used in a checkerboard pattern.

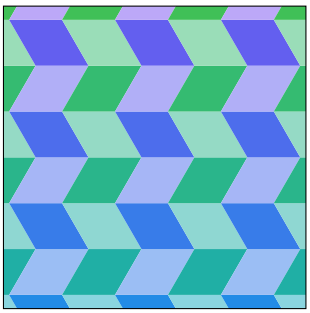
```
% \usepackage{opencolor}
\begin{tikzpicture}
\draw[
  fill gea Traich = {
    scale fixed = 1,
    step equi* = 7mm,
    init-row< =
      \TFRowColorLet{mycolor}{oc-cyan-6}{oc-green-6},
    style 1 = {fill=mycolor},
    style 2 = {fill=mycolor!50},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Winbuerg`={⟨*options*⟩} (initially unset) N 2026-03-25

This is a variation of `/tikz/fill gea Gammelsdorf` in which `/tikz/geomarray/style 1` →P. 36, `/tikz/geomarray/style 2` →P. 36, `/tikz/geomarray/style 3` →P. 36, and `/tikz/geomarray/style 4` →P. 36 are used.

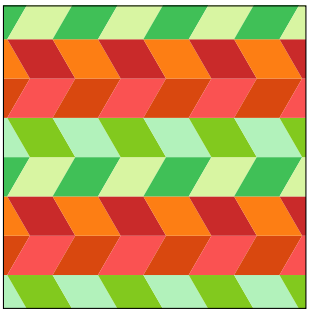
```
% \usepackage{opencolor}
\begin{tikzpicture}
\draw[
  fill gea Winbuerg = {
    scale fixed = 1,
    step equi* double = 7mm,
    init-row< =
      \TFRowColorLet{mycolA}{oc-cyan-6}{oc-green-6}%
      \TFRowColorLet{mycolB}{oc-blue-6}{oc-violet-6},
    style 1 = {fill=mycolA},
    style 2 = {fill=mycolA!50},
    style 3 = {fill=mycolB!50},
    style 4 = {fill=mycolB},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



`/tikz/fill gea Kreuzholzen`={⟨*options*⟩} (initially unset) N 2026-03-25

This is a variation of `/tikz/fill gea Gammelsdorf` → P. 49 in which `/tikz/geomarray/style 1` → P. 36 up to `/tikz/geomarray/style 8` → P. 36 are used.

```
% \usepackage{opencolor}
\begin{tikzpicture}
\draw[
  fill gea Kreuzholzen = {
    scale fixed = 1,
    step equi* double = 6mm,
    style 1 = {fill=oc-green-6},
    style 2 = {fill=oc-green-2},
    style 3 = {fill=oc-lime-2},
    style 4 = {fill=oc-lime-6},
    style 5 = {fill=oc-orange-9},
    style 6 = {fill=oc-orange-6},
    style 7 = {fill=oc-red-6},
    style 8 = {fill=oc-red-9},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```

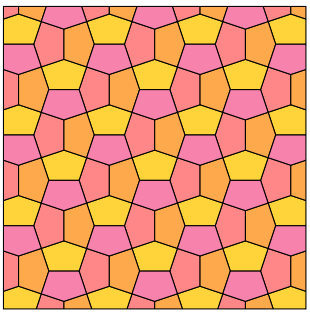


`/tikz/fill gea Grafenhaun`={⟨*options*⟩} (initially unset) N 2026-03-25

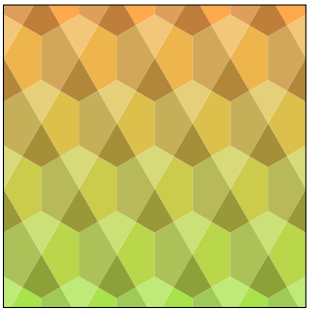
The basic item shape of this template is a hexagon divided into four pentagons (or two pentagons and two tetragons). `/tikz/geomarray/style 1` → P. 36, `/tikz/geomarray/style 2` → P. 36, `/tikz/geomarray/style 3` → P. 36, and `/tikz/geomarray/style 4` → P. 36 are used for the four parts.

The optimal congruence of the parts is found with `/tikz/geomarray/step equi* half` → P. 30, but other relations between xstep and ystep also produce pleasing results.

```
% \usepackage{opencolor}
\begin{tikzpicture}
\draw[
  fill gea Grafenhaun = {
    step equi* half = 12mm,
    scale fixed = 1,
    style 1 = {draw,fill=oc-red-4},
    style 2 = {draw,fill=oc-yellow-4},
    style 3 = {draw,fill=oc-orange-4},
    style 4 = {draw,fill=oc-pink-4},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



```
% \usepackage{opencolor}
\begin{tikzpicture}
\draw[
  fill gea Grafenhaun = {
    step equi = 10mm,
    scale fixed = 1,
    init-row< =
      \TFRowColorLet{mycolor}{oc-lime-4}{oc-orange-4},
    style 1 = {fill=mycolor},
    style 2 = {fill=mycolor!75!white},
    style 3 = {fill=mycolor!75!gray},
    style 4 = {fill=mycolor!75!black},
}]
  (0,0) rectangle (4,4);
\end{tikzpicture}
```



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