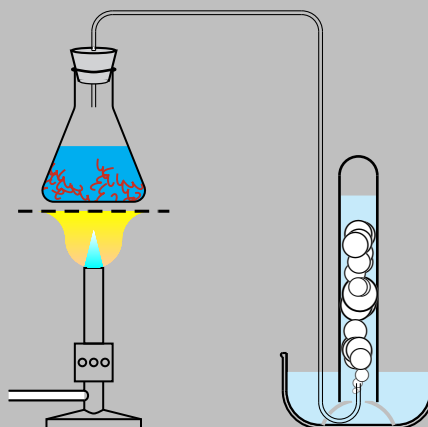


PSTricks package pst-labo

Chemical objects. Version 2.07

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`pst-labo` provides macros for a variety of devices used mainly for chemical applications. [**pst-labo**] Since most of these devices have a standardised design `pst-labo` spares you the trouble of having to create them manually. This document also describes how to create “high-level” objects using the command `PSTricks`. [6] All basic objects are included in the file `pst-laboObj.tex` and are loaded during the start of `pst-labo`. These objects can be used for personal extensions. Section 4 gives an overview of all objects.

Thanks to:
Frédéric Bréal; Patrick Drechsler (English translation);

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1 Parameter

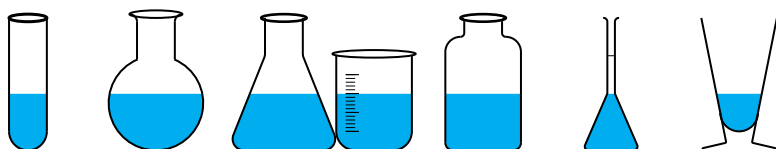
Table 1 describes all parameters unique to pst-labo.

Table 1: Summary of all parameters available with pst-labo

<i>Name</i>	<i>values</i>	<i>default</i>	<i>comments</i>
glassType	tube ballon becher erlen flacon fioleJauge	tube	defines type of glass cylinder
bouchon	$\langle false true \rangle$	false	Container is sealed with a plug.
pince	$\langle false true \rangle$	false	wooden clamp
tubeDroit	$\langle false true \rangle$	false	glass tube
tubeCoude	$\langle false true \rangle$	false	glass tube with 90 degree twist
tubeCoudeU	$\langle false true \rangle$	false	U-shaped glass tube
tubeCoudeUB	$\langle false true \rangle$	false	extended version, only applies to glass containers of type ballon and erlen
tubeRecourbe	$\langle false true \rangle$	false	
tubeRecourbeCourt	$\langle false true \rangle$	false	setup without Bunsen burner
tubePenche	$\langle -65 \dots 65 \rangle$	0	tilting angle
doubletube	$\langle false true \rangle$	false	pour d'gagement gazeux sans chauffage
etiquette	$\langle false true \rangle$	false	
Numero	$\langle Text \rangle$	{}	number for the option etiquette
tubeSeul	$\langle false true \rangle$	false	wide/narrow pspicture box
becBunsen	$\langle false true \rangle$	true	with/without Bunsen burner
barbotage	$\langle false true \rangle$	false	attaches an additional glass tube to the original glass container
substance	$\langle Makro \rangle$	\relax	\pstBullesChampagne, \pstFilaments, \pstBilles, \pstBULLES, \pstClous, \pstCuivre
solide	$\langle Makro \rangle$	\relax	\pstTournureCuivre, \pstClouFer, \pstGrenailleZinc
refrigerantBouille	$\langle false true \rangle$	false	pour chauffage à reflux
recuperationGaz	$\langle false true \rangle$	false	setup for collecting gas
couleurReactifBurette	$\langle Farbe \rangle$	OrangePale	
niveauReactifBurette	20	$\langle 0 \dots 25 \rangle$	restriction of 25mL
AspectMelange	$\langle Stil \rangle$	DiffusionBleue	
CouleurDistillat	$\langle Farbe \rangle$	yellow	
phmetre	$\langle false true \rangle$	false	display pH-meter
agitateurMagnetique	$\langle false true \rangle$	true	
aspectLiquide1	$\langle Stil \rangle$	cyan	defined as part of \newsstyle...
aspectLiquide2	$\langle Stil \rangle$	yellow	dito
aspectLiquide3	$\langle Stil \rangle$	magenta	dito
niveauLiquide1	$\langle 0 \dots 100 \rangle$	50	
niveauliquide2	$\langle 0 \dots 100 \rangle$	0	< niveauLiquide1
niveauliquide3	$\langle 0 \dots 100 \rangle$	0	< niveauLiquide2

1.1 glassType

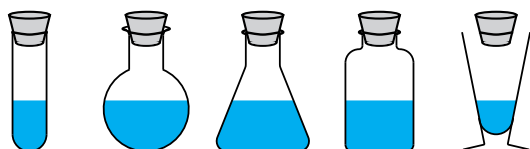
glassType describes the type of glass container. A normal test tube is used by default.



```
\psset{unit=0.5cm}
\pstTubeEssais
\pstTubeEssais[glasType=ballon]
\pstTubeEssais[glasType=erlen]
\pstTubeEssais[glasType=becher]
\pstTubeEssais[glasType=flacon]
\pstTubeEssais[glasType=fiolleJauge]
\pstTubeEssais[glasType=verre]
```

1.2 bouchon

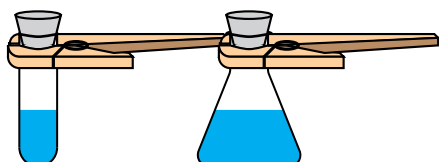
The option `bouchon` seals the respective glass container with a plug.



```
\psset{unit=0.45cm}
\psset{bouchon=true}
\pstTubeEssais[glasType=tube]
\pstTubeEssais[glasType=ballon]
\pstTubeEssais[glasType=erlen]
\pstTubeEssais[glasType=flacon]
\pstTubeEssais[glasType=verre]
```

1.3 pince

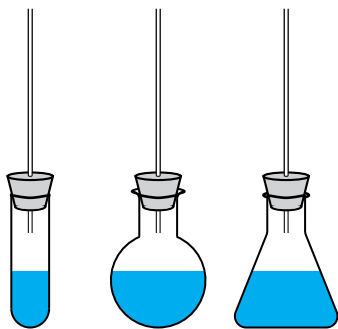
The option `pince` attaches a wooden test tub clamp to the glass container.



```
\psset{unit=0.5cm}
\psset{bouchon=true,pince=true}
\pstTubeEssais[glasType=tube]\hspace{1cm}
\pstTubeEssais[glasType=erlen]
```

1.4 tubeDroit

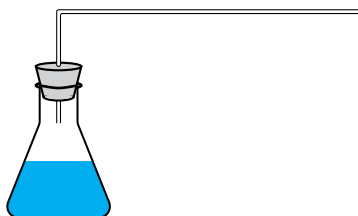
The option `tubeDroit` inserts a narrow glass tube into the glass container. Since this combination is only useful in combination with the option `bouchon=true` it is set to this value by default internally. It is to be noted that there is no vertical spacing of the narrow glass tube inserted by default, so the user has to take care of this manually, f. ex. using `\rule{0pt}{4cm}`.



```
\psset{unit=0.5cm}
\psset{tubeDroit=true}
\rule{0pt}{4cm}%
\pstTubeEssais
\pstTubeEssais[glasType=ballon]
\pstTubeEssais[glasType=erlen]
```

1.5 tubeCoude

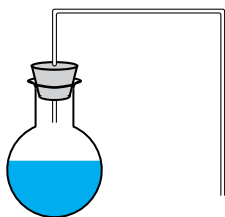
The option `tubeCoude` is basically identical to the previous one, except for the fact that a right-angled glass tube is drawn. Therefore the extra space needed in the vertical direction is less.



```
\psset{unit=0.5cm}
\psset{tubeCoude=true}
\rule{0pt}{2.5cm}%
\pstTubeEssais[glasType=erlen]
```

1.6 tubeCoudeU

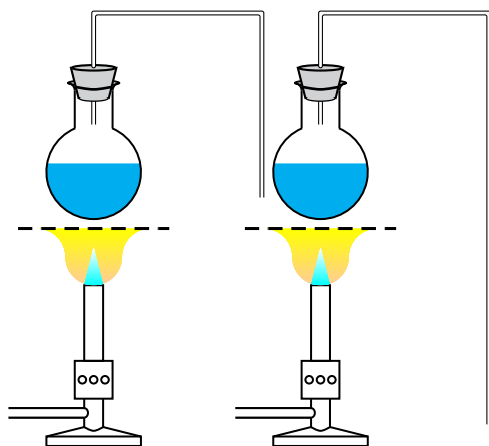
The option `tubeCoudeU` is basically identical to the previous one, except for the fact that a U-shaped glass tube is drawn. Therefore there is less space needed in the vertical direction.



```
\psset{unit=0.5cm}
\psset{tubeCoudeU=true}
\rule{0pt}{2.5cm}%
\pstTubeEssais[glasType=ballon]
```

1.7 tubeCoudeUB

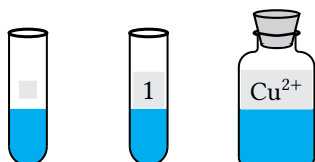
The option `tubeCoudeUB` is an extension of the U-shaped glass tube which is only useful if extending the tube to the bottom makes sense, as shown for instance in the macro `\pstChauffageBallon`.



```
\psset{unit=0.5cm,glassType=ballon}
\pstChauffageBallon[tubeCoudeU] \pstChauffageBallon[tubeCoudeUB]
```

1.8 etiquette and Numero

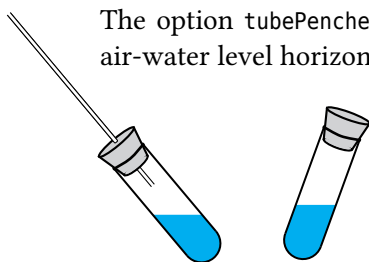
The option `etiquette` is a switch displaying labels defined using the option `Numero`.



```
\psset{unit=0.5cm}
\pstTubeEssais[etiquette]
\pstTubeEssais[etiquette,Numero=1]
\pstTubeEssais[glassType=flacon,bouchon,%
etiquette,Numero={\small Cu^{2+}}]
```

1.9 tubePenche

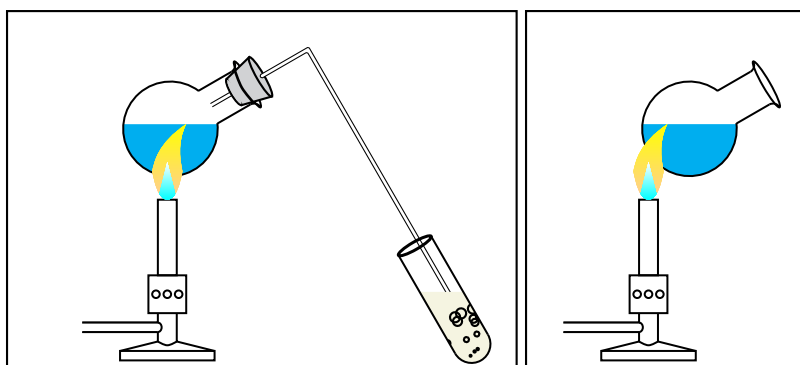
The option `tubePenche` allows tilting the chemical devices to almost any desired angle while keeping the the air-water level horizontal. The angles must be within the interval of $-65 \dots +65$.



```
\psset{unit=0.5cm}
\pstTubeEssais[tubeDroit=true,tubePenche=40]
\pstTubeEssais[tubePenche=-20,bouchon]
```

1.10 tubeSeul

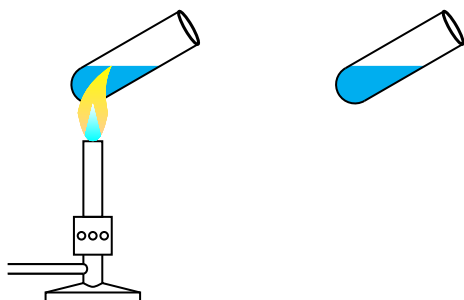
`tubeSeul` influences the size of the chosen box. This can be advantageous as the following example using `\psframebox` shows: If you do not wish to add a further container to the box on the right hand side the box would still have the same size as the one on the left. The option `tubeSeul=true` prevents this from happening. This option only has effects in combination with the macro `\pstChauffageTube` and glass containers of the type `ballon` and `tube`.



```
\psset{unit=0.5cm, glassType=ballon, becBunsen}
\psframebox{\pstChauffageTube[becBunsen, barbotage]}
\psframebox{\pstChauffageTube[tubeSeul=true]}
```

1.11 becBunsen

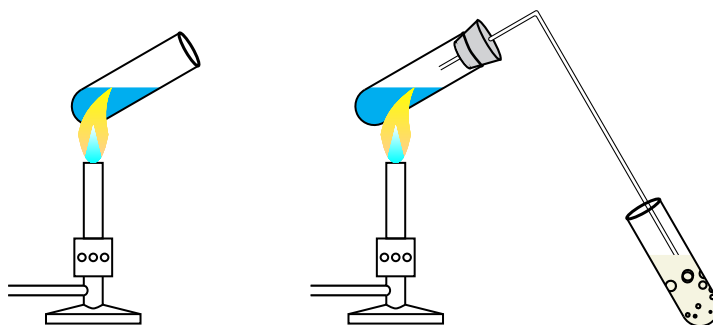
The option `becbunsen` toggles the drawing of a Bunsen burner. `becbunsen` is set to `true` by default for the macro `\pstChauffageTube` and to `false` for the macro `\pstChauffageBallon`.



```
\psset{unit=0.5cm, tubeSeul=true}
\pstChauffageTube
\pstChauffageTube[becBunsen=false]
```

1.12 barbotage

The option `barbotage` creates an additional test tube which is connected via a narrow glass tube to the original glass container. To supply the necessary space the option `tubeSeul` should not be activated (see section 1.10 on the preceding page)



```
\psset{unit=0.5cm}
\pstChauffageTube[tubeSeul=true]
\pstChauffageTube[barbotage]
```


1.13 substance

The type of substance within the glass container can be selected by the option `substance`. The default value is a blue fluid (`\pstBullesChampagne`). The available macros are summarised in table 2. It should be pointed out that `\pstFilaments` and `\pstBULLES` are required parameters.

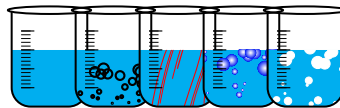
Table 2: Summary of macros for the option `substance`

<i>macro</i>	<i>default</i>	<i>comment</i>
<code>\pstBullesChampagne[value]</code>	25	standard
<code>\pstFilaments[value]{color}</code>	5	
<code>\pstBilles[value]</code>	50	two dimensional
<code>\pstBULLES[value]{color}</code>	20	three dimensional

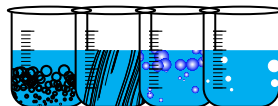
The optional value describes the number of passes for the internal `\multido`-loop. It is basically unlimited although values larger than 80 can lead to problems with \TeX 's defined memory. The later can be modified in the \TeX configuration file. The location of this file can be acquired using `kpsewhich texmf.cnf`.

```
voss@shania:~> kpsewhich texmf.cnf
/usr/local/texlive/2005/texmf/web2c/texmf.cnf
```

The first example shows the default values using two random colours. The second example demonstrates the use of optional arguments. Basically the macros `substance` and `solide` can be mixed randomly.



```
\psset{unit=0.5cm, glassType=becher}
\pstTubeEssais
\pstTubeEssais[substance=\pstBullesChampagne]
\pstTubeEssais[substance=\pstFilaments{red}]
\pstTubeEssais[substance=\pstBilles]
\pstTubeEssais[substance=\pstBULLES{white}]
```



```
\psset{unit=0.5cm, glassType=becher}
\pstTubeEssais[substance={\pstBullesChampagne[80]}]
\pstTubeEssais[substance={\pstFilaments[20]{black}}]
\pstTubeEssais[substance={\pstBilles[80]}]
\pstTubeEssais[substance={\pstBULLES[20]{white}}]
```

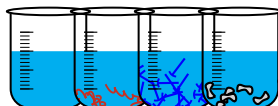
When using the optional parameters for internal looping it has to be noted that this parameter itself is used as part of another optional parameter and therefor has to be set in curly braces as the above example illustrates.

1.14 solide

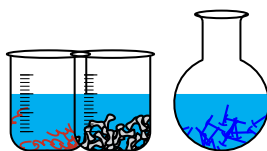
The option `solide` describes the type of substance within the glass containers. Table 3 summarises all available values. The same rules apply as described in section 1.13.

Table 3: Summary of macros for the option substance

<i>macro</i>	<i>default</i>
<code>\pstTournureCuivre[value]</code>	30
<code>\pstClouFer[value]</code>	60
<code>\pstGrenailleZinc[value]</code>	25



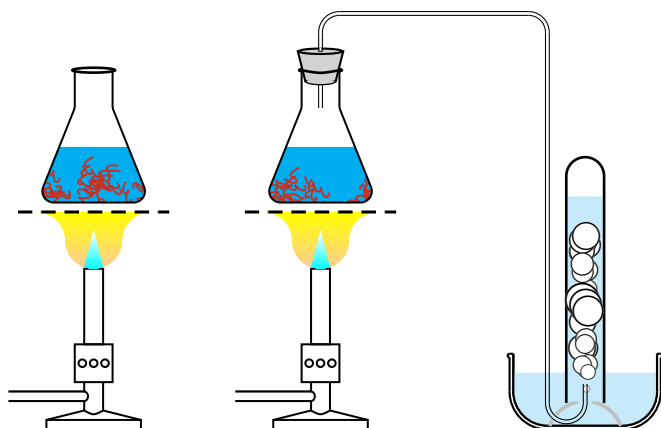
```
\psset{unit=0.5cm,glassType=becher}
\pstTubeEssais
\pstTubeEssais[solide=\pstTournureCuivre]
\pstTubeEssais[solide=\pstClouFer]
\pstTubeEssais[solide=\pstGrenailleZinc]
```



```
\psset{unit=0.5cm,glassType=becher}
\pstTubeEssais[solide={\pstTournureCuivre[50]}]
\pstTubeEssais[solide={\pstGrenailleZinc[80]}]
\pstTubeEssais[glassType=ballon,solide={\pstClouFer[50]}]
```

1.15 tubeRecourbe

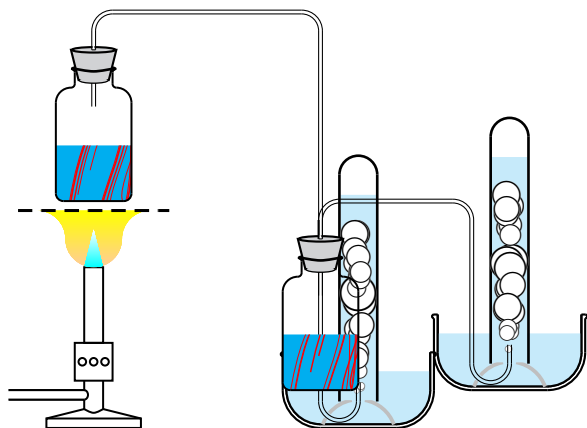
The option `tubeRecourbe` creates a device to collect exhausting gas from the glass container, including a Bunsen burner.



```
\psset{unit=0.5cm,glassType=erlen,recuperationGaz,substance=\pstTournureCuivre}
\pstChauffageBallon
\pstChauffageBallon[tubeRecourbe]
```

1.16 tubeRecourbeCourt

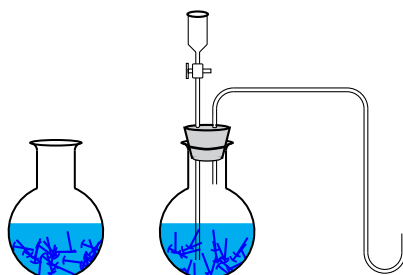
The option `tubeRecourbeCourt` creates a device to collect exhausting gas from the glass container, excluding a Bunsen burner.



```
\psset{unit=0.5cm,glassType=flacon,recuperationGaz,substance=\pstFilaments{red}}
\pstChauffageBallon[tubeRecourbe]
\pstChauffageBallon[tubeRecourbeCourt]
```

1.17 doubletube

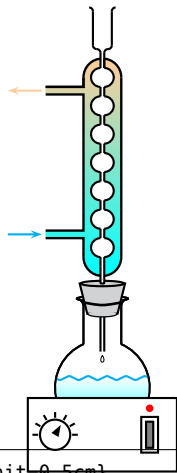
doubletube enables arranging two narrow glass tubes, one of which has a stopcock.



```
\rule{0pt}{4cm}
\psset{unit=0.5cm,glassType=ballon,%
substance=\pstClouFer}
\pstBallon
\pstBallon[doubletube]
```

1.18 refrigerantBouille

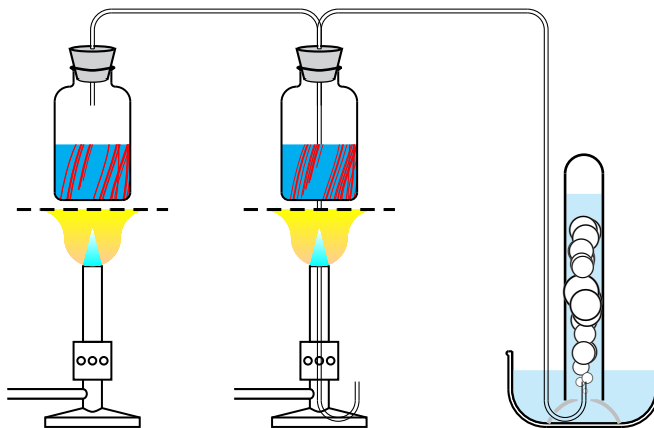
refrigerantBouille is one of the options for outputting a more complex setup. When adding further devices it should be noted that the geometrical origin is located in the centre of the setup.



```
\psset{unit=0.5cm}
\pstBallon[refrigerantBouilles,glassType=ballon,%
substance=\pstClouFer]
```

1.19 recuperationGaz

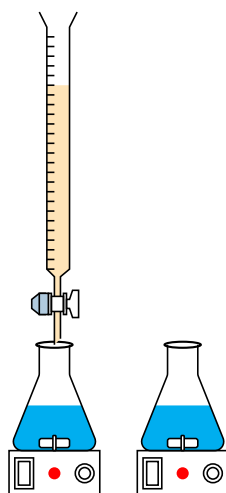
recuperationGaz describes the device collecting expanded gases.



```
\psset{unit=0.5cm,glassType=flacon,tubeRecourbe,substance={\pstFilaments[10]{red}}}
\pstChauffageBallon
\pstChauffageBallon[recuperationGaz]
```

1.20 burette

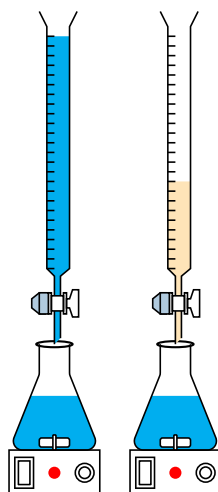
The macro `\pstDosage` displays a buret by default. This option suppresses its display.



```
\psset{unit=0.4cm}
\pstDosage[glassType=erlen]
\pstDosage[glassType=erlen,burette=false]
```

1.21 niveauReactifBurette and couleurReactifBurette

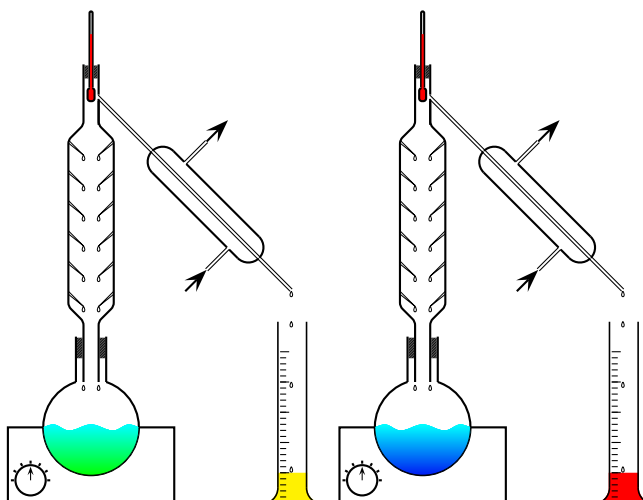
niveauReactifBurette and couleurReactifBurette control amount and color of the fluid in the buret.



```
\psset{unit=0.4cm,glassType=erlen,niveauLiquide1=60}
\pstDosage[niveauReactifBurette=25,couleurReactifBurette=cyan]
\pstDosage[niveauReactifBurette=10]
```

1.22 AspectMelange and CouleurDistillat

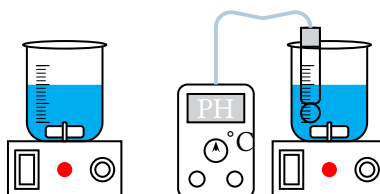
AspectMelange defines the color of a chemical substance and must comply to a predefined style to ensure the creation of a color gradient. CouleurDistillat defines the color of the distillate without this restriction.



```
\psset{unit=0.4cm}
\pstDistillation(-3,-10)(7,6)\quad
\pstDistillation[AspectMelange=Diffusion,CouleurDistillat=red](-3,-10)(7,6)
```

1.23 phmetre

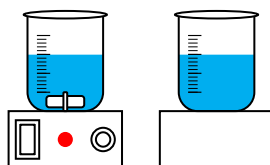
phmetre displays a pH-meter. Note that this option is only available with the macro `\pstDosage`.



```
\psset{unit=0.5cm,glassType=becher,burette=false}
\pstDosage
\pstDosage[phmetre]
```

1.24 agitateurMagnetique

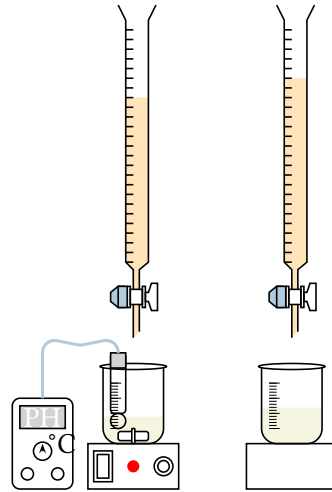
agitateurMagnetique is activated by default and displays a heat block. When deactivated this option only the symbols are suppressed, the rectangle is still displayed.



```
\psset{unit=0.5cm,burette=false,glassType=becher}
\pstDosage
\pstDosage[agitateurMagnetique=false]
```

1.25 niveauLiquide1, niveauLiquide2, niveauLiquide3 and aspectLiquide1, aspectLiquide2, aspectLiquide3

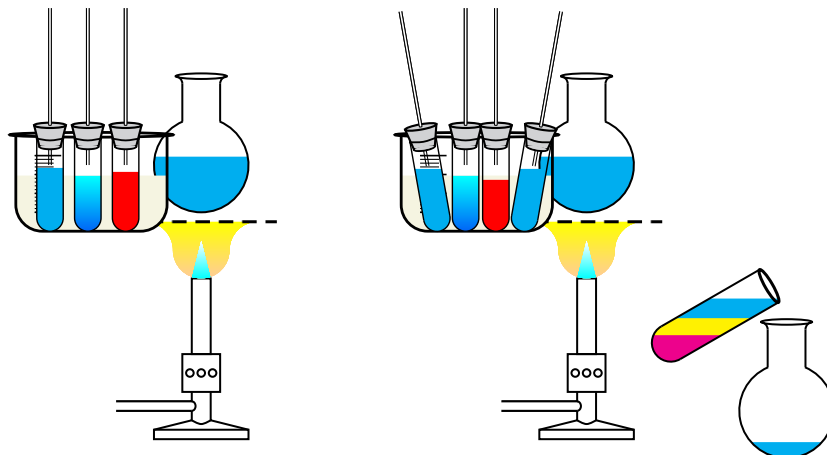
These options define fluid level and style of the liquids 1, 2 and 3 respectively. The style can either be one of the default values or a newly defined one as described in section 1.13. Depending on the macro used not all possible options can be used.



```

\psset{unit=0.4cm,glassType=becher}
\rule{0pt}{6cm}
\pstDosage[niveauReactifBurette=18,niveauLiquide1=30,aspectLiquide1=Champagne,%
  glassType=becher,phmetre=true]
\pstDosage[niveauReactifBurette=20,niveauLiquide1=40,aspectLiquide1=Champagne,%
  glassType=becher,phmetre=false,agitateurMagnetique=false]

```



```

\begin{pspicture}(0,0)(5,6)
  \rput(4,3){\pstChauffageBallon[becBunsen=true,unit=0.5]}
  \rput(2.5,4){\pstBallon[glassType=becher,xunit=1,yunit=0.5,aspectLiquide1=Champagne,runit=0.7]}
  \psset{glassType=tube}
  \rput(2.5,3.7){\pstTubeEssais[tubeDroit=true,unit=0.35,niveauLiquide1=70,aspectLiquide1=Diffusion]}
  \rput(3,3.7){\pstTubeEssais[tubeDroit=true,unit=0.35,niveauLiquide1=75,aspectLiquide1=Sang]}
  \rput(2,3.7){\pstTubeEssais[tubeDroit=true,unit=0.35,niveauLiquide1=80]}
\end{pspicture}
\begin{pspicture}(0,0)(5,6)
  \rput(4,3){\pstChauffageBallon[becBunsen=true,unit=0.5]}
  \rput(2.5,4){\pstBallon[glassType=becher,xunit=1,yunit=0.5,aspectLiquide1=Champagne,runit=0.7]}
  \rput(2.4,3.7){\pstTubeEssais[tubeDroit=true,unit=0.35,niveauLiquide1=70,aspectLiquide1=Diffusion]}
  \rput(2.8,3.7){\pstTubeEssais[tubeDroit=true,unit=0.35,niveauLiquide1=65,aspectLiquide1=Sang]}
  \rput(1.7,3.7){\pstTubeEssais[tubeDroit=true,unit=0.35,niveauLiquide1=80,tubePenche=10]}
  \rput(3.5,3.7){\pstTubeEssais[tubeDroit=true,unit=0.35,niveauLiquide1=80,tubePenche=-10]}
\end{pspicture}
\begin{pspicture}(1,3)(5,6)
  \rput(2.5,4){\pstBallon[glassType=ballon,unit=0.5,niveauLiquide1=15]}
  \rput(1.3,5.4){\pstTubeEssais[unit=0.5,niveauLiquide1=95,

```

```
niveauLiquide2=60,niveauLiquide3=30,tubePenche=-60}}
\end{pspicture}
```

2 Predefined colours and styles

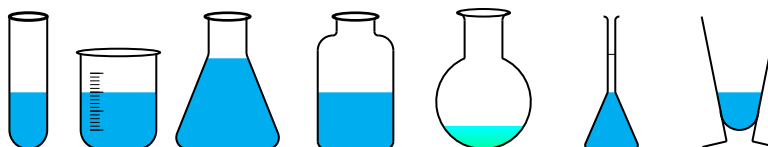
The following summary shows all predefined colours and styles provided by the package `pst-labo`, all of which all can be adapted by the user.

```
\definecolor{Beige} {rgb}{0.96,0.96,0.86}
\definecolor{GrisClair} {rgb}{0.8,0.8,0.8}
\definecolor{GrisTresClair} {rgb}{0.9,0.9,0.9}
\definecolor{OrangeTresPale} {cmyk}{0,0.1,0.3,0}
\definecolor{OrangePale} {cmyk}{0,0.2,0.4,0}
\definecolor{BleuClair} {cmyk}{0.2,0,0,0}
\definecolor{LightBlue} {rgb}{.68,.85,.9}
\definecolor{Copper} {cmyk}{0,0.9,0.9,0.2}
\definecolor{Marron} {cmyk}{0,0.3,0.5,.3}
%
\newpsstyle{aspectLiquide1} {linestyle=none, fillstyle=solid, fillcolor=cyan}
\newpsstyle{aspectLiquide2} {linestyle=none, fillstyle=solid, fillcolor=yellow}
\newpsstyle{aspectLiquide3} {linestyle=none, fillstyle=solid, fillcolor=magenta}
\newpsstyle{Champagne} {linestyle=none, fillstyle=solid, fillcolor=Beige}
\newpsstyle{BilleThreeD} {linestyle=none, fillstyle=gradient, gradmidpoint=0, gradend=white, GradientCircle=true}
\newpsstyle{Sang} {linestyle=none, fillstyle=solid, fillcolor=red}
\newpsstyle{Cobalt} {linewidth=0.2, fillstyle=solid, fillcolor=blue}
\newpsstyle{Huile} {linestyle=none, fillstyle=solid, fillcolor=yellow}
\newpsstyle{Vinaigre} {linestyle=none, fillstyle=solid, fillcolor=magenta}
\newpsstyle{Diffusion} {linestyle=none, fillstyle=gradient, gradmidpoint=0}
\newpsstyle{DiffusionMelange2}{fillstyle=gradient, gradbegin=white, gradend=red, gradmidpoint=0, linecolor=red}
\newpsstyle{flammeEtGrille} {linestyle=none, fillstyle=gradient, gradmidpoint=0, gradbegin=OrangePale, gradend=yellow}
\newpsstyle{rayuresJaunes} {fillstyle=hlines, linecolor=yellow, hatchcolor=yellow}
\newpsstyle{DiffusionBleue} {fillstyle=gradient, gradmidpoint=0, linestyle=none, gradbegin=green, gradend=cyan}
```

3 Macros

3.1 `\pstTubeEssais`

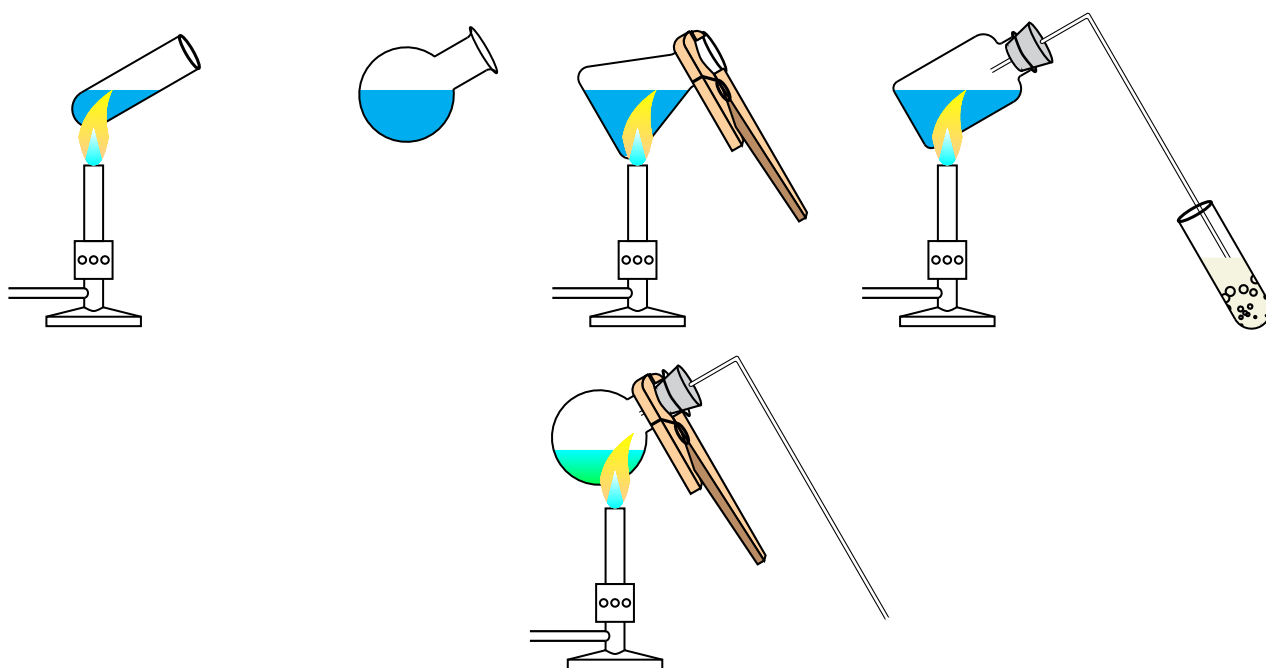
This macro displays the simplest type of glass container and has already been used numerous times in previous examples. The default value when used without further parameters is a normal test tube (`glassType=tube`).



```
\psset{unit=0.5}
\pstTubeEssais
\pstTubeEssais[glasType=becher]
\pstTubeEssais[glasType=erlen,niveauLiquide1=80]
\pstTubeEssais[glasType=flacon]
\pstTubeEssais[glasType=ballon,niveauLiquide1=20,aspectLiquide1=DiffusionBleue]
\pstTubeEssais[glasType=fiolleJauge]
\pstTubeEssais[glasType=verre]
```


3.2 `\pstChauffageTube`

`\pstChauffageTube` enhances the previous macro to include either a heat block, a Bunsen burner or a second narrow glass tube respectively.



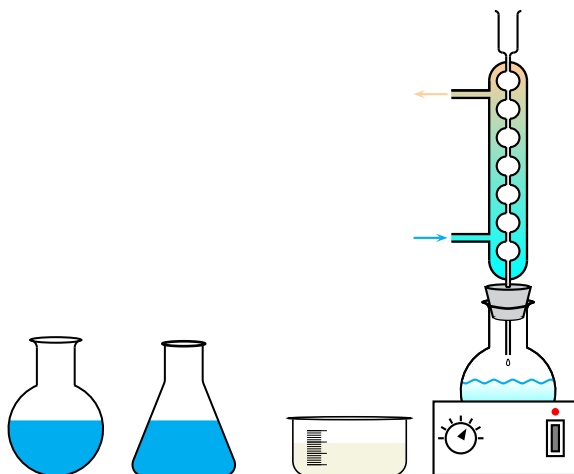
```

\psset{unit=0.5}
\pstChauffageTube[tubeSeul]
\pstChauffageTube[glassType=ballon,becBunsen=false,tubeSeul]
\pstChauffageTube[glassType=erlen,becBunsen,pince,tubeSeul]
\pstChauffageTube[becBunsen,barbotage,glassType=flacon]
\pstChauffageTube[becBunsen,tubeCoude,glassType=ballon,niveauLiquide1=20,%
aspectLiquide1=DiffusionBleue,tubeSeul,pince]

```

3.3 `\pstBallon`

`\pstBallon` is basically identical to `\pstTubeEssais` with more possible options.



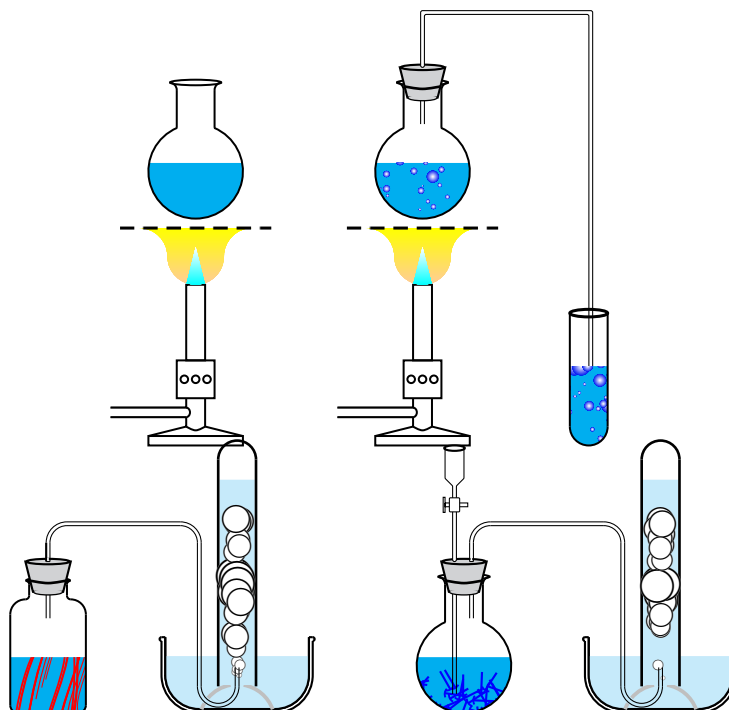
```

\psset{unit=0.5cm}
\pstBallon\hspace{-0.5cm}
\pstBallon[glassType=erlen]\hspace{-0.5cm}
\pstBallon[glassType=becher,xunit=0.75cm,yunit=0.25cm,aspectLiquide1=Champagne,runit=0.4cm]\hspace{-0.5cm}
\raisebox{1cm}{\pstBallon[refrigerantBouilles=true]}

```

3.4 \pstChauffageBallon

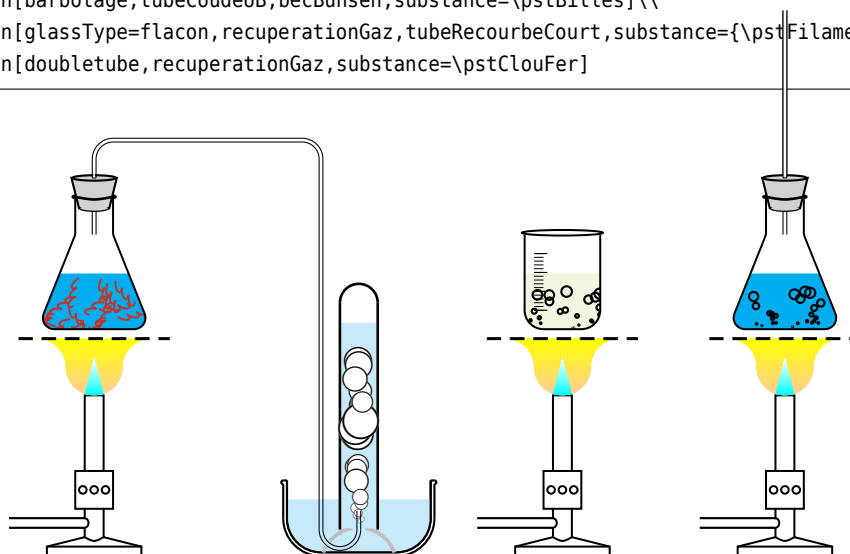
\pstChauffageBallon enhances the previous macro by displaying a Bunsen burner by default.



```

\psset{unit=0.5cm}
\pstChauffageBallon
\pstChauffageBallon[barbotage,tubeCoudeUB, becBunsen, substance=\pstBilles]\\
\pstChauffageBallon[glassType=flacon, recuperationGaz, tubeRecourbeCourt, substance={\pstFilaments[10]{red}}]
\pstChauffageBallon[doubletube, recuperationGaz, substance=\pstClouFer]

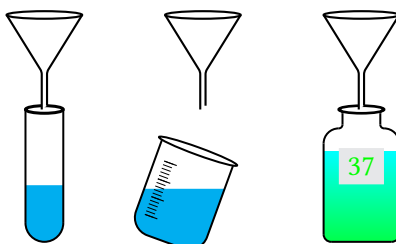
```



```
\psset{unit=0.5cm}
\pstChauffageBallon[glasType=erlen,tubeRecourbe,recuperationGaz,substance=\pstTournureCuivre]
\pstChauffageBallon[glasType=becher,aspectLiquide1=Champagne,substance=\pstBullesChampagne]
\pstChauffageBallon[glasType=erlen,substance=\pstBullesChampagne,tubeDroit]
```

3.5 \pstEntonnoir

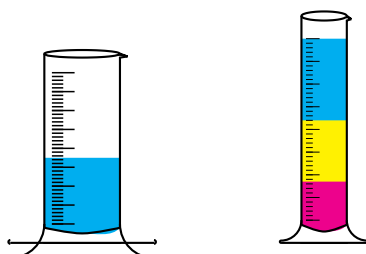
\pstEntonnoir displays a funnel. Called without any parameters it is combined with a test tube. It can be combined with any kind of setup.



```
\psset{unit=0.5cm}
\pstEntonnoir
\pstEntonnoir[glasType=becher,tubePenche=-20]
\pstEntonnoir[glasType=flacon,etiquette=true,Numero={\green 37},%
aspectLiquide1=DiffusionBleue,niveauLiquide1=80]
```

3.6 \pstEprouvette

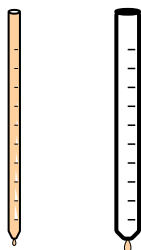
\pstEprouvette displays a measuring cylinder. Its size can be changed using the PSTricks scaling factor.



```
\pstEprouvette[yunit=0.5cm]
\pstEprouvette[unit=0.6cm,niveauLiquide1=100,niveauLiquide2=60,niveauLiquide3=30]
```

3.7 \pstpipette

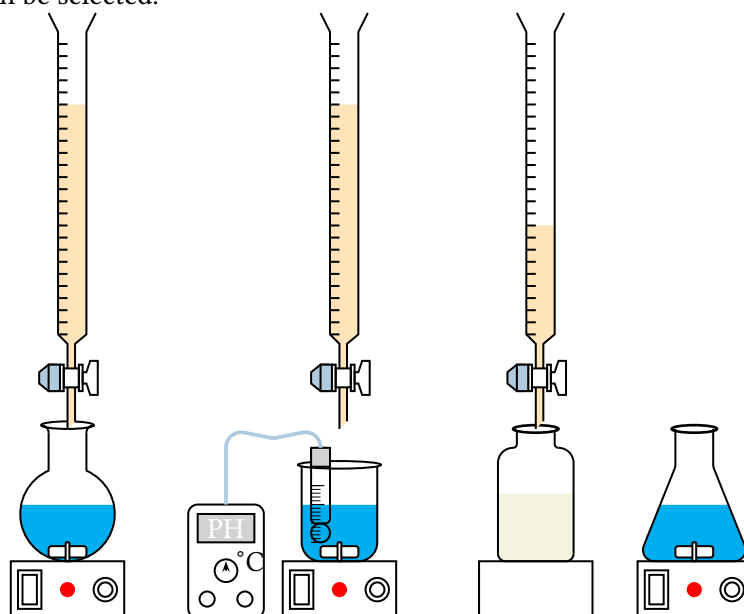
\pstpipette displays a pipette. Its scaling range can be altered by changing PSTricks scaling factors.



```
\pstpipette[unit=0.5cm,tubePenche=40]
\pstpipette[yunit=0.5cm]
```

3.8 \pstDosage

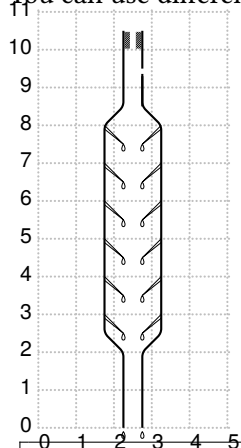
\pstDosage is normally used in combination with other devices. The buret has a maximal capacity of 25 mL. The current height and substrate can be changed by their options. An optional pH-meter (only with glass type becher) or heat block can be selected.



```
\psset{unit=0.5cm}
\pstDosage
\pstDosage[glassType=becher,phmetre=true]
\pstDosage[niveauReactifBurette=10,niveauLiquide1=60,aspectLiquide1=Champagne,%
  glassType=flacon,agitateurMagnetique=false]
\pstDosage[glassType=erlen,burette=false]}
```

3.9 \pstDistillation

You can use different macros for the distillation object:



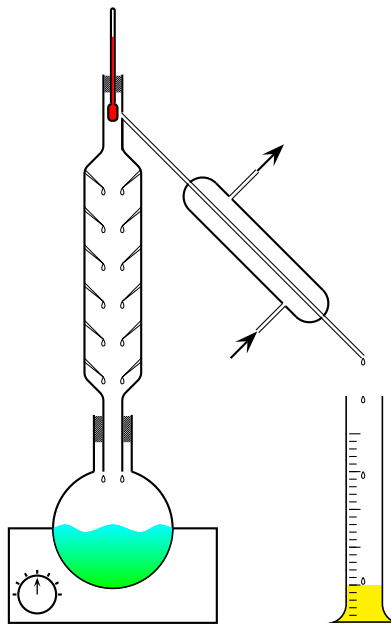
```
\psset{unit=0.5}
\begin{pspicture}[showgrid](5,11)
  \rput(2.5,0){\pscolon}
\end{pspicture}
```

The ozher macro needs coordinates which are passed on to \pstDistillation as pspicture environment.

```
\pstDistillation
```

```
\pstDistillation(xll, yll)(xur, yur)
```

In case these coordinates are not supplied a rectangle of $(-4, -10)(8, 7)$ is used, assuming that further objects will be included using `\rput`,



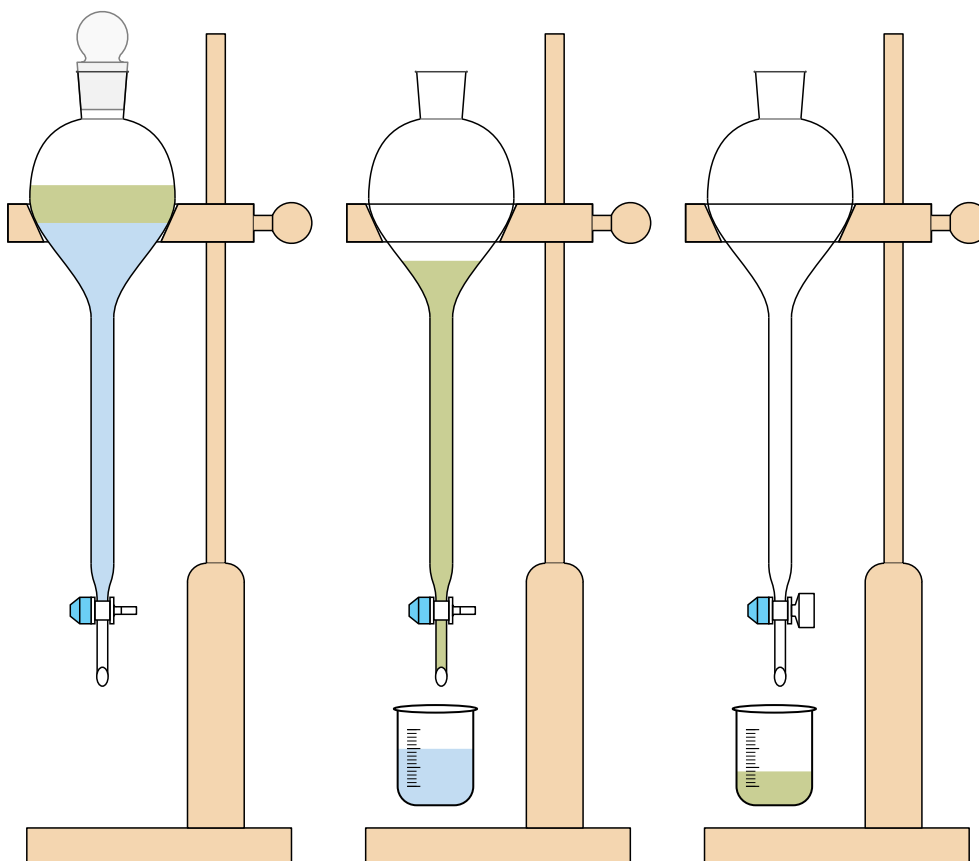
```
\psset{unit=0.5cm}  
\pstDistillation(-3,-10)(7,6)
```

3.10 `\pstSeparateFunnel`

```

\psset{unit=0.5}
\begin{pspicture}(-2,-6)(6,16)\psgrid%
\pstSupport
\pstSeparateFunnel[OpenTap=false,bouchon]
\end{pspicture}
\quad
\begin{pspicture}(-2,-6)(6,16)\psgrid%
\pstSupport
\pstSeparateFunnel[OpenTap=false,bouchon=false,niveauLiquide1=-1,niveauLiquide2=10]
\rput(0,-3){\pstTubeEssais[glasType=becher,aspectLiquide1=AqueoPhase]}
\end{pspicture}
\quad
\begin{pspicture}(-2,-6)(6,16)\psgrid%
\pstSeparateFunnel[OpenTap,bouchon=false,niveauLiquide1=1,niveauLiquide2=1]
\rput(0,-3){\pstTubeEssais[glasType=becher,aspectLiquide1=OrganicPhase,niveauLiquide1=30]}
\pstSupport
\end{pspicture}

```



4 Basic objects

The file `pst-labo0bj.tex` includes all possible basic objects. For lack of space they are not displayed here explicitly.

5 Examples

Creating complex examples is eased significantly by using a coordinate grid underlying the setup (`\psgrid`) or the optional argument `showgrid` for the `pspicture` environment.

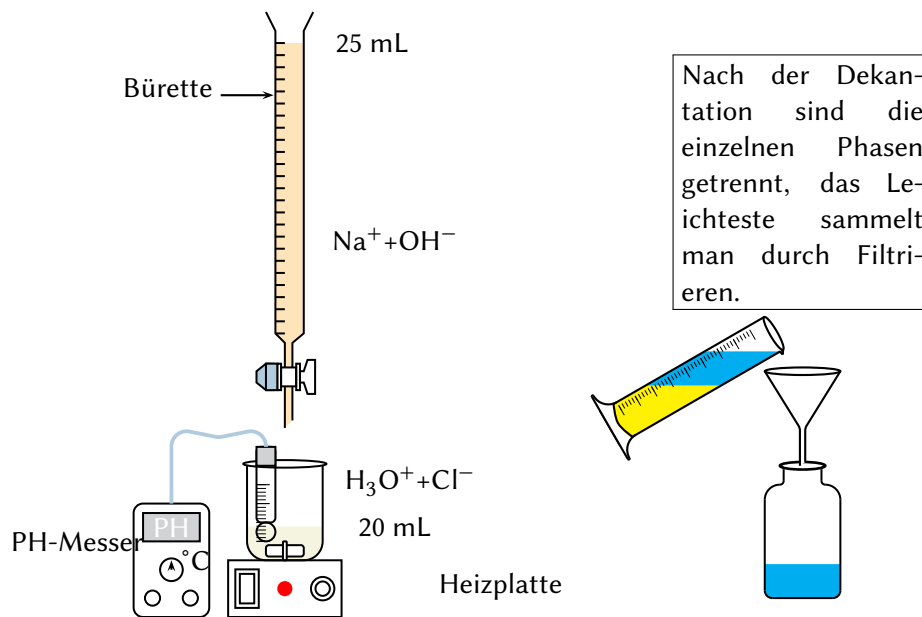


Figure 1: Example usage of `\pstDosage`

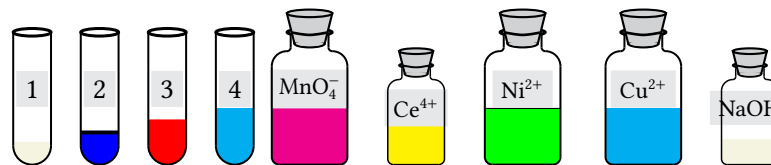


Figure 2: Example usage of `\pstTubeEssais`

References

- [1] Denis Girou. “Présentation de PSTricks”. In: *Cahier GUTenberg* 16 (Apr. 1994), pp. 21–70.
- [2] Frank Mittelbach et al. *The L^AT_EX Graphics Companion*. 2nd ed. Reprint. Heidelberg and Berlin: Lehmanns Media, 2022.
- [3] Sebastian Rahtz. “An introduction to PSTricks, part I”. In: *Baskerville* 6.1 (Feb. 1996), pp. 22–34. URL: [CTAN: %20/usergrps/uktug/baskervi/](https://www.ctan.org/usergrps/uktug/baskervi/).
- [4] Sebastian Rahtz. “An introduction to PSTricks, part II”. In: *Baskerville* 6.2 (Apr. 1996), pp. 23–33. URL: [CTAN: %20/usergrps/uktug/baskervi/](https://www.ctan.org/usergrps/uktug/baskervi/).
- [5] Sebastian Rahtz. *Most of the PSTricks examples of The L^AT_EX Graphics Companion*. URL: [CTAN:~graphics/pstricks/doc/lgc/](https://www.ctan.org/graphics/pstricks/doc/lgc/).
- [6] Herbert Voß. *PSTricks Grafik für T_EX und L^AT_EX*. 7th ed. Heidelberg/Berlin: DANTE – Lehmanns, 2017.
- [7] Herbert Voß. *PSTricks Graphics for L^AT_EX*. 1st ed. Cambridge: UIT, 2011.
- [8] Timothy Van Zandt. *PSTricks - PostScript macros for Generic T_EX*. 1993. URL: <http://www.tug.org/application/PSTricks>.
- [9] Timothy Van Zandt. *PSTricks - PostScript macros for Generic T_EX, Documented Code*. 1997. URL: [CTAN:/graphics/pstricks/obsolete/doc/src/pst-code.tex](https://www.ctan.org/graphics/pstricks/obsolete/doc/src/pst-code.tex).
- [10] Timothy Van Zandt and Denis Girou. “Inside PSTricks”. In: *TUGboat* 15 (Sept. 1994), pp. 239–246.

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