

## MODIFIED Cone PotStand Tool for use in United States

The following instructions have been **Heavily MODIFIED** for use in the United States. The original instructions are copyrighted by Kevin Beeden aka [Captain Paranoia](#) in the UK and relate to his PostScript tool.

Although this tool can be used for any number of conical windscreen/potstand projects, it is important to note that there are several conical shaped potstand designs which are under US patent protection in the US. Most notably, US Patent [7,967,003](#) describes a pot/stove/windscreen combination where a conical windscreen supports the pot solely by its rim. If you are in the United States, make or use of any item (other than experimental use) under active US patent constitutes as a direct patent infringement. If you would like a potstand described in the claims of US Patent [7,967,003](#), you are in luck. You will most likely find a suitable one from the fine folks at [Trail Designs](#) and if not, they may be willing to custom make you one.

That said, there are plenty of great uses for Captain Paranoia's tool in the US which do not infringe on any active patents. The following manuscript is provided under the assumption that it will be used in good faith and appropriately. Please review [zenstoves.net/PotStands.htm](http://zenstoves.net/PotStands.htm) for acceptable uses of [Captain Paranoia's](#) tool in the United States, U.S. territories, and U.S. possessions.

If you have any questions or comments about this tool, please contact [Captain Paranoia](#) at [www.outdoorsmagic.com](http://www.outdoorsmagic.com).

Please contact Zen Seeker if you have questions about the zenstoves site.

Enjoy and Happy Stoving,

Zen Seeker

## ***The Conic Windscreen Template***

Captain Paranoia in the UK has developed a very sophisticated Post Script code which allows for creating a modifiable printable conical template. Printed paper templates can be used as is for sizing and experiments (true scale models) or to assist you in building conical pot stands and other projects.

Per Captain Paranoia, the script can be configured to create a simple one-piece Conic Pot Stand, a two-part "Flissure" Conic Pot Stand that can be stored in the pot it support and a "Strata" ring to support a second, smaller pot. The "Infernal" Conic Windscreen option creates a dual-wall wood burning stove.



The Conic Windscreen script has many parameters that can be set by the user, to tailor the design to their pot and stove (if used). It is not intended to be a design followed rigidly, guaranteeing a safe, working Conic Windscreen every time. **It's up to the user to choose the design settings to suit their own setup, and to ensure that the resulting Conic Windscreen is safe to use.**

### **Copyright 2008-2012**

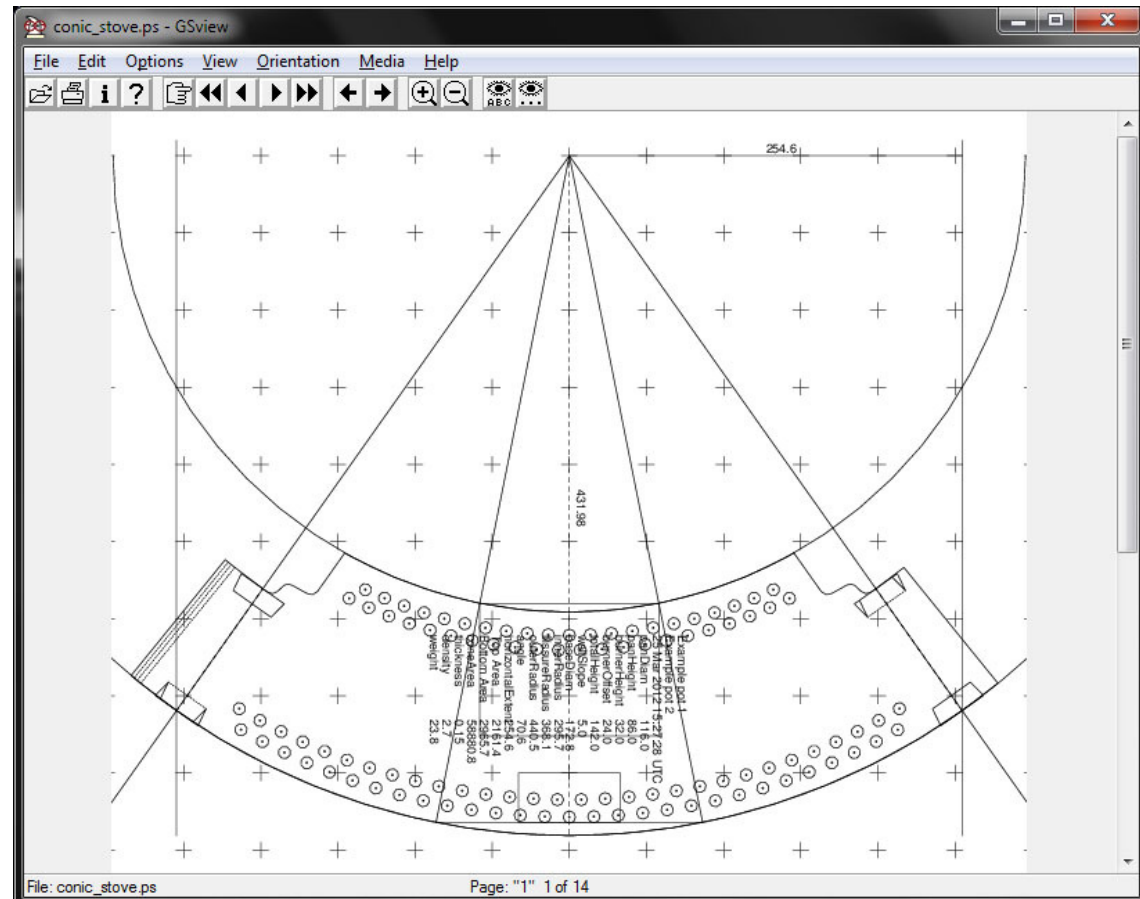
The script and these instructions are copyright property of Kevin Beeden, aka captain paranoia. The Strata ring design is the intellectual property of Kevin Beeden, aka captain paranoia, and is placed freely into the Public Domain.

**Note: Instructions have been heavily modified by Zen Seeker at [zenstoves.net](http://zenstoves.net) for use in the US. See UK version for Captain Paranoia's original text.**

## Installing a PostScript Viewer

The template is written in PostScript, so you'll need a graphics program that will accept and print PostScript (although many printers will accept and print raw PostScript: see the 'Printing' section below). Captain Paranoia suggests GhostScript and GSView:

[GhostScript & GSView](http://pages.cs.wisc.edu/~ghost/gsview/) are found at <http://pages.cs.wisc.edu/~ghost/gsview/>



GhostScript is a PostScript interpreter. Whilst it does have a GUI interface, it's not very friendly. GSView is a user application for viewing and printing PostScript files (not editing). It uses the facilities of GhostScript to do this.

The files you download are standard, self-installing WinZip files. All you need to do is double-click them, and they'll run a familiar installation process like any other application. Install GhostScript first, and put it where it suggests. Then install GSView, and put it where it requests.

Once you've installed them, you should be able to double-click on any .ps file, and it will open GSView for you, just like any other application.

Macintosh users should be able to use Preview, or might look at [Gutenprint](http://www.gutenberg.org/). Captain Paranoia doesn't have a Mac, so he can't comment on how well this might work. Alternatively, you might try an online PostScript viewer at <http://view.samurajdata.se>

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### PostScript Tool

A JavaScript tool has been added to the Zenstoves PotStand page to make it easier to set the parameters for Captain Paranoia's Conic Windscreen PostScript tool.

The screenshot shows a web browser window with the URL [zenstoves.net/PotStands.htm#ConeTemplates](http://zenstoves.net/PotStands.htm#ConeTemplates). The page title is "Captain Paranoia's Cone PotStand Tool". The interface is divided into several sections with various input fields and dropdown menus.

**Print Variables**

- ISO vs US paper:  (Note: North America uses their very own paper. ISO used by most others. Those in the US, Canada and Mexico should select "US")
- Large Paper:  (Select Yes if A4 letter or A3/tabloid used)

**Primary Pot Variables**

- Pot Covered by Cone:  mm (Measure from bottom of pot to where you would like cone to stop)
- Pot Circumference:  mm OR Pot Diameter:  mm
- Space between Pot and Top of Cone:  mm (Optional if you want an open top for venting and not for support)
- Width of Pot Handle at Top:  mm (Many handles are wider at the top)
- Width of Pot Handle at Middle:  mm
- Depth of Mid Handle:  mm (You get to define where mid handle is)
- Width of Pot Handle at Bottom:  mm
- Total Depth of Handle:  mm (This is where the bottom of your handle is. This can be used as a support point.)

**Secondary Pot Variables (if Strata support is used for suspending narrower pot)**

- Strata Feature Enabled:  (Number of Strata Rings: )
- Secondary Pot Height:  mm
- Secondary Pot Circumference:  mm
- Secondary Pot Handle Width Top:  mm
- Secondary Pot Handle Width Mid:  mm
- Secondary Pot Handle Width Bot:  mm
- Secondary Pot Handle Depth:  mm

**Stove Variables**

- Stove Height:  mm (This is how tall your stove or fuel tablet is)
- Space between Pot and Stove:  mm (This is the space above your stove and under your pot. Choose wisely for maximum efficiency.)

**Ventilation Hole Variables**

- Hole Type:  (Just in case you want triangular shaped holes.)
- Number Holes Top:  (Number of hole in the top half of cone)
- Number Holes Bottom:  (Number of hole in the bottom half of cone)
- Hole Size Top:  mm (Bigger holes allow for greater air flow)
- Hole Size Bottom:  mm
- Number of Rows Top:  (You get one, two or no rows)
- Number of Rows Bottom:  (You get one, two or no rows)

**Infernal Wood Stove Insert**

- Enable Infernal Feature:  (A shortened inverted cone designed to fit cradled in upright cone under top vent holes.)

**Fissure Variables (to split cone into top and bottom sections)**

- Enable Fissure Feature:  (Allows you to make a split cone for packing. top section locks into bottom section)

Simply adjust each of the settings on the page and create your PostScript text. Copy and paste this text in a text editor (such as NotePad) and Save this file as "conic\_stove.ps". You should be able to open your new PS file with a PostScript viewer.

If you don't like something, go back to the JavaScript tool and make adjustments as needed. If you are still having problems, read further as you may need to manually adjust some of the Advanced User Settings.

If you are happy with the way things look on your PostScript viewer, you can print out a paper template and play with it. You may find that you will need to go back and make some minor adjustments and reprint. You may also get away with your own adjustments with a pen a scissors. You may also luck out and find that you got everything just right the first time around.

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### Understanding PostScript

Captain Paranoia has created a very sophisticated code written in Post Script Language. The very beginning of this includes many parameters which can and need to be adjusted by stovers so that the code creates a template that works for you.

You will need to open the PS file with Notepad or similar rudimentary text editor. Once you do this, you will see that the PS file contains pages and pages of code.

Adjustable parameter variables start after this Message:

```
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% vary values here to suit your pan and burner setup
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

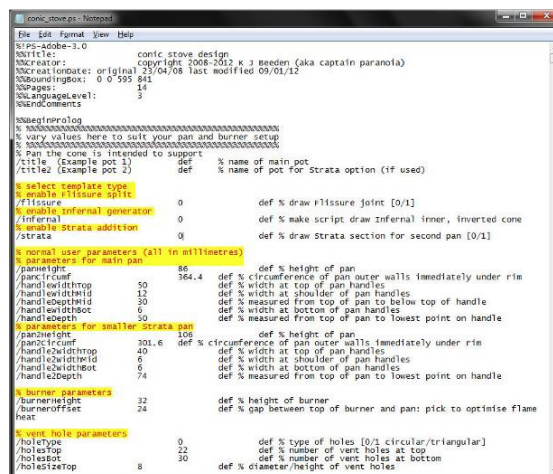
This is followed by the Expert parameter section which starts after this:

```
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% expert parameters
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

Nothing in the code should be changed after this (unless you like pain):

```
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% end of user parameters
% no user serviceable parts beyond this point
% %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
```

**SubSection Titles** start with “%” and examples are show here:



```
File Edit Format View Help
C:\Program Files\Notepad\notepad.exe
Title: cone stove design
Author: copyright 2008-2012 K J Reeden (aka captain paranoia)
CreationDate: original 25/04/08 last modified 09/01/12
BoundingBox: 0 0 595 841
Pages: 14
LanguageLevel: 3
%%<Comments>
%%=====
%% select template type
%% enable flissure split
%% enable infernal generator
%% enable strata addition
%% strata
%% normal user parameters (all in millimetres)
%% parameters for main pan
/panheight 86 def % height of pan
/pancircumf 364.4 def % circumference of pan outer walls immediately under rim
/panwidthtop 50 def % width at top of pan handles
/panwidthmid 12 def % width at shoulder of pan handles
/panwidthbot 30 def % measured from top of pan to below top of handle
/panwidthdepth 6 def % width at bottom of pan handles
/panwidth 50 def % measured from top of pan to lowest point on handle
%% parameters for smaller strata pan
/panheight 109 def % height of pan
/pancircumf 301.6 def % circumference of pan outer walls immediately under rim
/panwidthtop 40 def % width at top of pan handles
/panwidthmid 6 def % width at shoulder of pan handles
/panwidthbot 6 def % width at bottom of pan handles
/panwidthdepth 74 def % measured from top of pan to lowest point on handle
%% burner parameters
/burnerheight 22 def % height of burner
/burneroffset 24 def % gap between top of burner and pan: pick to optimise flame
heat
%% vent hole parameters
/holetype 0 def % type of holes [0/1 circular/triangular]
/holesatop 22 def % number of vent holes at top
/holesatbot 30 def % number of vent holes at bottom
/holesizeatop 8 def % diameter/height of vent holes
```

Example:

```
% select template type
% enable Flissure split
```

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**Parameter Titles** start with “/”:

```
conic.stove.ps - Notepad
File Edit Format View Help
%PSI-Adobe-3.0
%%Title: conic stove design
%%Creator: copyright 2008-2012 K J Beeden (aka captain paranofa)
%%CreationDate: original 25/04/08 last modified 09/01/12
%%BoundingBox: 0 0 595 841
%%Pages: 14
%%LanguageLevel: 3
%%EndComments

%%BeginProlog
% select template type
% enable r1 fissure split
% enable r1 fissure generator
% enable r1 fissure
% enable strata addition
% enable strata
% normal user parameters (all in millimetres)
% parameters for main pan
/panHeight
/panCircumf
/handleWidthTop
/handleWidthMid
/handleWidthBot
/handleDepthMid
% parameters for smaller strata pan
/panHeight
/panCircumf
/handleWidthTop
/handleWidthMid
/handleWidthBot
/handleDepthMid
% burner parameters
/burnerHeight
/burnerOffset
heat
% vent hole parameters
/holetype
/holesTop
/holesBot
/holesSizeTop
```

Examples of Parameter Titles:

```
/panHeight
/panCircumf
/handleWidthTop
/handleWidthMid
/handleDepthMid

/handleWidthBot
/handleDepth
```

**Modifiable Parameter Variables** are numerical variables shown after Parameter Titles towards the middle of the page:

```
conic.stove.ps - Notepad
File Edit Format View Help
%PSI-Adobe-3.0
%%Title: conic stove design
%%Creator: copyright 2008-2012 K J Beeden (aka captain paranofa)
%%CreationDate: original 25/04/08 last modified 09/01/12
%%BoundingBox: 0 0 595 841
%%Pages: 14
%%LanguageLevel: 3
%%EndComments

%%BeginProlog
% select template type
% enable r1 fissure split
% enable r1 fissure generator
% enable r1 fissure
% enable strata addition
% enable strata
% normal user parameters (all in millimetres)
% parameters for main pan
/panHeight 86
/panCircumf 364.4
/handleWidthTop 50
/handleWidthMid 12
/handleWidthBot 30
/handleDepthMid 6
% parameters for smaller strata pan
/panHeight 108
/panCircumf 301.6
/handleWidthTop 40
/handleWidthMid 6
/handleWidthBot 6
/handleDepthMid 74
% burner parameters
/burnerHeight 32
/burnerOffset 24
heat
% vent hole parameters
/holetype 0
/holesTop 22
/holesBot 30
/holesSizeTop 8
```

These **Modifiable Parameter Variables** are the only items you should ever modify in this Post Script code.



## Printing the Template

North Americans use a different standard for printer paper than the rest of the world. If you are in the US, Canada, Mexico or other country which uses US standard paper, you will need to change the `/ISOpaper` parameter setting to '0', which should select US paper sizes. If you have an A3 or US Tabloid printer, set the `/largePaper` setting to 1.

Find the following numerical parameters and adjust as necessary.

```
/ISOpaper      1      def % use ISO paper [0/1] Select 0 in US
/largePaper    0      def % A4/letter or A3/tabloid select [0/1]
/fullSize     1      def % print the design full size [0/1]
/showValues   1      def % print the parameters [0/1]
```

The first page of the template provides details of the classic "draughtsman's construction" method of creating a cone. This can be used if you don't have access to a printer; use the inner and outer radii and the 'horizontal extent' to draw an outline template on a large sheet of paper. See below for further details.

The template includes twelve pages that should cover most Conic Windscreen designs (maybe not if you want a Conic Windscreen for a gallon pot). Scroll through the pages to see which of them has some part of the Conic Windscreen template on them, and then use GSView's 'Print Selected Pages' printer dialogue to print only those pages. Most designs will probably only need pages 2, 3, 4, 6, 7 & 8.

The last page prints all the design parameters and variables used to construct the Conic Windscreen. You can print the Conic Windscreen parameters on the template for future reference by setting `/enableValues` to 1, or, if you find them intrusive, set it to 0 to stop them printing.

The template *should* scale perfectly to size unless you've set the `/fullSize` variable to 0; that's the only setting that should change the scaling\*. If the fiducial crosses and dotted center line are printing, then the `/fullSize` variable is set to 1.

The fiducial spacing (the expert setting `/pasteOverlap`) should be 50mm. One other measurement you can make is the difference between inner and outer radii; the values are printed on the template, and you can measure along the central dotted line.

\* Printers sometimes have small errors in their output scaling, and, in the past, I've added measurement bars and parameters in the code to compensate for these errors (e.g. when creating romers for map reading). Unfortunately, the scale distortion isn't consistent across the page. Captain Paranoia thinks, for the purposes of this template, most printers will be sufficiently accurate. Some graphics tools can also try to be 'helpful' and apply scaling, but GSView/GhostScript shouldn't do this.

Since many printers use PostScript as their 'native language', it may be possible to print the template without needing any graphics application such as GSView. Open any standard application program and use the 'Print' menu to see what printers are available on your PC. Make a note of the printer name. Then open a DOS shell and go to the directory you've saved the template in. Use the command:

```
copy conic_stove.ps <printer name>
```

where `<printer name>` is the name you noted above.

On Captain Paranoia's work PC, he has found that he had to change the printer name from 'STB\_XEROX\_PCL' to 'STB\_XEROX'. The former is the printer queue name, the latter is the printer's 'real name'. Otherwise, it worked fine.

## Adjusting Code Parameters

If for some reason you would like to dive into the code itself, either because the JavaTool discussed earlier is not up to your level of sophistication or just because of curiosity, Captain Paranoia has done his best to make his code end user friendly.

To work on the code, copy and paste it into a text editor such as NotePad or WordPad and save it as "conic\_stove.ps".

The coded template as supplied is set up for a "generic" pot, which should give you an idea of how the design works. It may be helpful to print out and make a paper mock-up of this example before modifying the script to suit your needs, as this will help you understand how the various parts are meant to be cut out, and how each of the features work. This is especially true of the handle area, and if you intend to use the Flissure version.

Once you're figured out how the parameters of the code work, use your text editor to edit the pot (pan) and stove (burner) user parameters to suit your setup. Edit only the values highlighted in red.

## Pot and Burner Parameters

These are the main parameters that you will need to adjust for your configuration. Measurements are in millimeters.

Parameter	Variable	Notes
<b>Main Pot Parameters</b>		
/panHeight	86	Amount of cone covering pot. Measure from bottom of pot to where you want top of cone to end
/panCircumf	364.4	Circumference of pot's outer wall. Measure with a strip of paper wrapped around side of pot where cone top will be. If you want space between your pot and cone, add (Pi x additional space x 2)
/handleWidthTop	30	Width at top of pot handle(s). Distance between the top of the pot handles, or pot grip width. The template adds a gap allowance for all handle settings.
/handleWidthMid	12	Width at shoulder of pot handle(s). Width of handle opening below the top of the handle.
/handleDepthMid	18	Measured from where top of cone will be to handleWidthMid opening
/handleWidthBot	6	Width at bottom of pot handle(s). This can often be reduced slightly, as the handles often curve in as they leave the pot.
/handleDepth	50	Measured from where top of cone will be to lowest point on handle.
<b>Stove Parameters</b>		
/burnerHeight	32	Height of stove of fuel (wood or other solid fuel) used.
/burnerOffset	24	Gap between top of stove (if used) to bottom of pot. Choose wisely to optimise flame heat. Stoves or fuels with tall flames will need a larger gap.

If you leave the filename as 'conic\_stove.ps', the script should print a datestamp. Sadly, PostScript doesn't seem to have a 'current filename' variable, so the name has to be fixed in the script.

Note that the sides of the Conic Windscreen spread out from top to bottom while the wire handles generally close in from top to bottom. The parameter /handleWidthBot will often be much smaller than /handleWidthTop and /handleWidthMid. Because of this, the handle pattern can sometimes produce odd results if the three parameters are very close; if this happens, try to ignore the odd features, and simply round the transitions between the three opening widths. It's far better to start off with a small opening which can be enlarged as necessary, than go mad and cut far too big an opening to start with.



## Hole Parameters

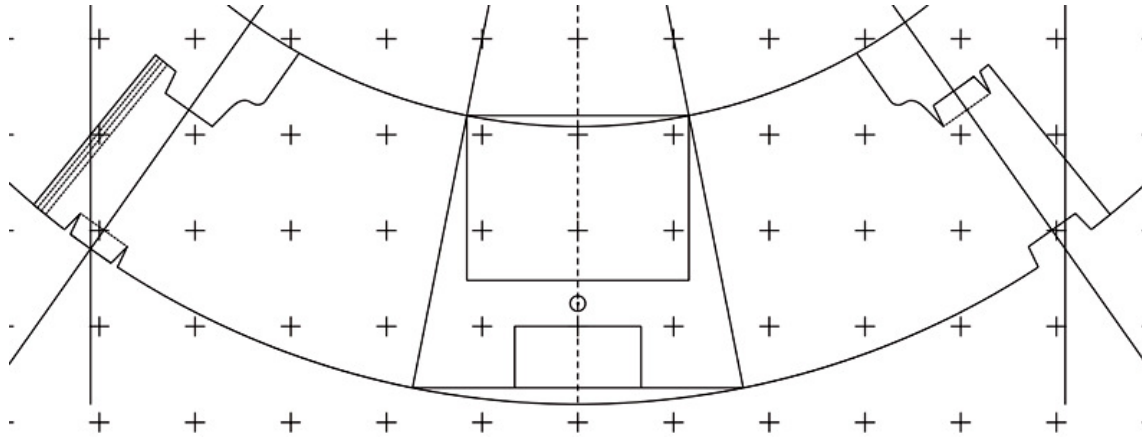
There is A Plan behind the choice of hole sizes; to allow adequate gas flow. The design aims to equal or exceed the area of holes in a Trangia 27 base unit (the top surface that supports the burner). That's about 3000mm<sup>2</sup>. Captain Paranoia figures that if it works for a Trangia, it'll work for him...

Parameter	Variable	Notes
<b>Vent Hole Parameters</b>		
/holeType	0	type of holes [0/1] 0 for circular holes 1 for triangular holes
/holesTop	22	number of vent holes at top
/holesBot	30	number of vent holes at bottom
/holeDiamTop	8	diameter of top vent holes
/holeDiamBot	8	diameter of bottom vent holes
/holeRowsTop	2	number of rows of holes at top [0..2] 0 for no rows 1 for single row 2 for double row
/holeRowsBot	2	number of rows of holes at bottom [0..2] 0 for no rows 1 for single row 2 for double row

You may need to change the number and size of holes to suit your pot. The hole spacing is set automatically to spread the holes around the Conic Windscreen, and keep them away from the joints. If you enable two or more rows, the rows are separated such that the distance between any two adjacent holes is similar. The example template as supplied seems to be a reasonable guideline for the hole spacing. The total cross-section area of lower and upper holes is printed on the template, along with the cone area (with spurious precision...) and weight.

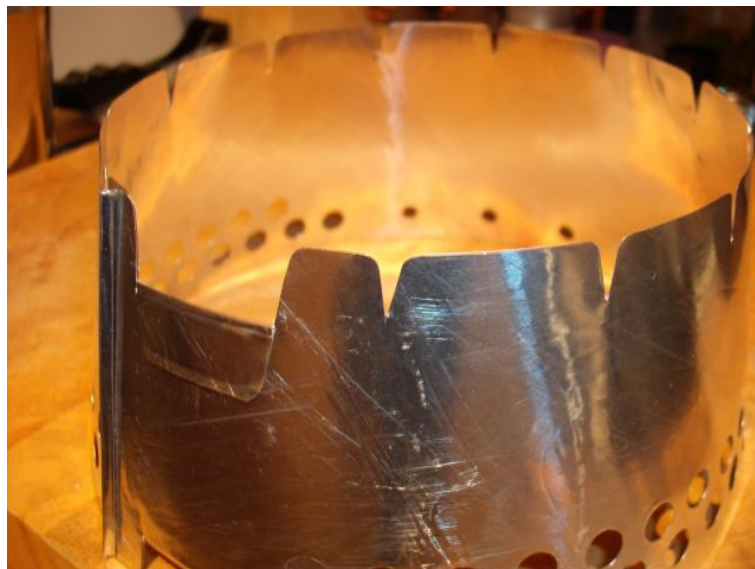
## Vertical Joint

The template uses a tab joint, as Captain Paranoia finds it easiest to make, easiest to mate in the field, is compact and seems robust in use. It does benefit from the little triangular folded reinforcement along the vertical edge of the overlap, to help prevent the 'free' outer edge of the joint from bowing outwards, especially with thinner foils.



If you're using Ti foil or stiffer Al foil, it may be wise to reduce the `/tabWidth` expert setting, as Ti will object to being forced to form the required curved fold. Alternatively, split the tab into two or three parts with V cutouts in the tab. Also, it may be very difficult to form the triangular reinforcement fold, but a single fold will probably suffice in the stiffer Ti foil; experiment with scrap to see how well it folds, and if it fractures when folded tightly.





## Strata add-on for use with a second Pot



The script can draw a template for Captain Paranoia's Strata add-on section to allow the Conic Windscreen to be used with a second, smaller diameter pot. To do this, modify the parameters for the second pot, and enable the Strata output with the switch:

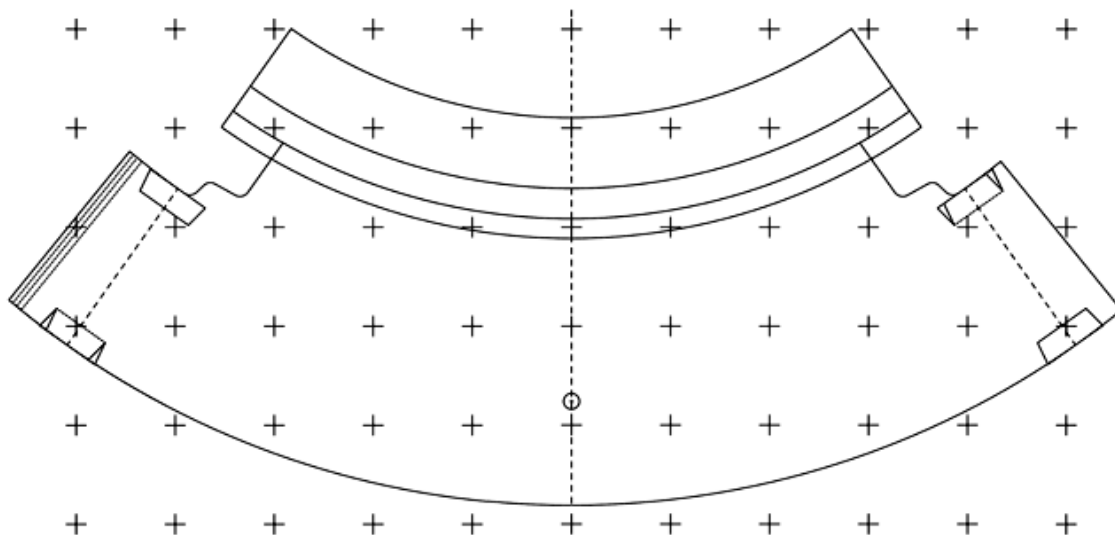
```
% enable Strata addition  
/strata 1 def % draw Strata section for second pot [0/1]
```

If you don't want to make a Strata ring for a second pot, leave the `/strata` setting at 0, and ignore the parameters of the second pot.

If there's a big difference between the diameters of the pots, you may need to use more than one ring for the Strata, to prevent it extending too far into the Conic Windscreen, and disturbing the hot gas flow:

```
/strataRings 3 def % number of rings used in Strata
```

The Strata template is drawn over the normal Conic Windscreen template, so you will need to print and cut out another template.

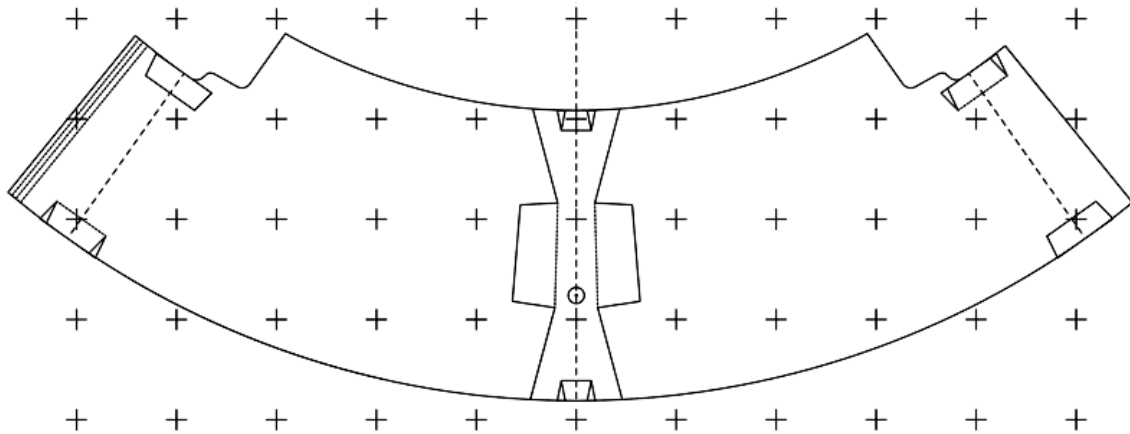


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### Small Foil Joint

The Conic Windscreen requires quite a wide piece of foil. If you can only find small pieces of foil (e.g. food trays), there is an option to create a permanent vertical joint. This generates a lap and fell joint, locked together with slot and tab at top and bottom.

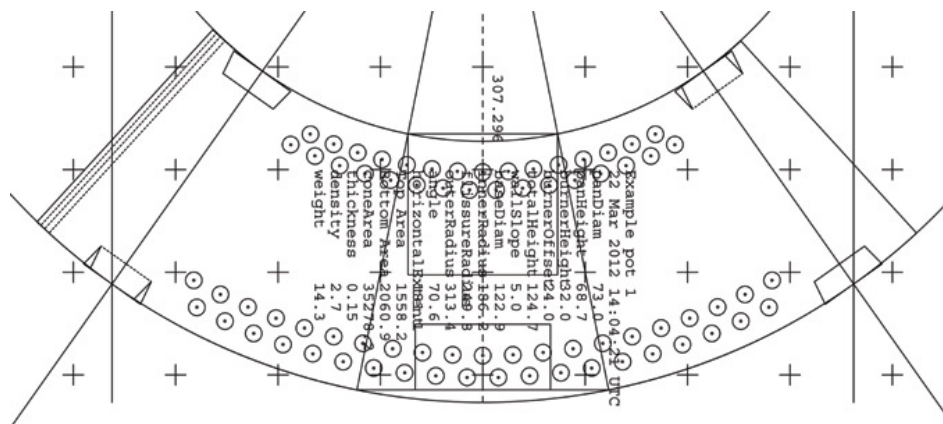
```
% enable small foil joint
/smallFoil      1      def % draw joint to allow use of two small foil
                    sections [0/1]
```



## Infernal Wood Burner Option

The script can be set to generate an inner, inverted conic wall to create a dual-wall wood burning stove. The inner conic wall is created using the same settings as the normal pot, but creates a cone that will just fit inside the main cone, with the top of the inner cone just below the lower of the second row of vent holes at the top of the outer cone. Enter the pot details as normal, and print out the outer cone. Then change the `/infernal` option to enable the Infernal Conic Stove generator.

```
% enable Infernal generator
/infernal 1 def % make script draw Infernal inner, inverted
cone
```



To allow room for the wood fire, the pot is supported on two titanium or stainless steel stakes threaded through the upper holes of the outer cone. The 'exhaust' holes of the inner cone provide primary air supply to the wood fire, and the 'inlet' holes of the inner cone provide secondary air, helping to burn the volatiles coming off the wood. The exhaust holes of the outer cone provide the exhaust ports for the wood stove. You will have to use a heat-resistant metal such as titanium or stainless steel to make the Infernal Conic Stove, as a wood fire burns much hotter than most alcohol stoves or hexamine (ESBIT). You will also need to make a grate to hold the fire above the air holes of the Infernal cone; some wire mesh should do.



The Infernal Conic Stove (in not very heat-resistant paper & bamboo...)

Since the Infernal Conic Stove outer is simply a normal Conic Windscreen, it can be used as a multifuel stove utilizing an alcohol stove and/or solid fuel tabs. Simply use the Infernal inner cone and pot supports up high when you need to use it as a wood burner and then lower the pot support to allow for proper spacing over solid fuel tabs or an alcohol stove.

Please note that Captain Paranoia has not made or tested the Infernal option, so please consider it one of the more experimental settings. He welcomes hearing of any test results or suggestions.



## **Expert Parameters and Other Adjustments**

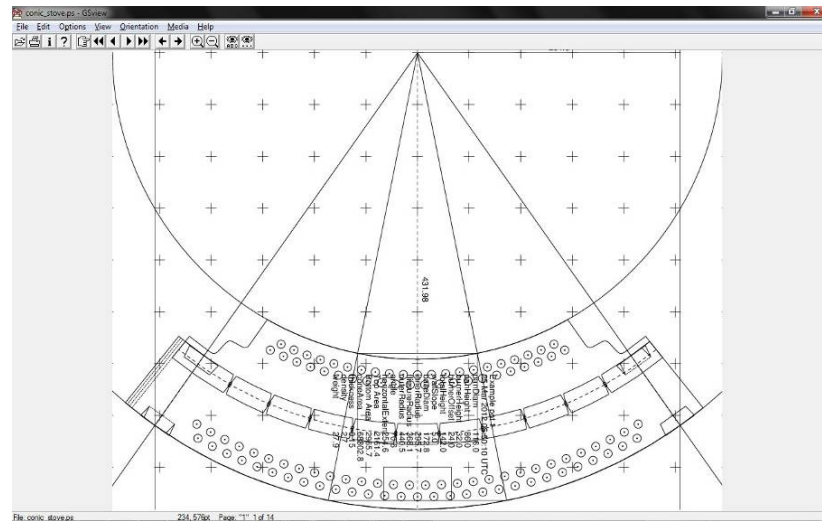
The only 'expert' parameters you might have to change are the `/density` and `/thickness` to match the material you're using, e.g. density 4.5 for titanium, and 0.127mm thickness for the Titanium Goat foil. These only affect the weight reports, and have no effect on the actual template.

However, if the design doesn't 'look right', feel free to play with the other settings, especially for very large or very small pots. `/wallSlope` and `/holeOffsetTop` may need to be adjusted for small diameter pots (e.g. beer CanPots).

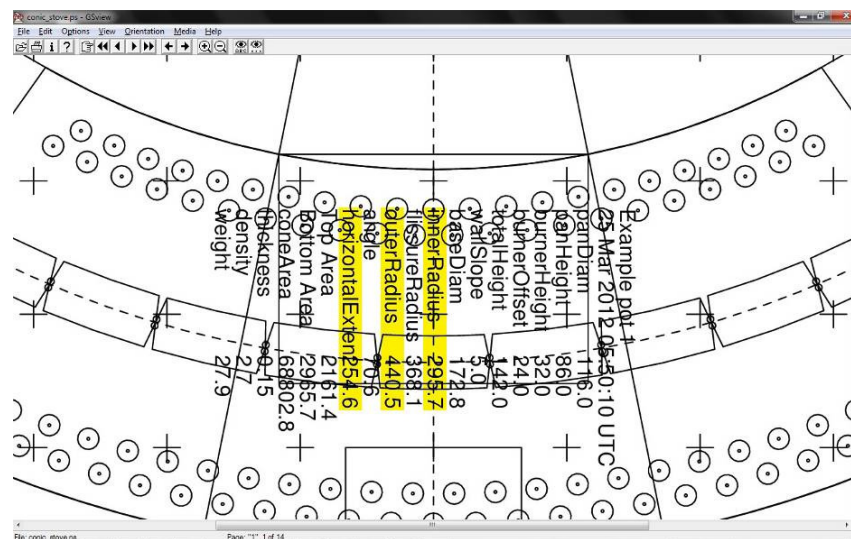
It still requires a bit of brainwork to interpret and adjust the auto-generated template, as it's pretty hard to make the template perfect around the joint and handle openings; the two features aren't always perfectly integrated. One or more trial runs with paper prototypes should help iron out any problems before committing to foil, and is strongly recommended.

## ***Draughtsman's Construction***

If you don't have a printer, you can use the draughtsman's construction method printed on page 1 of the design to draw an outline Conic Windscreen template on a large piece of paper (e.g. newsprint or wallpaper). This draws a side view of the stove, pot and Conic Windscreen cross-section, and draws in the continuation of the sloping Conic Windscreen sides. It shows where you need to draw 'end stop' lines for the circular arcs, and gives a horizontal extent measurement from a centerline.



So, all you need to do is edit the file as normal, and view the result in GSView. Read the values for `innerRadius` and `outerRadius`, and the `horizontalExtent`.



Then take a large piece of paper and fold it down the center. Fold the paper up a little from one end, across the first fold, so that it is square across the first fold (line up the end of the first fold back on itself). Repeat this fold at the other end of the paper.

Now measure the horizontal extent distance along the two horizontal folds, either side of the center fold, and draw straight lines between them, parallel to the center fold. These form 'end stop' lines for the outer arc.

Take a long strip of paper, and mark about 1/2" from one end. From this mark, measure and mark the `innerRadius` and `outerRadius`.

Now take a thumb tack, and press it into the each of the three marks on the strip. Using the first mark, fix the strip at a point on the center line with the thumb tack, so that the `outerRadius` mark fits within the sheet of paper.

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Place the tip of a pen or pencil in the `outerRadius` mark on the strip, and draw an arc, ensuring that the arc sweeps through the 'end stop' lines on both sides. Repeat for the `innerRadius` mark.

You can use the strip to add more arcs to act as guidelines for punching the air holes, measured from inner and outer radii.

Remove the strip, and use a straight edge to draw a line from the center of the two arcs to the points where the 'end stop' lines meet the outer arc. These lines mark where the ends of the Conic Windscreen should overlap.

Now all you need to do is add an overlap allowance by drawing lines from the arc center, outside the first two lines. Try to copy the full design as best as you can, adding handle details, etc.

Once you're happy that you've marked all the design details, cut out the template and roll it up into a Conic Windscreen, aligning the overlap lines carefully. Use paperclips or staples to fasten the ends of the Conic Windscreen together, and then use scissors to cut tab and slot joints; you just need to cut out a narrow 'V' at either end of the joint. Because we cut both ends of the Conic Windscreen at the same time, we ensure that the joints are perfectly aligned.

You can now remove paperclips or staples, and your template should be complete.

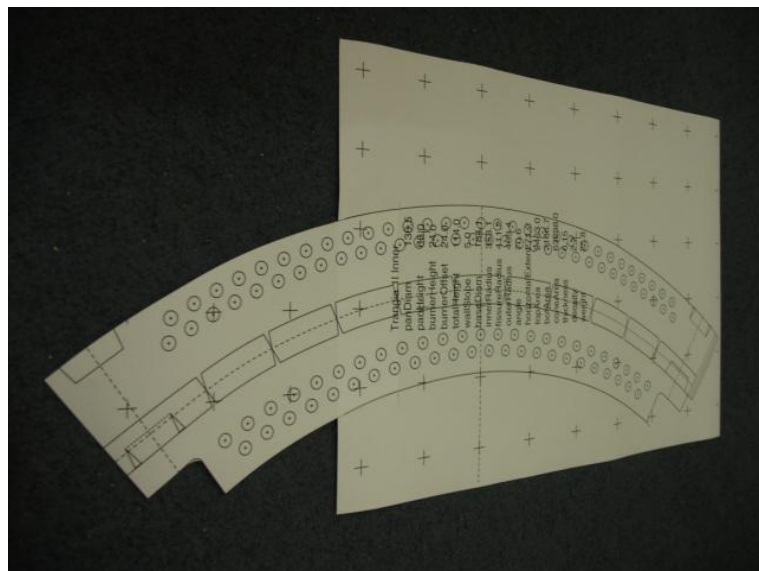
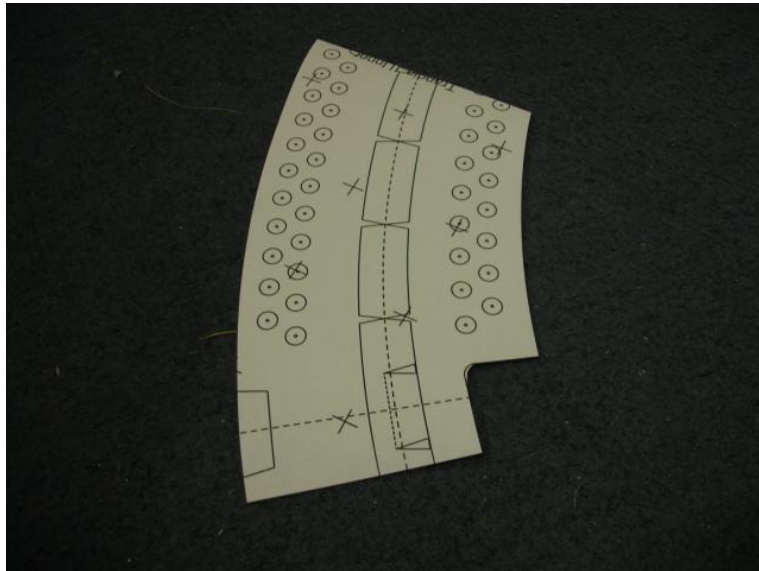
## ***Building the Conic Windscreen***

On the printed template, solid lines are cuts (barring the fiducials), short dashes are folds, and long dashes are guidance marks (e.g. center line and joint alignment).

Here is one example of how paper templates can be used as a guide for transforming flat sheet metal into a Conic Windscreen. **Please review the first page of this document before starting a Conic Windscreen project in the US.**

Captain Paranoia recommends making a paper mock-up of the design first, to ensure that the handle opening is correct, and to decide how best to finish the 'tails' of the handle opening in the Flissure variant, since they are very dependent on the nature of the handle design. If your pot uses a very shallow handle, the 'tails' of the Flissure handle opening can be quite tall, and can bow out. If, even after rolling the Flissure up a few times, this still happens, you might consider adding another slot-and-tab joint at the top of the Flissure handle opening.

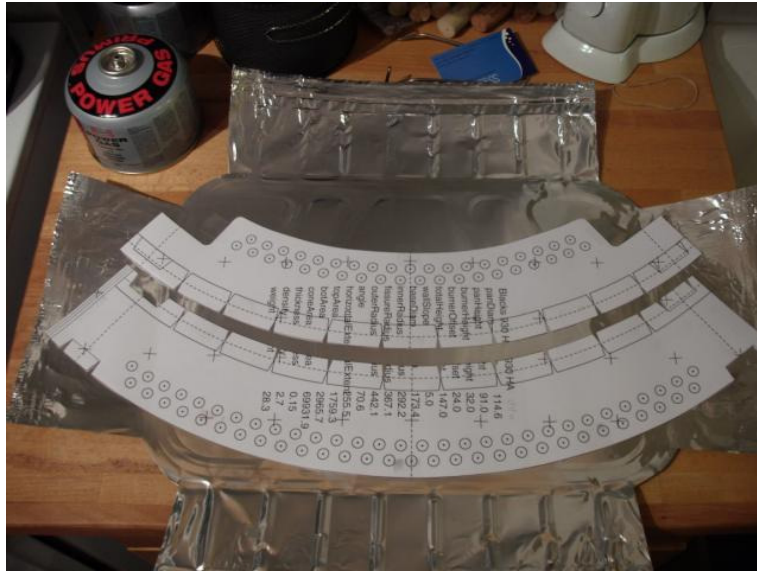
Print out the template and paste the pages together, using the fiducials and outline as guides. Captain Paranoia has taken to cutting out the smaller template part and aligning it onto the larger template part using the punched hole outlines and inner and outer arcs:



Cut out the template completely, and tape the template to suitable piece of metal foil (0.15mm foil is about right; large disposable BBQs are a possible source, or large serving platters, disposable

## MODIFIED Cone PotStand Tool for use in United States

roasting trays or oven liner trays). In the US, aluminium roof flashing seems widely available (e.g. from Home Depot).

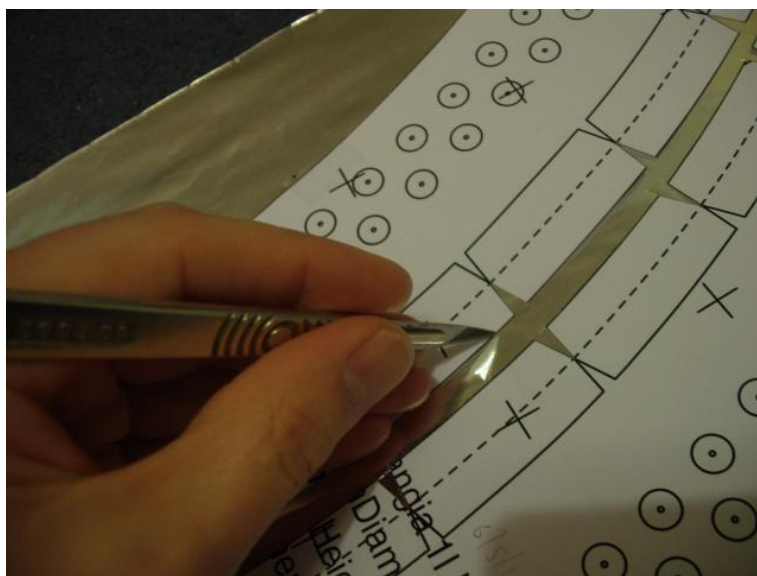


Mark the handle/joint points by pricking through at the corners with a thumbtack or similar. You can mark the Flissure finger V slots in this way, too, if you like, or cut them out as part of the basic outline (below). It's a good idea to prick a hole at the tip of each 'V', as it helps to act as a stop for the cut, preventing the cut from going too far.

Cut out the basic shape, using sturdy scissors or snips (e.g. kitchen scissors). When cutting, you'll need to make sure that the template remains in place; stop cutting at intervals, and use more tape to hold the cut part to the template.

Take care when cutting the V-slots in a Flissure; don't let the cut extend beyond the tip of the V, or the Flissure wall will slip into the deeper cut, and not form the correct shape. This is most critical at the slots next to the handle opening.

An alternative method of cutting the outline is to use the tip of a scalpel or fine craft knife to gently score around the outline of the template, and then remove the template and cut out the scored outline.



## MODIFIED Cone PotStand Tool for use in United States

Here's an example of a scored outline:



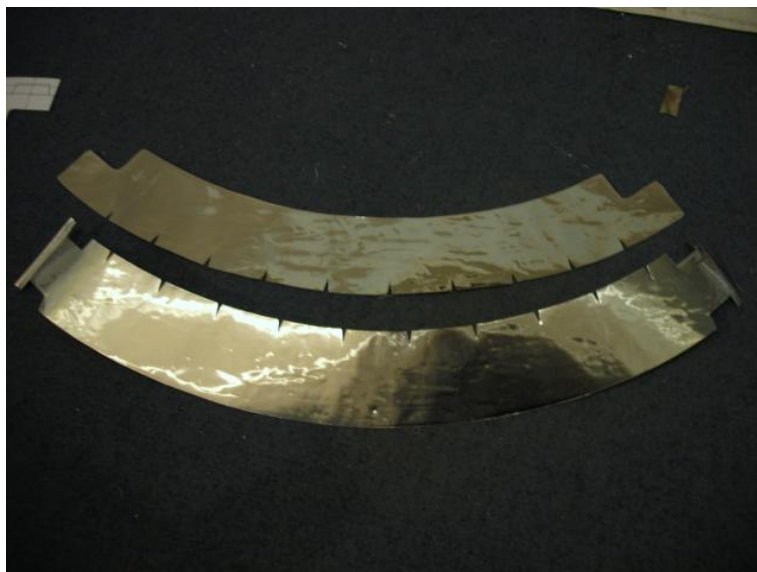
Cut out the tabs and slots for the joints. Each end should have one slot, and one tab. *Don't cut two slots in one end.* One end should have a slot at the top (the 'outer' end, with the folded reinforcement), the other end should have a slot at the bottom.

Cut out the handle opening.

Use the scissors to round all the sharp corners, especially on the Flissure tabs. Use a sharp radius curve (1-2mm radius), to just take off the point of the corner, rather than make a gently rounded edge.

Score the tab fold lines with the ballpoint pen. The tab at the top should fold out, to keep it out of the flame. The tab at the bottom should fold in. When you make the folds, place a piece of double-thickness scrap foil 'inside' the fold; this will allow room for the mating part of the joint. You can process the folded section so that it has a bit of spring, and lift the tips of the tabs to ease mating. The tabs on the joints can be usefully pre-curved to encourage the Conic Windscreen to take a nice circular shape. Leaving the scrap in place, carefully and gently bend the tab to put in a gentle curve; if you can find a large can or another larger diameter pot, you can form the bend around that. Then take the scrap out; its purpose is to stop the tab closing up, a bit like a pipe-bending spring.

And here are the Flissure halves cut out, showing the Flissure joint details, and the formed tab and slot joints:





## MODIFIED Cone PotStand Tool for use in United States

Captain Paranoia usually gets impatient at this point, and assembles the Conic Windscreen to check that the pot fits properly. This is particularly important if you are building a windscreen which will fit tightly around your pot.



Once the outline is cut out, re-attach the template and punch the holes. Use a core punch to make all the holes. Place the foil over something firm but yielding, such as a few layers of cornflake packet, onto a very firm surface (e.g. a concrete or tile floor). You can also get some rather nice card punches from hobby shops, which seem to work well. You may choose not to punch a block of the holes if you want to create a windproof side to the Conic Windscreen, or to punch smaller holes on the 'windward side'.



Since the size and number of holes required depends on the stove and the pot you choose to use, you may decide to punch only a small number of holes first (e.g. just one row), and experiment to see if the Conic Windscreen works with a small number of holes. The important consideration is to ensure good combustion, minimizing the amount of carbon monoxide generated. Signs of incomplete combustion are sooting on the pot, or a sweet, sickly smell in the exhaust gases. Sooting can also suggest that the flame gap is wrong.

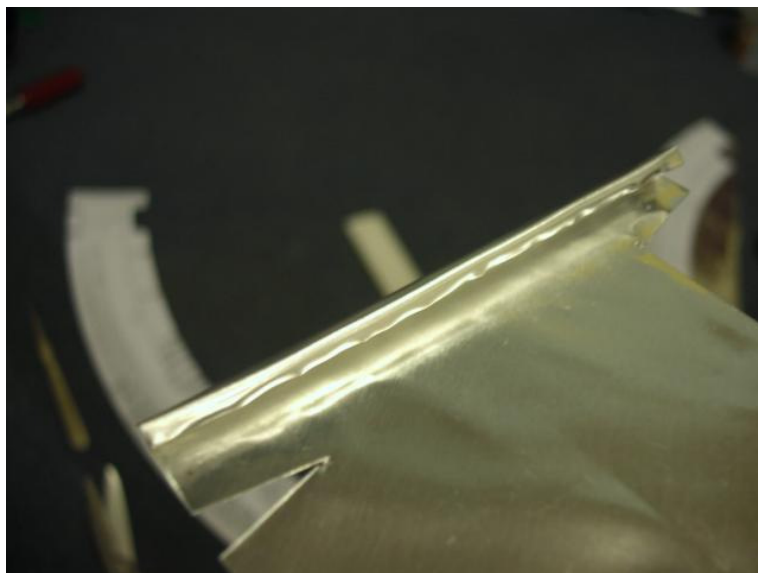
If you start with a small number of holes first, you can easily put the template back in place, and punch more holes if experiment shows that more holes are needed.

## MODIFIED Cone PotStand Tool for use in United States

When all the holes are punched, remove the template, and use a hammer or rubber mallet to gently tap the punched holes flat, again over the firm but yielding surface:



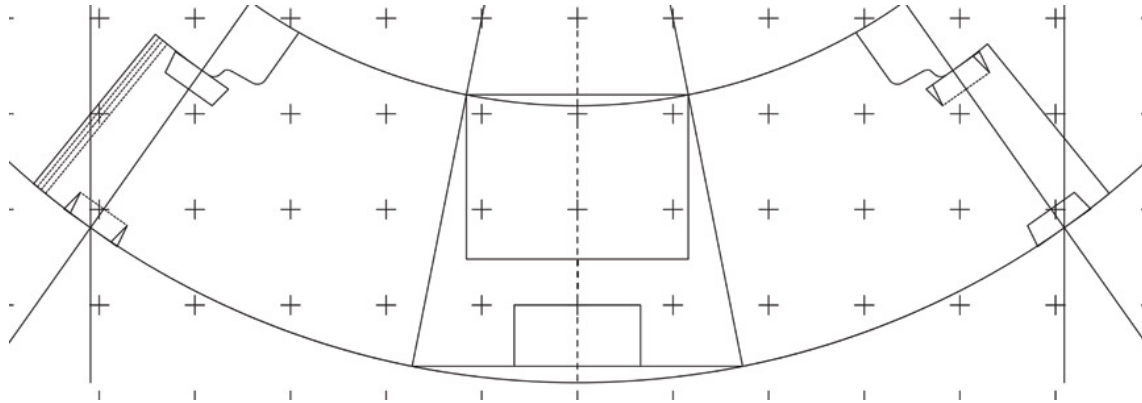
Form the little, triangular reinforcing section for the outer edge. The Conic Windscreen edge tends to bow out otherwise. Captain Paranoia forms each fold by running a ball-point pen along the fold line with a straight edge, on the outer face of the Conic Windscreen, onto a softish surface (e.g. magazine or telephone directory). Captain Paranoia then completes the folding with some careful manipulation; Captain Paranoia puts the straight edge into the fold, and runs a fingernail along the back of the foil to fold it along the straight edge. Start at the outer edge first, and form each fold in turn, tidying the fold with a fingernail. It can be a bit tricky, but the result is worthwhile. Here's a picture during the forming process, with two of the folds made:



That's it. Maybe run a wet SOS pad along the edges to take off any splinters or sharp edges.

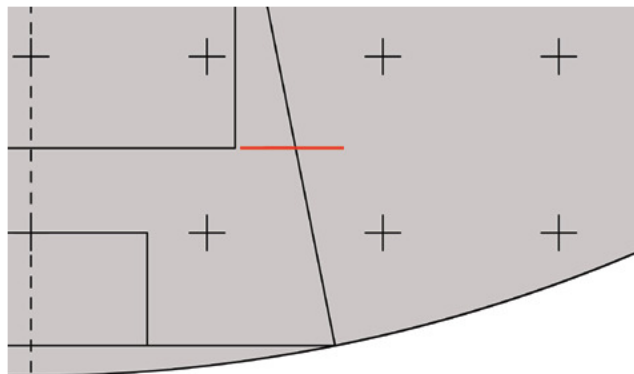
## Pot Supports

There are a number of ways to support a pot. If you choose to use tent stakes to support the underside of your pot, this tool can help you make the proper measurements.

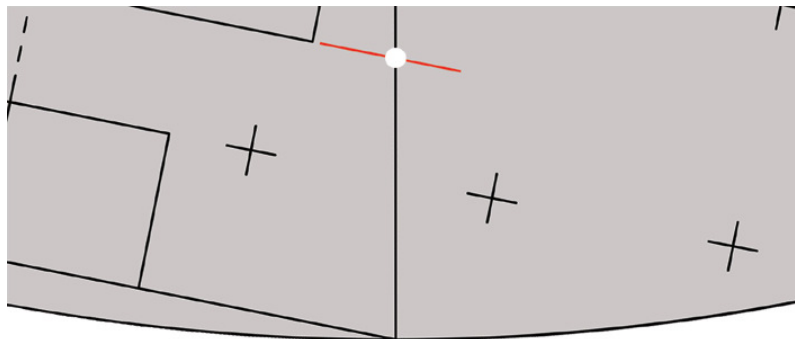


When you print out your template, there is a mock up in the center of the template showing a representation of a "side view" of a "stove" the pot covered within your cone and the angled wall of your cone. You can cut out this representation and use it as a template for marking holes for pot supports (tent stake holes or otherwise).

Start by making a line level with the bottom of your pot and extend it through the representation of the angled cone side (left one or right). Cut this out and use the curved bottom of this template to line it up with the curved bottom of your flattened cone. You can use a pushpin to mark your hole with the example template below.



You can also cut or punch your template so that you can mark your point with a marker.

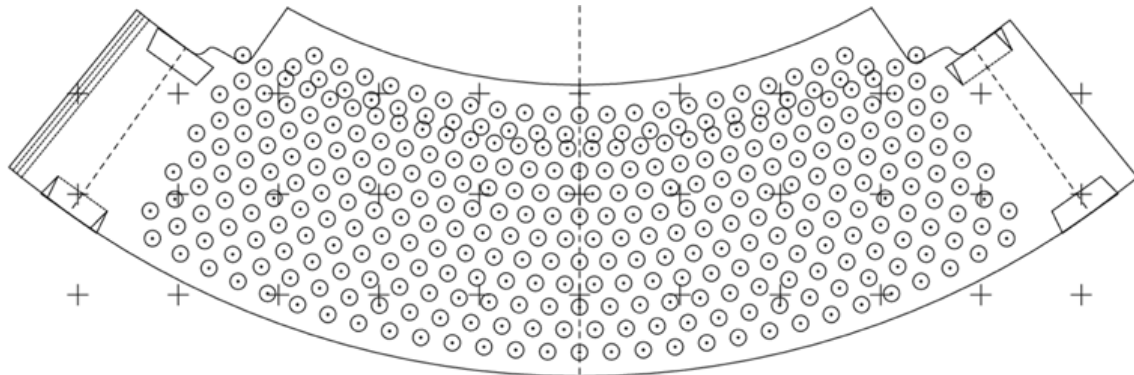


If you intend to use different stove or fuel options with your windscreen and would like multiple height options for supports, simply adjust the parameter variables and print out a second template to use of measuring.

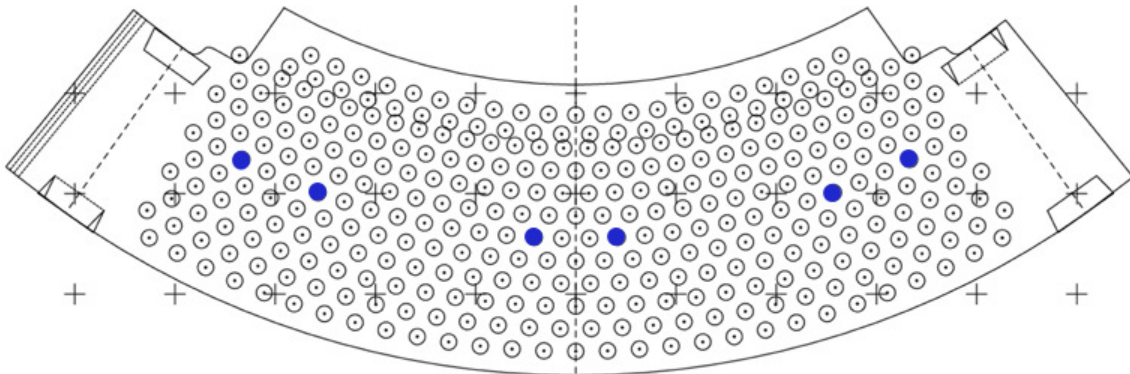
## MODIFIED Cone PotStand Tool for use in United States

If you don't like this tool for measuring out your support height, you have other options.

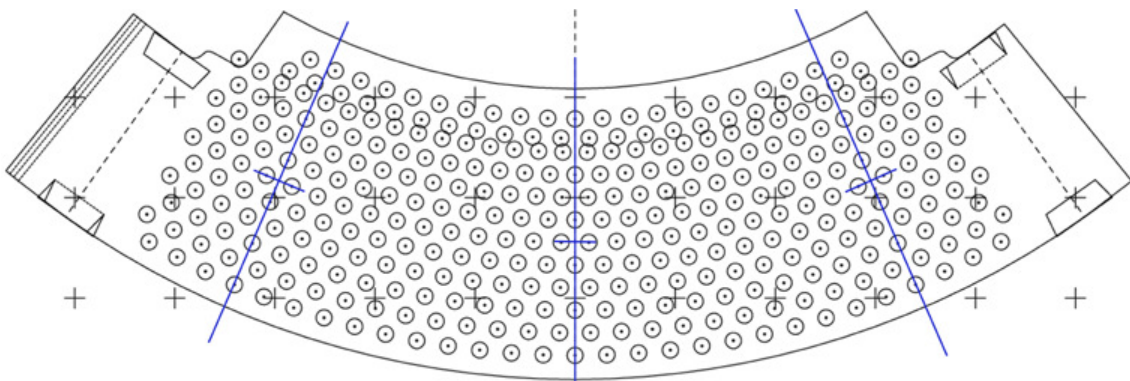
### Vent Hole Method



You can set your number of bottom of top ventilation rows so that many rows of ventilation holes are shown. These holes can help you space out where you would like your supports to be.



If you are punching holes for support rods, this method is just about right.



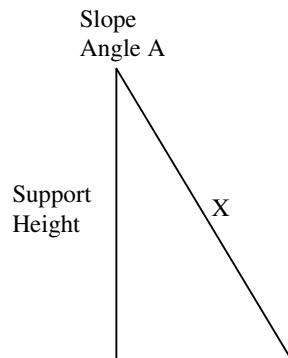
If you are adding vertical supports, you can use a ruler to connect the center points as shown above in every other row.

## MODIFIED Cone PotStand Tool for use in United States

### Math Method

You can set up your windscreen as you normally would. Place a large book or stack of books next to your cone and open up your pages so that a marker will sit at just the right height. Mark your cone by twisting it around your pen. Now that you have your proper height, you just have to figure out how and where you want to space out your supports.

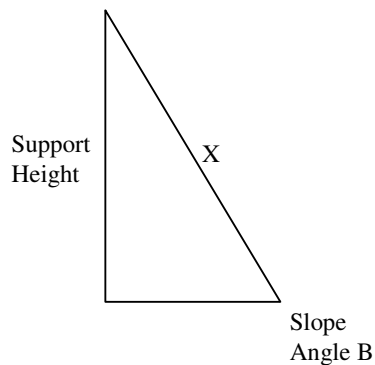
If you are into computing things, you can use the slope of your cone's wall and your desired height of support to calculate the distance from the edge of your template/cone. The angle of the default template appears to be around 11 degrees.



$$\cos = \text{Adjacent/Hypotenuse}$$

$$\cos(11^\circ) = \frac{\text{Support Height}}{X}$$

$$X = \frac{\text{Support Height}}{\cos(11^\circ)}$$



$$\sin = \text{Opposite/Hypotenuse}$$

$$\sin(79^\circ) = \frac{\text{Support Height}}{X}$$

$$X = \frac{\text{Support Height}}{\sin(79^\circ)}$$

The slope itself if calculated by:

$$\tan = \text{Opposite/Adjacent}$$

$$\text{Slope Angle A} = \arctan\left(\frac{(\text{Bottom Diameter} - \text{Top Diameter}) / 2}{\text{Support Height}}\right)$$

$$\text{Slope Angle B} = \arctan\left(\frac{\text{Support Height}}{(\text{Bottom Diameter} - \text{Top Diameter}) / 2}\right)$$



## ***Final Fettling***

It helps to roll the Conic Windscreen up gently to encourage it to form the final conic shape (this will only work with aluminium; titanium isn't ductile like aluminium, so won't retain any curve). Pay particular attention to the ends of the Conic Windscreen, especially the upper Flissure section, as these tend not to get bent so much when the Conic Windscreen is rolled for storage. This will make it easier to mate the joint, and the pot will sit better in the Conic Windscreen. Ideally, when unpacked, the Conic Windscreen should relax into just about the perfect cone diameter, and not need to be 'forced' to align the slot and tab joints.

The Flissure joint needs a little encouragement at first, and needs careful and quite precise cutting; you may find that you need to trim the edges of the V slots very slightly in thicker foil. The ends of the upper Flissure section should start inside the Conic Windscreen, otherwise they'll bow out from the Conic Windscreen. The tabs should be mated inside/outside alternately, and this can usually be done either before or after the joint in the lower section has been made. Once the Flissure joint has been mated a few times, the foil bends into shape a little, and the joint becomes easier to mate.

The joint is made by bringing the ends of the Conic Windscreen together, with an offset, and sliding the tabs into the mating slots. Once the tabs are folded, they should never need folding again; some people have been confused, thinking that the tabs must be folded and unfolded every time the Conic Windscreen is assembled, misunderstanding how the joint is meant to work.

Here's a picture of the mated Flissure joint:



Once you get used to setting the Conic Windscreen up, it takes very little time; Captain Paranoia can assemble a Flissure in less than 40 seconds, starting with the Flissure, stove & lighter packed away in his cook system of pot and pot cozy.

Here is an example of a Flissure packed up:

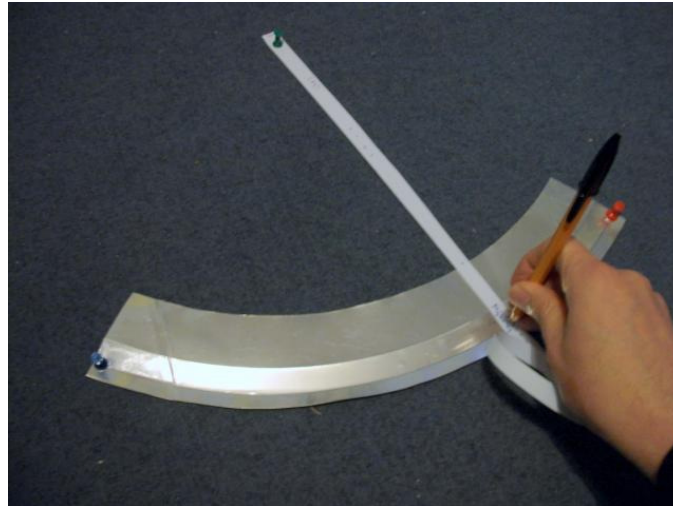




## ***Building the Strata add-on***

The Strata is a little more complicated to build than the Conic Windscreen, as it needs carefully curved folds to be formed. The folds are best made by creating fairly deep radial score lines where the folds are to be formed, using a ballpoint pen. One fold needs to be scored on one side of the foil, and the other score on the other side of the foil.

Captain Paranoia finds the best way of forming the scores is to use the strip of paper method, as described in the "draughtsman's construction" section above. Score three of the Strata arcs (*strataR0*, *strataR1* and *strataR3*) on a piece of foil, extending the arcs beyond the required angle. This picture shows the scoring of the arcs:



Roughly cut out the Strata section, leaving a surrounding scrap, and turn it over. Place a thumb tack in the hole used to draw the outer arc, *strataR3*, and align the Strata section so that the thumb tack meets the corresponding scored line at one end of the arc. Puncture a hole in the foil, and, without moving the foil, lift off the paper strip, and fasten the foil down using the thumb tack. Repeat the process at the other end of the arc. This should now have aligned the Strata section with the center of rotation of the arcs; sweep the strip along the arcs to check. Use the ballpoint pen and paper strip to score the last arc, *strataR2*.

Cut the surrounding scrap foil from the Strata, along *strataR0* and *strataR3* arcs.

Now form the folds. This requires patience to go along each of the scored inner arcs, creating a fold bit by bit, ensuring a sharp fold. You won't be able to bend the foil along one arc to the required degree until you've formed a fold in all arcs. Gradually increase the sharpness of the folds until the Strata forms into a nice circle, which will sit inside the rim of the main Conic Windscreen. You may need to use a tool of some sort to tidy up the folds and the edges; Captain Paranoia used a flat screwdriver blade with a fine tip. Trim the ends of the Strata to suit the opening required for the inner pot.

Here's a picture of a finished, 3-ring Strata in action; it's a LifeVenture 450ml mug in a Flissure made for an MSR Titan kettle:



## ***A Conic Windscreen Caddy***

You might also be interested in Captain Paranoia's caddy idea:



[Conic Windscreen Caddy - http://www.outdoorsmagic.com/gallery/images.asp?sp=&v=2&UAN=2925](http://www.outdoorsmagic.com/gallery/images.asp?sp=&v=2&UAN=2925)

## ***Finally...***

If you have any problems, or suggestions for improvement of the script or these instructions, let Captain Paranoia know, and he'll do his best to help.