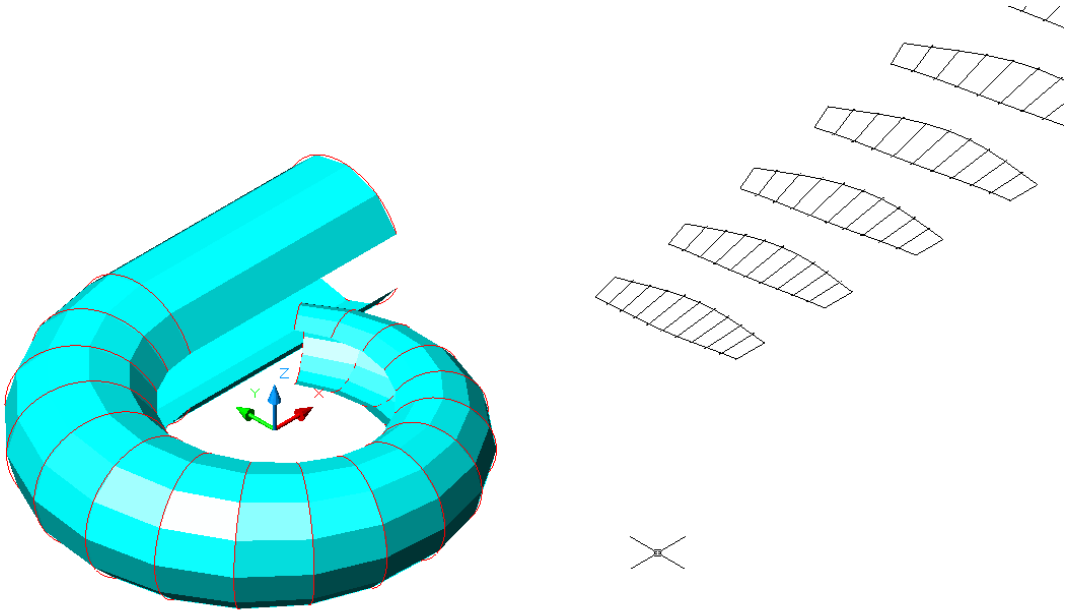
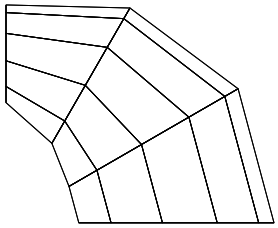
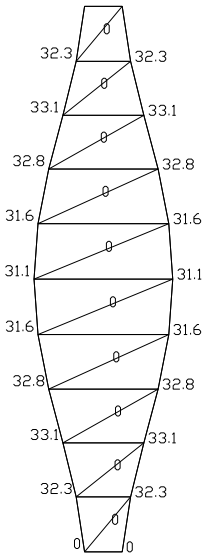
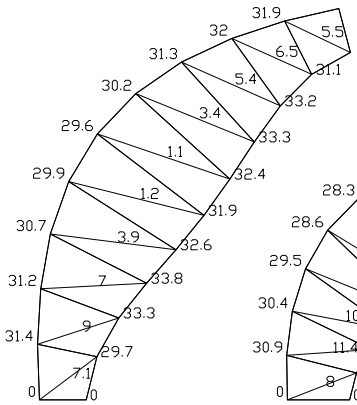
SPIRAL-CONE UNFOLDING

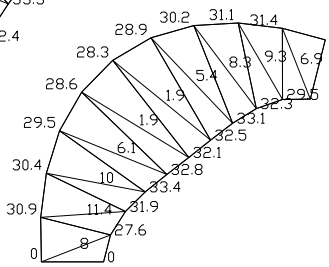
(AutoCAD APP)











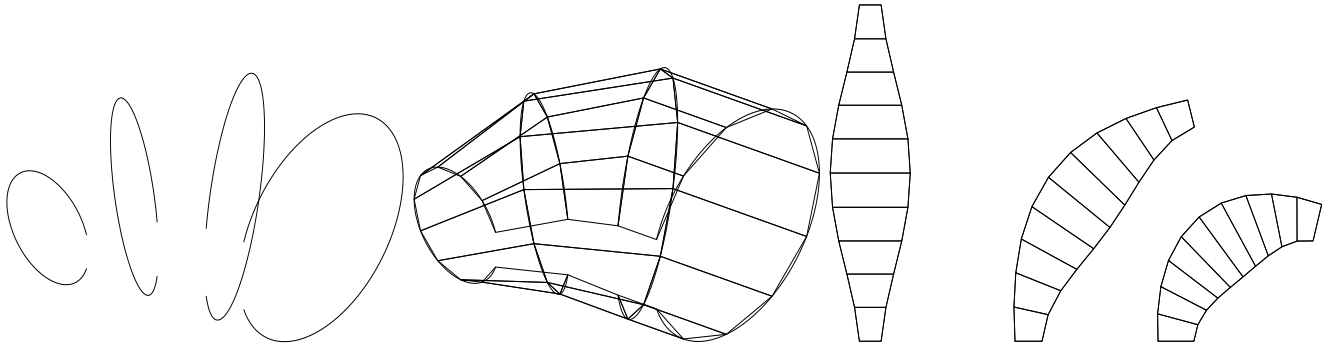
Version 2.1, April 2014

Contents

Cones unfolding

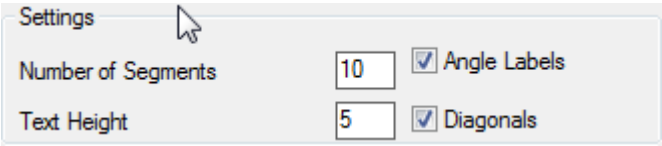
Spiral cones are used in water, oil and gas pipelines, chimneys, turbine inlets. This APP allows one to design and unfold them in convenient AutoCAD environment.

Cones are defined by sections (3D edges) that can be any open curves (arcs, open polylines, open splines).
Program generates 3D model and corresponding flat pattern:



Input data

- 3D **<u>open</u>** curves (arc, polyline, spline, ellipse…).
  If contours are closed they need to be opened/cut by TRIM command.
- Settings:
  Number of Segments (curve divisions)
  Text Height (labels on flat patterns)
  Display of Angles and Diagonals

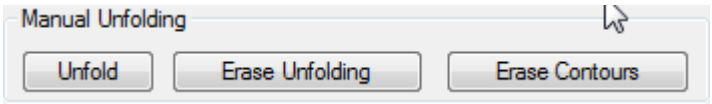


Results

- 3D surface model, presented by quadrangles (SOLID), cyan layer “Surface”
- Unfolding shape (Flattened quadrangles), yellow layer “Unfold”
- Outer contour of cones, blue layer “Contour”
- Angle labels are on magenta layer »Angle«
  - bending angle on each part of segment
  - bending deviation across diagonal

Usage

1. Open drawing with 3D open contours (eg. Arcs)
2. Press SPI<CR>, for Dialog window
3. Press button [Unfold]
4. Select arc in correct sequence
5. Finish selection with <Enter>



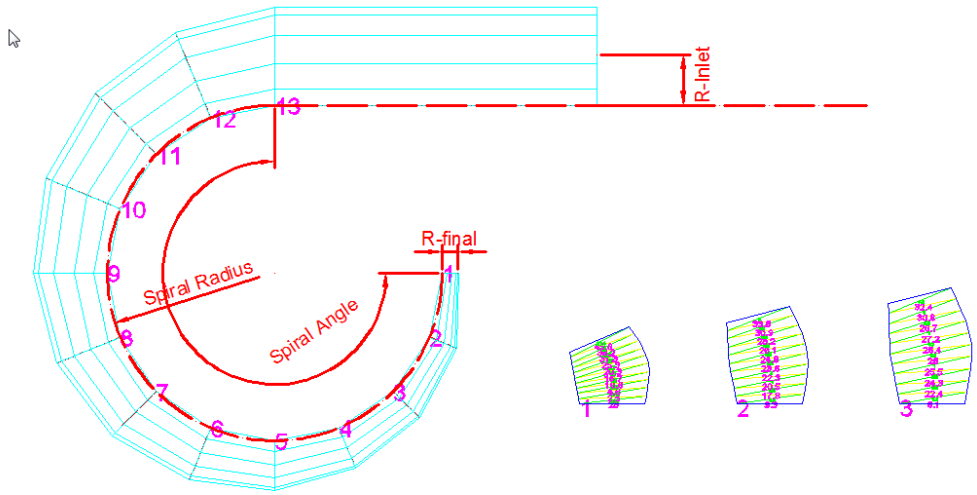
Commands [Buttons]

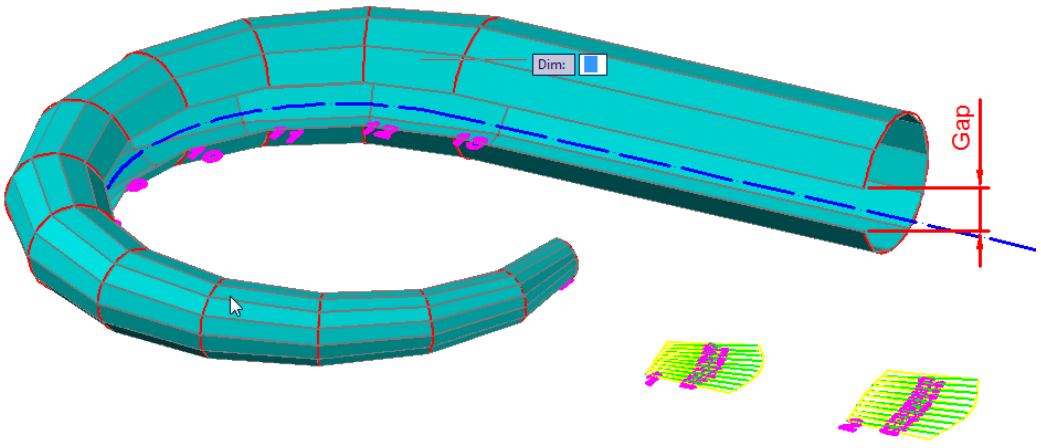
[Unfold]	Generates 3D model amd flat pattern of selected curves
[Erase Unfolding]	Erases unfolded pattern
[Erase Contours]	Erases entire drawing

Spiral (Turbine inlet)

Generates & unfolds stator (runner) inlet tube: Arcs' gaps are aligned with spiral radius.

	Runner	Default
Spiral Radius	Turbine stator Radius	1000
Spiral Gap (inside the spiral)	Turbine stator Height	200
Inlet Radius	Start radius	500
Final Radius	End radius	300
Spiral Angle	Closing angle (>270°)	180°
Spiral Cones	Number of spiral sections	15
Number of segments		10

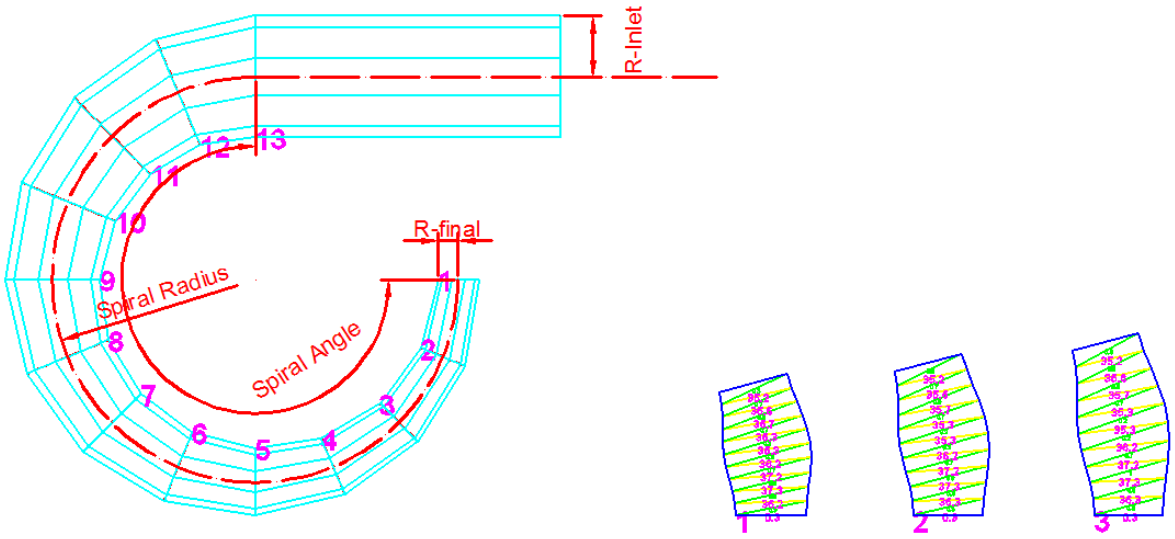




Elbow (Pipe)

Generates & unfolds pipes with the following information:

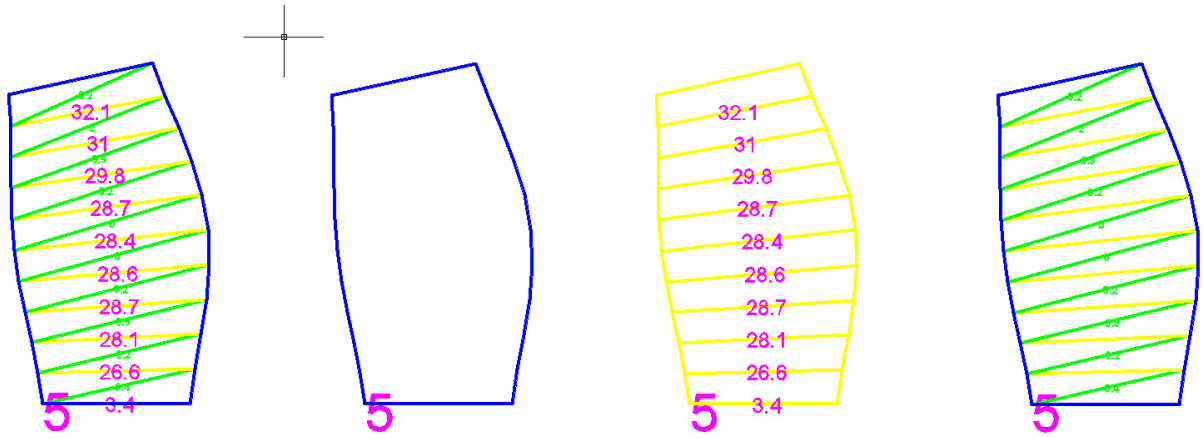
	Pipe	Defaults
Spiral Radius	Tube center radius	1000 mm
Spiral Gap (inside the spiral)	Welding gap	1 mm
Inlet radius	Inlet radius	500
Final Radius	End of spiral radius	300
Spiral Angle	Desired angle (45° – 270°)	180°
Spiral Cones	Number of spiral sections	15
Number of segments	Number of cross edges' divisions	10



Results

Result is a set of unfolded flat-patterns (one for every cone):

Geometry	Color	Layer	Contents
Flat Pattern	blue	Unfold	Polyline



CSV defined Arcs

Arcs can be read from Excel ASCII file (CSV). File must have 3 columns:

- Angle of arc
- Spiral Radius (center of Spiral to center of an Arc)
- Arc radius

Gap is defined by “Spiral Gap” in command window

Fi	R	r
0	1180,012	500
18	1172,493	492,6887
36	1168,059	488,392
54	1163,519	483,9954
72	1158,006	478,6592
90	1150,608	471,5032
108	1140,369	461,6046
126	1127,14	448,8398
144	1110,838	433,1404
162	1091,328	414,4119
180	1068,942	393,0123
198	1044,143	369,4513
216	1018,246	345,0099
234	991,9511	320,4372
252	966,8497	297,2529
270	944,2863	276,6991
288	920,0425	259,9566
306	911,3119	247,2933

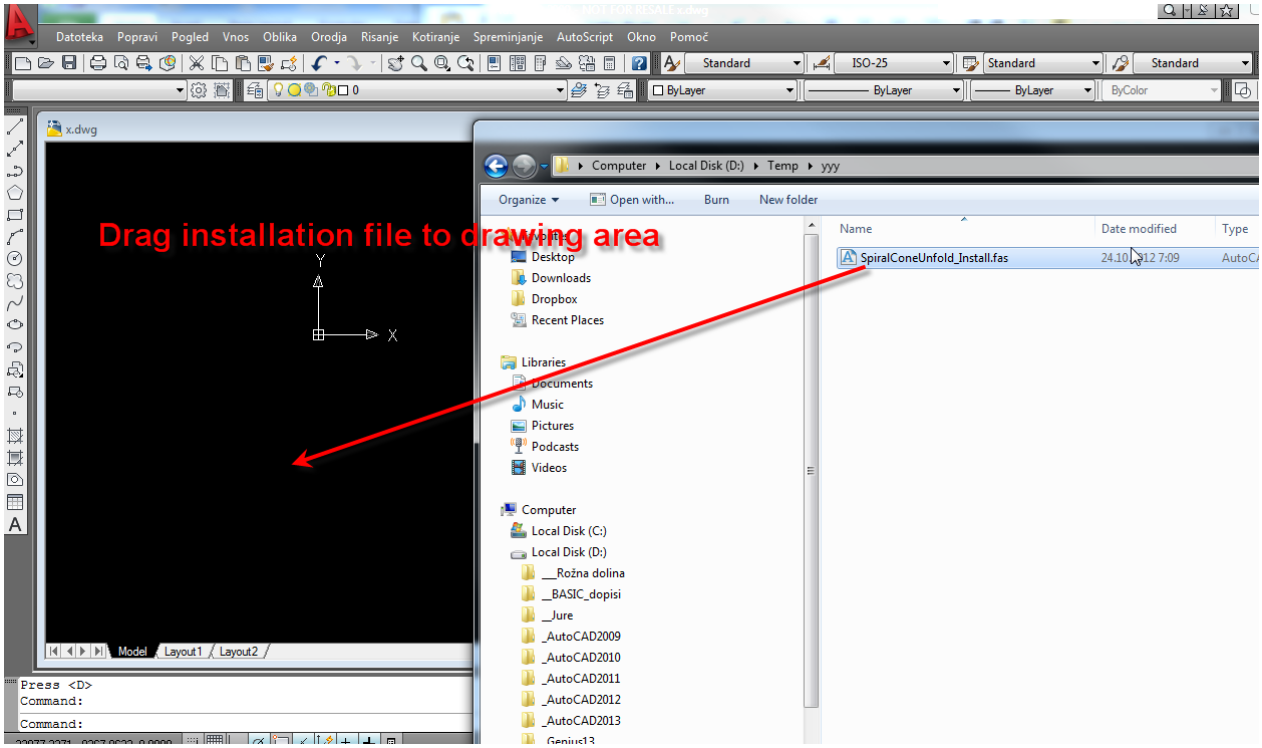
First line (column names) is ignored.

Installation

- Autodesk standard APP installation (MSI install)

- Quick & easy DDinstall © by obtaining "SpiralConeUnfold_Install.fas". Just send email to basic@basic.si. This is much faster installation for occasional user.

Installation is done by simply Drag&Drop of installation file (SpiralConeUnfold_Install.fas) into the drawing area:



- Installation for infrequest user:

1. Make standard installation

2. Copy ALL files from
   %APPDATA%\Autodesk\ApplicationPlugins\BASIC_SpiralCone_Unfolding.bundle\Contents, (%APPDATA% = C:\Users\ **Users\Username** \AppData\Roaming) to your directory to separate directory (D:\Unfolding)

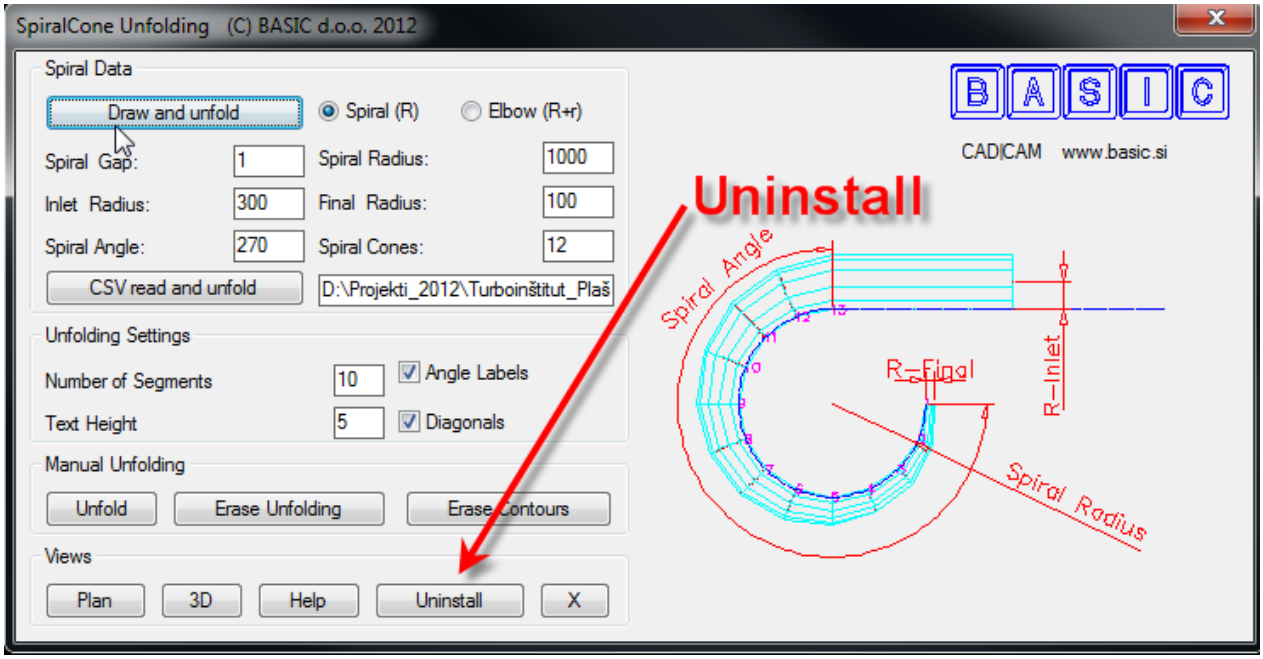
3. Add "File Search Path" to this Directory

4. Copy acaddoc.lsp to your project unfolding directory (D:\MyUnfolding)

Any file, open from your project directory¸ D:\(MyUnfolding, where acaddoc.lsp is located) will load the application. Working in other directories does not load the application.

Uninstall

- Use standard Windows Uninstall procedure (Start/Control Panel/Programs and features…
- Press [Uninstall] button and application is removed ☺



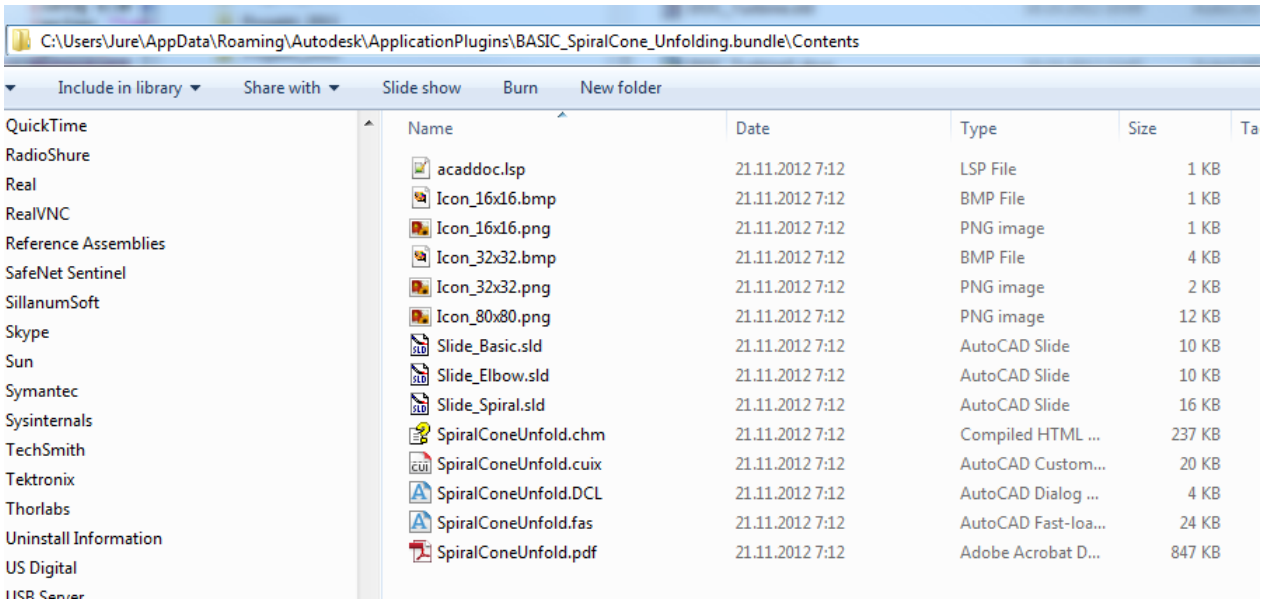
File locations

All files are in

%APPDATA%\Autodesk\ApplicationPlugins\BASIC_SpiralCone_Unfolding.bundle\Contents, where

%APPDATA% translates to C:**Users\Username**\AppData\Roaming

You can check this path with Windows file explorer:



Files are created automatically at installation:

acaddoc.lsp	Autoloading file. Loads application whenever you open a drawing.
SpiralConeUnfold.fas	Main program (loaded with every drawing)
SpiralConeUnfold.cuix	Menu file
SpiralConeUnfold.dcl	Screen dialog file
SpiralConeUnfold.chm	Helo file
SpiralConeUnfold.pdf	Help file
Slide_Basic.sld Slide_Elbow.sld Slide_Spiral.sld	Menu slide (pictures).
Icon16x16.png, Icon16x16.bmp Icon32x32.png, Icon32x32.bmp Icon80x80.png	Different Icons

All files and directory “BASIC_SpiralCone_Unfolding.bundle”, deleted by pressing [Uninstall] button.

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Settings

All settings are saved to User (drawing) variables on exiting command window.

Value (integer)	Default	Variable	Value (real)	Default	Variable
Num of Segs	10	USERI1	Text Size	5	USERR1
Angle labels	1	USERI2	Spiral Radius	1000	USERR2
Diagonals	1	USERI3	Spiral Gap	100	USERR3
Spiral Angle	270	USERI4	Inlet Radius	300	USERR4
Spiral Cones	12	USERI5	Final Radius	100	USERR5