

DXF-AAMA DXF-AAMA is a file format developed by the American Apparel Manufacturers Association in an attempt to solve the difficulties of using DXF files. **DXF is the most commonly used format for the exchange of drawing files.** Unfortunately, since DXF does not contain neither scale or units, nor usually any method of reliably describing what needs to be cut, drawn, drilled, notched etc. in a pattern file, plain DXF files are normally not very useful.

But if the DXF-AAMA format is used, files can contain many patterns either nested, or non-nested, in a form which can be easily processed and used by plotter operators.

Properly used, DXF-AAMA is almost as good as the Vectorscript format that we mainly use. It is a format which is almost a standard, and if your customers can deliver files in DXF-AAMA format, you can be almost guaranteed a nestable pattern at the end of it which is a first for DXF!

DXF-AAMA units & scale There's nothing in a plain DXF file to tell the person or program reading the file what units have been used. So 123.45 could be inches, feet, metres, furlongs or parsecs. This is not a huge problem as long as you know what units were used. So make sure that this is communicated on a drawing or note with the file.

When patterns are imported into programs like Tangent, the user has the opportunity to set the correct units, so a job is cut to the right size.

"Classic" DXF-AAMA In a DXF-AAMA file, entities in a pattern are grouped together into a block ("anonymous block" in DXF-speak). (Almost the same as VW symbols or groups.) There's more details on how to do this at the end of this section. Files can contain many blocks, each with an insertion point in the Entities section of the file. Using blocks, a file containing many instances of the same panel is much smaller than a similar file without blocks.

Each block has several layers used to describe the intent of the entities on the layer. These layers have specific names or numbers describing the intent of the layer and the tool used to plot the layer. (Names are clearer and easier to debug.)

In "Classic" DXF-AAMA, layers can be called:

Number	Name	Tool
1	CUT, OUTLINE	Rotary Blade
8	DRAW, INK	Marker tool
11	INTCUT	Rotary or drag blade
13	DRILL	Drill punch
4	NOTCH	Notch or drag blade
19	TEXT	Marker
26	REF	Reference

CUT layers contain the pattern outline which must be a single closed polyline or polygon. (This rule applies to VW outlines and outlines used in almost all nesting programs). This is essential to allow nesting.

DRAW layers contain any plotted element sent to the marker pen and can contain any of the normal DXF entities such as polyline, line, circle or arc.

INTCUT layers contain internal cut items and can contain any of the normal DXF entities such as polyline, line, circle or arc.. These are sent to a different tool to the outline to allow cut ordering. Obviously these entities can be sent to the same rotary blade tool, but can be cut before or after the outline as required.

DRILL layers contain point data only, and are sent to the drill punch.

NOTCHes are a garment specific item and are non-standard DXF. They would be hard to reproduce with a standard CAD package since they are formed by using a point for the insertion, with a direction and length stored in fields normally used for Z axis and radius coordinates. Where people want to draw a notch by hand in a CAD program, they would be best to include this as a simple cut on an INTCUT layer.

TEXT items are used for panel numbering and should contain an insertion point and the relevant text. Text items in DXF-AAMA files are handled the same way as text in a Vectorworks file. The text is substituted for vector based text, and controlled in the text options in Tangent preferences.

Any items sent to layers called REF, NONE, DIMENSION, INVISIBLE will be optionally ignored or sent to tool 8 (grey) which will screen in Tangent, but not be cut. Users can put their normal drawing details in these layers and not have them cut.

What's missing? The AAMA format was developed for garments where most jobs are cut on a high ply cutter with a knife and possibly a drill.

AAMA files ignore pattern features and tools commonly used in industrial textiles work including different diameter rotary blade cutters, creasing tools, internal cut tools and specialised tools such as grinders and sanders. For that reason, we've added support for these items on extra layers called:

Number	Name	Tool
	CREASE	Creaser
	INTCUT2	Drag or rotary blade
	INTERNAL	Drag or rotary blade
	RECIPRO	Recipro Cutter
	DRAG	Drag blade
1001..1002..etc.		Unassigned**

** Aeronaut's Tangent software supports layer numbers from 1001 upwards. This provides users with the ability to add extra layers where necessary and to assign tools and different setups to these layers as required without conflicting with "classic" DXF-AAMA which ignores the additional layers.

When you are setting up drawings for export to DXF-AAMA files, you can use these extra layer names and numbers to get greater flexibility.

If you have customers who regularly deliver, or attempt to deliver, eccentric DXF files, getting them to use the DXF-AAMA format will help both of you get consistent results without the mistakes and confusion which can often result from uneducated DXF files.

DXF versions Always use the most basic DXF export you can find. Post DXF release 12, things started to get vague with all sorts of additional and undocumented features added to DXF files which few people understand. DXF release 12 is a published format and is the best to use.

Creating a DXF-AAMA file

This section is written for people who are creating DXF drawings for import into Tangent or any other nesting and plotting program.

Setting up a DXF-AAMA format is very very easy! The majority of problems with DXF files are caused by people, not software. There are a things which will reduce these problems considerably. *Communicate! Think!*

In most cases, an entire drawing is neither needed nor wanted. The purpose of the document is to generate tool paths for a machine. So bear that in mind when formatting and exporting. In most cases nobody will need to open the drawing in a CAD program, so eliminate what is not essential.

Think about what is needed in a drawing, format and export accordingly.

If you know a few things about the file which you are trying to exchange, it is far easier to translate it. You should communicate...

The Scale,

The Units,

The Fabric Width,

All that's necessary to create a DXF-AAMA file is to format the drawing in a specific way. The drawing needs to have a layer for each type of tool you want to use. The layer can be numbered or named with the special layer names detailed below (CUT, DRAW, DRILL etc.)

Aeronaut recommends that even if your cutter has only got one cutting tool, that internal and external cuts are put on different layers. You can always choose to cut everything with the same setup but if all entities to be cut are in the same layer, you have no choice.

Bear in mind what the drawing represents... it is not something to be printed on paper or viewed on screen. The drawing is data for a cutter, and all lines represent tool paths. The more garbage there is in the file, the more likely you are to have problems.

Once a drawing is set up correctly, save it as a template. Probably the best way to work is to copy patterns from the original drawing and paste into an AAMA template and then export as a DXF file.

Alternatively, entities which are not to appear on the cut pattern have to be put on a reference layer, made invisible or deleted. This applies to all title blocks, engineering details etc.

The four stages...

These are the four essential stages to format for DXF-AAMA export.

1. Assign each entity to a layer.
2. Join the outer cut paths of patterns into a single closed polyline.
3. Group or make a block of all the parts of each pattern.
4. Export to DXF.

The stages which follow are for AutoCAD. Other software may use similar or more modern names for these stages. For help with AutoCAD, see [http:// docs.autodesk.com](http://docs.autodesk.com)

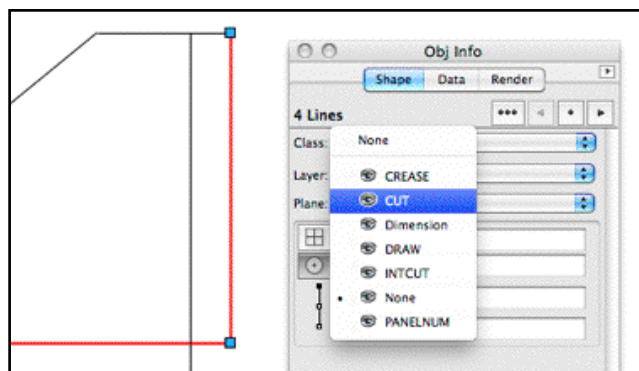
1. Assigning and re-assigning layers:

To change the layer of one or more objects

- Select the objects whose layer you want to change.
- Click Home tab: Layers panel: Layer Properties
- In the Layer Properties Manager, select the layer that you want to assign to the objects.
- Press ESC to remove selection.

In Vectorworks:

- Select the objects whose layer you want to change.
- In the object info palette, select a layer name from the popup.



2. Join the outer cut paths of patterns into a single closed polyline.

In AutoCAD, this is called “Join Polyline Segments”

You can join a line, an arc, or another polyline to an open polyline if their ends connect or are close to each other.

If the ends are not coincident but are within a distance that you can set, called the fuzz distance, the ends are joined by either trimming them, extending them, or connecting them with a new segment.

Spline-fit polylines return to their original shape when joined. Polylines cannot be joined into a Y shape. (Note, a cut outline cannot have a forked join either!)

If the properties of several objects being joined into a polyline differ, the resulting polyline inherits the properties of the first object that you selected.

To join polylines, splines, lines, and arcs into a single polyline

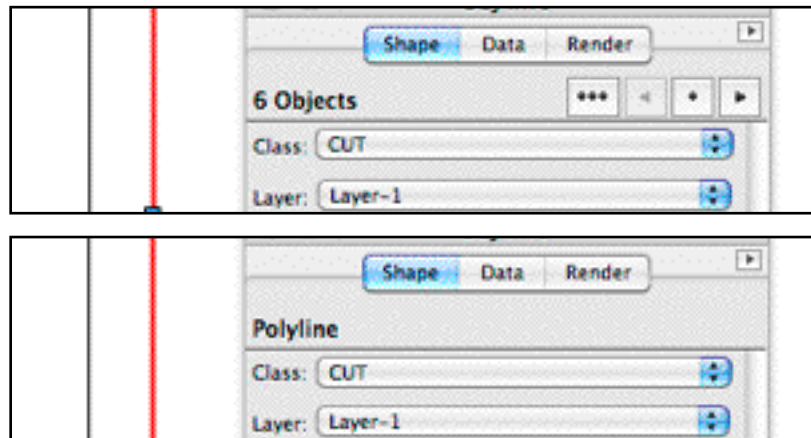
- Click Home tab: Modify panel: Edit Polyline.
- Select a polyline, spline, line, or arc to edit. If you selected a spline, line, or arc, press Enter to convert the selected object into a polyline.
- Enter j (Join).
- Select one or more polylines, splines, lines, or arcs that are located end to end.

Each selected polyline, spline, line, or arc is now joined into a single polyline.

- Press Enter to end the command.

In Vectorworks:

- Select the objects which you want to form into a polyline.
- From the Tools menu, select the Compose menu item. Check with the Object info palette to make sure that only one polyline remains.

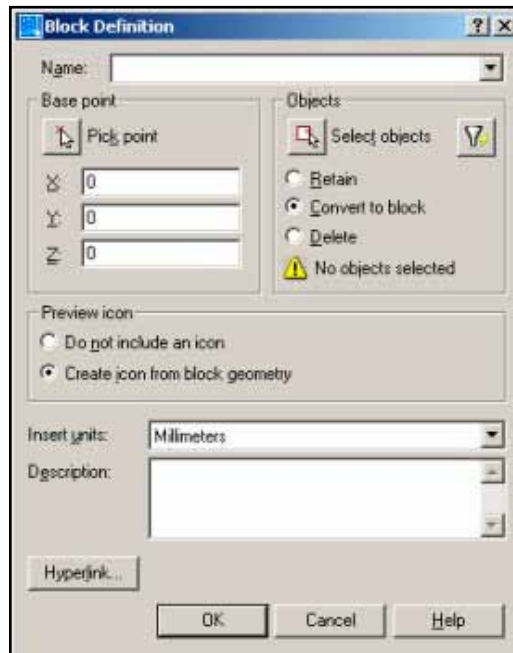


6 objects have been turned into one Polyline. Success!

3. Grouping.

To get all the entities from a single panel into a group, in AutoCAD you use a BLOCK. A block in Autocad is a collection of all of the line and arc entities that create an object, grouped together to make one selectable object. Selecting one particular entity (such as a midpoint of a line for example) will select all objects contained within the block.

Open the 'block definition' box by typing the command **block** into the Autocad console, then press return. Type the pattern number into the name box.



Click the Select objects button to select all the parts of the pattern including the pattern number etc. Right-click or press enter to return to the block definition box. Within the objects section there are 3 options to choose from: Retain, Convert to Block and Delete.

Select Convert to Block. The selected entities will be converted into a block, and will remain in place on the drawing.

Click on the OK button to create the block.

Note, that it's not normally necessary to name the block. However, if you do give the block a name, make it the same as the panel number.

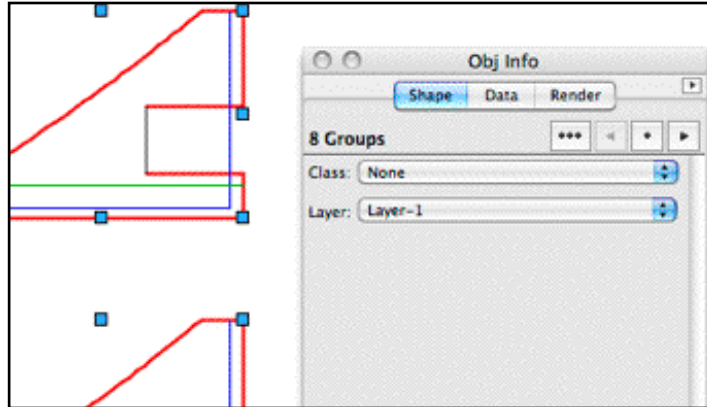
In Vectorworks:

- Select the objects which you want to group.
- Press **⌘-G** or select "Group" from the Organise menu. The Object info palette will show the entities are now a Group.

4. Export to DXF.

Before you export the patterns, check to make sure that the only things visible in the drawing are the patterns. Remember, it's a cut file now and things like text and title blocks are irrelevant.

In Vectorworks, you can do a Select All... (⌘-A) and check the object info palette. It should read "n groups" and there should be nothing else loose in the drawing.



To create a DXF file in AutoCAD...

Click File menu: Save As.

In the Save Drawing As dialog box, in the Files of Type box, select a DXF format. Try to use DXF release 12 or similar.

To save the entire drawing in DXF format, go directly to step 4.

To save specific objects in DXF format, click Tools Options. In the Save as Options dialog box, select the DXF format you want and select Select Objects. Enter a value for the number of decimal places of accuracy (2 places for millimetres and 4 for inches is enough). Click OK.

In the Save Drawing As dialog box, select a folder and enter a file name. Click Save.

The .dxf extension is appended to the file name. There's no need to append AAMA. However if you do save as .aama, Tangent will accept this as a valid DXF file.

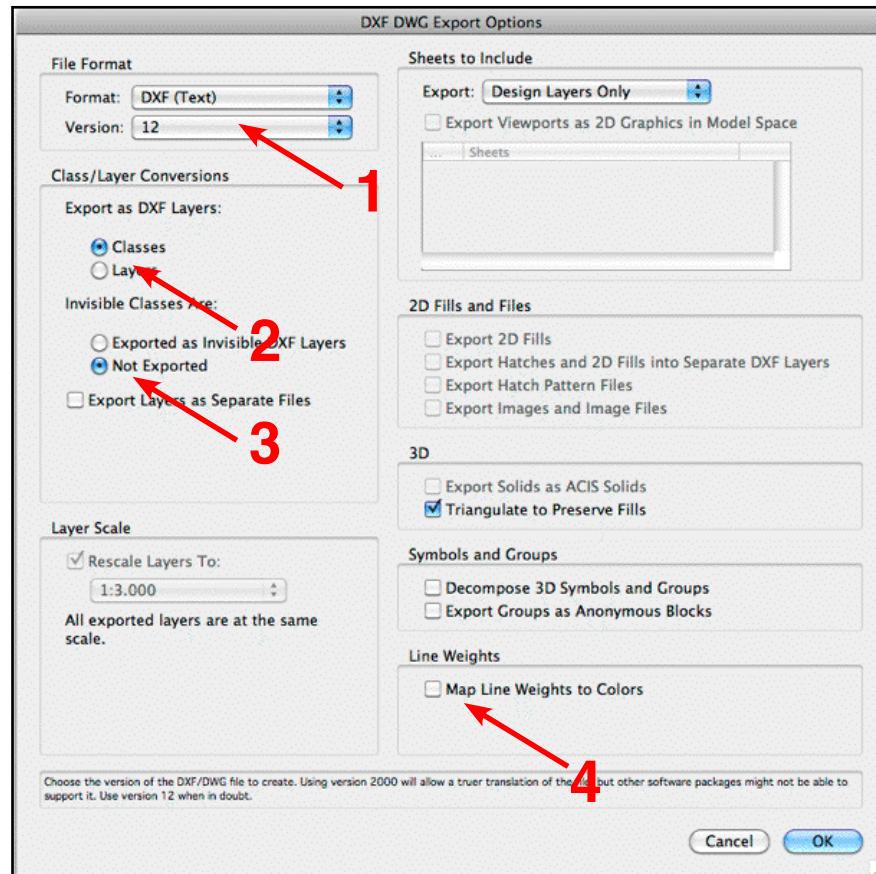
It's a good idea to tag the file name with the date or fabric name. Example:
Colins FR1000 12-02-11.dxf

Remember not to use characters such as /:\. which can cause problems with the operating system.

If you chose to save only selected objects, select the objects and press ENTER.

To create a DXF file in Vectorworks:

From the file menu, select Export: Export DXF/DWG.



In the Export Options dialog;

- Select DXF version 12 as the export format.
- If you have used Vectorworks classes, choose Export Classes as layers. Vectorworks classes are close in functionality to AutoCAD layers (which are not really layers at all).
- Invisible layers or classes are not exported.
- Don't map line weights to colours. It won't affect your output, but if you try to re-import your DXF drawing, this option will wreck it.
- Click OK to export the drawing. Name it after the job. It's a good idea to tag the file name with the date or fabric name. Example: Collins FR1000 12-02-11.dxf

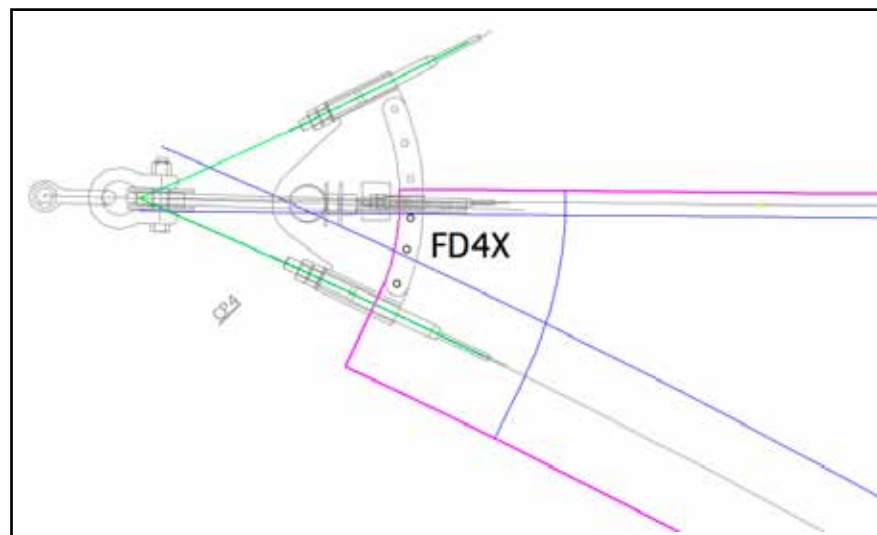
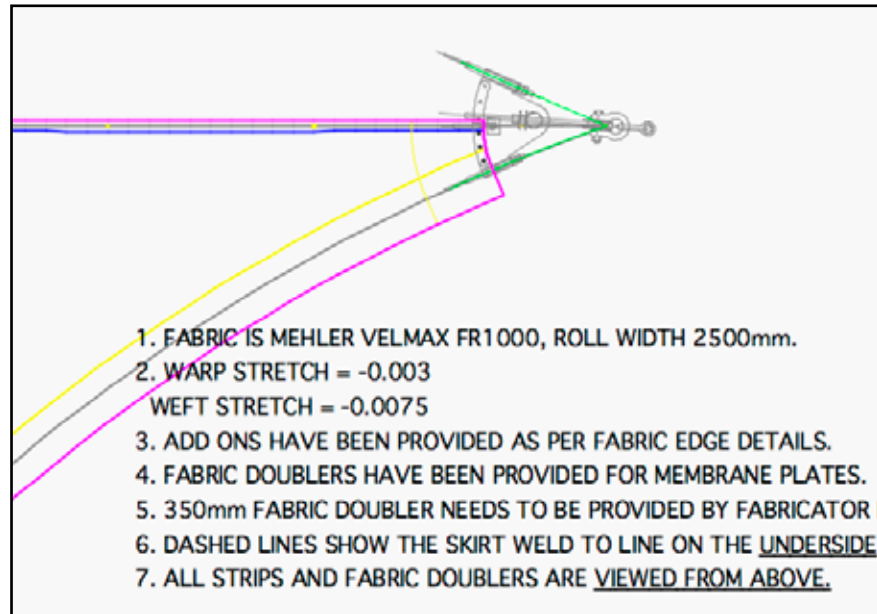
Remember not to use characters such as /:\. which can cause problems with the operating system.

Problems with DXF-AAMA files

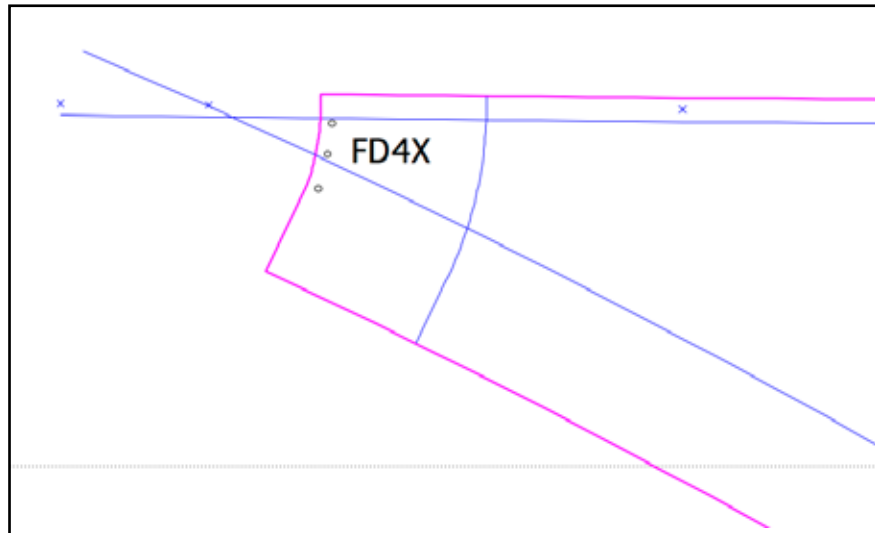
Initially, you can have a few problems with DXF-AAMA files. The most common are failing to do one or more of the four stages listed above.

- Not assigning entities to the correct layer.
- Not making the outline into one closed polyline which affects nesting.
- Not grouping patterns.

The other big problem is objects included in a drawing which should *never* be there. Remember, *it's a cut file not a print job!* The picture below shows a lot of what should not be present in a file intended for cutting.



The text blocks and metalwork should either be made invisible, put on a reference layer or deleted before exporting to DXF.



Bear in mind some of the basics. An outline is an outline. Everything you want drawn or cut in a panel MUST be inside the outline (or it isn't an outline is it?) This is especially important when nesting since the nesting routines in most programs use the outline and ignore entities inside a pattern.

When you delete the non-essential items, you can see more clearly that there are markings extending way off the edge of the pattern. These are almost certainly going to cause problems.

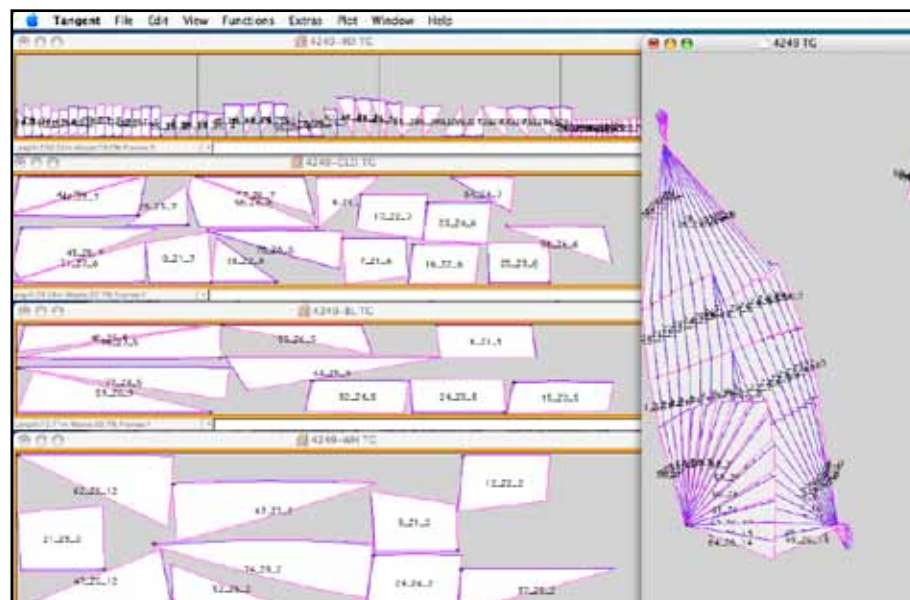
To begin with, start by creating and exporting very simple DXF-AAMA files to Tangent. When you are sure your scale and units are correct, and that the layers in your template give you enough flexibility with the tools you want to use, you can start to work with more complicated files. It is possible with many CAD programs to write a macro or plug-in tool to automatically format a DXF-AAMA drawing.

Multiple panels and queue Windows

The advantage of using DXF-AAMA as a file format (compared with almost anything else other than Vectorworks, EPSF or some proprietary format such as Plotmaker ASCII or NTV,) is that it is easy to set up files which contain more than one panel, and even more than one type of fabric. Strictly speaking, multiple fabrics are not part of the AAMA format, but since they do not break the format, it works fine.

To set up a multiple panel file, you just put each group or BLOCK into a layer which corresponds to the fabric name. When this file is opened in Tangent, a new queue/window will be created for each fabric.

The DXF format supports a separate layer or class name for the BLOCK itself. So, while each entity within the BLOCK has its own layer name (CUT, OUTLINE, DRAW etc.) you can give the BLOCK itself another layer name such as FABRIC1, FABRIC2 etc.



When imported into Tangent, this type of file will generate a new window for every type of fabric it finds in the file.

CAUTION! If you are not careful, your files can contain layer names outside the BLOCKS section of the DXF file (in the ENTITIES section of the file) which can generate new queue windows in Tangent. In many cases these windows will be empty. This is not so much a fault in Tangent as a fault with the file. Normally, deleting the windows will not cause problems.

**DXF-AAMA
Layer Names**

Layer Number	Alternative Layer Name	Tool
1	CUT, OUTLINE	Rotary Blade
4	NOTCH	Notch or drag blade
8	DRAW, INK	Marker tool
9	STRIPE	Grid or Stripe reference
10	MARKER	Marker or Plaid reference
11	INTCUT	Rotary or drag blade
13	DRILL	Drill punch
15	TEXT	Annotations
19	TEXT	Marker
26	REF	Reference
	CREASE	Creaser
	INTCUT2	Drag or rotary blade
	INTERNAL	Drag or rotary blade
	RECIPRO	Recipro Cutter
	DRAG	Drag blade
1001..1002..1003	1001..1002..1003	Unassigned

Layers above 1001 can be freely used. If you don't know what tool to use, assign a layer above 1001 and then assign the tool and setup alter in Tangent.

Typical DXF-AAMA panel

