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Module 4

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Pattern Information

Getting additional information from the pattern and the model.

Measure

You may find the distance between any two points on either the pattern or the 3D model by clicking the measure button on the tool bar. Move the cursor over the first point press down the left mouse button, release the button over the second point. The point-to-point distance is displayed in a dialogue in addition the coordinates of each point, the angle in the X-Y plane, the distance in the X, Y and Z directions (delta X, delta Y, delta Z) are displayed.
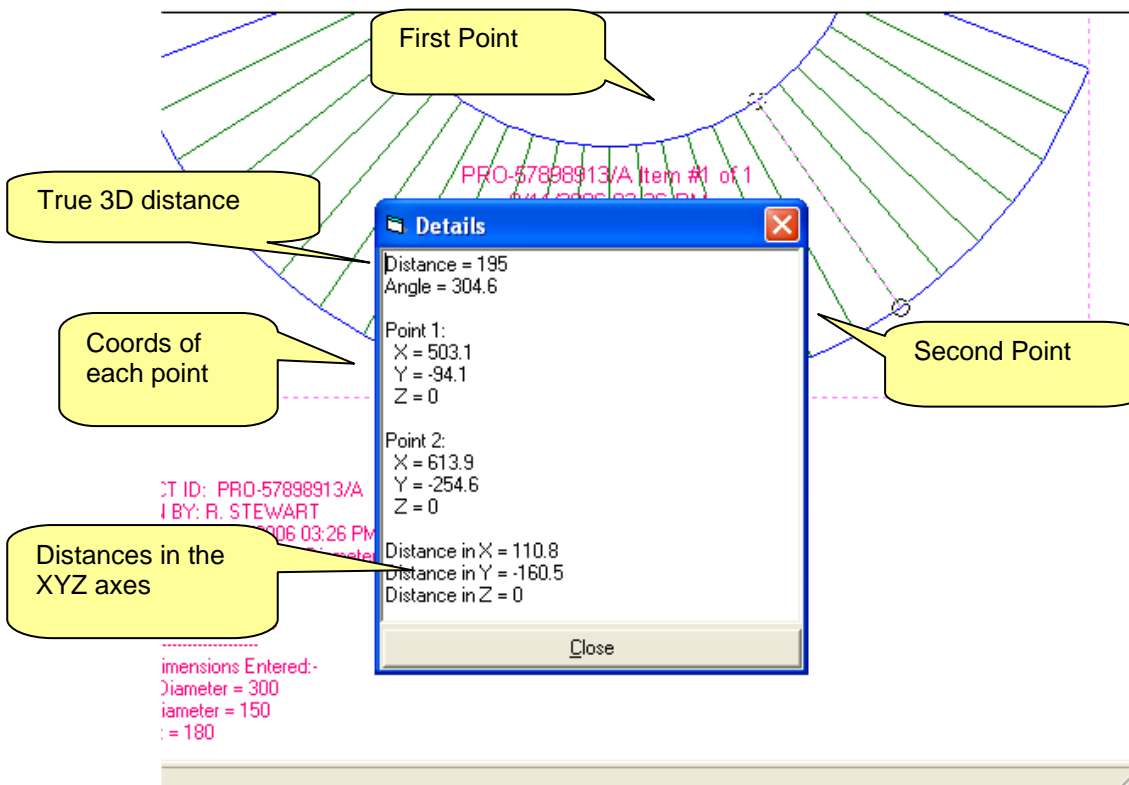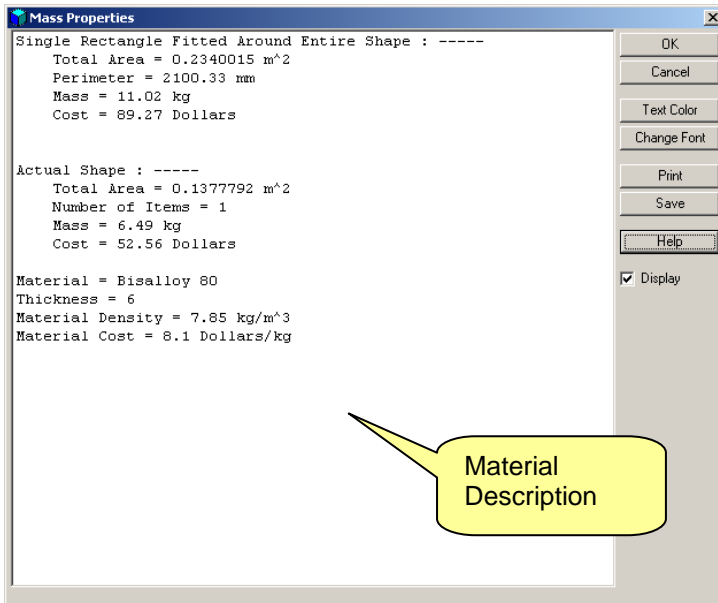

Mass Properties

Information to assist estimating the cost of a project is available through the Mass Properties feature. The shape must have been given a **thickness** setting and a **material** must have been selected from the **Properties** dialog. The Materials Table must be kept up to date with current prices for accurate cost estimates to be obtained (see Materials Editor below for instructions).

Click the material properties on the toolbar to display the *Mass Properties* dialogue box. This will show us the area, mass and cost of the shape in three modes:

1. **Single Rectangle Fitted Around The Entire Shape.** This provides the area, perimeter, mass and cost of material based on a rectangle fitted to the extremities of the entire shape. The rectangle includes spacing between each item if there are multiple items. It is the minimum rectangle from which the shape may be cut in the current position and rotation.
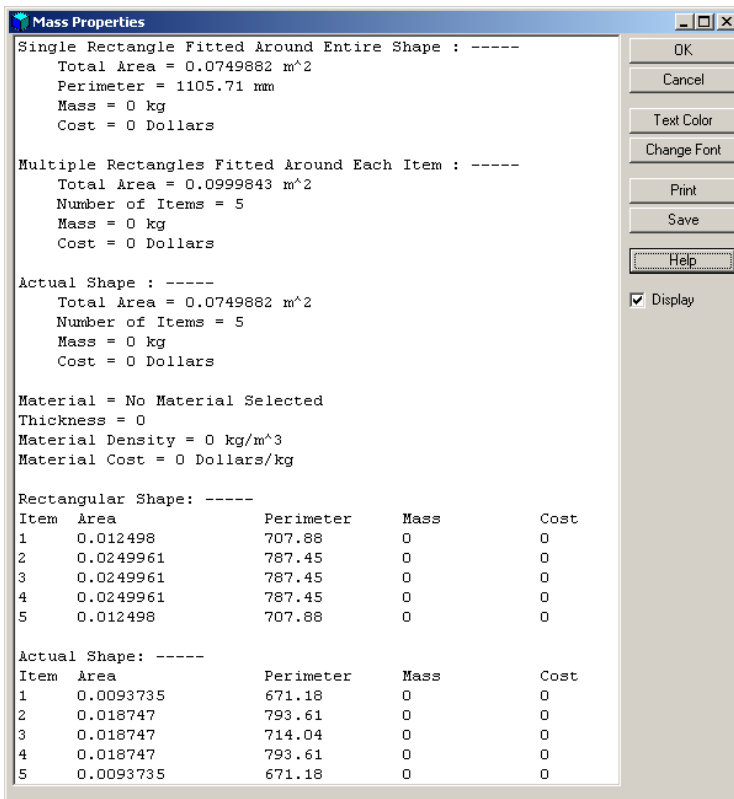
2. **Actual Shape.** This is the true area, perimeter and mass of the cut shape. If the shape is made up of multiple parts the area is the sum of the areas of the individual true shapes. This will be the mass of the finished item and may also be useful during the design phase of the project

```
Mass Properties                                    [x]
Single Rectangle Fitted Around Entire Shape : -----    ┌──────┐
      Total Area = 0.2340015 m^2                        │  OK  │
      Perimeter = 2100.33 mm                            └──────┘
      Mass = 11.02 kg                                   ┌──────┐
      Cost = 89.27 Dollars                              │Cancel│
                                                        └──────┘
                                                        ┌──────────┐
Actual Shape : -----                                    │Text Color│
      Total Area = 0.1377792 m^2                         └──────────┘
      Number of Items = 1                               ┌───────────┐
      Mass = 6.49 kg                                    │Change Font│
      Cost = 52.56 Dollars                              └───────────┘
                                                        ┌──────┐
Material = Bisalloy 80                                  │ Print│
Thickness = 6                                           └──────┘
Material Density = 7.85 kg/m^3                          ┌──────┐
Material Cost = 8.1 Dollars/kg                          │ Save │
                                                        └──────┘
                                                        ┌──────┐
                                                        │ Help │
                                                        └──────┘
                                                        ☑ Display
```

Material Description

If the "Apply Label" check box is ticked, the label information will be printed onto the drawing. Once the label is on the drawing, it can be moved simply by clicking on it and holding down the left mouse button while dragging.

Double click the label text to re-open the label dialog box. You may change the text color and font size. Hide the label by de-selecting the 'Display' check-box.

Important Note: If the material thickness is 0 (zero), then the mass and cost will also be zero. If this is the case, exit from the Material Properties dialog and set the material thickness. The program can now calculate the mass.

```
Mass Properties                                    [_][□][x]
Single Rectangle Fitted Around Entire Shape : -----    ┌──────┐
      Total Area = 0.0749882 m^2                        │  OK  │
      Perimeter = 1105.71 mm                            └──────┘
      Mass = 0 kg                                       ┌──────┐
      Cost = 0 Dollars                                  │Cancel│
                                                        └──────┘
Multiple Rectangles Fitted Around Each Item : -----    ┌──────────┐
      Total Area = 0.0999843 m^2                         │Text Color│
      Number of Items = 5                               └──────────┘
      Mass = 0 kg                                       ┌───────────┐
      Cost = 0 Dollars                                  │Change Font│
                                                        └───────────┘
Actual Shape : -----                                    ┌──────┐
      Total Area = 0.0749882 m^2                         │ Print│
      Number of Items = 5                               └──────┘
      Mass = 0 kg                                       ┌──────┐
      Cost = 0 Dollars                                  │ Save │
                                                        └──────┘
Material = No Material Selected                         ┌──────┐
Thickness = 0                                           │ Help │
Material Density = 0 kg/m^3                             └──────┘
Material Cost = 0 Dollars/kg                            ☑ Display

Rectangular Shape: -----
Item  Area            Perimeter    Mass       Cost
1     0.012498        707.88       0          0
2     0.0249961       787.45       0          0
3     0.0249961       787.45       0          0
4     0.0249961       787.45       0          0
5     0.012498        707.88       0          0

Actual Shape: -----
Item  Area            Perimeter    Mass       Cost
1     0.0093735       671.18       0          0
2     0.018747        793.61       0          0
3     0.018747        714.04       0          0
4     0.018747        793.61       0          0
5     0.0093735       671.18       0          0
```

If the shape consists of multiple patterns, such as an elbow, segmented bend or breech, additional information is provided that details the individual patterns.

The properties information may be added to the pattern drawing, printed or saved as a text file. If it is printed or saved the Project ID, shape name, time and date are added.

Materials Editor

For the mass and cost to be accurate, some preliminary work is needed.

First, go to the 'Tools' pull-down menu and select 'Global Options'. Click on the 'Material' Tab. Click the option button to select 'Inches' or 'millimeters'. Also enter the unit of currency required if your national currency is not dollars. Click the 'Save' button if you wish to save these settings as "defaults" for future shapes.
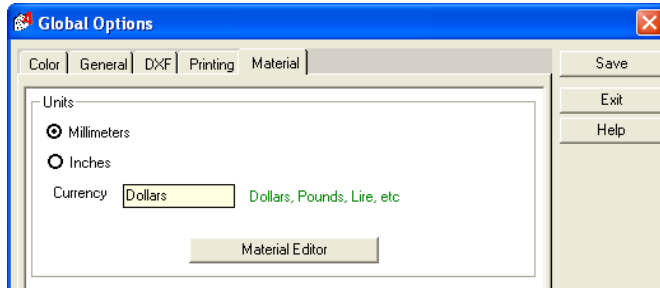
Next, click the 'Material Editor' button. Some sample data has been entered into the *Materials Editor* for testing purposes and this should be replaced with current data from your material supplier.

Note: The materials editor may also be accessed directly from the 'Tools' pull-down menu.

It consists of a table of 'Description', 'Mass Per Unit Area' and Cost Per Unit Area. In the case of the **metric units**, the area is converted to square meters to reduce the size of the numbers. The value "**Kg/sq. m**" is the mass in kilograms of a square meter of the material **per 1 mm of thickness**.
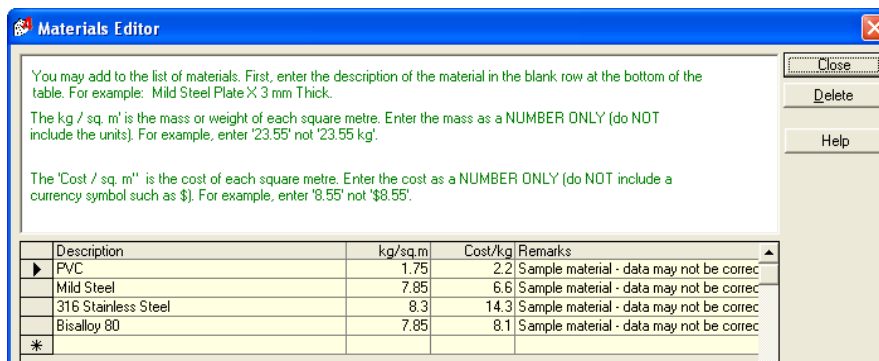
Material table - Metric
Some steel merchants quote the density of material per cubic meter (this is typically 7850 kg/cubic meter for steel). If this is the case, divide it by 1000 to get the mass per mm of thickness. The cost is in dollars (or your currency) per kg.
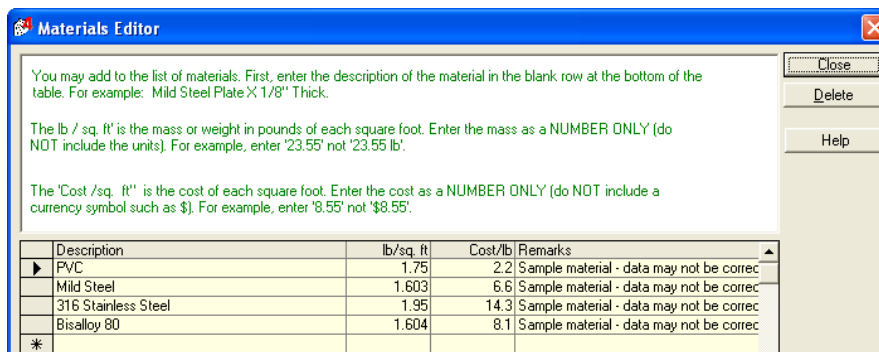
Material table - Imperial (inches)

In the case of the Imperial (**inch**) units the area is in **square feet**. The mass is in pounds per square foot **for 1 inch of thickness** of the material. The cost is in dollars (or your currency) per pound (lb).

The Materials data may also be modified using Microsoft Access, however be careful not to change field names or leave blank rows or blank values within a row. The name of the file is Materials.mdb

---

Next, there must be a thickness setting greater than 0. With a thickness of 0 (zero), the mass and the cost will show as 0 (zero).

Note that the materials data file, **Materials.mdb**, must be backed up regularly. This *file will be overwritten when you install a program update from the web-site*.
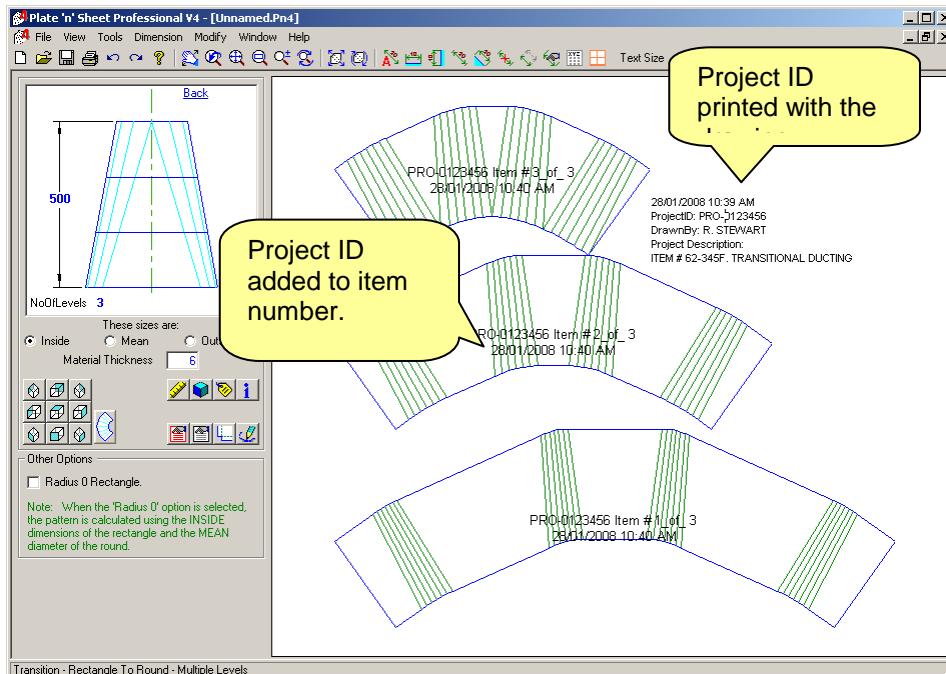
Project Identification
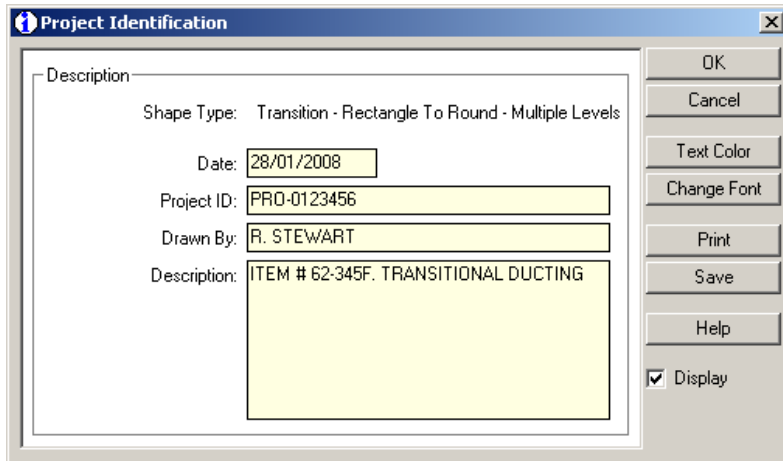
Click the project identification button on the tool bar to display the identification dialogue box.

You may enter a project identification name or number, project description and the name or initials of the person who has produced it.

This information will be saved with the shape and can be recalled at any time. It is added to the Label and may be printed with the drawing. In addition, if you have the Auto-Dimension option "Item Numbers" selected the Project ID will be printed on each part.

Label
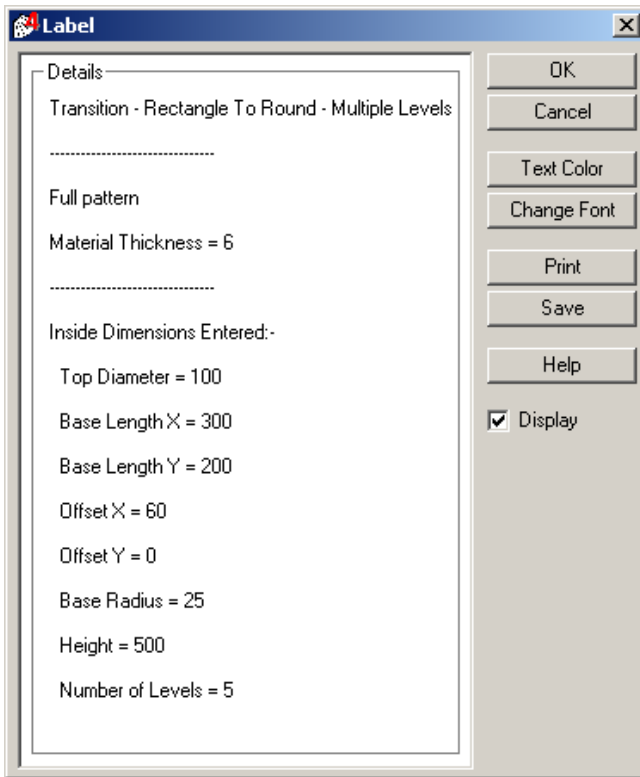
A label may be positioned on the drawing to show the parameters entered to create to the shape.

This can be printed with the pattern as a way of identifying the pattern and so the fabricator can check that the dimensions are correct during the rolling or pressing operation.

Click "Display" check-box to hide or display the label on the drawing.

If the "**Display**" check box is ticked, the label information will be printed onto the drawing.

Once the label is on the drawing, it can be moved simply by clicking on it and holding down the left mouse button while dragging.

Double click the label text to re-open the label dialog box. You may change the text color, font size or hide the label by de-selecting the "**Display**" check box. The label may also be printed separately for attachment to the cut material.
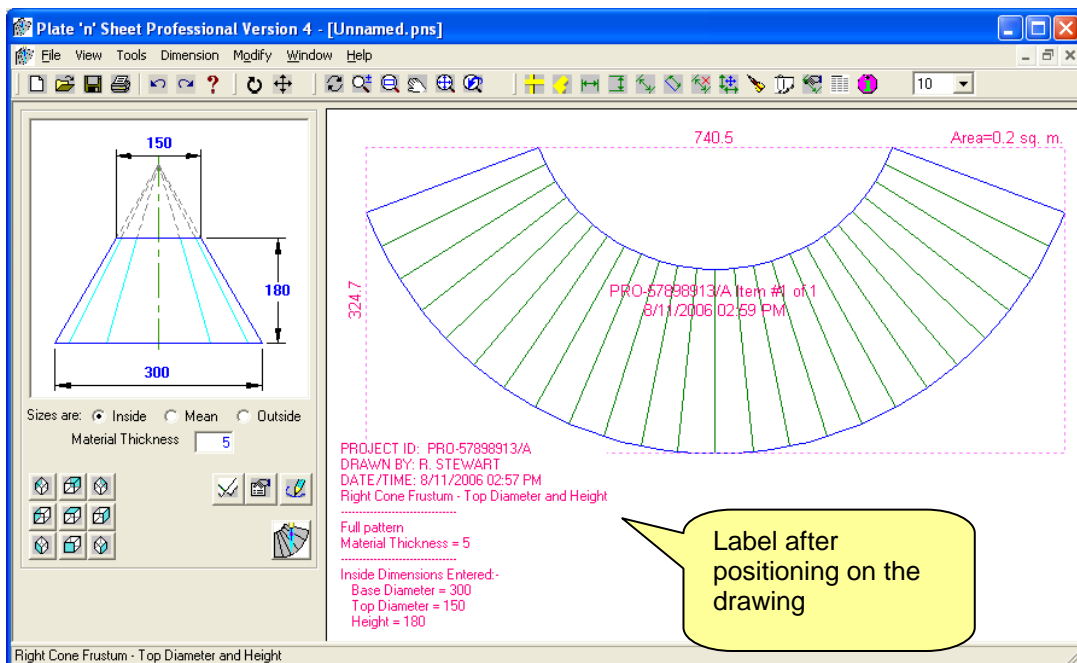
Do not be concerned if the label hides lines on the drawing. When it is printed the text will be transparent. If you click the print button and view the Print Preview, you will see what the drawing will look like after printing.

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Professional Edition

Export DXF and Send to AutoCAD Options

Overview

The DXF is a common format for exchanging CAD data between programs. Use the '**Export DXF**' you wish to export the unfolded pattern or 3D model to a CAD program or other software for further drafting.

For example, you may wish to add the unfolded pattern or views of the model into an existing CAD drawing for further dimensioning. Select '**Export DXF**' and save the file with a meaningful name. Open this file with the CAD program you are using and continue to work on it.

These tasks are selected from the "File" pull-down menu.

If you are using **AutoCAD** (the "full" version 2000 or later) you can transfer the pattern or view directly onto the AutoCAD screen.

If you are using **AutoCAD LT** you must save the DXF, as described above, and open it with AutoCAD LT. You may also insert the DXF into an existing drawing as a block.
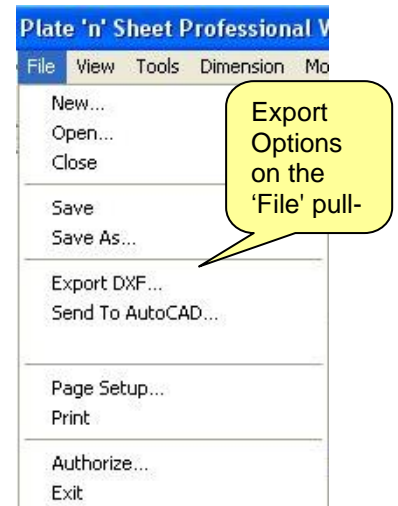
Many NC profile cutters also use software that can read a DXF file and generate the NC code. Nesting programs can also usually read a DXF exported from Plate 'n' Sheet.

The options available for the 'Export DXF' and 'Send to AutoCAD' are the same. In each case you may export:

The Unfolded Pattern.

The 3D Model.

The current view of the 3D model as a 2D drawing.

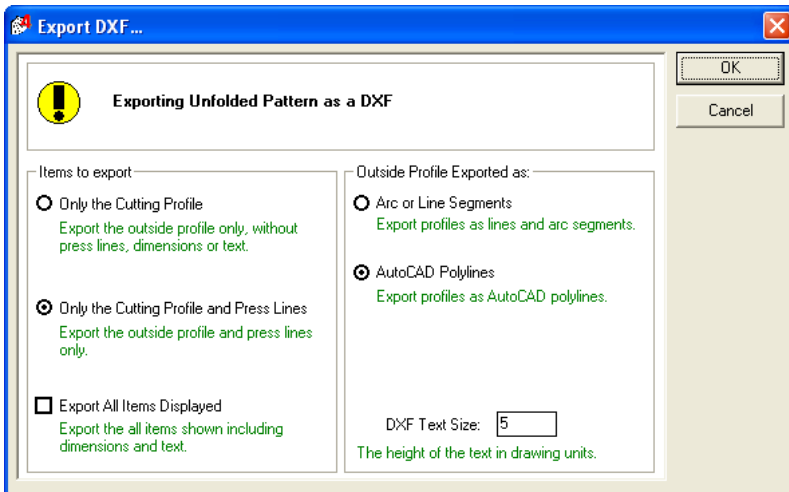In addition, you may choose to export the shape only or include dimensions and text.

Note that the current view determines what is exported and the options that are available. If the current view is of the unfolded pattern, the available options will be a little different than if the view is of the model.

In either case, when you select 'Export DXF', you will be prompted for a filename. Make a note of the name and the folder. Meaningful names are usually best – use the Job Number, or client name, etc.

Exporting a Pattern

The following options are available if the current view is of the unfolded pattern.

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The available options are grouped as follows:

'**Items to Export**': You may choose to export the cutting profile only, the cutting profile with press lines. In addition, by clicking the 'Export All Items Displayed' checkbox any dimensions, labels or text may be exported as part of the DXF.

'**Outside Profile Exported As**': These options determine the entity type used for the outside profiles. AutoCAD polylines are a continuous sequence of connected points. It behaves as a single entity. This has some advantages to AutoCAD users but is not always compatible with other CAD programs.

Note: The 'Arc and line' option uses a series of arcs of best fit around curves. Polylines, on the other hand, connect each point with straight-line segments. Consider increasing the number of press lines to get a smoother curve around radii if using this option.

The DXF text size may be set at this point. The default value is determined by the Global Options setting. This size is a dimension in drawing units. For example, if you are creating a cone that is 2400 mm in diameter, the text may have to be 50 mm high to be legible on the printed drawing. Once the shape has been imported into a CAD program it may be modified.

Exporting a Model

The following options are available if the current view is of the unfolded pattern.
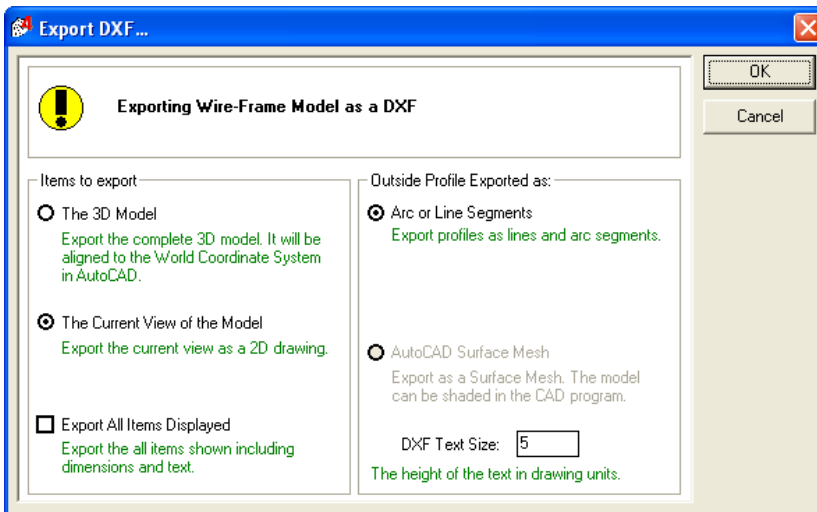
The available options are grouped as follows:

'**Items to Export**': You may choose to export the full 3D Model, where each point is an X,Y,Z coordinate. Alternatively, you may export the current view as a 2D drawing. In addition, by clicking the '**Export All Items Displayed**' checkbox any dimensions, labels or text will be exported as part of the DXF.

'**Outside Profile Exported As**': These options determine the entity type used to construct the shape. If you are exporting the 3D model you may export it as a surface mesh or as line segments. A surface mesh can be shaded or rendered in AutoCAD but may not be compatible with all CAD programs. A 3D model exported as lines and arcs is more compatible but is a "wire-frame" model and cannot be shaded.

Printing

Print Setup

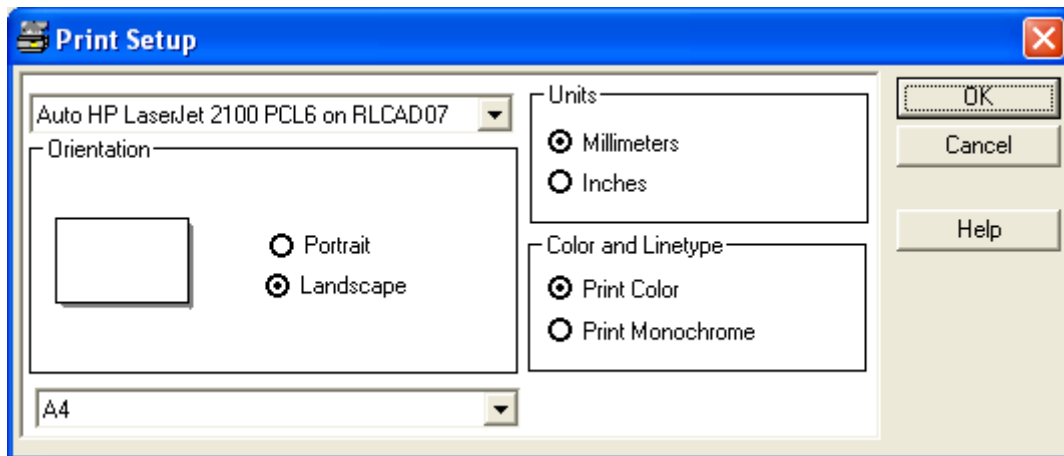The Print Setup dialog box is provided so that you can:

Select a printer

Set a page size

Set the page orientation (portrait or landscape mode)

Set the units to be either inches or millimeters

Decide whether the printed drawing is in color or monochrome (black and white).

You will find access to the Print Setup dialog from the 'File' pull-down menu.. The initial (default) settings may be set and saved in 'Global Options'.

Print Frames

Print frames, representing the limits of your printer can be superimposed over the pattern. This shows how the pattern is positions relative to the sheet. Sometimes rotating or moving the pattern can save sheets of paper prior to printing.

The Two Modes of Printing

Printing a Template: Select this option if you wish to print the unfolded pattern to scale to use as a template. The first preview will show the extents of the shape and the number of pages required to print it.

Print the Current View: Selecting this option allows the user to print the current view including a 3D model view or a pattern view but it will not be to scale. It will be printed at the current zoom scale.
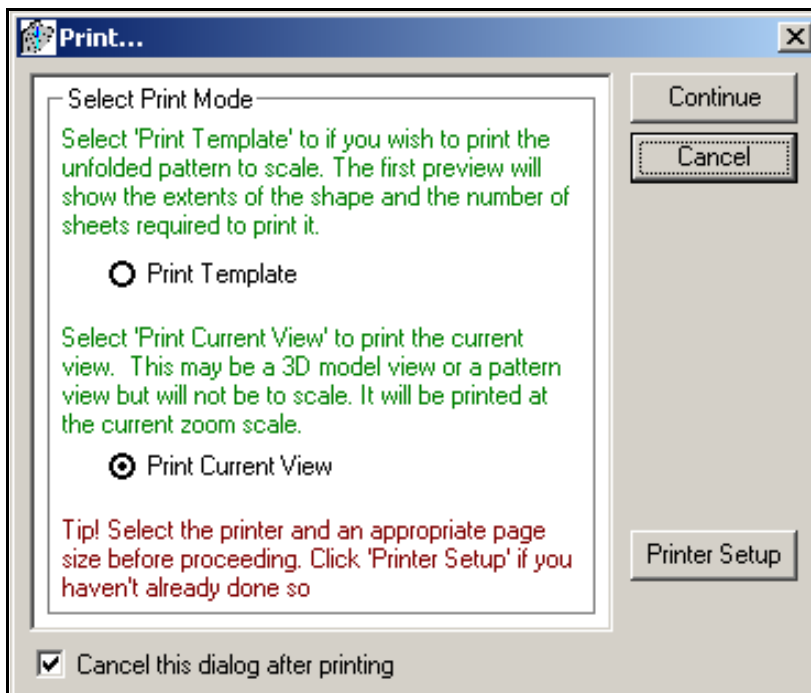
Selecting an option will automatically display the '**Print Preview**' window. The preview window will have different options depending on whether you have chosen to print a template or a view.

Printing the Current View

Select "**Print current view**" to print what is shown on the screen. By clicking the "**Display/Hide Scale on Border**" button you can choose to print showing the border and/or ruler marks. There is only one "**Select Printing Operation**" option when in this mode and that is to print what displayed.
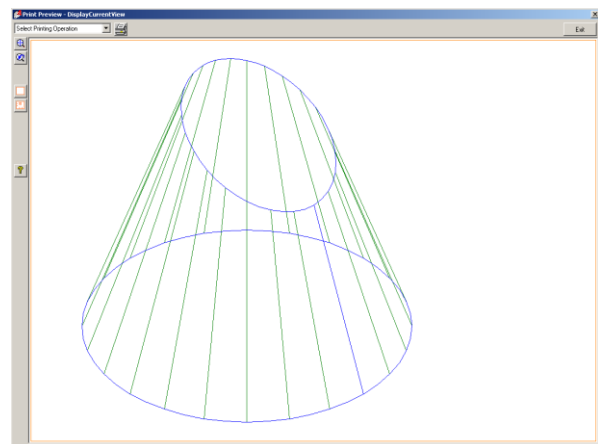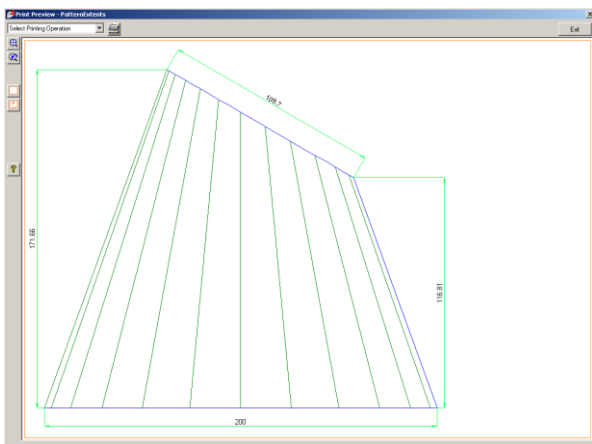
Printing a Template

Select "**Print template**" if you wish to print a full-size pattern. You can choose to print the template with or without scale marks by toggling the "**Show/hide Scale on Borders**" button.

If the shape is larger than the sheet size selected in '**Printer Setup**', the outline of multiple sheets will be superimposed over the shape. You may print individual sheets, all of the sheets or the entire shape scaled down to fit on a single sheet. This selection is made from the drop-down list in the upper left corner of the "**Print Preview**" window.

You can print on one page or multiple pages depending on the pattern size and orientation. If printing on multiple pages the page numbers will be shown in the bottom left hand corner (A1, A2 … B1, B2….) of the sheet.