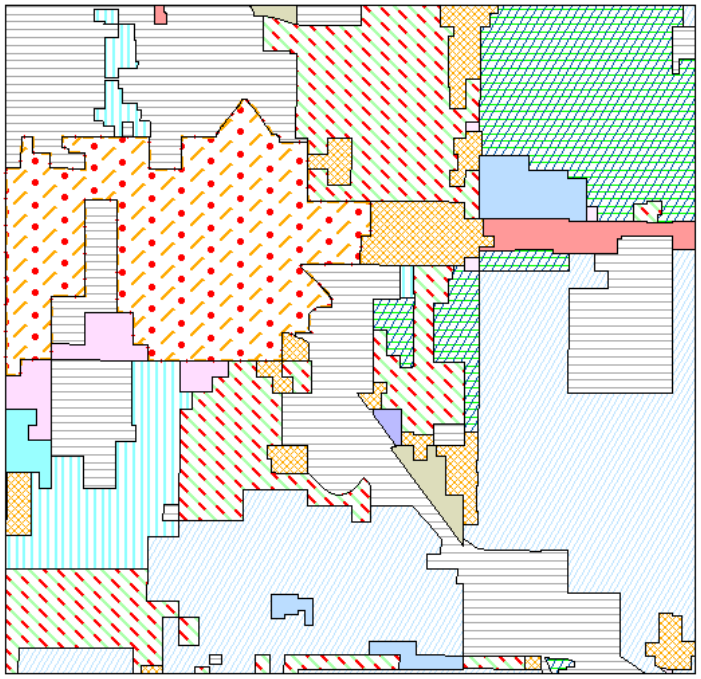
Hatch Patterns for Polygon Fills

Hatch patterns are one option for styling polygon fills in vector, CAD, and shape objects. Hatch patterns are composed of sets of repeated parallel lines with a regular spacing and a transparent background. A hatch pattern can be made up of one or more line sets (*hatch elements*); each hatch element can have its own color, angle, spacing, and thickness. The hatch elements can be simple solid color lines or more complex line patterns created in the Line Pattern Editor.

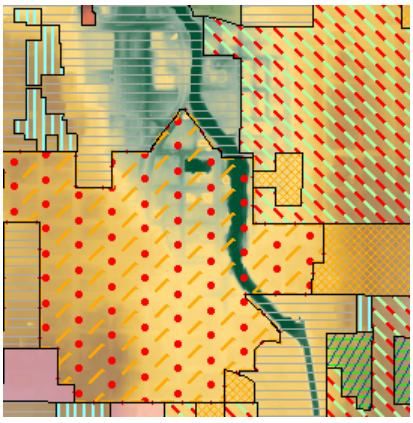
Because hatch patterns have a transparent background, polygons with hatch pattern fills can be overlaid on other data layers without fully obscuring these layers. Hatch patterns allow you to design a more diverse set of "transparent" fill styles than using partially-transparent solid fill colors alone. Like bitmap fills, hatch patterns are always rendered at the same scale on screen, but they can be easily modified by changing any of the pattern settings, such as color, angle, and spacing.



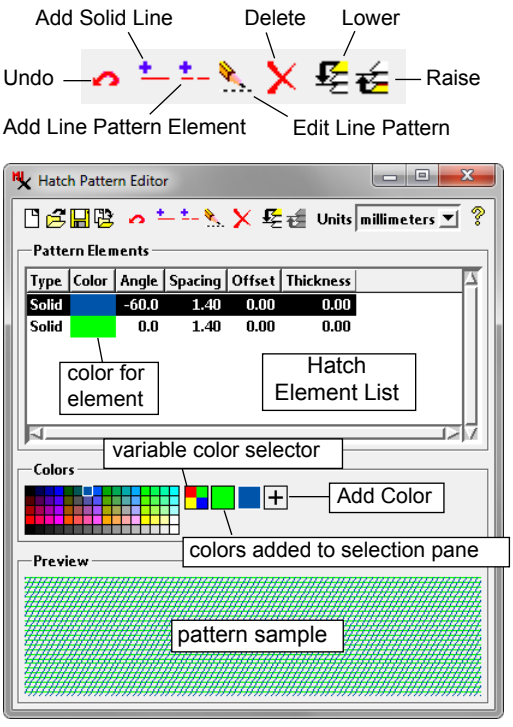
Hatch pattern fills can include one or more simple line elements or more complex line patterns. Use two hatch elements at different angles to create cross-hatch patterns.

Hatch Pattern Editor

The Hatch Pattern Editor is opened by choosing the Hatch option in the Fill Style controls and pressing the *Create or Edit Pattern* icon button. The Hatch Pattern Editor window is divided into several sections (see illustration below). The toolbar has icon buttons for adding a new solid line element, adding a line pattern element, or creating or editing a line pattern. Each hatch element you add is shown in the element list with its settings. Use the controls in the Colors box to set the color for each element. The Preview panel at the bottom of the window shows the complete hatch pattern at the same size as it will be rendered in the polygon fill on screen. Standard icon buttons in the top left corner of the Hatch Pattern Editor window let you create a *New* hatch pattern, *Open* an existing pattern in the style object, *Save* the current pattern, or *Save As* to save with a different pattern name.



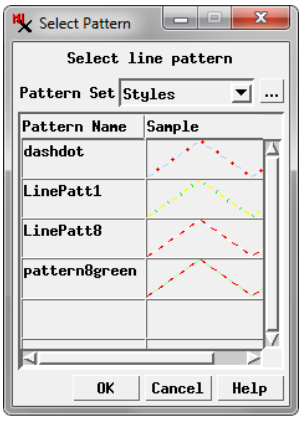
Hatch fill patterns have a transparent background, so that underlying data layers are not obscured by the fill.



Toolbar

The Hatch Pattern Editor opens with a new empty pattern. Press the Add Solid Line icon button on the toolbar to add a hatch element consisting of simple repeated solid lines. To use an existing line pattern for the hatch element, press the Add Line Pattern Element icon button; the Select Pattern window (right) then opens. The Pattern Set menu in this window provides the choices Basic (for the basic set of standard line patterns) or Styles, which shows any line patterns that are already available in the current style object. Left-click on a line pattern name in the Select Pattern window and press OK.

You can create a new line pattern to be stored in the current style object by pressing the Edit Line Pattern icon button. The Line Pattern Editor window then opens to allow you to create and save the pattern. See the Technical Guide entitled *Line Pattern Editor* for a description of this window.



(continued)

The remaining icon buttons in the toolbar are provided for managing the list of hatch pattern elements. The Delete icon button deletes the selected hatch element. Use the Raise and Lower icon buttons to move the active element up or down in the list.

Hatch Element Settings

Enter values in the fields in the Pattern Elements list to set the geometric properties of the selected hatch pattern element.

Type: shows the element type (Solid or Pattern).

Color: shows the color that has been assigned to the element using the Colors controls (see below).

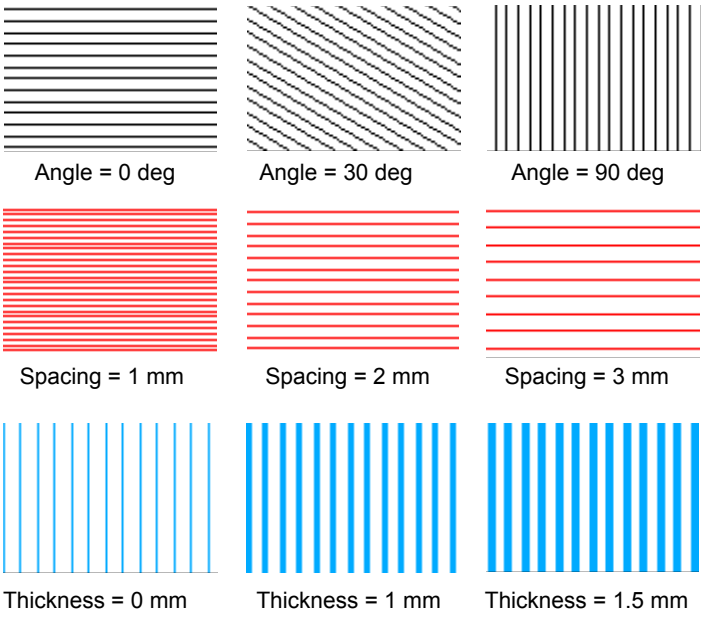
Angle: sets the angle of the hatch element in degrees. The initial value is 0 degrees, which results in horizontal lines. Positive angles are measured clockwise from the horizontal (see Angle samples in illustration to the right). You can enter values between -180 and +180 degrees.

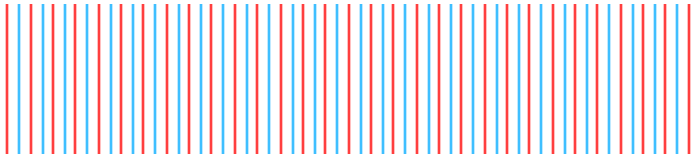
Spacing: sets the distance between the lines on the screen in the unit set on the Units menu in the upper right corner of the window; the choices are millimeters, inches, and points. Samples with spacing between 1 and 3 mm are illustrated to the right.

Offset: all hatch elements are drawn from a common origin on the screen, so that different patterns with the same spacing, thickness, and angle are aligned at common boundaries. You can enter a value in the Offset field to change the origin for a hatch element. For example, you can create a pattern with alternating lines of different colors by using two hatch elements with the same angle, spacing and thickness, but with the Offset for one element set to half of the spacing (see illustration above right).

Thickness: sets the width of the hatch lines on the screen in the selected unit. The minimum thickness of 0 (the default) results in lines 1 pixel wide (on screen, in print, or in rendered raster). If you increase the thickness without increasing the spacing, the hatch lines may merge into a solid color.

Hatch Element Geometric Settings Examples





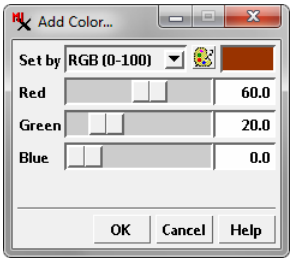
Pattern with two vertical hatch elements, each with Spacing = 4 mm and Thickness = 0. The blue element has Offset = 0 while the red element has Offset = 2 mm, which produces a uniform interleaving of the two parallel elements. Without the positive Offset value, the red lines would be superimposed on the blue lines.

Colors

When you add a line pattern as a hatch element, the colors set for the line pattern elements are maintained in the hatch pattern. When you add a simple hatch element, use the controls in the Colors box to set the color for the element. To choose a fixed color for the pattern element currently selected in the list, left-click on a color tile in the palette. A sample for the chosen color is added to the pane to the right of the palette. You can click on this sample or the corresponding color palette tile to assign this color to additional elements.

You can choose a different color palette by right-clicking on the palette, which opens the Select Palette window. This window shows a graphic list of the available discrete color palettes. Left-click on the desired palette in the list and press the OK button to show this palette in the Hatch Pattern Editor.

You can choose a color that is not in a palette by pressing the Add Color icon button, which opens the Add Color window. The *Set by* menu in this window determines the types of controls that are shown. The menu provides a Palette option as well as a choice of color models that you can use for specifying the color, including RGB (0-100), RGB (0-255), HIS, and others. Adjust the color sliders or enter values in the numeric fields and press OK to set the custom color, which is then shown as a sample in the Colors box.



Instead of assigning a fixed color to a hatch element, you can press the Variable icon button next to the palette (the word "Variable" is then shown in the Color field for the element in the list). When the hatch pattern is used in a polygon fill style, a hatch element with "variable" color is assigned the color currently set for the polygon fill. The same hatch pattern can then be used for a number of different styles simply by changing the color in the Fill Style controls. Hatch patterns can include elements with both fixed and variable colors.

You can change the background color for the Preview pane by left-clicking in the pane. A standard Select Colors window opens that allows you to select a color for the background.