

## MicroStation V8i - Groups and Patterns

### 11.0 Groups tool box



The tools in the Groups tool box are used to create and manipulate complex chains, complex shapes, and graphic groups.

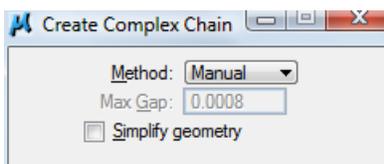
To	Select in the Groups tool box
Create a complex chain (open complex element).	 <i>Create Complex Chain</i>
Create a complex shape (closed complex element) from individual open elements.	 <i>Create Complex Shape</i>
Create a complex shape from the union, intersection, or difference between closed elements or by “flood fill.”	 <i>Create Region</i>
Create a graphic group. or Add elements to an existing graphic group. or Combine two or more graphic groups into one graphic group.	 <i>Create/Add to Graphic Group</i>
Remove (drop) an element(s) from a graphic group. or Break up a graphic group into individual elements.	 <i>Drop from Graphic Group</i>
Break up a complex element(s) or an element(s) of a special type into simpler components.	 <i>Drop Element</i>
Discontinue an association between a shared cell, dimension witness line, or multi-line and another element.	 <i>Drop Association</i>

### 11.1 Create Complex Chain



Used to create a complex chain — an open complex element that is formed from a series of open elements (lines, line strings, arcs, curves, and open B-spline curves) that can be manipulated as if it were a single primitive element. The resulting complex chain takes on the *active* element attributes regardless of the attributes of the component elements.

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Tool Setting	Effect
Method	<p>Sets how elements are added to the complex chain:</p> <ul style="list-style-type: none"> <li>• Manual — Each element is manually identified.</li> <li>• Automatic — After the first element is identified, and accepted, if endpoints of additional open element(s) are within the Max. Gap distance of each other, they are included automatically. Where there is a choice of two or more elements (at the endpoint of an element) then the process lets you choose to either Accept the highlighted element, or Reset to see the alternative(s).</li> </ul>
Max(imum) Gap	<p>The greatest allowable distance between elements when the Method is Automatic.</p> <p>If zero, only elements that connect (have a common endpoint) can be added.</p>
Simplify geometry	<p>If on, connected lines are added as line strings. If you identify only connected lines, the tool produces a primitive line string element rather than a complex chain.</p>

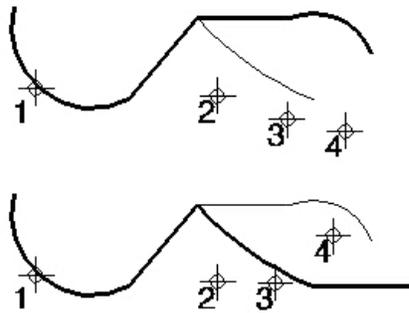
### ***To create a complex chain manually***

1. Select the *Create Complex Chain* tool.
2. Set the Method to Manual.
3. Identify the first element to include in the chain.
4. Continue to identify elements to add to the chain.  
If they are not already connected, the elements are connected as they are identified.
5. Reset to complete the complex chain.

### ***To create a complex chain automatically***

1. Select the *Create Complex Chain* tool.
2. Set the Method to Automatic.
3. Identify the first element.
4. Accept to automatically include other elements that are within the Max Gap distance. If a fork is found, where more than one element is within the Max Gap distance, the message "FORK – Accept or reset to See Alternate" displays in the status bar.
5. Enter a data point to accept the highlighted element  
or  
Reset to highlight an alternate element. Continue to reset until the desired element highlights.
6. Accept to complete the complex chain. Creation of the chain ends automatically if there are no elements within the Max. Gap.

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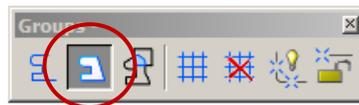
Create Complex Chain with Method set to Automatic. After entering data point 2, the top element in the fork was highlighted (top). To highlight the alternate path, a Reset was entered (bottom).

To convert a complex chain back to its individual components, use the *Drop Element* tool.

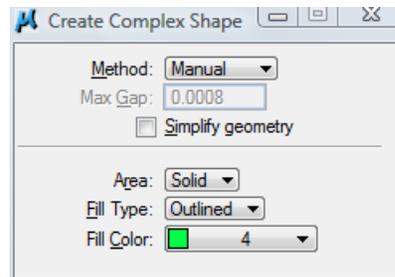
It is best to create complex chains from elements that share common endpoints.

To draw a complex chain of connected arcs and line segments with one tool, use the **Place SmartLine** tool in the Linear Elements toolbox.

## 11.2 Create Complex Shape



Used to create a complex shape (a closed complex element that can be manipulated as if it were one primitive element) from a series of open planar elements (lines, line strings, arcs, curves, and open B-spline curves). The resulting complex shape takes on the active element attributes regardless of the attributes of the component elements.



Tool Setting	Effect
Method	<p>Sets how elements are added to complex shape.</p> <ul style="list-style-type: none"> <li>Manual — Each element is manually identified.</li> <li>Automatic — After the first element is identified, and accepted, if endpoints of additional open element(s) are within the Max. Gap distance of each other, they are included automatically until a closed shape is created. Where there is a choice of two or more elements (at the endpoint of an element) then the process lets you choose to either Accept the highlighted element, or Reset to see the alternative(s).</li> </ul>
Max(imum) Gap	<p>The largest distance allowed between consecutive elements, if Method is Automatic.</p> <p>If zero, only elements that connect (have a common endpoint) can be added.</p>
Simplify	<p>If on, connected lines are added to the boundary as line strings. If you identify only connected lines,</p>

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geometry	the tool produces a primitive shape element rather than a complex shape.
Area	Sets the type of shape created. <ul style="list-style-type: none"><li>• Solid — The shape created is solid (can be hatched/patterned).</li><li>• Hole — The shape created is a hole (cannot be hatched/patterned).</li></ul>
Fill Type	Sets the active Fill Type. <ul style="list-style-type: none"><li>• None — No fill</li><li>• Opaque — Filled with Active Color</li><li>• Outlined — Filled with Fill Color (outline of shape takes the Active Color)</li></ul>
Fill Color	Complex shape is filled with this color if the Fill Type is Outlined; otherwise disabled (dimmed).

### ***To create a complex shape manually***

1. Select the *Create Complex Shape* tool.
2. Set the Method to Manual.
3. Identify the first element.
4. Continue to identify elements to add to the shape.  
The elements are connected as they are identified, unless they already are connected.
5. If the first and last elements connect, accept the shape.  
If the first and last elements do not connect, Reset to close the shape and create a line element between their endpoints.

### ***To create a complex shape automatically***

1. Select the *Create Complex Shape* tool.
2. Set the Method to Automatic.
3. Identify the first element.
4. Accept to automatically include other elements that are within the Max Gap distance.  
If the elements do not have a common endpoint, they are connected.  
If a fork is found; that is, if more than one element is within the Max. Gap, the message "FORK — Accept or Reset to See Alternate" displays in the status bar.
5. Enter a data point to accept the highlighted element.  
or  
Reset to highlight an alternate element. Continue to Reset until the desired element highlights.

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If an element is accepted that is connected to the first element identified, the complex shape is closed. If an element is not found within the Max Gap, a line element is created between the open endpoints of the first and last elements and the complex shape is closed.

To convert a complex shape back to its individual components, use the **Drop Element** tool.

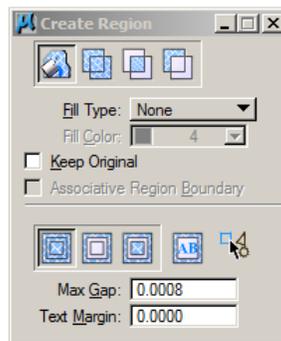
To draw a complex shape of connected arcs and line segments with one tool, use the **Place SmartLine** tool in the Linear Elements tool box.

### 1.3 Create Region



Used to create a complex shape (a closed complex element that can be manipulated as if it were one primitive element) from either of the following:

- The union, intersection, or difference between two or more closed elements.
  - A region bounded by elements that have endpoints that are closer together than the Max(imum) Gap.
- Icons in the tool settings let you select the method for defining the region.



(Continued on next page)

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Tool Settings	Effect
Flood icon	<div style="text-align: center;"></div> <p>Edges bound the area enclosed by elements that either touch one another or whose endpoints fall within the Maximum Gap. Selection sets can be used to select the elements required to enclose the flood area.</p> <p>Where a selection set is not used, each element, or a part of each element, to be used to create the region must be visible in the view. For example, where a group of lines (not line strings) create a graphically closed shape, but some are not within the view, then no region is created and the following error message results — “Error - No enclosing region found.”</p>
Union icon	<div style="text-align: center;"></div> <p>Edges bound the union of two or more closed planar elements.</p> <p>Where more than two elements are involved, use &lt;Ctrl&gt;-data points to select the extra elements.</p>
Intersection icon	<div style="text-align: center;"></div> <p>Edges bound the intersection of two or more closed planar elements.</p> <p>Where more than two elements are involved, use &lt;Ctrl&gt;-data points to select the extra elements.</p>
Difference icon	<div style="text-align: center;"></div> <p>Edges bound the difference of two or more closed planar elements.</p> <p>Where more than two elements are involved, use &lt;ctrl-data point&gt; to select the extra elements.</p>
Fill Type	<p>Sets the Active Fill Type.</p> <ul style="list-style-type: none"> <li>• None — If on, the complex shape is not filled.</li> <li>• Opaque — If on, the complex shape is filled with the Active Color.</li> <li>• Outlined — If on, the complex shape is filled with the Fill Color.</li> </ul>
Fill Color	<p>(Fill Type set to Opaque or Outlined only) Complex shape is filled with this color (and optional gradient) if the Fill Type is Outlined. When Fill Type is Opaque, Fill Color displays the Active Color, which can also be set from this location.</p> <p>When Fill Type is None, the Fill Color option is disabled (dimmed).</p>
Keep Original	<p>If on, the original elements remain in the design.</p>
Associative Region Boundary	<p>If on, the region boundary retains association with the elements used to create it. If one of the original elements is modified, then the boundary element updates to reflect the modification.</p>
Ignore Interior Shapes icon	<div style="text-align: center;"></div> <p>(Flood icon selected only) If selected, interior shapes are ignored when the region boundary is calculated.</p>
Locate Interior Shapes icon	<div style="text-align: center;"></div> <p>(Flood icon selected only) If selected, closed elements inside the selected area are included as part of the new complex shape.</p>

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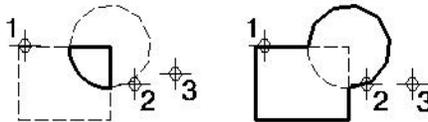
Identify Alternating Interior Shapes icon		(Flood icon selected only) If selected, alternating areas are flooded where shapes are nested inside one another.
Locate Interior Text icon		(Flood icon selected only) If on, any text or dimensional text inside or overlapping the selected area is avoided.
Dynamic Area Locate icon		(Flood icon selected only) If on, the area to be included in the region displays dynamically as you move the screen pointer over the view.
Max(imum) Gap		(Flood icon selected only) Sets the largest distance allowed between consecutive elements. If zero, only elements that connect can be added.
Text Margin		(Flood icon selected only) Sets the margin to be left around any text or dimensional text that is included in the selected area.

### To construct a complex shape from the intersection or union of elements

1. Select the *Create Region* tool.
2. In the Tool Settings window, click the Intersection or Union icon.
3. Identify one element.
4. Identify second element.
5. (Optional) Use <ctrl-data point> to select further elements.  
If the elements do not overlap, the following occurs, depending on the Method:

Method	If elements do not overlap, then
Intersection	"Elements do not intersect" displays.
Union	A shape is placed over each element.

6. Accept to create the region.



*Creating a region from two elements  
Left: Intersection. Right: Union. Keep Original is on.*

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### To construct a complex shape from the difference between elements

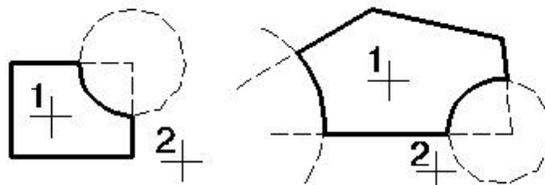
1. Select the *Create Region* tool.
2. Click the Difference icon.
3. Identify the base element (the element to be subtracted from).
4. Identify the element to be subtracted.
5. (Optional) Use <Ctrl>-data points to identify further element(s) to subtract from the initial element.
6. Accept to create the region.



*Method set to Difference*

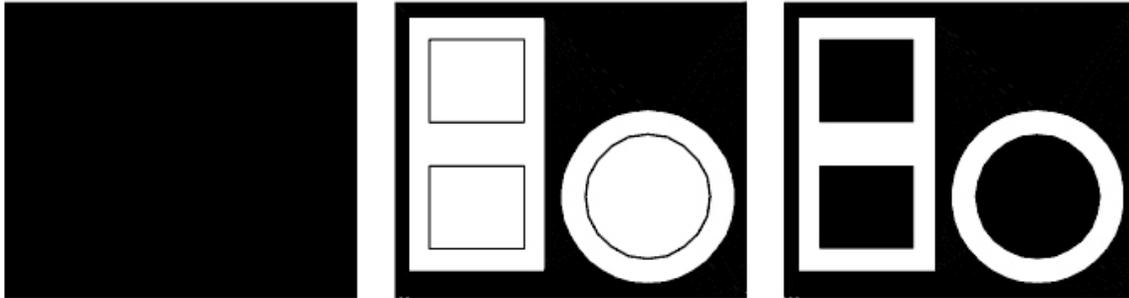
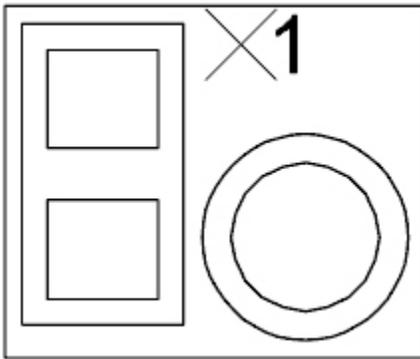
### To construct a complex shape by “flood”

1. Select the *Create Region* tool.
2. Click the Flood icon.
3. Set Fill Type and Fill Color as required.
4. Click the Ignore Interior Shapes, Locate Interior Shapes, or Identify Alternate Shapes, icon to define how any interior shapes are to be treated.
5. (Optional) Click the Locate Interior Text icon if you want the region shape to avoid text and dimensional text.
6. (Optional) Click the (Optional) Dynamic Area Locate icon to dynamically display the proposed region as you pass the pointer over the elements.
7. Enter a data point in the area enclosed by the bounding elements.
8. Accept the complex shape.



*Method set to Flood. Keep Original is on.*

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*Creating a flood region with Fill Type set to Opaque.  
Top left shows original elements. Placing a data point at 1, produces:  
Lower Left: Ignore Interior Shapes on.  
Lower Center: Locate Interior Shapes on.  
Lower Right: Identify Alternating Interior Shapes on.*

### 11.4 Add to Graphic Group

See MicroStation help documentation in MicroStation

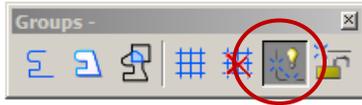


### 11.5 Drop from Graphic Group

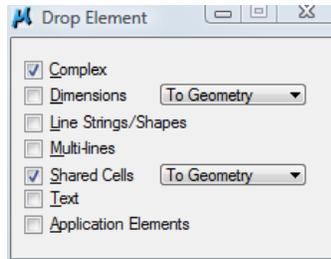
See MicroStation help documentation in MicroStation



## 11.6 Drop Element



Used to break up an element(s) into simpler components. Tool settings are used to specify the element types on which the tool operates.

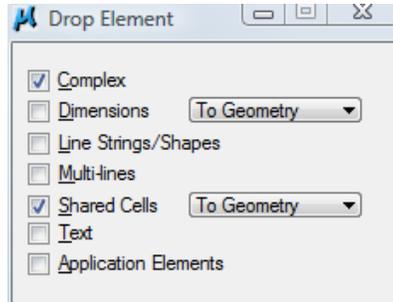


Tool Setting	Effect
Complex	If on, complex elements (cell, complex chain, complex shape, text node, surface, or solid) are dropped into their components.
Dimensions	If on, dimension element(s) are dropped into lines, line strings, ellipses, arcs, and text. <ul style="list-style-type: none"> <li>To Geometry — Drops down lines, line strings, ellipses, arcs, and text.</li> <li>To Segment — Drops down individual dimension segments.</li> </ul>
Line Strings/Shapes	If on, line strings and shapes are converted to series of individual line elements.
Multi-lines	If on, multi-line elements are converted to sets of line strings, lines, and/or arcs.
Shared Cells	If on, the associated option menu lets you drop shared cells: <ul style="list-style-type: none"> <li>To Geometry — They are dropped into their components.</li> <li>To Normal Cell — They are converted to unshared cells.</li> </ul>
Solids	(3D only) If on, the associated option menu lets you drop SmartSurfaces or SmartSolids: <ul style="list-style-type: none"> <li>To Surfaces — They are dropped to simple surfaces.</li> <li>To Wireframe — They are dropped to wireframe elements.</li> </ul>
Text	If on, text characters in text elements are converted to the individual elements that are used to draw the characters — lines, line strings, arcs, ellipses, and shapes.
Application Elements	If on, used to drop light weight geometry.

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### *To break up an element into its components*

1. Select the element(s).
2. Select the *Drop Element* tool.
3. Turn on the appropriate tool settings to specify the element type(s) on which to operate.



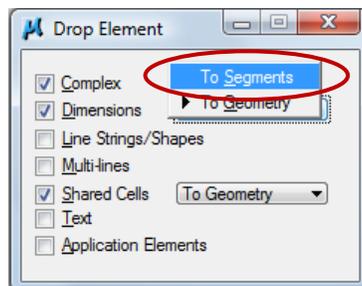
4. Accept the settings and initiate the drop.  
Only the selected elements of the specified type(s) are dropped. The tool has no effect on selected elements of other types. If none of the selected elements is of the specified type(s), the message "Nothing to drop" displays in the status bar.

### *Alternative Method — To break up an element into its components*

1. Select the *Drop Element* tool.
2. Turn on the appropriate tool settings to specify the element type(s) on which to operate.
3. Identify the element.
4. Accept the drop.

*Drop Element* cannot be used to drop elements more than one level at a time. For example, if you turn on Complex and Line Strings/Shapes and operate on a complex shape that contains two line strings, the complex shape is dropped but the component line strings are not so the operation results in two line strings.

Dropping chain dimensions to individual dimensions can be accomplished by checking the Dimensions setting and selecting "To Segments" from the drop- down options.



### 11.7 Drop Association



Used to discontinue an association point between a shared cell origin, dimension extension line vertex, or multi-line vertex and another element. The association point is converted to a non-associative origin or vertex with its own x-, y-, and (in 3D) z- coordinates. It is then independent of the other element. For more information about association points, see *Associating Elements*.

#### ***To discontinue an association***

1. Select the *Drop Association* tool.
2. Identify the association point.
3. Accept the drop.

#### ***To discontinue all association points on an element(s)***

1. Select the element(s).
2. Select the *Drop Association* tool.
3. Accept the drop.

### 11.8 Hatching and Patterning

Patterning is the repeated placement of a hatch line or cell through a closed area at a specified interval (spacing), scale, and angle. You can place patterns on any designated level.

When using a hatching or patterning tool with the tool setting Method set to Flood, Union, Intersection, or Difference, turning on Dynamic Area along with Associative Pattern lets you create patterns that regenerate themselves when their bounding elements are modified. As well, you can create single associative patterns with disjoint regions.

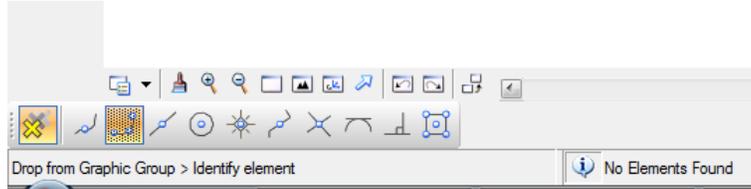
#### **Controlling the display of patterns**

Elements — either lines or cells — in a pattern are designated as pattern elements.

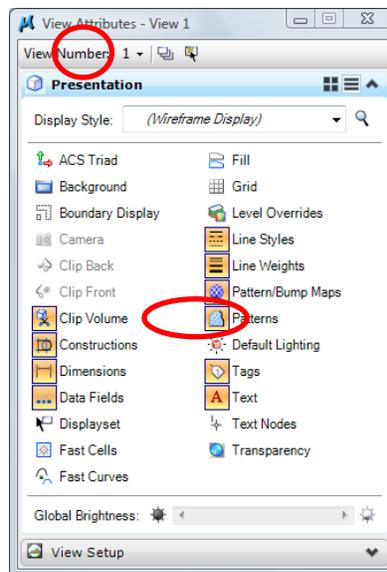
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### *To turn the display of patterns on or off in one or more views*

1. From the Settings menu, choose View Attributes.  
The View Attributes dialog box opens.  
or  
In the view control bar, select the View Attributes icon or the adjacent downward-pointing triangle.  
The View Attributes dialog opens.



2. From the View Number option menu, choose the number of the desired view.



3. Click on Patterns to turn on or off.
4. Repeat steps 2 and 3 for additional views.

### *To turn the display of patterns on or off in all views*

1. From the Settings menu, choose View Attributes.  
The View Attributes dialog box opens.
2. Turn Patterns on or off.
3. Click the All button.



## 11.9 Patterns tool box

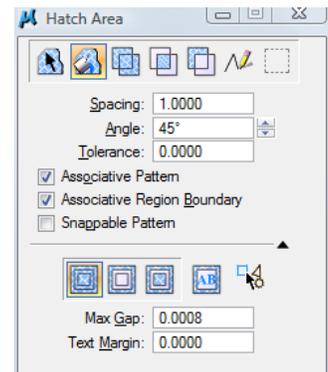
The tools in the Patterning toolbox are used to pattern areas and along linear elements .

To	Select in the Patterning toolbox
Hatch an area.	 <i>Hatch Area</i>
Crosshatch an area.	 <i>Crosshatch Area</i>
Pattern an area by tiling the Active Pattern Cell.	 <i>Pattern Area</i>
Pattern along a linear element.	 <i>Linear Pattern</i>
Display the angle and scale attributes of a pattern element.	 <i>Show Pattern Attributes</i>
Set the active pattern settings to match the attributes of an existing pattern element.	 <i>Match Pattern Attributes</i>
Modify the patterning.	 <i>Change Pattern</i>
Delete patterning.	 <i>Delete Pattern</i>

## 11.10 Hatch Area



Used to hatch an area. Elements used to define the area to be hatched can be in the active file, or in references. Where associative patterning is used, any modification to elements defining the hatched area results in an equivalent update to the hatching.



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Tool Setting	Effect
Method	<p>Determines the area that is hatched.</p> <ul style="list-style-type: none"> <li>• Element — The interior of a shape , ellipse , or closed B-spline curve; or between components of a multi-line. —</li> <li>• Fence — The area inside the fence.</li> <li>• Intersection — Of two or more closed elements.</li> <li>• Union — Of two or more closed elements.</li> <li>• Difference — Between two or more closed elements.</li> <li>• Flood — The (minimum) area enclosed by a set of elements (something like the flood fill tool common in painting programs). With method set to Flood, a Show Extended Information icon appears in the lower right corner of the tool settings window. Clicking this icon expands the tool settings to display further controls.</li> <li>• Points — An area defined by a series of data points, each of which defines a vertex.</li> </ul>
Spacing	Sets the interval between hatching lines.
Angle	Sets the angle at which hatching lines are drawn. By default, the angle is relative to the view being used. Where AccuDraw is active, however, the angle is relative to the AccuDraw drawing plane.
Tolerance	Maximum distance between curved element and approximating line segments used to pattern.
Associative Pattern	<p>If on, hatching is associated with the patterned element and is automatically updated when the element is manipulated or modified. In other words, if the element is modified later, the hatch lines are re-drawn to match the modified element.</p> <p>If Method is Intersection, Union, Difference, or Flood, a complex shape that bounds the patterned area is created, and the hatch lines are associated to the complex shape. If you move or modify the original element(s), used to create the complex shape, the complex shape is updated, along with the hatching.</p>
Associative Region Boundary	(Associative Pattern on only) If on, hatching can be placed on a level other than the level of the hatched element. If the Method is Intersection, Union, Difference, or Flood, a complex shape that bounds the hatched area is created, and the hatching is associated to the complex shape. If you move or modify the original element(s), used to create the complex shape, the complex shape is updated, along with the hatching.
Snappable Pattern	If on, hatching lines can be snapped to. If off, hatching lines do not interfere with snapping to other elements.
Ignore Interior Shapes	(Method set to Flood only) If selected, interior shapes are ignored when the region boundary is calculated.
Locate Interior Shapes	(Method set to Flood only) If on, all closed elements (regardless of their Area attributes) inside the selected area are avoided when the area is hatched.
Identify Alternating Interior Shapes	(Method set to Flood only) If selected, alternating areas are hatched where shapes are nested inside one another.
Locate Text	(Method set to Flood only) If on, any text or dimension text inside or overlapping the selected

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	area is avoided when the area is hatched.
Dynamic Area	(Method set to Flood only) If on, the area to be hatched displays dynamically as you move the screen pointer over the shapes.
Alternating Area	(Method set to Flood only, with Locate Interior Shapes on and Dynamic Area off) If on, alternating areas are hatched where shapes are nested inside one another.
Max(imum) Gap	(Method set to Flood only) The maximum distance, in working units, between the endpoints of enclosing elements.
Search For Holes	<p>(Method set to Element only) When creating a non-associative pattern, gives you options for how hole elements are treated. You can ignore hole elements or search for hole elements on the same level as the element to pattern, or on all levels displayed in the view.</p> <ul style="list-style-type: none"> <li>• No — Ignores hole elements.</li> <li>• Element Level — Searches for hole elements on the same level as the element to hatch.</li> <li>• View Levels — Searches for hole elements on all levels displayed in the view.</li> </ul>
Use Element Symbology	If on, hatching is created using the active color, line weight, and line style of the element being patterned
Fill Type	(Method set to Points only) Sets the active fill type for the closed shape defined by the points — None (no fill), Opaque (filled with the active color), or Outlined.
Fill Color	<p>(Method set to Points only) Sets the color and optional gradient with which the elements are filled.</p> <ul style="list-style-type: none"> <li>• If Fill Type is Opaque, the element(s) are filled with the active color, which is also the color of the element's outline.</li> <li>• If Fill Type is Outlined, the element(s) can be filled with a color that is different from the active color.</li> </ul>

### ***To hatch the area inside a closed element***

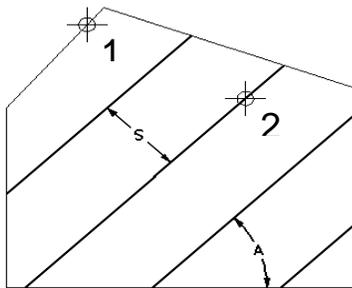
1. Select the element.
2. Select the *Hatch Area* tool.
3. Set the Method to Element.
4. Enter a data point to define a point through which a hatch line must pass.  
Elements that are inside the selected element and have the Area attribute Hole are hatched as follows:

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If Associative Pattern is	Then Hole elements inside selected element
Off	Are not hatched.
On	<p>If they were grouped with the Solid element using the <i>Group Holes</i> tool, they are not hatched and the hatching is associated with the Hole elements as well as the Solid.</p> <p>Otherwise, the area enclosed by any other element inside the element, regardless of its Area attribute, is hatched, and no associations are made to it.</p>

### **Alternative Method — To hatch the area inside a closed element**

1. Select the *Hatch Area* tool.
2. Set the Method to Element.
3. Identify the element.
4. Enter a data point to define a point through which a hatch line must pass.



*Hatching the area inside a closed element. Identify the element (1) and then enter a data point to define a point through which a hatch line must pass. "A" denotes the Active Pattern Angle. "S" denotes the Active Pattern Spacing.*

### **To hatch the fenced area**

1. With the fence present, select the *Hatch Area* tool.
2. Set the Method to Fence.
3. Enter a data point to define a point through which a hatch line must pass.

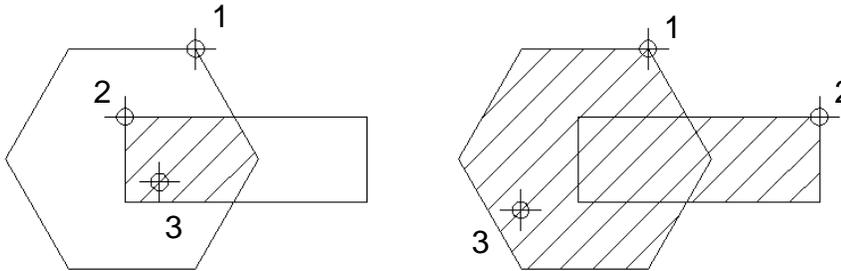
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### To hatch the intersection or union of closed elements

1. Select the *Hatch Area* tool.
2. In the Tool Settings window, set Method to Intersection or Union.
3. Identify one element.
4. Identify another element(s).  
As you accept each successive element, the edges that do not enclose the area to be hatched are hidden.  
The resulting area is highlighted.  
If the elements do not overlap, the following occurs, depending on the Method:

Method	If elements do not overlap, then
Intersection	"Elements do not intersect" is displayed in the status bar.
Union	All elements are hatched.

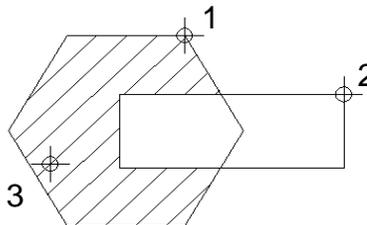
5. After you accept the last element, Reset to finish (or select a different tool).  
The area is hatched. The final acceptance point defines a point through which a hatch line must pass.



Identify one element (1), then another element (2), accept (3), and then Reset to finish.  
Results with Method set to Intersection (left) and Union (right).

### To hatch the difference between elements

1. Select the *Hatch Area* tool.
2. Set the Method to Difference.  
If any elements are selected, they are de-selected.
3. Identify the element from which to subtract.
4. Identify the element(s) to subtract from the element that was identified in step 3.
5. Accept the elements.  
The area to be hatched is displayed dynamically.
6. Reset to finish.

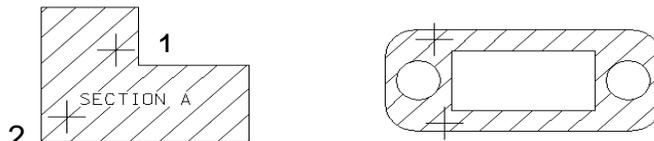


With Method set to Difference, identify the first element (1) and the element to subtract (2), then accept (3).

## MicroStation V8i - Groups and Patterns

### To hatch an area enclosed by bounding elements

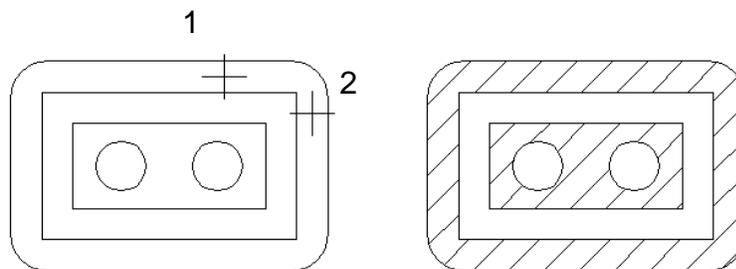
1. Select the *Hatch Area* tool.
2. Set the Method to Flood.
3. (Optional) If you want the hatching to avoid closed elements, text or dimension text inside the selected area, or you want to view the hatch area dynamically, click Show Extended Information (lower right in the tool settings) and turn on Locate Interior Shapes, Locate Text, and/or Dynamic Area.
4. Enter a data point in the area enclosed by the bounding elements. (To minimize the time required, zoom in to the area of interest or select the bounding elements.)  
The area to be patterned is displayed dynamically.  
If there are selected elements, only selected elements are considered as possible bounding elements. If no elements are selected, all elements in the view in which the data point is entered are considered.
5. Accept the hatching.  
The area is hatched. If Locate Interior Shapes and Locate Text is on, any inside closed element (regardless of its Area attribute), text or dimension text is avoided. If Associative Pattern is on, the hatch lines are associated to a complex shape created from the bounding elements and the inside elements.



Enter a data point inside the bounding elements (1). Accept the hatching (2).  
Results with Locate Text on (left), and Locate Interior Shapes on (right).

### To hatch an area containing nested elements within the bounding elements

1. Select the *Hatch Area* tool.
2. Set the Method to Flood.
3. (Optional) Click Show Extended Information (lower right in the tool settings) and turn on Locate Interior Shapes, and Alternating Area.
4. Enter a data point in the area enclosed by the bounding elements.  
The area to be patterned is displayed dynamically.
5. Accept the hatching.  
The areas are hatched alternately. If Associative Pattern is on, the hatch lines are associated to a complex shape created from the bounding elements and the inside elements.



Left: Enter a data point inside the bounding elements (1). Accept the hatching (2).  
Right: With Alternating Area on, alternating enclosed areas are hatched or left blank.

## MicroStation V8i - Groups and Patterns

### To hatch an area defined by data points

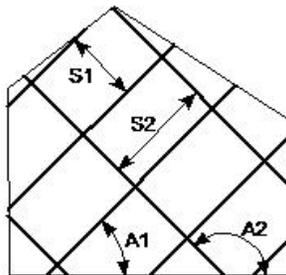
1. Select the *Hatch Area* tool.
2. Set the Method to Points.
3. Enter a data point to define each vertex of an imaginary shape that encloses the area. The imaginary shape is dynamically displayed.
4. Reset to finish.

### 11.11 Crosshatch Area

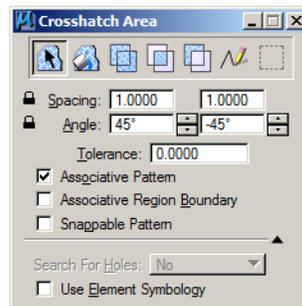


Used to crosshatch an area. Elements used to define the area to be crosshatched can be in the active model, or in references. Where associative patterning is used, any modification to elements defining the crosshatched area results in an equivalent update to the crosshatching.

The tool settings and procedures are the same as those for the Hatch Area tool, except that there are additional fields to specify the Spacing and Angle of the crosshatch lines, in addition to those for the hatch lines. Icons in the tool settings let you select the method for defining the area to be crosshatched.



*Crosshatch Area.* "A1" and "A2" denote the Active Pattern Angles. "S1" and "S2" denote the Active Pattern Spacing.



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Tool Settings	Effect
Element icon	 <p>The interior of a shape, ellipse, or closed B-spline curve; or between components of a multi-line.</p>
Flood icon	 <p>The (minimum) area enclosed by a set of elements (something like the flood fill tool common in painting programs). With method set to Flood, a Show Extended Information icon appears in the lower right corner of the tool settings window. Clicking this icon expands the tool settings to display further controls.</p>
Union icon	 <p>Edges bound the union of two or more closed planar elements.</p> <p>Where more than two elements are involved, use &lt;Ctrl-data point&gt; to select the extra elements.</p>
Intersection icon	 <p>Edges bound the intersection of two or more closed planar elements.</p> <p>Where more than two elements are involved, use &lt;Ctrl-data point&gt; to select the extra elements.</p>
Difference icon	 <p>Edges bound the difference of two or more closed planar elements.</p> <p>Where more than two elements are involved, use &lt;Ctrl-data point&gt; to select the extra elements.</p>
Points icon	 <p>An area defined by a series of data points, each of which defines a vertex.</p>
Fence icon	 <p>The area inside a fence</p>
Spacing	Sets the interval between the rows and the columns of the cross-hatching.
Angle	The angle at which instances of the crosshatch are placed. By default, the angle is relative to the view being used. Where AccuDraw is active, however, the angle is relative to the AccuDraw drawing plane.
Tolerance	Maximum distance between a curved element and the approximating line segments used for crosshatching.
Associative Pattern	<p>If on, crosshatching is associated with crosshatched geometry.</p> <ul style="list-style-type: none"> <li>• If Element is selected, the crosshatching is associated with the crosshatched element and is automatically updated when the crosshatched element is manipulated or modified.</li> <li>• If Intersection, Union, or Difference is selected, a complex shape that bounds the crosshatched area is created, and the crosshatching is associated with the complex shape. The crosshatching and the complex shape are automatically updated when the</li> </ul>

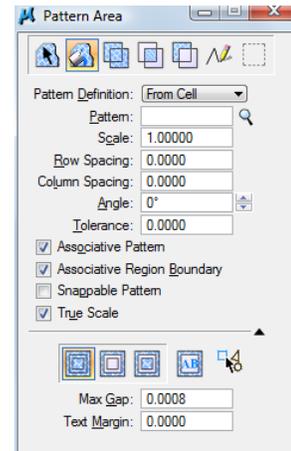
## MicroStation V8i - Groups and Patterns

	original element(s), used to create the complex shape, are modified or manipulated, only if Associative Region Boundary is also on.
Associative Region Boundary	(Associative Pattern on only) If on, crosshatching can be placed on a level other than the level of the crosshatched element. If Intersection, Union, Difference, or Flood is selected, a complex shape that bounds the crosshatched area is created, and the crosshatching is associated to the complex shape. If you move or modify the original element(s), used to create the complex shape, the complex shape is updated, along with the crosshatching.
Snappable Pattern	If on, crosshatched cells can be snapped to. If off, crosshatched cells do not interfere with snapping to other elements.
Ignore Interior Shapes icon	 <p>(Flood icon selected only) If selected, interior shapes are ignored when the region boundary is calculated.</p>
Locate Interior Shapes icon	 <p>(Flood icon selected only) If on, all closed elements (regardless of their Area attributes) inside the selected area are avoided when the area is crosshatched.</p>
Identify Alternating Interior Shapes icon	 <p>(Flood icon selected only) If selected, alternating areas are crosshatched where shapes are nested inside one another.</p>
Locate Interior Text icon	 <p>(Flood icon selected only) If on, any text or dimension text inside or overlapping the selected area is avoided when the area is crosshatched.</p>
Dynamic Area Locate icon	 <p>(Flood icon selected only) If on, the area to be hatched displays dynamically as you move the screen pointer over the shapes.</p>
Max(imum) Gap	(Flood icon selected only) The maximum distance, in working units, between the endpoints of enclosing elements.
Text Margin	(Flood icon selected only) Sets the size of the margin between hatching lines and existing text elements in the area to crosshatch.
Search For Holes	<p>When creating a non-associative pattern, you can ignore hole elements or search for hole elements on the same level as the element to pattern, or on all levels displayed in the view.</p> <ul style="list-style-type: none"> <li>• No — Ignore hole elements.</li> <li>• Element Level — Searches for hole elements on the same level as the element to hatch.</li> <li>• View Levels — Searches for hole elements on all levels displayed in the view.</li> </ul>
Use Element Symbology	If on, hatching is created using the active color, weight, and style of the element being patterned.
Fill Type	(Points method only) Sets the active fill type for the closed shape defined by the points — None (no fill), Opaque (filled with the active color), or Outlined.
Fill Color	<p>(Points method only) Sets the color and optional gradient with which the elements are filled. If Fill Type is Opaque, the element(s) are filled with the active color, which is also the color of the element's outline.</p> <p>If Fill Type is Outlined, the element(s) can be filled with a color that is different from the active color.</p>

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- If the second angle is set to zero, *Crosshatch Area* places the second element at 90° to the first angle used.

### 11.12 Pattern Area



Used to pattern an area by tiling the Active Pattern Cell. Elements used to define the area to be patterned can be in the active file, or in references. Where associative patterning is used, any modification to elements defining the patterned area results in an equivalent update to the patterning.

Tool Setting	Effect
Method	<p>Determines the area that is patterned.</p> <ul style="list-style-type: none"> <li>• Element — The interior of a shape , ellipse , or closed B-spline curve; or between components of a multi-line.</li> <li>• Fence — The area inside the fence.</li> <li>• Intersection — Of two or more closed elements.</li> <li>• Union — Of two or more closed elements.</li> <li>• Difference — Between two or more closed elements.</li> <li>• Flood — The (minimum) area enclosed by a set of elements (something like the flood fill tool common in painting programs).</li> <li>• Points — An area defined by a series of data points, each of which defines a vertex.</li> </ul>
Pattern Cell	Lets you key in the name of the cell that is tiled to create the pattern. Optionally, you can click the Browse Cells button to the right of the input field, which opens the Cell Library dialog box to let you browse the cells in the attached library, or you can attach a cell library.
Browse Cells	Opens the Cell Libraries dialog box for purposes of placement of a different active cell.
Scale	Sets the factor by which the Active Pattern Cell is scaled.
Row Spacing	The interval between rows.
Column Spacing	The interval between columns.
Angle	The angle at which instances of the active Pattern Cell are placed. By default, the angle is relative to the view being used. Where AccuDraw is active, however, the angle is relative to the AccuDraw drawing plane.
Tolerance	Maximum distance between a curved element and the approximating line segments used for patterning.

## MicroStation V8i - Groups and Patterns

Associative Pattern	If on, patterning is associated with a patterned element and is automatically updated when the element is manipulated or modified. If the Method is Intersection, Union, Difference, or Flood, a complex shape that bounds the patterned area is created, and the patterning is associated to the complex shape. If you move or modify the original element(s), used to create the complex shape, the complex shape is updated, along with the patterning.
Associative Region Boundary	(Associative Pattern on only) If on, patterning can be placed on a level other than the level of the patterned element. If the selected method is Intersection, Union, Difference, or Flood, a complex shape that bounds the patterned area is created, and the patterning is associated to the complex shape. If you move or modify the original element(s) used to create the complex shape, the complex shape is updated, along with the patterning.
Snappable Pattern	If on, patterning cells can be snapped to. If off, patterning cells do not interfere with snapping to other elements.
Ignore Interior Shapes	(Flood method only) If on, all closed elements (regardless of their Area attributes) inside the selected area are ignored when the area is patterned.
Locate Interior Shapes	(Method set to Flood only) If on, all closed elements (regardless of their Area attributes) inside the selected area are avoided when the area is patterned.
Identify Alternating Interior Shapes	(Flood method only) If on, alternating areas are patterned where shapes are nested inside one another.
Locate Text	(Method set to Flood only) If on, any text or dimension text inside or overlapping the selected area is avoided when the area is patterned.
Dynamic Area	(Method set to Flood only) If on, the area to be patterned displays dynamically as you move the screen pointer over the shapes.
Max(imum) Gap	(When Method is set to Flood) The maximum distance, in working units, between the endpoints of enclosing elements.
True Scale	If on, the active pattern cell is scaled to adjust it to the units of the active file. The scaling occurs only if the cell is shared and the units of the file in which the cell was created differ from those of the active file.
Text Margin	(Flood method only) Sets the size of the margin between pattern elements and existing text elements in the area to pattern.
Search For Holes	When creating a non-associative pattern, you can ignore hole elements or search for hole elements on the same level as the element to pattern, or on all levels displayed in the view.
Use Element Symbology	If on, a pattern is created using the active color, weight, and style of the element being patterned.
Fill Type	(Points method only) Sets the active fill type for the closed shape defined by the points — None (no fill), Opaque (filled with the active color), or Outlined.

## MicroStation V8i - Groups and Patterns

Fill Color	<p>(Points method only) Sets the color and optional gradient with which the elements are filled.</p> <ul style="list-style-type: none"> <li>• If Fill Type is Opaque, the element(s) are filled with the active color, which is also the color of the element's outline.</li> <li>• If Fill Type is Outlined, the element(s) can be filled with a color that is different from the active color.</li> </ul>
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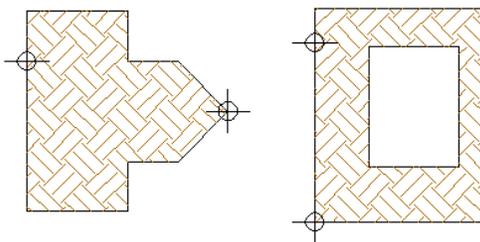
### To pattern the area inside a closed element

1. Select the element.
2. Select the *Pattern Area* tool.
3. Set the Method to Element.
4. Enter a data point to place the origin of one of the pattern cell instances.  
Elements that are inside the selected element and have the Area attribute Hole are patterned as follows:

If Associative Pattern is	Then Hole elements inside selected element
Off	Are not patterned.
On	<p>If they were grouped with the Solid element using the <i>Group Holes</i> tool they are not patterned and the pattern is associated with the Hole elements as well as the Solid.</p> <p>Otherwise, the area enclosed by any other element inside the element, regardless of its Area attribute, is patterned, and no associations are made to it.</p>

### Alternative Method — To pattern the area inside a closed element

1. Select the *Pattern Area* tool.
2. Set the Method to Element.
3. Identify the element.
4. Enter a data point to place the origin of one of the pattern cell instances.



At left, pattern cell EARTH is used to pattern a complex shape. At right, the outside block is also patterned with EARTH. Since the inner block has the area attribute of Hole, the area inside it is not patterned.

## MicroStation V8i - Groups and Patterns

### ***To pattern the fenced area***

1. With the fence present, select the *Pattern Area* tool.
2. Set the Method to Fence.
3. Enter a data point to place the origin of one of the pattern cell instances.

### ***To pattern the intersection or union of closed elements***

1. Select the *Pattern Area* tool.
2. In the Tool Settings window, set Method to Intersection or Union.
3. Identify one element.
4. Identify another element(s).  
As you accept each successive element, the edges that do not enclose the area to be patterned are hidden. The resulting area is highlighted.  
If the elements do not overlap, the following occurs, depending on the Method:

Method	If elements do not overlap, then
Intersection	"Elements do not intersect" is displayed in the status bar.
Union	All elements are patterned.

5. After you accept the last element, Reset to finish (or select a different tool).  
The area is patterned. The final acceptance point defines a point through which a pattern line must pass.

### ***To pattern the difference between elements***

1. Select the *Pattern Area* tool.
2. Set the Method to Difference.  
If any elements are selected, they are de-selected.
3. Identify the element from which to subtract.
4. Identify the element(s) to subtract from the element that was identified in step 3.  
The area to be patterned is displayed dynamically.
5. Reset to finish.

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### *To pattern an area enclosed by bounding elements*

1. Select the *Pattern Area* tool.
2. Set the Method to Flood.
3. (Optional) If you want the patterning to avoid closed elements, text or dimension text inside the selected area, or you want to view the pattern area dynamically, click Show Extended Information (lower right in the tool settings) and turn on Locate Interior Shapes, Locate Text, and/or Dynamic Area.
4. Enter a data point in the area enclosed by the bounding elements. (To minimize patterning time, zoom in to the area of interest or select the bounding elements.)  
The area to be patterned is displayed dynamically.  
If there are selected elements, only selected elements are considered as possible bounding elements. If no elements are selected, all elements in the view in which the data point is entered are considered.
5. Accept the patterning.  
The area is patterned. If Locate Interior Shapes and Locate Text is on, any inside closed element (regardless of its Area attribute), text or dimension text is avoided. If Associative Pattern is on, the patterning is associated to a complex shape created from the bounding elements and the inside elements.

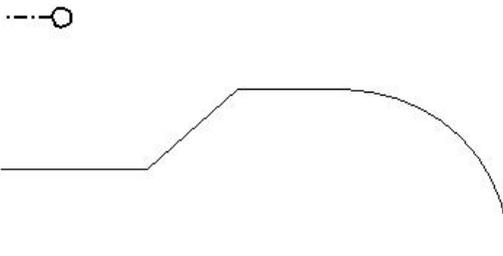
### *To pattern an area defined by data points*

1. Select the *Pattern Area* tool.
2. Set the Method to Points.
3. Enter a data point to define each vertex of an imaginary shape that encloses the area.  
The imaginary shape is dynamically displayed.
4. Reset to finish.

## 11.13 Linear Pattern

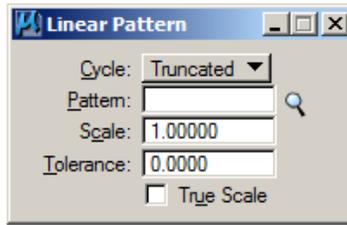


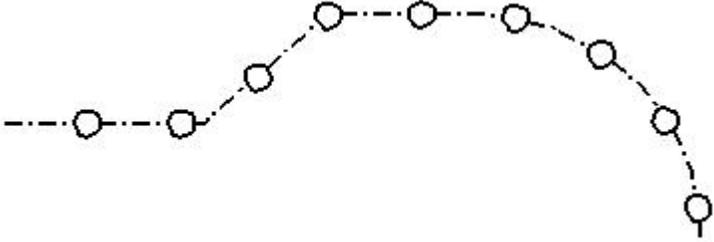
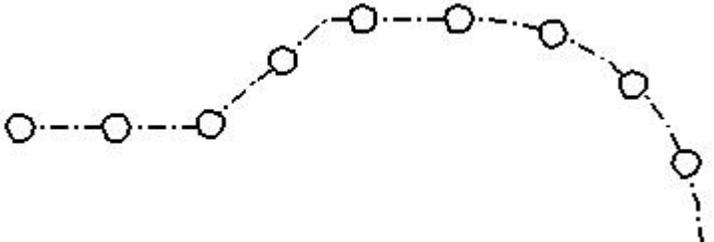
Used to draw or “tile” a pattern along an existing linear element. That is, to replace the linear element with repetitions of the pattern cell. After applying linear patterning to an element, you can turn off Patterns in the **View Attributes dialog** (Settings > View Attributes), to display the original linear element.



*The pattern cell (top) and the element (bottom) used for the illustrations in the table below*

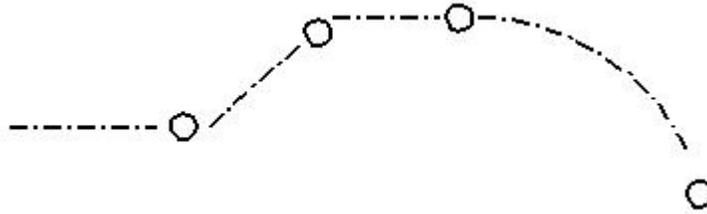
## MicroStation V8i - Groups and Patterns



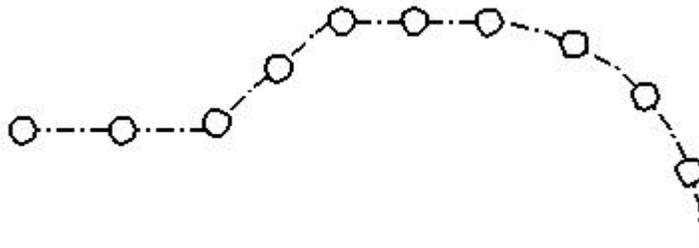
Tool Settings	Effect
Cycle	<p>Sets the manner in which the active Pattern Cell is placed.</p> <ul style="list-style-type: none"><li>• <b>Truncated</b> — Place along the element at the Active Pattern Scale. If necessary, the last instance is truncated.</li></ul> 
	<ul style="list-style-type: none"><li>• <b>Complete</b> — Placed along the element at a scale that is adjusted, if necessary, from the Active Pattern Scale so that only complete instances are placed.</li></ul> 

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- **Single** — Placed with one instance on each segment.  
If a segment's length is less than 80% of the cycle length, the segment is patterned with the first horizontal line in the pattern cell.



- **Multiple** — Place along an element at a scale that is adjusted, if necessary, from the Active Pattern Scale so that every instance is complete along each segment. If a segment's length is less than 80% of the cycle length, the segment is patterned with the first horizontal line in the pattern cell.



Pattern	The cell that is tiled to create the pattern. Can also be set with the Pattern button in the Cell Library dialog (Element > Cells).
Browse	Opens the Cell Library dialog for the placement of a different active cell.
Scale	The active Pattern Cell is scaled by this factor.
Tolerance	Maximum distance between a curved element and the approximating line segments.
True Scale	If on, the active pattern is scaled to adjust it to the units of the active model. The scaling occurs only if the cell is shared and the units of the model in which the cell was created differ from those of the active model.

### To pattern a linear element

1. Select the *Linear Pattern* tool.
2. Identify the element.
3. Enter a data point to indicate the pattern direction.

## 11.14 Show Pattern Attributes



Used to display the Pattern Angle and Pattern Scale attributes of a pattern element.

### To display the angle and scale of a pattern element

1. Select the *Show Pattern Attributes* tool.
2. Identify the pattern element.  
The element highlights, and its type and level display in the status bar.
3. Accept the element.  
The pattern angle and scale are displayed in the status bar.

## 11.15 Match Pattern Attributes



Used to set the active pattern settings (Angle, Scale, and Spacing) to match the attributes of a pattern element in the DGN file.

### To match the active pattern settings to those of an existing pattern element

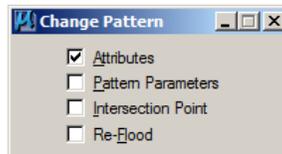
1. Select the *Match Pattern Attributes* tool.
2. Identify the pattern element.
3. Accept the pattern element.  
The new active pattern settings are displayed in the status bar.

## 11.16 Change Pattern



Used to change an existing pattern to:

- Match the current attributes and/or pattern parameters.
- Redefine the intersection point of the patterning.
- Re-flood the area.



Tool Settings	Effect
Attributes	If on, the current pattern attributes are applied to the pattern.
Pattern Parameters	If on, the current pattern parameters are applied to the pattern.
Intersection Point	If on, the pointer position defines the new intersection point of the pattern.
Re-Flood	If on, the selected region is re-flooded.

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### To change an existing pattern to the current settings

1. Select the *Change Pattern* tool.
  2. Identify the existing pattern.
  3. Accept.
- You can define or change the current settings via the *Pattern Area* tool settings. The *Pattern Area* tool also lets you select a different pattern for an element that already has a pattern.

### 11.17 Delete Pattern



Used to delete patterning.

### To delete patterning

1. Select the *Delete Pattern* tool.
2. Identify the patterning to delete or, in the case of associative patterning, the patterned element.
3. Accept the deletion.