

## 12.1 What Are Visual Objects?

In order to represent the mass and material transformations in a process, we need only two types of objects: unit procedures and streams. In the previous chapters we have described extensively the visual as well as functional properties of those elements. However, oftentimes, the drawing of a flowsheet can be enhanced by including several other non-functional elements (i.e., elements without any modeling behind them). For instance, you may wish to surround a certain section of the flowsheet by a bounding rectangle and assign it a name, since it represents a particular area of the entire process (e.g., media or buffer preparation). In other cases, the designer of a particular flowsheet may wish to comment on certain steps by placing some text right under a particular step. All these new elements that can be added to enhance the visual appearance of a process flowsheet but have no effect on the physico-chemical transformations occurring in it, we will call Visual Objects.

## 12.2 Types of Visual Objects

All members of the “Pro-Designer” software series support the following types of visual objects:

- Lines
- Polylines
- Rectangles / Squares
- Round Edge Rectangles / Round Edge Squares
- Ellipses / Circles
- Polygons
- Text

All visual objects can be inserted in a flowsheet by using the visual objects toolbar. The toolbar can be visible or hidden. To make the toolbar show up:

(a) Select the following button from the menu bar:



or,

(b) Select the **View \ Visual Objects Toolbar** option from the main menu.

The toolbar, along with annotation on each of its buttons is shown in the Figure 12.1.

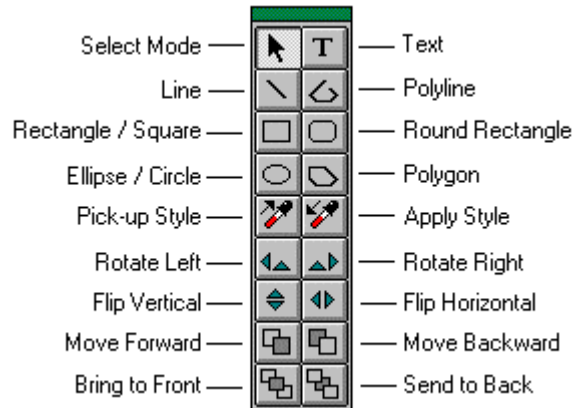
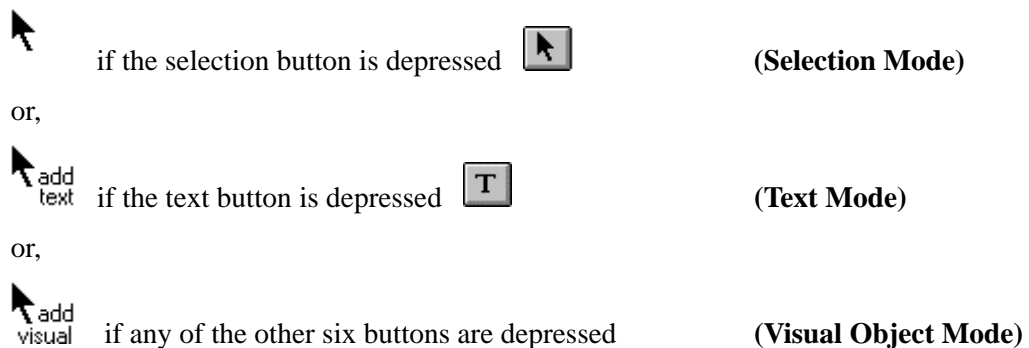


Figure 12.1: The Visual Objects Toolbar.

## 12.3 Adding a New Visual Object

To insert one of the seven types of visual objects, you will use the first eight (8) buttons of the toolbar displayed in four rows. All these buttons of the toolbar function in somewhat the same way: you click on a button and then use the mouse to either select one or more objects (when the Selection Mode button was clicked) or create the corresponding visual object. Notice that after you click on one of these eight buttons, the button stays depressed and when you move the mouse over the workplace area, the mouse cursor becomes:



If you are in selection mode, you may go over any object (visual or processing) and click on it, in order to select it. If you need to add other objects in the selection set, you may click on them by holding the **Ctrl** key down. If you **Ctrl+Click** on an object that is already selected, then the object is removed from the selection set. If you plan on selecting many objects, you may opt to 'group-select' them by drawing a "lasso" around them. The "lasso" can be drawn by pressing the left button on an empty area and dragging the mouse until the rectangle displayed on the screen with a dotted-line as a border is large enough to include all the elements that you want included in the selection set. When you let go of the mouse button, all the objects that are fully included in the "lasso" area will be displayed as selected.

When you are in the text mode, then the cursor reminds you that you are about to insert a text object:



### → To Insert a Text Object...

1. Make sure the corresponding button is depressed on the palette.
2. Move the mouse to the location where you want to start typing the text and click.
3. Notice how the system inserts automatically the string "Text" that is already highlighted so that as you start typing the text is replaced by your typing.
4. When you are done typing, you may click anywhere away from the object.

- NOTES:**
- a. During the typing of the text, most of the system services are temporarily suspended (notice how most of the main menu entries are disabled).
  - b. The text typed can contain carriage-return characters (i.e., the text can be a multi-line text). Simply type **Enter** to insert a new line character.
  - c. During typing, you may use the arrow keys to move the cursor. You can select text pieces by moving the cursor with the arrow keys while the **Shift** key is depressed or by click-and-dragging the mouse. As usual, **Ctrl+X** or **Shift+Del** cuts the selected text, **Del** or **Backspace** erases the selected text and **Ctrl+V** or **Ctrl+Ins** or **Shift+Ins** inserts the text kept in the clipboard.
  - d. If, during typing, you decide to abort the creation of this new text object, simply hit the **Esc** key.

### When in Visual Object Mode...

When you are in the visual object mode, then the cursor reminds you that you are about to insert a visual object.

### → To Insert a Rectangle / Round Rectangle / Ellipse...

1. Make sure the corresponding button is depressed on the palette.
2. Move the mouse to the top-left corner of the desired location of the object you are inserting (in the case of drawing an ellipse, which would be the top-left corner of the ellipse's enclosing rectangle).
3. Press the left button and drag (i.e., move the cursor while the button is depressed). Notice how the shape and size of the inserted object follows the cursor as it moves.
4. When, the object has the desired size, release the mouse button.

- NOTE:** To insert an object with fully symmetrical shape (i.e. a square or an ellipse) make sure you keep the **Shift** key depressed before the first mouse click (in step 1 above). Then the system automatically draws a square or a circle (instead of following the mouse cursor precisely).

**→ To Insert a Line...**

1. Make sure the corresponding button is depressed on the palette.
2. Move the mouse to a location where you wish to start drawing the line and click.
3. Move the mouse to the other end of the line and click again.

**NOTES:** a. To insert a line that is either horizontal or vertical, make sure that you keep the **Shift** key depressed during the mouse move (step 2 above). Then the system automatically draws either a horizontal or vertical line (whichever is closer to the location of the mouse cursor).

b. If, during the drawing of a line, you decide to abort, then simply hit **Esc**.

**→ To Insert a Polyline / Polygon...**

1. Make sure the corresponding button is depressed on the palette.
2. Move the mouse to a location where you wish to locate the first vertex of the polyline / polygon and click.
3. Move the mouse to the location of the next vertex of the polyline / polygon and click. Repeat until you have created all the vertices of the polyline / polygon.
4. To end the drawing of the polyline / polygon, double-click to enter the last vertex.

**NOTES:** a. During the insertion of vertices, a right-click will cancel the last vertex inserted.

b. If, during the drawing of a polyline / polygon, you decide to abort, then simply hit **Esc**.

## 12.4 Editing Existing Visual Objects

Before we edit any object, we must select it. Make sure you are in select mode and click on the object that you want to edit. Notice that:

- if the object is a text object, then it is displayed in red color with a dotted frame around it,
- if the object is any of the other types of visual objects, then a set of black square rectangles (called 'handles') are displayed.

**→ To Edit a Text Object...**

1. Move the cursor over the text and right-click. From the context-menu that appears select **Edit**.
2. Move the insertion point anywhere in the text you need to make changes or insert new text.
3. To end the editing of the text object, simply click anywhere outside the area of the text.

**NOTES:** a. As a short-cut to step 1 above, you may simply move the cursor over the text object that you wish to edit and double-click on it.

- b. If, during the editing of a text object, you decide to abort and keep the text with its old contents, simply hit **Esc**.

### → To Edit (Resize) Any Visual Object (Except Text)...

1. Make sure the desired visual object is selected.
2. Move the mouse over one of the selection handles and drag the handle. Notice how the visual object's size changes to re-fit itself within the new rectangle established by the new location of the handle.

- NOTES:**
- a. The handles displayed on the middle point of an surrounding rectangle's edge allow you to move that side only. The corner rectangles allow you to move two sides at the same time.
  - b. Polylines and polygons can be resized just like any other visual object. Resizing a polygon or a polyline essentially scales up or down the dimensions of every edge and appropriately adjusts the location of the vertices. If you want to simply move the location of the vertices but not affect the entire size of the polyline / polygon, see next (To Reshape a Polyline or a Polygon).
  - c. If more than one objects are included in the selection set and a selection handle is being dragged, then the entire set of objects get resized.

### → To Reshape a Polyline or a Polygon

1. Bring up the context-menu of the polyline or polygon that you wish to reshape and select **Reshape**.
2. Move the mouse over the vertex that you wish to move and drag its handle to the desired new location.
3. Repeat with all vertices that you wish to relocate.
4. To end the reshaping of the polyline / polygon, simply click away from the object.

- NOTES:**
- a. During the reshaping of a polyline / polygon all other user options are being temporarily disabled (until the end of the reshaping session).
  - b. Unlike resizing, reshaping can only be applied to one object (polyline or polygon) at a time.

## 12.5 The Visual Objects Command Menu

Just like any object that is part of a design case, visual objects can accept certain commands that affect their appearance. To see the menu of commands accepted by a visual object, you can simply move the mouse over the object and right click, to invoke its context menu. Even though the exact list depends on the type of visual object that you are addressing, the following commands are accepted by almost all visual objects (see Note (a) below for exceptions):

- ⇒ **Rotate {Left or Right}**
- ⇒ **Flip {Horizontal or Vertical}**

⇒ **Order {Bring Forward, Send Backward, Bring to Front, Send to Back}**

⇒ **Style {Pick Up, Apply Style, Edit Style, Use Default}**

All of the above commands can also be administered from the toolbar's last ten buttons shown at the bottom five rows (see Fig. 12.1).

### **Rotate Left / Right...**

Applying this command to the selected object(s) will rotate them left / right by 90°.

### **Flip Horizontal / Vertical...**

Will rotate the selected object(s) by 180° around a hypothetical horizontal / vertical axis.

### **Bring Forward / Send Backward...**

As several objects are drawn on the workspace area, it is possible that one may partially (or totally) overlap another. The order by which objects are drawn determines which object gets to be displayed last and therefore be exposed in its entirety. Bring Forward advances the selected object(s) by one position in the drawing order and relative to all other objects that currently exist in the design case (including process step icons and streams). The further an object is moved the more exposure is likely to get when displayed. The further back an object is sent, the more of its surface could be covered by other objects that will be drawn after it. Note that if more than one object is selected to move forward or backward in the drawing order, their relative position remains unchanged.

### **Bring To Front / Send To Back...**

Sending an object to the front will make sure that the object will be drawn last and therefore it will be completely exposed to view. The opposite will happen when we send an object to back. In the latter case, if any other objects are partially or totally overlapping with it, they will get to be shown on top of the object moved to back. Note that if more than one object are selected and sent to front or back, their relative position in the drawing order remains unchanged.

### **Pick Up Style...**

Besides location and size, style affects the appearance of every visual (as well as processing) object. The elements that constitute the drawing style of an object depend on the object's type. For example, for lines, the line color, the presence or absence of arrowheads at the end and the beginning of the line and the line thickness are the style components. In rectangles, ellipses and other solid objects, the fill-in characteristics are also components of their style. For text objects, on the other hand, none of the above is part of their style. Instead, the font name, font size and text color are part of a text object's style. For more on how to set the style characteristics of a visual object or how to set the default style for all visual objects, see in the following section (Editing the Style of Visual Objects). In any case, the style of an object is the collection of all characteristics that determine the visual appearance of an object (other than position and size). By selecting an object and clicking on the toolbar's button that corresponds

to this command, the program copies all of its style's characteristics. Typically, a pick up style command will be followed by one or more apply style commands that actually apply the copied style to one or more target objects, thereby making their visual characteristics identical to the source object.

### **Apply Style...**

Once the style of an object has been picked up (see above), then we can select others (of the same or similar type) and apply the selected style on them.

- NOTES:**
- a. Rotate Left / Right and Flip Horizontal / Vertical don't apply to text objects.
  - b. Just like visual objects, process step icons and process streams also have a style: the style of a process step's icon is made up of the icon's color, and the font and color of its name, equipment name, and description label. Similarly, a stream's style is made up of its line thickness, color and its tag's font and color. The style of process steps and streams can be picked up and applied just like any other visual object.
  - c. If you picked-up the style of an object and then applied it to others whose attribute styles are sub/super-sets of the source object, only the applicable style components (if any) will be copied. For example, if you picked up the style of a line object and applied it to a solid object (like a rectangle) only the rectangle's line characteristics will change to match the source's line characteristics. On the other hand, if you applied the picked up style of a rectangle to a line, the reverse will happen. The line characteristics will be taken on by the target line and the fill-in characteristics will be ignored.

## **12.6 Editing the Style of Visual Objects**

The attributes that comprise the style of a visual object depend on the object type. The style attributes of shapes affect the appearance of:

- the lines (thickness, color, arrow-heads)
- the interior - for solid objects only - (solid color, pattern or none)

On the other hand, the style attributes for text objects affect:

- the text font (type, size, boldness, etc.)
- the text color

Note that process step icons have their own style. Their style affects:

- the color of the icon
- the color of their labels (process step name, equipment name, and description)
- the font of their labels (process step name, equipment name, and description)
- the visibility of their labels (process step name, equipment name, and description)
- the style, color and thickness of the label frames line

Similarly, streams have a style that affects:

- the color of the lines

- the thickness of the lines
- the color of the stream's label
- the font of the stream's tag
- the visibility of the stream's tag
- the style, color and thickness of the label frame line

### ➔ Editing the Style of a Text Object...

1. Bring up the context-menu of the text object that you wish to modify the style and select **Style \ Edit Style....** This brings up the following dialog through which you can modify all the attributes of a text object.

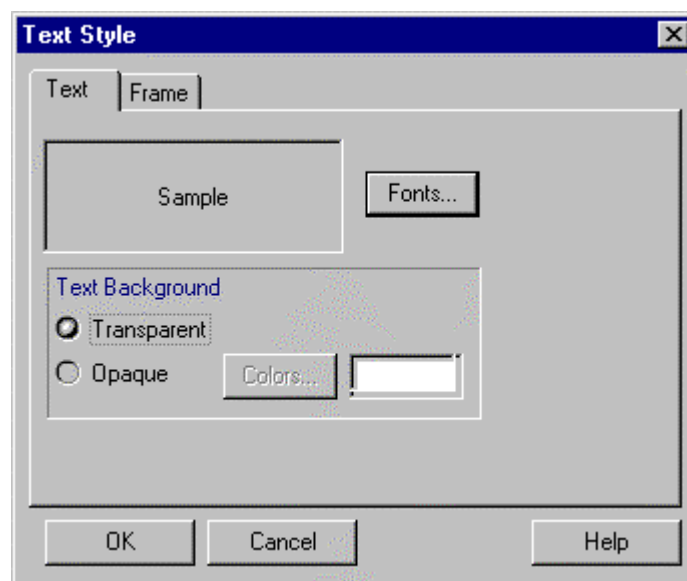


Figure 12.2: Editing the style of a text object.

2. If you select **Style \ Use Default**, then the selected object(s) will be forced to follow the style set as the default style of such objects. To find out how to edit the default style of visual objects see the section below ("Editing the default style of Visual Objects").

### ➔ Editing the Style of a Visual Object (Other Than Text)...

1. Move the cursor over the object, bring-up the context menu and select **Style \ Edit Style....** This brings up the following dialog that allows the user to edit the outline as well as the interior of the visual object. For line objects, a different dialog is displayed that allows you to modify all the attributes of a line object.



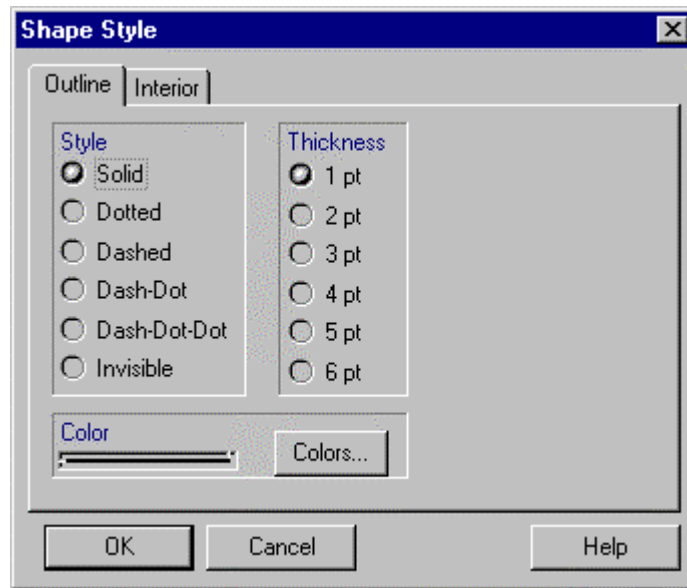


Figure 12.3: Editing the style of a visual object.

## 12.7 Editing the Default Style of Visual Objects

Every visual object that is inserted into a design case must be provided with a style (default style). The characteristics of the default style can be edited for each design case file. Note that the changes will stay saved with the saved design case file and the next design case will use the defaults that your “Pro-Designer” software has built-in.

### → To Edit the Default Style for Text Objects...

1. From either the **Edit \ Flowsheet Options...** submenu of the main menu or the context menu of the flowsheet select the **Preferences \ Default Styles \ Text...** entry. Then a dialog similar to the one shown in Fig. 12.2 will be displayed.
2. Make your selections for all style attributes and click **OK**.

### → To Edit the Default Style for All Visual Object Types (Except Text)...

1. From either the **Edit \ Flowsheet Options...** submenu of the main menu or the context menu of the flowsheet select the **Preferences \ Default Styles / Visual Object...** entry. Then a dialog similar to the one shown in Fig. 12.3 will be displayed.
2. Make your selections for all style attributes and click **OK**.



### Tip

Modifying the default style for visual objects will affect the appearance of all existing objects that follow the default style. If you wish to have some objects maintain their current style, you must explicitly visit them and use the **Colors & Lines...** or **Font...** option to set their styles yourself.

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