

GD&T

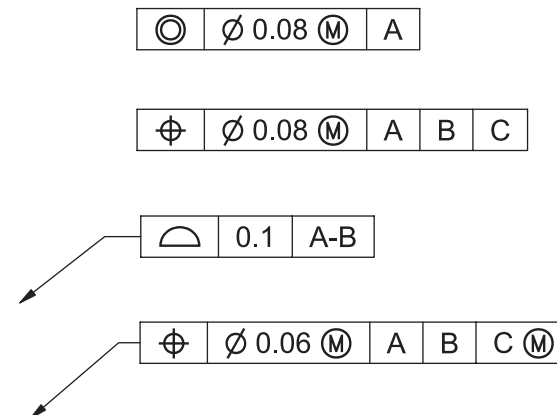
Geometric dimensioning and tolerancing (GD&T) uses symbols and related tolerances to specify design characteristics. You can use standard dimensioning tools and specific dimension styles for some GD&T requirements. Inventor also provides tools that allow you to add feature control frames, feature identifier symbols, datum feature symbols, and datum target symbols.

Feature Control Frames

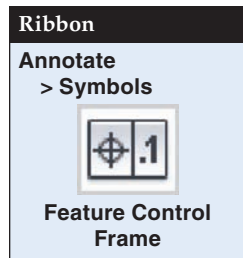
Access the **Feature Control Frame** tool to create a *feature control frame*. See [Figure 23A-1](#). Select a point or feature to control. To locate the symbol at the selection, press [Enter] or right-click

Figure 23A-1.

Examples of feature control frames.



feature control frame: The rectangular frame that contains the geometric characteristic, geometric tolerance, material condition, and datum reference symbols for an individual feature.

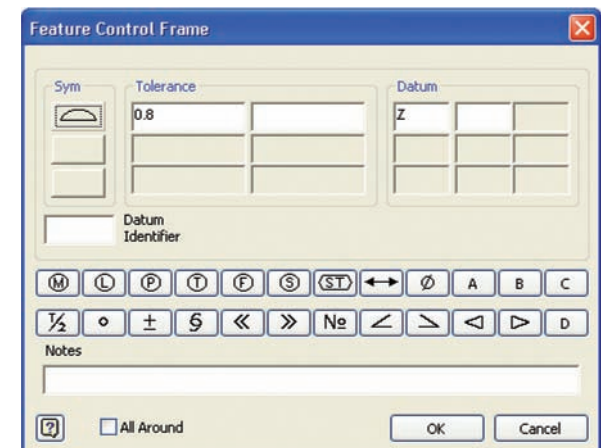
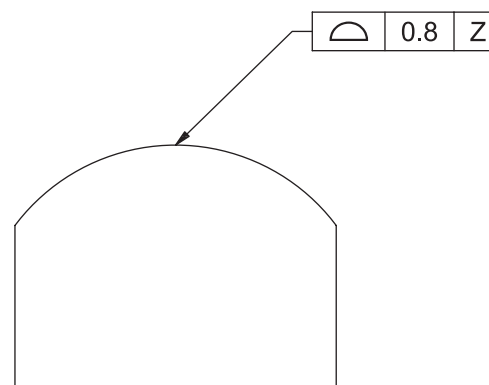


and select **Continue**. To connect the symbol to a leader, pick a second point and press [Enter] or right-click to select **Continue**. The **Feature Control Frame** dialog box appears, allowing you to define the finish characteristics. See [Figure 23A-2](#).

The **Sym** area includes buttons that allow you to define the geometric characteristic symbols for the first, second, and third lines of the feature control frame. Select a button to pick a symbol from the symbols palette. Use the **Tolerance** area to specify geometric tolerances. The **Tolerance 2** text box is available only if you pick the **Allow Tolerance 2** check box in the **Feature Control Frame Style** area of the **Style and Standard Editor**. Use the **Datum** area to enter primary, secondary, and tertiary datums. The **Datum 2** text box is available only when you enter a value in the **Datum 1** text box, and the **Datum 3** text box is available only when you enter a value in the **Datum 2** text box. The **Datum Identifier** text box, which is available only if you pick the **Datum ID** check box in the **Feature Control Frame Style** area of the **Style and Standard Editor**, allows you to reference a feature identifier symbol.

Figure 23A-2.

Placing a feature control frame using the **Feature Control Frame** dialog box.

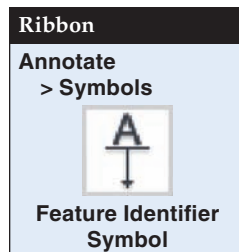


The **Modifier** buttons allow you to add GD&T symbols and information, such as material condition and tolerance zone descriptors. To use these buttons, pick a location inside a text box and choose the required symbol button. The symbol appears in the selected text box. Use the **Notes** text box to add a note below the feature control frame. Check **All Around** to add an all-around symbol on the leader next to the feature control frame. Pick the **OK** button to create the feature control frame. Press [Esc], right-click and select **Done**, or access a different tool to exit.



NOTE

Right-click on a feature control frame and select **Edit Feature Control Frame...** to make changes. You can also override the default units for a specific feature control frame by right-clicking on the feature control frame and selecting **Edit Unit Attributes**. You must deselect the **Use Standards Notation** check box in the **Edit Unit Attributes** dialog box to override the default unit settings.

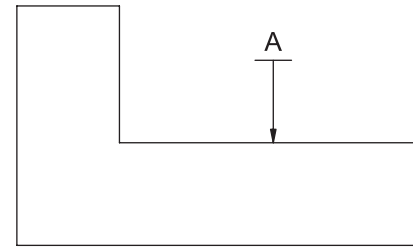


Feature Identifier Symbols

Use the **Feature Identifier Symbol** tool to add a *feature identifier* symbol, which is not used in the ASME standard. See [Figure 23A-3](#). Select a point or feature to identify. To locate the symbol at the selection, press [Enter] or right-click and select **Continue**. To connect the symbol to a leader, as shown in [Figure 23A-3](#), pick

feature identifier: A symbol that is used to correlate certain features to specifications in the ISO, DIN, and JIS standards.

Figure 23A-3.
Placing a feature identifier
symbol.



a second point and press [Enter] or right-click and select **Continue**. The **Format Text** dialog box appears, allowing you to add information to or modify the default feature identifier value. Pick the **OK** button to create the feature identifier symbol. Press [Esc], right-click and select **Done**, or access a different tool to exit.



NOTE

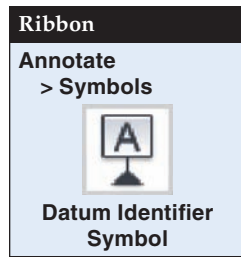
The **Format Text** dialog box automatically opens if you make three picks when placing the symbol.

Datum Feature Symbols

Identify a *datum* using a *datum feature symbol*. Datum feature symbols connect to a triangular datum arrow that attaches to a surface or extension line with a diameter or center plane

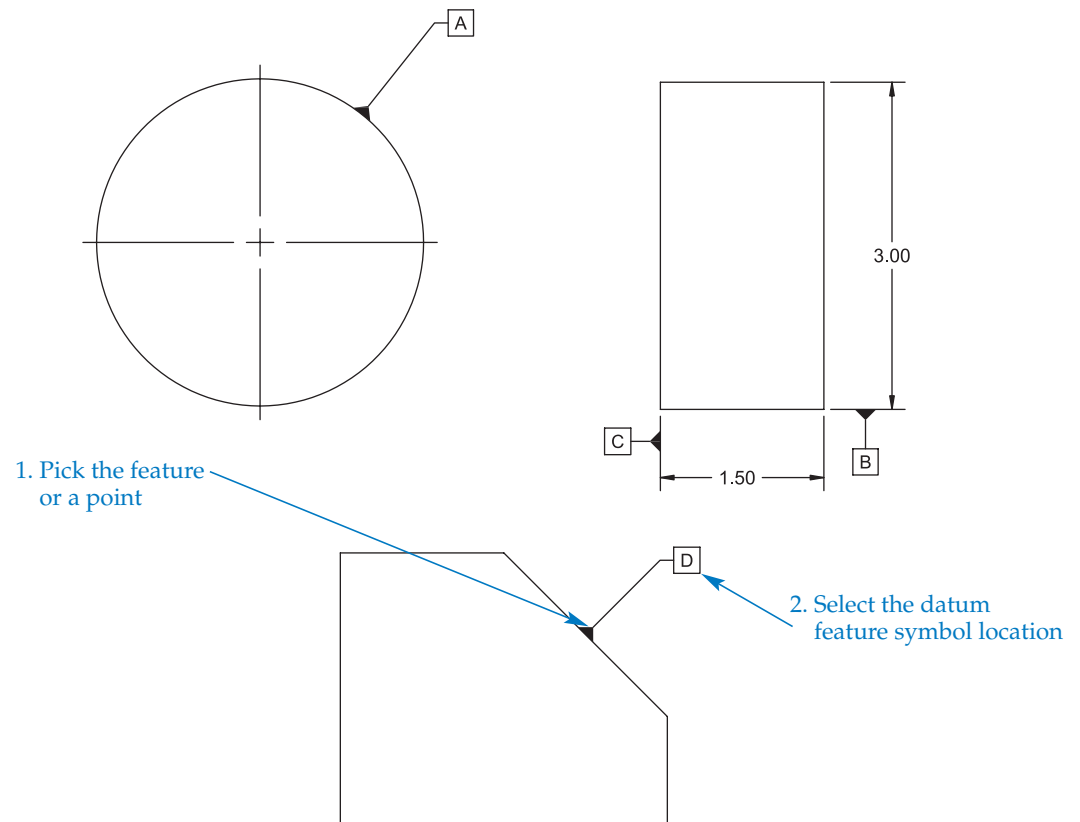
datum: A theoretically perfect surface, plane, point, or axis.

datum feature symbol: A datum identification symbol in Inventor; identifies a datum as a square box that contains the datum reference letter.



dimension, or to a feature control frame. See **Figure 23A-4**. Inventor refers to datum feature symbols as *datum identifier symbols*. Access the **Datum Identifier Symbol** tool to place a datum feature symbol. Select a point or feature representing the datum. To locate the symbol at the selection, press [Enter] or right-click and select **Continue**. To connect the symbol to a leader, as shown in **Figure 23A-4**,

Figure 23A-4.
Examples of datum feature symbols.

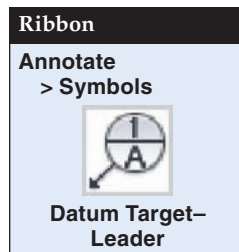


pick a second point and press [Enter] or right-click to select **Continue**. The **Format Text** dialog box appears, allowing you to add information to or modify the default datum value. Pick the **OK** button to create the datum feature symbol. Press [Esc], right-click and select **Done**, or access a different tool to exit.



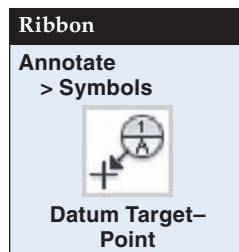
NOTE

The **Format Text** dialog box automatically opens if you make three picks when placing the symbol.



Datum Target Symbols

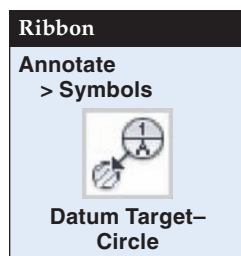
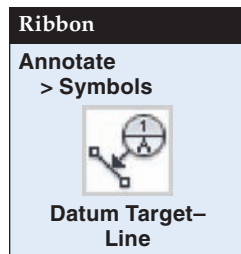
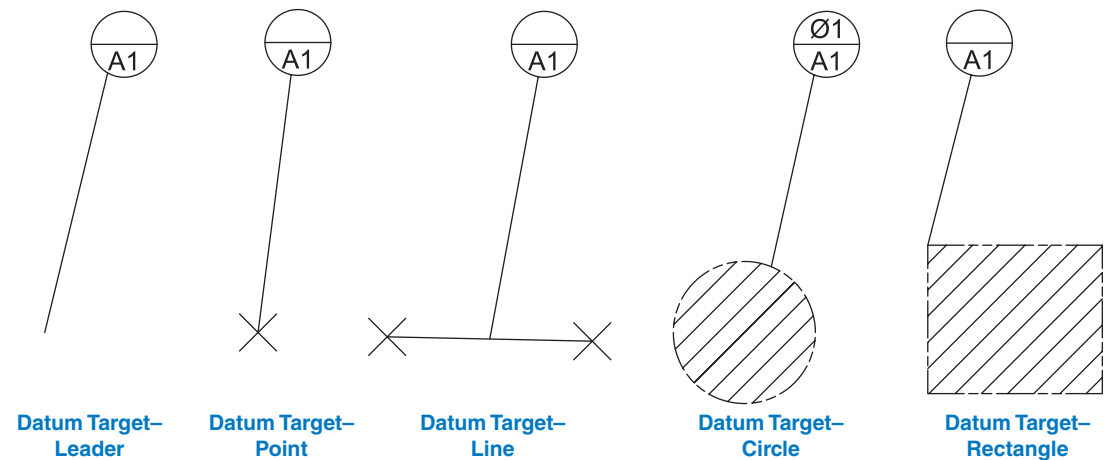
A *datum target symbol* is a circle with a horizontal line through the center. The top half of the circle is blank, unless the symbol indicates the size of a circular datum target area. The bottom half of the datum target symbol identifies the related datum. The datum reference letter and datum target number are assigned sequentially to the datum, such as A1, A2, and A3. A datum target symbol connects to the related datum target point, line, or area with a leader that typically does not terminate with an arrowhead. See [Figure 23A-5](#).



The **Datum Target – Leader** tool allows you to place a datum target with a leader attached to the specified feature or point. Use the **Datum Target – Point** tool to add a datum target with a leader attached to a point. Use the **Datum Target – Line**

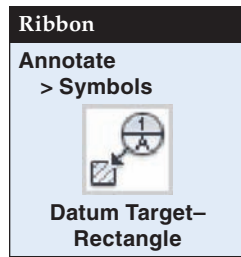
datum target symbol: A symbol that specifies points, lines, or areas of contact on a part. Datum target symbols establish datums when it is not possible or appropriate to use a surface.

Figure 23A-5.
Examples of datum targets.



tool to add a datum target with a leader attached to a target line, with points at the line ends. The **Datum Target – Point** tool allows you to place a datum target with a leader attached to a point or feature to target. When using the **Datum Target – Line** tool, pick the beginning of the target line and then the end of the line. When using the **Datum Target – Circle** or **Datum Target – Rectangle** tools, pick the center of the target area followed by the edge, or radius, of a circle area or the corner of a rectangular area.

Once you access the correct tool, begin the process of picking points to create the symbol. When using the **Datum Target – Leader** or **Datum Target – Point** tool, pick a point or feature to target. When using the **Datum Target – Line** tool, pick the beginning of the target line and then the end of the line. When using the **Datum Target – Circle** or **Datum Target – Rectangle** tools, pick the center of the target area followed by the edge, or radius, of a circle area or the corner of a rectangular area.



Once you specify the target, pick to locate the symbol and then press [Enter] or right-click to select the **Continue**. The **Datum Target** dialog box appears, allowing you to specify datum target values. See [Figure 23-6](#). The **Dimension** text box is available for creating each type of datum target symbol, but it is usually appropriate only for specifying the diameter of a circular target area. Specify the datum in the **Datum** text box. Pick the **OK** button to create the surface finish symbol. Press [Esc], right-click and select **Done**, or access a different tool to exit.

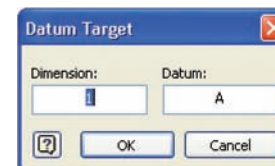


PROFESSIONAL TIP

Type %%c before a circular target area diameter to include the diameter symbol

Figure 23A-6.

The **Datum Target** dialog box.





NOTE

Right-click on a datum target symbol and select **Edit Datum Target...** to make changes. You can override the default units for a specific datum target symbol by right-clicking on the symbol and selecting **Edit Unit Attributes**. You must deselect the **Use Standards Notation** check box in the **Edit Unit Attributes** dialog box to override the default unit settings. You can also attach another datum target symbol to the existing symbol by right-clicking on the symbol and selecting **Attach Balloon**.

4. Use geometric dimensioning and tolerancing symbol tools to dimension the drawing as shown. Adjust dimensions as needed.
5. Resave ACT23-1.idw.
6. Keep Inventor open for the next exercise, or exit if necessary.