

Circular forms

Any object, regardless of its shape, can be broken down into combinations of circular and rectangular forms. We have already learned how to draw rectangular forms. To understand circular forms, examine a circle drawn in a square in elevation. We notice two things:

1. The center of the circle coincides with the intersection of the diagonals of the square (O).
2. The circle is tangent at the midpoint of the four sides of the square ($w, x, y, \text{ and } z$).

The square is the only rectilinear figure which will fulfill these two conditions. To draw a perspective circle, we need only transpose these conditions to a perspective square.

Construction of a circle in perspective

1. Draw any perspective square $ABCD$.
2. Draw diagonals to locate the center.
3. Draw perspective lines through the perspective center to bisect the sides ($w, x, y, \text{ and } z$).
4. Draw a smooth curve tangent to the midpoints of the sides. This curve will be a circle in perspective.

The ellipse

Ordinarily, we would use a French curve to draw a smooth curve. However, it can be shown that any curve inscribed in a perspective square as described above is an ellipse. If we can find a simple way of matching an ellipse to a perspective square, we can use an ellipse guide for drawing perspective circles. The ellipse has two dimensions that may be useful, a major axis and a minor axis.

Draw ellipses on opposite faces of a perspective cube and connect the perspective centers of these faces with a perspective line. This line, which is perpendicular to both ellipses, crosses them at their narrowest dimensions and is thus the minor axis of both.

Now draw two concentric circles in perspective and locate their major and minor axes. Notice that while the minor axes are on the same line, the major axes (m and M) are erratic.

According to these two figures, the major axis of the ellipse is of no value in perspective drawing. The minor axis, on the other hand, is easily located: we need only find the perspective center of the square and draw a perspective perpendicular at this point.

Parallel circles have minor axes on a line.

To use the ellipse guide in drawing a perspective circle, choose the ellipse that is tangent at the midpoint of all four sides of the perspective square, and whose minor axis coincides with the perspective perpendicular.

The drawing opposite illustrates two reasons why the ellipse guide may not fulfill both these conditions at the same time:

1. An accurate ellipse will not fit a distorted square. In previous chapters we have seen how distortion increases as the cube is shifted from side to side.
2. Ellipse guides usually come in increments of 5° ; the required ellipse may fall somewhere in between.





