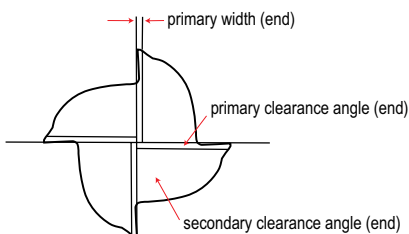


Center Cutting End View



Non-Center Cutting End View

An end mill is a straight or tapered shank milling cutter, which extends or projects from the milling machine spindle unobstructed. It is one of the most versatile and most-used of the cutting tools in any machine shop. It is capable of milling, drilling, reaming, planning, shaping, contour cutting and more. Improvements in cutting efficiency through both design and material changes have only increased the use of this style of tool.

Axial Relief: The relief, measured in the axial direction, between a plane perpendicular to the axis at the cutting edge and the relieved surface.

Clearance (Secondary Relief): The additional space provided behind the relieved land. Eliminates undesirable contact between the mill and the workpiece.

Cutting Edge: The leading edge of the cutter tooth.

Flute: The chip space between the back of one tooth and the face of the following tooth.

Gash: The secondary cuts on a mill. Provides chip room.

Heel: The back edge of the relieved land.

Helical Rake: The angle between the tool axis and a tangent plane at a given point on the flute face.

Helix Angle: The cutting edge angle made by a helical cutting edge with a plane containing the axis of a cylindrical mill. When viewed from the cutter end of the mill, the flute will move clockwise for a right hand helix.

Hook: A concave condition of a tooth face. The rake of a hooked tooth face must be determined at a given point.

Land: Used to define the width of a specified surface.

Left Hand Cut: When viewed from the cutting end of the mill, a clockwise rotation of the mill is required to cut.

Length of Cut: The effective axial length of the relieved peripheral cutting edge.

Radial Rake: The angle between the tooth face and a radial line passing through the cutting edge in a plane perpendicular to the cutting axis.

Rake: The angular relationship between a reference plane or line and the tooth face or a tangent to the tooth face at a given point.

Relief: The result of the removal of tool material behind or adjacent to the cutting edge. Provides clearance and prevents rubbing.

Relief Angle: The angle formed between a relieved surface and a point on the cutting edge, or a given plane tangent to the axis.

Right Hand Cut: When viewed from the cutting end of the mill, a counterclockwise rotation is required to cut. Most end mills are right hand cut.

Shank: The projecting portion of a cutter which locates and drives the cutter from the machine spindle.

Tooth Face: The surface of the tooth on which the chip forms.