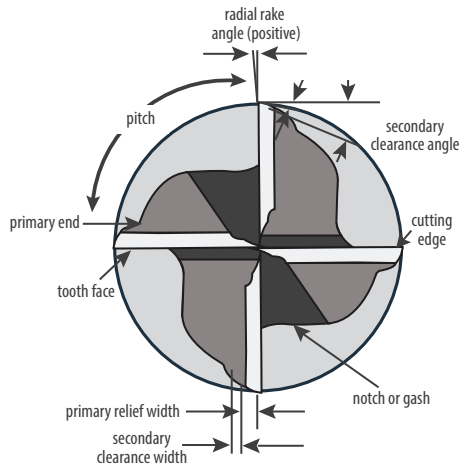


END MILL ATTRIBUTES & TERMINOLOGY

COMMONLY USED INDUSTRY LANGUAGE AND DEFINITIONS

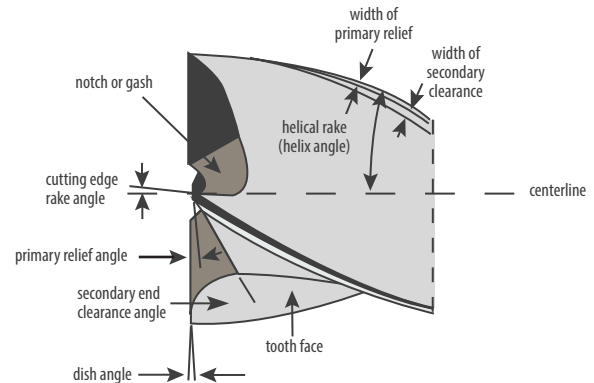
END VIEW

figure 1



CROSS SECTION VIEW

figure 2



AXIAL 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 contact between the mill and workpiece.

CORE DIAMETER - The diameter measured tangent from bottom of all flutes, determines the strength of your end mill.

CUTTING DIAMETER - Measured from margin-to-margin on cutting end of tool. Even number of flutes can be measured 180° apart.

CUTTING EDGE - Leading edge of the cutter tooth.

DISH ANGLE - Angle perpendicular to centerline of tool and allows proper end cut characteristics which reduces full diameter contact.

FLUTE - The number of cutting edges and the chip space between the back of one tooth and the face of the following tooth. The number of flutes will determine the feed rate.

FLUTE LENGTH - Length of flutes or grooves. Often confused with cutting length.

FLUTE WASH - Amount of non-cutting flute area past the length of cut.

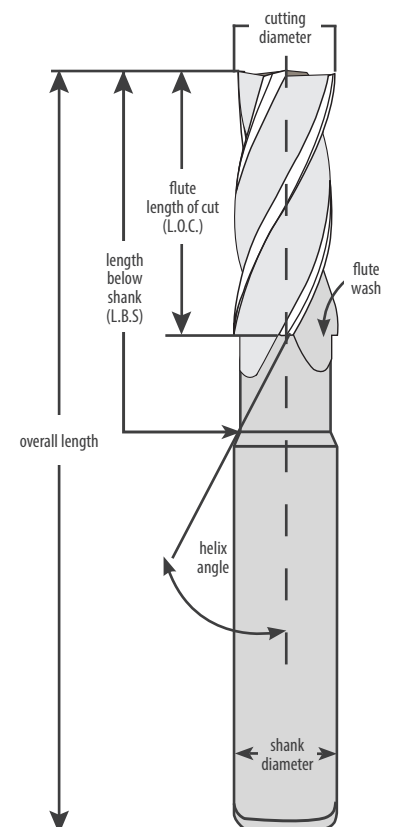
GASH ANGLE - Angle that the gash relief is developed which provides chip room.

HAND OF CUT - Right Hand (RH): Counterclockwise rotation of the end mill is required in order to cut. Most end mills are right hand. Left Hand (LH): Clockwise rotation of mill is required to cut.

HEEL - The back edge of the relieved land.

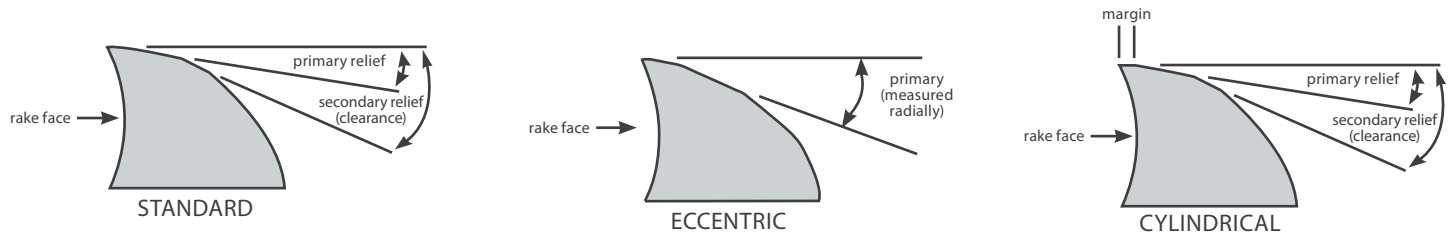
SIDE VIEW

figure 3



RELIEF TYPES

figure 4



HELIX ANGLE - Angle formed by a line tangent to the angle of the flute grind, and parallel to the centerline of the tool. The cutting edge angle which a helical cutting edge makes with a plane containing the axis of a cylindrical mill.

LAND - Defines the width of a specified surface.

LENGTH BELOW SHANK (LBS) - Length measured from front of tool to the shank, allowing for deep pocketing.

LENGTH OF CUT (LOC) - Actual cutting depth of the tool in the axial direction. Axial length of the peripheral cutting edge which has been relieved to cut.

OVERALL LENGTH (OAL) - Measurement from end to end.

PITCH - Angular measurement from flute to flute. Variable pitch has unequal spacing.

PRIMARY RELIEF - Relief measured in the axial direction between a plane perpendicular to the axis at the cutting edge, and the relieved surface.

RADIAL RAKE - Angle of rake face measured from center of the tool. The angle between the tooth face and a radial line passing through the cutting edge in a plane perpendicular to the cutting axis. Results in the removal of tool material behind or adjacent to the cutting edge which provides clearance.

RADIAL RELIEF - Area where cutting face is relieved, behind the cutting edge, to avoid rubbing.

Cylindrical - Primary and secondary relief angles, effective for non-ferrous alloys.

Eccentric - Primary relief measured radially along its edge, ideal for ferrous and tough materials.

Standard - Allows for high degree of primary and secondary radial relief.

RAKE - Angular relationship between the tooth face or a tangent to the tooth face.

RELIEF ANGLE - Angle formed between a relieved surface and a given plane, tangent to the axis at the cutting edge.

SHANK - Extending part of a cutter which propels the cutter from the machine spindle.

TOOTH - The cutting edge.

TOOTH FACE - The surface of the tooth on which the chip invades.

WELDON SHANK - Shank with a locking drive flat.