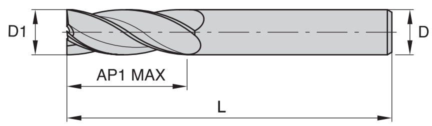
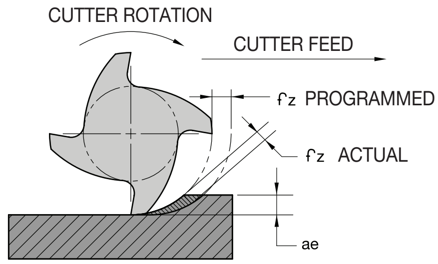
Square End

Radial Width of Cut Factor

If the radial width of cut (ae) is less than .5 x D1, the actual chipload at the cutting edge is less than the programmed chipload.

To obtain the correct chipload at the cutting edge, follow the simple 4-step process.





Step 1: Determine the following values from your application:

D1 = end mill cutting diameter

ae = radial width of cut

fz = desired chipload per tooth at the cutting edge

Step 2: Determine the radial width engagement ratio:

radial width engagement ratio = ae/D1

Step 3: Determine the chipload factor from the table below using the radial width engagement ratio from Step 2:

Step 4: Calculate what the programmed chipload should be to get the desired chipload at the cutting edge:

fz programed = fz * chipload factor

Example: What is the programmed chipload to achieve a desired chipload of .002"/tooth using a 1/2"-diameter end mill with a radial width of cut of .05"?

Step 1: D1 = **.500"** ae = **.05"** fz = **.002"**

Step 2: Radial width engagement ratio = ae/D1 = .05"/.500" = **.1**

Step 3: Chipload factor for a .1 radial width engagement ratio = **1.73**

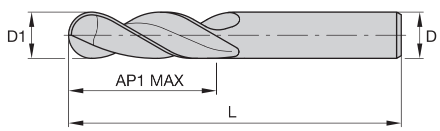
Step 4: The programmed chipload = fz x chipload factor = .002" x 1.73 = **.0034"**

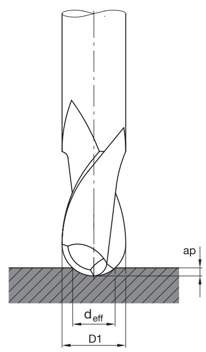
Radial Width Engagement Ratio = ae/D1	Chip Load Factor
0.3	1.1
0.25	1.15
0.2	1.25
0.15	1.41
0.1	1.73
0.07	2.0
0.05	2.33
0.03	2.93
0.02	3.6
0.01	5.0

Ball Nose

Effective Cutting Diameter Calculation

When the axial depth of cut is less than half of the cutting diamter (ap < .5D1), the end mill diameter used to determine speed and feed rate is smaller than the cutting diameter (D1). This smaller end mill diameter is known as the effective cutting diameter (Deff). This effective cutting diameter can be calculated using a simple 4-step process.





Step 1: Determine the following values from your application:

D1 = end mill cutting diameter

ap = axial depth of cut

Step 2: Determine the depth of cut ratio:

depth of cut ratio = ap/D1

Step 3: Determine the diameter factor from the table below using the depth of cut ratio from Step 2:

Step 4: Calculate the effective cutting diameter (Deff):

Deff = D1 multiplied by the diameter factor

Example: What is the effective cutting diameter for a 1/2"-diameter ball nose end mill running at a .05" axial depth of cut?

Step 1: D = **1/2"** ap = **.05"**

Step 2: Depth-of-cut ratio = .05/.5 = **.1**

Step 3: Diameter factor = **.6**

Step 4: Effective cutting diameter = .5 x .6 = **.3"**

Depth of cut ratio = ap/D1	Diameter factor
0.40	0.98
0.30	0.917
0.25	0.87
0.20	0.8
0.15	0.71
0.10	0.6
0.08	0.54
0.05	0.44
0.04	0.39
0.03	0.34
0.02	0.28
0.01	0.19