

Types of Tool Entry

The type of part entry programmed is very influential in the tool's success and one of the most punishing operations for a cutter. Below we have listed some common part entry methods and suggestions on making these most successful.



Pre-Drilled Hole

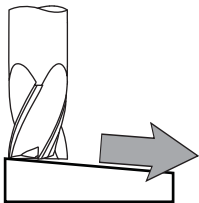
Pre-drilling a hole to full pocket depth (and 5-10% larger than the end mill diameter) is the safest practice of dropping your end mill into a pocket. This method ensures the least amount of end work abuse and premature tool wear.



Helical Interpolation

A very common and safe practice with ferrous materials. Employing corner radius end mills during this operation will increase tool wear and lessen corner breakdown. We recommend a programmed helix diameter >110-120% of tool diameter.

Our new speed & feed app "Milling Advisor" will give you specific cutting parameters for operations like this (see pg. 47).



Ramping-In

This type of operation can be very successful, but institutes many different torsional forces the cutter must withstand. Finding a tool with good core strength plus room for proper chip evacuation is key. Employing corner radius end mills during this operation will help immensely.

Below are some suggested starting ramp angles:

- Non-Ferrous Materials: $3^{\circ} - 10^{\circ}$
- Ferrous Materials: $1^{\circ} - 3^{\circ}$

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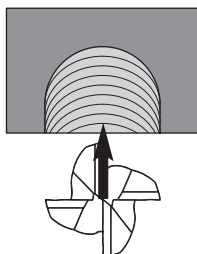
Straight Plunge

The least preferred method and one that can easily break a tool. The tool must be center cutting. End milling incorporates a flat entry point making chip evacuation tough, tool pressure very high and success random at best.

Please note: Drill bits are intended for straight plunging and we highly recommend this type of tool for this operation.

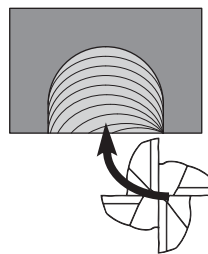
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Side Entry (use tools with a corner radius for best results)



Straight Entry

Straight entry into the part takes a toll on the cutter. Until the cutter is fully engaged, the feed rate upon entry must be reduced by at least 50%.



Roll-In Entry

Rolling into the cut ensures a cutter to work its way to full engagement and naturally acquire proper chip thickness. The feed rate in this scenario should be reduced by 50%.