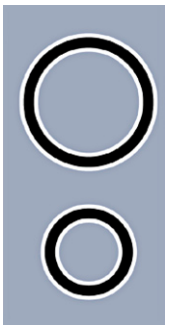
Removing broken tools with a Metal Disintegrator

Basics to keep in mind

Using "Overburn" to your advantage

The path cut by an Electro Arc Disintegrator is always larger than the wall of the electrode itself. That "overburn" incidentally allows the escape of coolant and waste material. It also means you need to select a slightly smaller diameter electrode than the O.D. you want cut. The smaller the diameter, the faster the cut, so it pays to fine-tune the size.

In the diagram, the black circles represent the electrode cross section; the white is overburn.

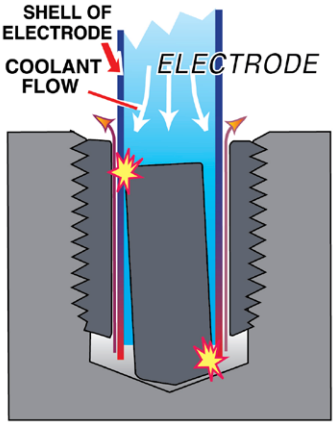


For standard-size holes and materials, the overburn has already been calculated. The settings in the Selector Chart in each machine's manual takes all relevant factors into account.

Size of electrode, heat selection, and whether you use an insulated guide bushing affect the overburn. Generally, for small electrodes up to .187" (4.75 mm) diameter, overburn runs from .007 to .015 (.17 to .38 mm) (added to the diameter). From .187 to 1/2" (4.75 to 50 mm), overburn runs from .015" to .025" (.38 to 6.35 mm).

Remember the invisible core

As the electrode sinks into the material being cut, it hides the fact that a core is being formed inside the electrode as shown. When you get to the bottom of the tap or bolt being cut, the core will break off and may fall over inside the electrode, shorting it out and sending the amp meter into the red. **Shut down the machine immediately** to prevent damage. Back out and remove the core before doing anything else.



To avoid surprises, add about 20% for electrode consumption to the depth you need to burn. Keep track of your burn progress.

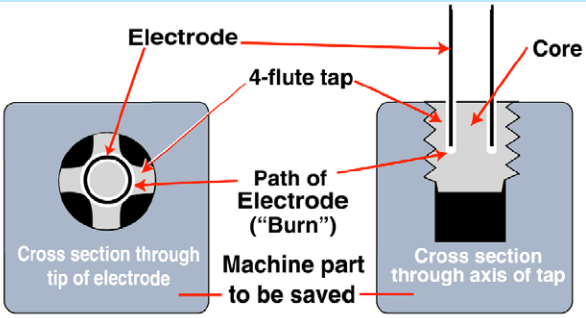
Electro Arc IQ and Servo heads have a depth gauge and shutoff switches built right into the quill housing. If you're using one of the portable heads with drill press or other tool, use whatever depth measuring device they have to know when you're getting close to the end.

Strategies

Removing Broken Taps

The basic method is to cut out the core of the tap, leaving the flutes to collapse inward without damaging the threads already made.

The white circle in the illustration at right indicates the cylindical path cut by an electrode through the core of a four-flute tap. To remove standard three and four-flute taps, use an electrode about half the outside diameter of the broken tap.



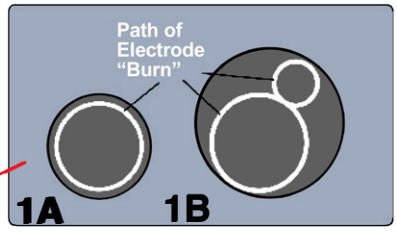
To take out a two-flute, spiral or pipe tap, you will need to use a larger diameter because the core is proportionally larger in these taps. In the AC Selector Charts, these are noted by an asterisk.

Removing Broken Drills

The basic method is the same as for taps (above). Cut out the core of the drill, leaving the flutes to collapse inward. Note that many drills shatter in breaking, and loose pieces can cause shorts as you encounter them. Keep an eye on the Current Indicator as you work these jobs.

Removing studs and bolts

Disintegrate a hole just less than the diameter of the threads (1A). Then chip out the threads with a pick. For larger diameter bolts, you may need to make two passes as shown at 1B.



Do you need a bigger machine?

Higher-power machines can support an arc over a larger diameter and even cut special shapes like square and hex cross-sections. DC-arc machines can run at higher effective power than AC machines. For more information, see Electro Arc AC and DC Metal Disintegrators.