



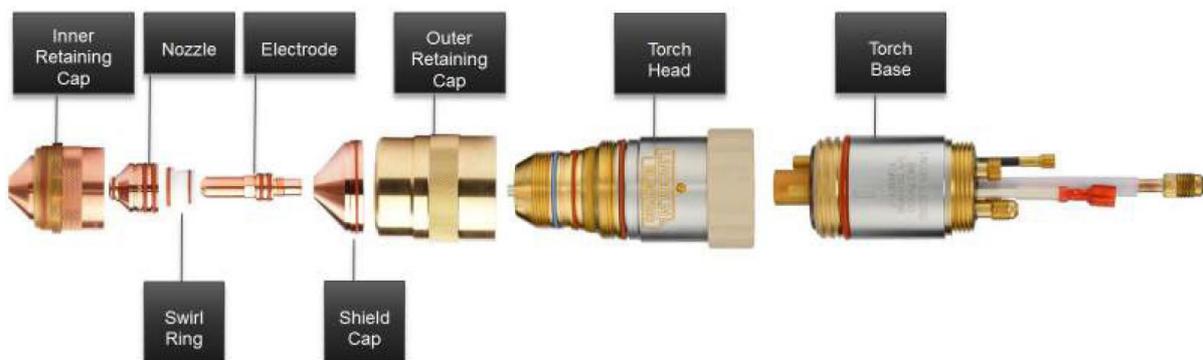
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Consumable Life and Cut Quality

Plasma torch consumable life is a complex subject and one that cannot be addressed simply. There are many variables that affect the life of torch consumables. Because each application is unique and represents different operating conditions, it is difficult to make blanket statements that suit every situation.

Rather than attempting to note specific numbers for every possible combination of applications, we would like to make the following broad statements in an effort to clarify what might be expected with **Lincoln Electric** high current density plasma cutting systems:

When discussing torch consumable life, **Lincoln Electric** typically refers to electrode life, not a combination of electrode, nozzle, swirl ring, shield cap and other typical front end parts. In most applications an electrode will typically outlast a nozzle by a ratio of 2:1. Shield Caps will typically last as long as two electrodes. Inner Retaining Caps and Swirl Rings will typically last as long as ten electrodes. Outer Retaining Caps are rarely consumed.



Assuming proper system operation, the three most important factors that determine the life of an electrode are amperage, number of pierces, and cut duration.

Cut errors such as mis-firing above the plate or running out of material before the arc is properly extinguished will severely diminish electrode and nozzle life. Improper piercing height can cause poor shield cap life. Torch consumables can be quickly ruined if the torch crashes during operation. Gas quality is extremely important, dirty, moist, or oil contaminated air will rapidly deteriorate consumables.



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Under ideal cutting conditions the following electrode life could be achieved.

| Lincoln Electric Spirit II Plasma | | |
|-----------------------------------|---------------------|---------|
| Amps | Cut duration (secs) | Pierces |
| 100 | 4 | 7500 |
| 100 | 20 | 3500 |
| 100 | 60 | 750 |
| 200 | 4 | 2800 |
| 200 | 20 | 1600 |
| 200 | 60 | 625 |
| 275 | 4 | 2400 |
| 275 | 20 | 750 |
| 275 | 60 | 300 |
| 400 | 4 | 3200 |
| 400 | 20 | 600 |
| 400 | 60 | 150 |

Consumable life and the number of pierces that can be achieved cannot be considered in isolation. Cut quality will deteriorate as the consumables wear.

Genuine **Lincoln Electric** consumables are manufactured to the highest standards and utilise Hafnium Optimization Technology in the manufacture of the electrodes. This along with the unique electrode cooling design extends useable electrode life considerably meaning more production from a single set of consumables thereby contributing to a **lower cost of operation**.





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Consumable Life vs Cut Quality

Parts cut with Lincoln Electric FineLine™ High Definition Technology with the Spirit II systems will have an edge bevel of 2 degrees or less from top to bottom. This is historically the industry standard for precision plasma cutting.



Cut with FineLine™ High Definition Technology

Certain competitor's consumable life statements now accept cut edge bevels of 3.18° to 6.33° (4° average). Bevels in the 3-6° range are normally considered conventional plasma. On thin materials the impact of this level of bevel on product quality is minimal, however, on thicker materials this can result in considerable amounts of rework to bring the cut component back within manufacturing tolerance.



Torch consumable life is a very visible indicator of operating expense, but cutting speed and **elimination of secondary processing** to compensate for poor cut quality are of far more importance when calculating operating costs. **Lincoln Electric** high current density plasma cutting systems offer a unique combination of cut quality and speed that ensure the lowest cost of producing cut parts.

Cut quality needs to be considered **over the entire life** of the consumables.