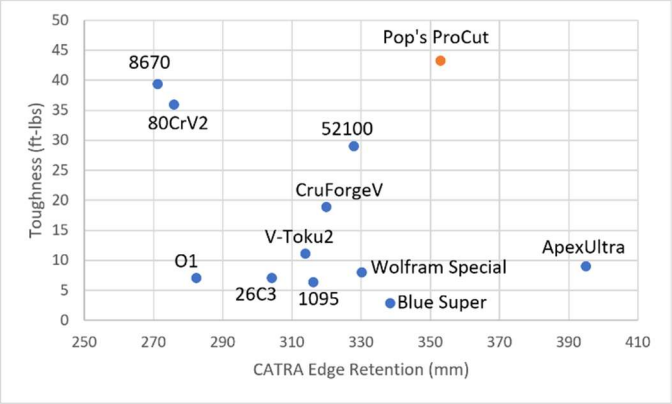
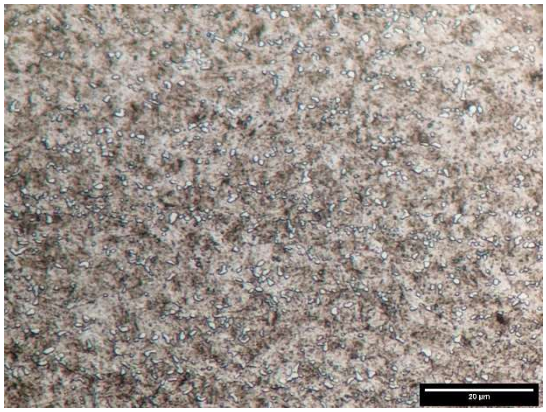
Pop's ProCut with Dr Larrin Thomas

Pop's ProCut is a new low-alloy non-stainless steel, also known as "carbon steel." ProCut is designed to have the wear resistance of high tungsten/vanadium steels, such as Wolfram Special, Blue series steels, and CruForgeV, with the high toughness of high nickel steels, like 8670. It is also relatively easy to forge, heat treat, grind, and finish, resulting in a good balance of usability and performance for the end user. With the high nickel content, it can also be used as the "bright layer" in high-performance pattern-welded Damascus.





Composition

C (%)	Ni (%)	V (%)	W (%)	Cr (%)	Mn (%)	Si (%)
0.87	2.0	0.25	1.25	<0.25	0.4	0.25

Forging and Thermal Cycling

These steps are recommended for those forging ProCut. Thermal cycling is not required for stock removal makers.

Forging Temperature: 2200°F (1200°C). As with other steels, overheating or forging too cold can lead to cracking.

Normalizing: 1650°F (900°C) 10-15 minutes, air cool.

Annealing: 1350°F (730°C) 30 minutes, cool at 100°F/hr to 1100°F (50°C/hr to 595°C). Alternatively, heat to nonmagnetic and slowly cool, such as in vermiculite.

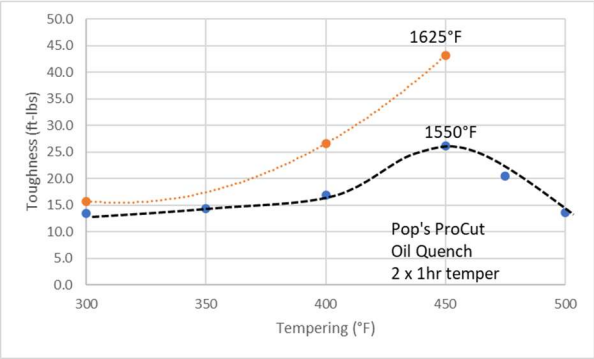
Furnace Heat Treatment

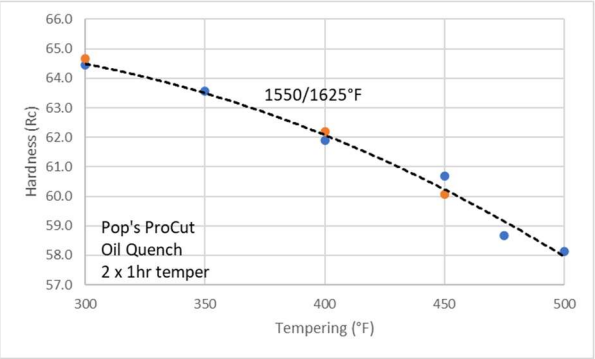
Austenitizing: 1500°F (815°C) for high wear resistance, 1650°F (900°C) for high toughness. Soak for 10-15 minutes prior to quenching. More carbide is retained at the lower temperature for edge retention.

Quenching: Most oils can be used with ProCut due to its high hardenability.

Cryo and Cold Treatments: Dry ice or liquid nitrogen is optional and will add 0.5-2 Rc.

Tempering: 300-400°F (150-200°C) for high hardness and edge retention, 450°F (230°C) for high toughness. Temper twice for 1 hour each time, cooling to room temperature between each tempering.





Forge Heat Treatment

The vanadium and tungsten carbides in ProCut "pin" the grain boundaries, which means grain growth is avoided even at relatively high temperatures. The controlled carbon content also means that overheating does not lead to a drop in toughness at those temperatures.

Austenitizing: Heat to "one shade brighter" than non-magnetic.

Steel that is normalized and annealed first can be quenched from temperatures as low as non-magnetic.

Quenching, Cryo, and Tempering: See the furnace heat treatment section.

