Processing Instructions for Composite Steels

Thank you for your trust! Here is some important information for working with our forge-welded steels.

General Information

We remove the scale from the surface mechanically to allow you to incorporate the forged texture into your knife design. If you prefer a more uniform surface, you can grind off about 0.1-0.3 mm from each side to remove the texture and decarb. The heat treatment condition is specified in the product description. Small welding residues may be present on the edges of the composite steels.

San Mai / 3-Layer Steel

(e.g., ApexUltra core layer / S235JR outer layer)

These steels combine a hard core layer with two tougher outer layers. The heat treatment always depends on the edge steel. For steels with martensitic cladding (e.g., 1.2235 or our martensitic, stainless cladding), complete quenching is possible. These steels can be forged and treated similar to mono steel, ensuring the core layer remains centered and the cutting edge consists only of core steel. After rough grinding, we briefly etch with ferric chloride to check the position of the cutting edge and adjust the bevel as needed.

Note: For steels with ferritic (e.g., S235JR or wrought iron) or austenitic (e.g., 1.4301) outer layers, the risk of cracking due to internal stresses from heat treatment can be reduced by grinding the edge to 1 mm before hardening and rounding the spine. We recommend quenching only the cutting edge and avoiding cryogenic treatment.

Go Mai / 5-Layer Steel with Nickel

(e.g., ApexUltra core layer / Ni / 80CrV2 outer layer)

The same principles apply as with 3-layer steel. The additional nickel layer prevents carbon diffusion to the outer layer, ensuring the cutting layer can reach its full potential as no carbon is bleeding into the cladding. The nickel layer appears as a bright silver line if the steel is etched.

Go Mai / 5-Layer Steel with Copper

(e.g., ApexUltra core layer / Cu / 80CrV2 outer layer)

The copper layer offers an interesting visual contrast and prevents carbon diffusion to the outer layer. For stock-removal knives, these steels can be treated like any other combination. Forging requires caution: maintain a temperature between 1000°C and 800°C, and avoid tensile stresses by forging the steel only flat.

Etching

Surface Preparation: Ensure an uniform sanded finish (400-1500 grit), free of grease and dust.

Deep Etching: This creates a relief between the layers and serves as a base for contrast etching. We recommend a 1-part Fe(II)Cl / 10-part water mixture.

Contrast Etching: For better color contrast, etch with instant coffee (2 l water + 1 l instant coffee powder) or warm orange juice (30-40°C). Check the deep etching every 5-10 minutes and the contrast etching every 30-60 minutes. Repeat the etching steps as necessary, cleaning carefully in between. After etching, quickly rinse with fresh water, neutralize in a separate basin without touching the blade, and then dry and oil the blade.

We look forward to seeing what you create! Tag us on Instagram @messerschmiede_hangler!