



## FF AEB-L Core

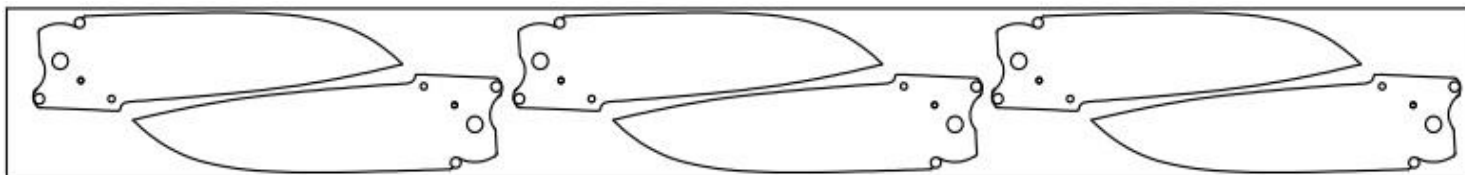
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FF AEB-L Core is a San-mai layered stainless damascus composed of an Uddeholm AEB-L core and AEB-L + AISI 304 steels placed on the sides. AEB-L is martensitic stainless steel with a fine structure developed for razors and surgical scalpels. This steel is hardenable up to 64 HRC; however, we recommend reaching 60-61 HRC hardness for knife blades.

Steel	Color	C	Si	Mn	P	S	Cr	Ni
<b>AEB-L</b>	Black-Grey	0,65	0,4	0,65	<0,025	<0,015	12,8	
<b>304L</b>	Silver-shiny	<0,03	<0,75	<2	<0,045	<0,03	18-20	9

## MACHINING

Our products are soft annealed to achieve optimal machinability, with a hardness of approximately 280 HV. You can use all conventional machining methods. Avoid cutting or shaping the material with machine shears. We recommend using a bandsaw, milling, laser cutting, or waterjet cutting. For optimal core centricity, **place the blade edge at the outer rim of the billet**. The core thickness slightly increases from the center to the edges.



### MILLING/DRILLING

- Milling – monolithic carbide mill --- Vc50-60 m/min
- For hard-milling (sizing) with monolithic carbide, mill feed up to Vc100 m/min
- Milling with VBD mill --- Vc75-100 m/min
- Milling with HSS-Co mill --- Vc14-16 m/min
- Drilling - HSS-Co drill --- Vc10-12 m/min
- Drilling – PVD coated carbide drill ---Vc60-80 m/min.

### GRINDING

You can grind our steel on all conventional types of grinders. We recommend belt-grinders or Berger grinding machines. For belt grinders, we recommend sanding belts with ceramic grains, like 3M Cubitron II; however, all range of conventional abrasives is usable (for example, SAIT, Klingspor, Norton, VSM, etc.). Avoid overheating (tempering) the steel while grinding. When heat-treated, it may lose the required properties.

## HEAT TREATMENT

### SOFT ANNEALING

Our materials are soft-annealed, and there is no need to repeat this process. Annealing is only necessary if the material will be further reforged. In such cases, the steel structure and properties are not guaranteed. The procedure is as follows:

- Heat the material in a furnace to 820 °C / 1508°F
- Hold at the temperature for 4 hours at least
- Slow cooling in a furnace
- You can remove the steel from a furnace when the temperature drops below 380°C / 716°F.

### HARDENING

Hardening is essential to achieve full corrosion resistance and the final hardness of the steel. The steel has to be hardened by a professional company using vacuum technology like Bodycote. Recommended hardening process:

- Preheating temperature 1050-1080 °C / 1922-1976°F.
- Hold at the temperature for 15 minutes
- Cooling by nitrogen gas (oil-bath is also possible)
- Immediate deep freeze.

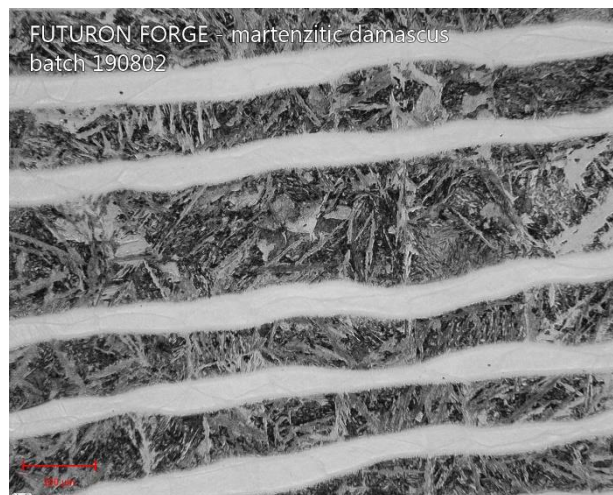
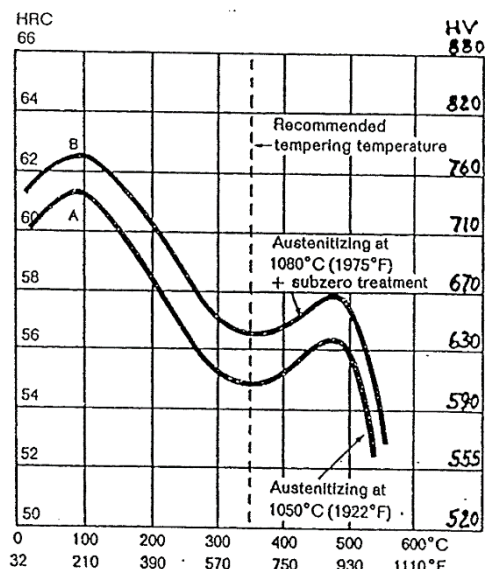
In case of a heat-treating failure, the material can be re-hardened only once. Multiple re-hardening cycles will cause material degradation.



## TEMPERING

Tempering have to begin as soon as possible, no later than one hour after hardening.

- We recommend tempering process 2x1h 150-180 °C / 302-356°F (60-61 HRC) for knife blades
- Repeat deep freeze, after the first hour of the tempering process.



## ETCHING

To properly contrast the damascus steel layers, etching the material (blade) is necessary. You can experiment with various etching techniques depending on your skill level. By following the steps below, you'll achieve good results.

Etchant	Solution	Concentration	Time	AEB-L	304L
Ferric Chloride $\text{FeCl}_3$	$\text{FeCl}_3$ + Distilled water	20-25%	10-25 minutes	Black-Grey	Silver - shiny

- Ensure that the blade's surface is smooth, clean, and free of scratches (etching won't hide imperfections). Finished up to 1000+ grit or polished.
- Properly degrease the blade; cleaning it in the soap-water works well.
- Before etching, test the solution on a sample piece of heat-treated material.
- Before immersing the blade, check for surface dirt in the solution. The etched part has to be degreased and clean. Do not use automatic stirrers or shaking baths during etching. The etching solution can be reused multiple times.
- After etching, neutralize the blade using  $\text{Na}_2\text{CO}_3$  (Sodium carbonate) or  $\text{NaHCO}_3$  (Baking soda). You can also use soap water and properly clean the etching residues from a blade.
- Dry the etched blade properly. We recommend spraying the blade with WD-40 (or similar) and drying again to remove any residues.
- For enhanced contrast, lightly polish the etched blade on a buffing wheel. We recommend testing this on a sample piece first.
- To make your etching solution more reactive, increase the temperature, concentration of  $\text{FeCl}_3$ , or add vinegar.

## MARKING