



DATASHEET

CONTRAST

High-contrast stainless damascus (#FFCONTRAST #StainlesFuturon)



#FFCONTRAST is stainless damascus steel with a high-contrast. We combine high performance martensitic steel UHB AEB-L with austenitic AISI 304. Our production of damascus steel is a highly controlled process, made under high pressure in a protective atmosphere.

As a first composite, we use UHB AEB-L produced by Uddeholm with good corrosion resistance and excellent cutting abilities. This steel was developed for razors and razorblades because of its fine grain microstructure.

As a second composite, we use austenitic stainless AISI 304, bringing toughness and a bright shine.

The number of layers depends on the basic „packet“size, ranges between 150-350 layers. The common mixture ratio varies from 3:1 to 2:1 (AEB-L : AISI 304). This material is intended for knives, jewelry, watchcases, and artwork production, where customers appreciate high-contrast in a fully stainless damascus.

Technical information

Composition

As a first composite, we use UHB AEB-L produced by Uddeholm with good corrosion resistance and excellent cutting abilities. Its maximal hardness is 64 HRc; however, we recommend tempering up to 61 HRc. This steel was developed for razors and razorblades because of its fine grain microstructure.

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

Forging

Generally, we do not recommend further forging of our damascus steel. This may lead to the destruction of steel fine grain structure and loss of its properties. However, if there's a need to forge our damascus steel, follow those instructions:

- The forging temperature is 950-1050 °C.
- Forging must be done smoothly to avoid the creation of cracks.
- Forged steel is very durable, so forging is more difficult in comparison with usual carbon steels.
- Slow cooling is necessary after the forging process.
- The forged piece has to be properly annealed.

Machining conditions

Our products are soft annealed to provide the best possible machining, reaching hardness approx. 250HV. You can use all conventional types of machining. Recommendation of machining condition below:

- 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.)

Watch out for not to overheat (tempering) the steel by grinding. When it's overheated, it may lose required properties.

Heat treatment

Soft annealing

Our materials are delivered soft annealed. You have to apply this process only after forging.

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

Hardening

To reach full corrosion resistance and the final hardness of the steel, it's necessary to harden it. We recommend hardening the steel by heat treatment professionals using vacuum technology like Bodycote.

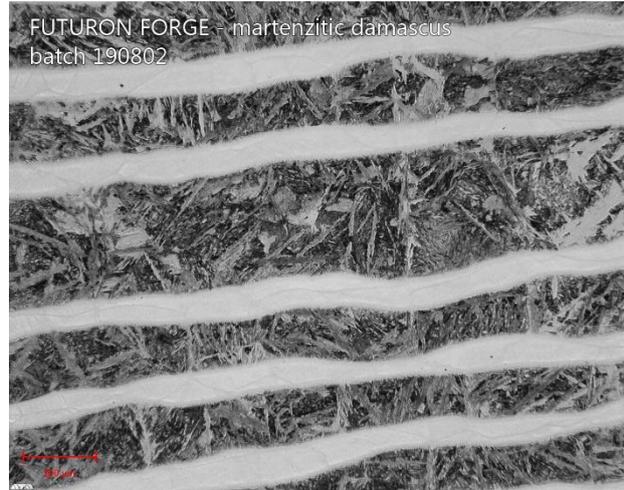
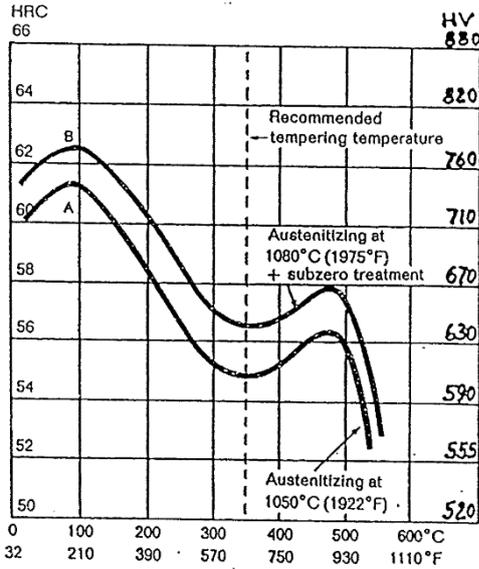
Recommended hardening process below:

- Heating up to 1050-1080 °C / 1922-1976°F
- Hold at the temperature for 15 minutes
- Cooling by nitrogen gas (oil cooling is also possible)
- Deep freeze -150/-196 °C / -302/-384 °F and hold for 1-3 hours. (optional process - increases hardness and durability of steel)

Tempering

After hardening, it's necessary to make the tempering process as soon as possible.

- For knife blades, we recommend tempering process 2x1h 150-180°C / 300-355°F. Final hardness of AEB-L is 60-61 HRc.
- For decorative and art pieces, we recommend tempering process 1x2h 250°C / 480°F. Final hardness of AEB-L is 56-57 HRc.



Etching instruction

Etching

To properly contrast the damascus steel layers, it's necessary to etch the material (blade). You can experiment with various etching techniques depending on your skill; however, following the below-mentioned steps, you'll get nice results.

Etchant	Solution	Concentration	Time	AEB-L	304L
Ferric Chloride Fe3Cl	Fe3Cl + Distilled water	20-25%	5-10 minutes	Black	Silver - shiny

- The surface of the blade has to be smooth, clean and without scratches (etching won't hide them), finished up to 1000+ grit or polished.
- The blade has to be degreased properly (cleaning in the soap-water works fine)
- Before you start etching, you can try the solution on a sample piece of material (heat-treated)
- You can re-use etching solution several times. Before you get the blade into the solution, check if there's no dirt on the surface of a solution.
- When the etching is finished, you have to neutralize the blade using Na₂CO₃ (Sodium carbonate) or NaHCO₃ (Baking soda). You can also use soap-water and properly clean the etching residues from a blade.
- Dry etched blade. We recommend spraying the blade with WD-40 (or similar) and drying it again to remove any possible residues.
- You can slightly polish the etched blade on a buffing wheel for better contrast. We recommend testing it on a sample piece.
- If you want to make your etching solution more reactive, increase a concentration of Fe₃Cl or add vinegar.

Product marking

Marking: FF CONTRAST

Hashtags: #StainlessFuturon #FFCONTRAST



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