

# Product information

Hardenable Stainless Damascus steel, 93x.x



## MARTENSITIC STAINLESS DAMASCENE STEEL

### GRADES

	C	Si	Mn	Cr	Mo	V	%
<b>I. RWL34</b>	1.05	.50	.50	14	4	.2	
<b>II. PMC27</b>	.60	.50	.50	13.5	-	-	

### FORGING

Temperature 1160 - 1050 Deg C (2120 - 1920 Deg F)

Melting starts at 1220 Deg C (2230 Deg F), which means that the material is sensitive to overheating. A good control of the heating temperature is needed. Electric or gas fired furnace is recommended.

Compared to normal low alloy carbon steels, the martensitic stainless steels have higher, almost doubled deformation stresses. Hand forging must therefore be performed on relatively small dimensions.

Long heating times leads to decarburization and scale formation.

Slow cooling after the hot working prevents crack formation at the martensite formation temperature at 200 Deg C (400 Deg F).

Cooling under vermiculite or other heat insulating material is advantageous.

### SOFT ANNEALING

Because of the cracking risk, no cutting or machining should be done after hot working until the material is annealed.

The material should be annealed for 5 hours at 750 - 780 Deg C (1380 - 1440 Deg F).

The bar material delivered from DAMASTEEL is annealed below 300 HV.



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## HEAT TREATMENT

Tempering curves of the two components are shown on the next page.  
 For knife applications the following heat treatments can be recommended:

	Hardening Temperature	Tempering Temperature	Tempering Time	Hardness HRC	
				RWL34	PMC27
<b>I</b>	1050 C (1920 F)	220 C (430 F)	1 x 2 h	59	53
<b>II</b>	1050 C (1920 F)	175 C (345 F)	”	62	54
<b>III</b>	1080 C (1980 F)	220 C (430 F)	”	58	56
<b>IV*</b>	1080 C (1980 F)	175 C (345 F)	”	63	58
<b>V*</b>	1100 C (2010 F)	175 C (345 F)	”	63.5	60.5

\* The treatments IV and V include deep cooling -80 C (-140 F) after both hardening and tempering. Time 15 minutes.

Low temperature tempering is recommended for best corrosion properties.

## ETCHING

Etching is done to develop the patterns on the finished piece. The best conditions for etching are good polished surfaces carefully degreased.

A knife blade is preferably dipped into the etching acid. After etching the piece must be carefully cleaned in water. A final cleaning with brush and soap eliminates the risk for acid rests.

	Etching Acid	Approx. time minutes	Etching colour	
			RWL34	PMC27
<b>I</b>	H2SO4 30 % Soap 0,1 %	5	Bright	Grey
<b>II</b>	H2SO4 30 % HClO4 7 %	5	Bright	Black
<b>III</b>	HCL 37 %	5	Bright	Black

The second alternative gives a heavier attack and deeper relief, but unhealthy gases are formed.

**The acids must be handled with care.**

