(CUSTOM) Stainless GoMai CuShim

154CM / AEBL Stainless Damascus — Heat Treatment Specification

Revision 1.0 | Baker Forge & Tool, Boone NC

STEEL PROFILES

Layered 154CM and AEBL stainless steel Damascus. Both steels harden in the heat treat cycle. High molybdenum content in 154CM provides exceptional corrosion and wear resistance. Both steels are martensitic stainless — both harden during heat treatment. Foil wrap required during austenitize.

Property	154CM	AEBL
Classification	High-carbon stainless (aerospace)	Stainless cutlery steel
Carbon	~1.05%	~0.67%
Chromium	~14%	~13%
Molybdenum	~4%	—
Role in Billet	Primary layer / hardening steel	Contrast / cladding layer
Forge Range	1900–2100°F	1900–2100°F

STEP 1 — NORMALIZE

⚠ **Stainless Damascus does not require a standard normalize cycle. Skip normalize. Proceed directly to austenitize.**

Parameter	Spec
Normalize?	Not required for stainless Damascus — skip this step
Why?	Stainless steels do not benefit from normalize cycles used for carbon steel. Proceed to austenitize.

STEP 2 — AUSTENITIZE & HARDEN

⚠ **Foil wrap is REQUIRED. Do not austenitize bare — decarburization will destroy surface hardness.**

⚠ **Do NOT exceed 1975°F — toughness drops dramatically in 154CM above this temperature.**

Parameter	Spec
154CM Austenitize	1900–1950°F | Soak 15–20 min
AEBL Austenitize	1950°F | Soak 15–20 min
Combined Target	1925–1950°F — compromise temp works both steels
Atmosphere	Foil wrap (stainless foil) — required to prevent decarburization
Quench medium	Plate quench (between two flat aluminum plates)
Thermocouple	Required — do not guess this temperature

STEP 3 — SNAP TEMPER

⚠ **CRITICAL — Do not skip. Do not delay. Perform IMMEDIATELY after quench — within minutes.**

Parameter	Spec

Snap temper temp	350°F
Hold time	10–15 minutes after temp is reached
Purpose	Prevents cracking in martensite before cryo. Mandatory for both 154CM and AEBL.
Next step	Proceed to cryo AFTER snap temper cools to room temp

STEP 4 — CRYO TREATMENT

⚠ **Cryo is REQUIRED for 154CM. Strongly recommended for AEBL. Freezer is NOT sufficient — use dry ice or LN2.**

Parameter	Spec
Method	Dry ice minimum — LN2 (liquid nitrogen) preferred
Hold time	30 min minimum in dry ice | 15–20 min in LN2
Why?	Converts retained austenite to martensite. Critical for maximizing hardness and stability in 154CM.
Timing	After snap temper has cooled to room temp, before full temper
154CM — Cryo	Required
AEBL — Cryo	Strongly recommended

STEP 5 — TEMPER

Parameter	Spec
Cycles	2 cycles (double-temper)
Temper temp — hard	400°F → target HRC 62–63
Temper temp — balanced	450°F → target HRC 60–61
Hold time	1 hour min per cycle for stainless steels
Cool between cycles	Full air cool to room temp before second cycle

FULL PROCESS SUMMARY

#	Step	Temp / Setting	Notes
1	Skip Normalize	N/A	Not required for stainless Damascus
2	Austenitize	1925–1950°F | Soak 15–20 min	Foil wrap required. Thermocouple required. Do not exceed 1975°F.
3	Quench	Plate quench	Between two flat steel plates.
4	Snap Temper ⚠	350°F | 10–15 min	IMMEDIATELY after quench. Do not delay.
5	Cryo	Dry ice or LN2	After snap temper cools to room temp. 154CM required, AEBL strongly recommended.
6	Temper ×2	400–450°F | 1 hr each min	Full air cool between cycles. Double-temper every time.

WATCH POINTS & COMMON FAILURES

Issue	What to Watch For / Why It Happens
Decarburization	Bare austenitize without foil wrap strips carbon from surface. Result: soft skin under hard core. Always foil wrap.
Overtemp on 154CM	Exceeding 1975°F causes dramatic toughness loss. Use thermocouple — do not guess.
Skipped snap temper	Austenite-to-martensite transformation without snap temper risks cracking. CRITICAL step — do not skip.
Insufficient cryo	Freezer (-20°F) is not cold enough. Retained austenite remains. Dry ice (-109°F) minimum, LN2 (-320°F) preferred.

POST-HEAT TREAT — ETCHING

154CM and AEBL etch with strong contrast — 154CM stays bright, AEBL goes dark. Gator Piss MAX is formulated for stainless and produces the cleanest result on this combo.

Product	Use
Gator Piss MAX	Designed for stainless Damascus.
Gator Skin	Apply after etch for protection. Locks in contrast and extends finish life.
Grime Reaper	Pre-etch cleaning. Remove all oil, fingerprints, and grinding residue before etching.

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