

## Electrolyte Chart

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## TUS TECHNOLOGIES

<u>Item</u>	<u>Etch</u>	<u>Electrolyte/Power/Practice</u>
<b>“NO STAIN” Electrolytes help minimize the tendency to stain.</b> <u>primarily for Stainless Steel</u>	dark	<b>SUITABILITY OF AN ELECTROLYTE FOR SPECIFIC APPLICATIONS MUST BE ESTABLISHED BEFORE USE.</b> “NO STAIN” EX-RS1, 12-24VAC, 1-2 sec. cycles EX-61, 12-24VAC, 1-2 sec. cycles
<u>primarily for Carbon/Tool Steels</u>	dark	“NO STAIN” EX-RC1, 12-24VAC, 1-2 sec. cycles
Aluminum	dark gray/ black	<b>EX-10</b> , 24VDC,3-4sec. Dark gray; black 2-3 hits, 1.5 sec; <b>EX-9B</b> , 24VDC, 3 sec., <b>EX-21</b> , 24VAC, 2-3 sec. <b>EX-42</b> , 24VDC,2sec.
	deep etch	<b>EX-4</b> , 24VDC, AB, 2-3 sec., prox 1/2 thou. per hit
Black/Blue Oxide	light gray white	<b>EX-21</b> (/22/23/25), 12-24VAC, 1.5-3 sec., 2-4 hits, water pad rub, oil and dry wipe
	bright metallic	<b>EX-D20</b> , 24VDC,1-2sec., 2-4 hits, water pad rub, oil and dry wipe
Brass (see copper/brss)		
<b>BG42</b> , Lescalloy/Vasco SS Bearing Steel, 1.15C, 14.5Cr, 4Mo, 1.2V, 64RC	dark	<b>EX-12</b> , 12VAC,2-2.5sec, 1-2 hits
Carbide Tools	black black darkgrey blue/black	<b>EX-3</b> , <b>EX-4</b> , 24VAC,2-4sec <b>EX-12</b> , 12-24VAC, 1.5 sec, AB, 2 hits <b>EX-21</b> , 12-24VAC, 2-3 sec <b>EX-3</b> , 24VDC, 1.5 sec, 1-2 hits, at first mark is bluish white, wipe water moist, after a few minutes has turned into strong blue black, use fine line font, marks tend to overetch/blur at edges if etched too long.
Cd plated bearings	black	<b>EX-61</b> , 12VAC, 1.5 sec.
Chrome Plate Steel, bright and satin	black	<b>EX-9B</b> , 12-24VAC, 1-2 sec, AB, 1-2hits <b>EX-10</b> , 12-24VAC, 1-2 sec.
	deep shallow/dark	<b>EX-9B</b> , 25VAC, 2x 5sec
Chrome plated brass	deep etch into base	<b>EX-9B</b> , 24VDC, 2 sec, AB, 1-4hits ( <b>Zippo-EX-12A</b> ,24VDC,3sec,3hits, prox .001-.0015”)
	dark/black etch	( <b>Zippo-EX-9B</b> ,24VAC,3sec,2hits)
Chromated (Cadmium) Steel	dark	<b>EX-60</b> , 24VAC, 2 sec. <b>EX-10</b> , 12-24 VAC, 2-4 sec.
Chromated (Zinc) Steel	dark	<b>EX-D10</b> , 24 VAC, 2 sec

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Cobalt Alloy (L605)	gray frosted shallow depth etch	EX-10, 24 VAC, 3sec, 2hits
50% Co alloy, Fansteel	dark/black	<b>EX-9B</b> , EX-21, 24VAC, 1.5-2.5 sec, AB, (EX-9B stronger/blacker)
Hyperco 50 A (Carpenter) <u>black-heat treated</u> 48.75 Co, 1.9 Vanad, bal Fe	white gray shiny mark	EX-9B, 24 VDC, 2sec
Copper / Brass	dark/black deep etc	EX-61, 12/24VAC, 1.5-2 sec EX-21, 24VDC, 2x3sec.
Brass plated (over Ni flash on hardened C-steel)	dark grey gray black	EX-61, 24VAC, 1sec, AB EX-12, 24VAC, 1sec, AB
Brass, polished lightr cases,Zippo	shallow depth etch "Copper Red" etch	EX-60, 24VDC, 3sec., 2 hits (.0005-.001") EX-12A,12VAC,3sec,1hit
Brass, .040 thick,	Deep etch	EX-60, 24VDC, 2sec., 10-20 hits (.001-.002"); (EX21 not as good)
Al Bronze coating 92 % Cu – 8% Al	Dark / black	EX-60, 12 VAC, 1.5 sec, 1 hit, AB, water rinse, hot air dry , pitch black
Bronze	Black Deep etch .002-.003	EX-9B, 12VAC, 2 sec., 2 hits, pitch black EX-21, 24 VDC, 2 sec, 2-3hits, AB
CopperGraphite CopperTungsten	black	EX-21, 24VDC, 2sec, 1-2 passes, excellent black
Deep Etch		see also stainless steel and aluminum
.005 - over .008" stainless steel knives / cutlery	dark background	EX-D40A, 24VDC, repetitive 1-2sec passes, 1-3 min
Electrodes, Graphite, CopperGraphite, CopperTungsten	black	EX-21, 24VDC, 2sec, 1-2 passes, excellent black
Gold plate	black Shallow depth/clear	EX-10, 12-24VAC, 1-2 sec, one or more hits EX-10, 12-24VDC, 1-2 sec, one or more hits
Graphite	black	EX-21, 24VDC, 2sec, 1-2 passes, excellent black
Hastelloy X, Haynes 188, Alloy L605	black / dark  shallow depth -deep etch, light gray	EX-31, 24VAC, 1.5 sec, AB, 1-3 hits  EX-9B, 24VDC, 1.5-2 sec, AB, 1-2 hits

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Ni plate, electroless, crs	black	EX-10, 15B, 22, 12-24VAC, 1.5-3 sec
Ni plate, scissors	black	EX-9B, 12 VAC, 1 hit, 1.5 sec
Ni plate, dull on brass	black clear shallow depth	EX-9B, 24 VAC, 1 hit, 2sec EX-9B, 24 VDC, 1 hit, 2sec
Ni plate bright on brass (bolster/knife sample)	black (strong)	EX-61, 12 VAC, 3-4 hits, AB, 1.25 sec, water wipe
NiTinol, Ni-Ti shape memory alloy	Black	EX-9B, 12 VAC, 1.5 – 3 sec., 1 or more hits or roll
Silver Plate	Dark	EX-10, 12VAC, 2-4 sec; over time fades to gray, can be rubbed off to frosted mark
Silverplate over Stainless Steel	Dark	EX-9B, 12VAC, multiple passes, good dark, etch into stainless to minimize rub off, 9B somewhat darker than EX-10
stainless 303, blackened	surface etch deep etch	EX-D20, 24VDC, 2sec, AB, 1 hit, nice light white marks EX-D20, 24VDC, 2sec, AB, multiple hits, nice deep gray white marks (prox 1/4-1/2thou depth per hit); alt 12A
stainless 420/440	deep etch	EX-D20, 24VDC, AB, prox 1/2 thou per 1.5-2 sec cycle. alt D10/D30 ;
stainless steel 410,420/440/300	dark etch, decorative	<b>EX-9B</b> , 12-24 VAC,AB, 1-2 sec, 1-2 hits) (also EX-9B-6; -9B-10; -10; -12; -12A, -61)
see also “deep etch” above	deep etch	<b>EX-D20</b> ; 24VDC, 1.5-2.5 sec, AB, multiple hits (prox. 1/3-1/2 thou/ hit);
Talonite Blade Steel (Camillus)	white gray/frosted metallic look	<b>EX-D20</b> , 24VDC, 1.5-2 sec, 1 hit, <b>AB</b> (excellent shallow depth etch)
	Dark: does not mark	
Titanium	dark	EX-25, 12VAC, 3sec EX-10, 24 VAC, ¼ sec or less (very fast)
TiN ( black) Finish Stainless S	white gray/frosted metallic look	<b>EX-D20</b> , 24VDC, 1.2 sec, 2-3 hits, <b>AB</b>
	light gray white	EX-D10, 24VDC, 2sec, 2hits, AB
Ti-Nitrided steel (gold)	black	<b>EX-D20</b> , 12VAC, 1.8 sec, 2-3 hits, <b>AB</b> EX-10, EX-12 (for “AB”), EX-12A (for stationary), 24VAC, 1.5-2 sec, 1-3 hits, AB better, stationary OK for fine lines
Sn plate over bronze	black	EX-31, 24VAC, 1.5 sec
Zn coated steel	black	EX-33, 12VAC, 2sec
Zn cast parts	Black	EX-61, 12/24 VAC, 1.5-2 sec EX-10. 24 VAC, 2 x 2 sec. sharp but waeker