Multi-Etch® Effects on Multiple Metals

Multi-Etch® was originally developed for use on titanium but it was also found to be effective on other metals.

All tests were conducted with fresh Multi-Etch® heated to 135ºF

Metal	Etch Time (minutes)	Etch Depth N/C = No Change	Surface change	Notes
Aluminum	3	.0005”	Bright/semi-polished	
Brass	15 188	.004” .050	Granular	
Bronze, Ancient (A Rio Grande zinc-free alloy)	20-30 seconds	N/C	Brightened, no smut	
Bronze, PMC	3	0.0025	Brightened; no smut	
Bronze, PMC Fast	3	.003”	Crystalized surface	
Copper (see also PMC copper below)	15 94	.008” .050	Granular	
Copper, PMC	3	.002”	Frosted; dark brown smut	
Gold (14KY)	3	N/C	N/C	Note 4
Hafnium	3	N/C	Frosted/matte grey	
Magnesium	3	.001”	Chalky white smut	
Meteorite (Gibeon)	3	.002”	Crystal grain revealed; black smut. Leaving in longer will make the crystal grain more pronounced.	
Niobium	3	N/C	N/C	Note 1, 4
Palladium	3	N/C	N/C	Note 2, 4

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Pewter	15 375	.002” .050		
Platinum	3	N/C	N/C	Note 2, 4
Silver (925)	3	N/C	Slightly frosted	Note 4
Stainless steel	3	.001”	Frosted with dark grey smut	
Tantalum	3	N/C	N/C	Note 1, 4
Titanium--6/4--grade 5 (aircraft grade)	6	.0005”	Brightened/matte	
Titanium--CP grades 1 and 2	5-20 seconds 15 150	not measurable .005” .050	See Note 3	Note 3
Tool steel (01)	15 94	.008” .050	Frosted finish	
Zinc	3	.0005”	Black smut	
Zirconium	15 250	.003” .050		

Note 1
Niobium and Tantalum: Multi-Etch can be used to erase anodizing “mistakes” on these two metals. If high voltage colors, i.e., turquoise-green, need to be removed, etch times can be between 15 minutes to one hour.

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These metals normally anodize without the need to use ME. However, occasionally these metals arrive from the mill with oxides that can alter the brilliance of anodizing. When that is the case, you can pre-etch these metals in order to achieve the normally brilliant colors. Etch times in these cases will vary depending on the thickness of these "mill oxides."

Tumbling niobium and tantalum tends to darken these metals. A distinct brightening effect can be achieved by a one-minute dip in Multi-Etch.

Note 2

Platinum and Palladium: Although ME will not etch platinum or palladium, it can be used to remove all steel ions prior to welding or soldering. Rather than using the standard protocols involving a 15 minute dip in nitric acid,a 15 *second* dip in Multi-Etch at 135ºF is just as effective.

Note 3

Titanium, CP grade 2: Preparing titanium for brilliant anodization requires just a 5-20 second dip. The surface finish, whether polished, wire-brushed, matte, etc. will be maintained as long as the etch time is less than 20 second. Longer etch times will tend to change polished finishes to matte. After five minutes, the finish starts to trend to polished.

Erasing anodizing "mistakes" takes 30 seconds to two minutes depending on the color (thickness of the oxide.) Low voltage colors take less time to remove than high voltage colors.

Note 4

Using Multi-Etch to remove broken drill bits: For gold, niobium, palladium, platinum, silver, and tantalum, dip the piece in Multi-Etch for approximately 3 minutes to remove enough of the drill bit so that it can be picked out. Leave in longer to dissolve the whole drill bit.