

ELECTRO-CHEM ETCH INC.

Electrolytes



Special Features:

- *Several formulations available for Corrosion "free" etching & high contrast "dark" marking.*
- *Other formulations are available for fast deep etching of ferrous and copper alloys*
- *Some formulations meet the MIL-STD-792 Requirements.*
- *Mark (AC) & Etch (DC) modes.*
- *Available in Gallon, Quart, and Pint bottles.*

The electrolyte is the element that performs the actual etching or marking functions. They are the "chem" part of the electro-chemical etching process. By themselves they are usually neutral salts and are pretty harmless and do not affect the metal much. They only become "potent" in conjunction with the application of an electric field whereby they become ionised and attack the metal, thus performing either the "etching" (i.e. metal removal) or "marking" (i.e. metal oxidation) functions. Thus they are formulated to have either a good etch rate, or dark "color" oxides to produce good contrast for marking. Many of the electrolytes can be used interchangeably on some metals, but have optimum performance characteristics for certain metals. For example the electrolyte SCE-4 has a very good etch rate for most ferrous alloys. Therefore if you want to do deep etching fast, use this electrolyte. Others such as SCE-10 or HFE do not have a good etch rate but produce very dark color oxides. So if you need high contrast markings use these electrolytes.

After the etching or marking process has been completed, the electrolyte residue must be removed from the part or it will react with the moisture in the air and cause the part to "rust" a few days later. Therefore it is imperative that the part be thoroughly "cleaned" with the AMC cleaner which removes and neutralizes any electrolyte residues from the part.

However, ELECTRO-CHEM ETCH INC. has formulated some special electrolytes such as HFE (Halogen Free Electrolyte) or CFE (Corrosion Free Electrolytes), and SCE-20 that DO NOT require neutralization and will NEVER cause rusting of the part, while at the same time produce excellent high contrast markings. Many aerospace companies (Honeywell, Pratt & Whitney Canada, Fatigue Technology, to mention a few) now only use HFE exclusively for their marking operations. In addition both the CFE and HFE meet the requirements of MIL-STD 792 specification.

The electrolyte you will need depends on the material you are using. Located below is a listing of the recommendations of electrolytes for marking metals and alloys. These recommendations are of necessity, general and are intended to be used as a guide. It is always advisable to mark a test piece of similar material prior to your

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production run. See Table 1 for a complete listing of metals and the corresponding electrolytes.

Electrolyte Special Features Appropriate materials

SCE-1 All purpose, deep etching Ferrous Metals, Aluminum

SCE-4 Fast deep etch rate Ferrous Metals, Nickel, Cobalt Alloys

SCE-3 Meets Mil-std-792 Titanium, Copper Alloys

SCE-5 Black Oxide

HFE,CFE CORROSION FREE. Ferrous Metals, Nickel, Cobalt Alloys

SCE-20 DO NOT CAUSE RUSTING

MIL-STD 792

SCE-11 MIL-STD 792 Titanium, Silver plate, Cadmium plate

CF-17 Titanium, Chromium, Nickel

See Table below for a complete listing of metals and the corresponding electrolytes.

METAL	ELECTROLYTE	COLOR OF MARK,	SETTING
Aluminum and its alloys containing <7.0% silicon.	SCE-1	Black	DC
All Aluminum alloys.	SCE-1 and SCE-4	Black	DC
Magnesium and its alloys.	SCE-3 SCE-1	Black Deep Etch Clear	AC DC
Brass, Bronze, Copper and its alloys	SCE-3, SCE-9, HFE, and SCE-10	Black	AC
Tin, Silver, and Cadmium Plating.	SCE-11, SCE-3,	Black	AC
Iron base alloys A-286, 17-4PH, PH15-7mo	SCE-1, SCE-4 ,CFE HFE, SCE-10,	Black	AC
Maraging steel Invar 36.	SCE-4	Deep Etch Clear	DC
Nickel and cobalt alloys such as Inconel, Inconel 718,	SCE-4, SCE-10, HFE	Black	AC
Hastelloy C, Stellite X750,	SCE-1 Deep Etch	Clear	DC

and Rene' 41.

Black Oxide	SCE-5	White	AC
*Buff with Scotch or eraser stick if necessary.		White	DC

For exotic metals or metals not listed, consult factory.