



All CEI fluoropolymer etching products consist of a sodium-naphthalene complex (sodium naphthalide) dissolved in glyme solvent. Specifically, CEI uses ethylene glycol dimethyl ether (monoglyme), bis (2-methoxyethyl) ether (diglyme), or a mixture of the two in all of our etchants.

Monoglyme has an especially high affinity to sodium naphthalide, allowing for more concentrated solutions with greater etching ability at room temperature. Diglyme provides much higher flashpoint and lower volatility solutions when less aggressive surface treatments are acceptable.

Etchants made with diglyme typically do not fully dissolve at room temperature and require heating to achieve full efficacy.

C-Etch A and C-Etch B are sodium naphthalide based etchants made with monoglyme. This makes them excellent choices when a sodium-rich etching solution is required. Since these etchants are fully dissolved at room temperature, no heating is required.

C-Etch C, C-Etch D, and C-Etch E are sodium naphthalide -based etchants made with diglyme. This makes them the preferred choices for less-aggressive surface treatments when flammability is an operational concern. These formulations provide three different concentrations from which to choose.

C-Etch-F and C-Etch M are proprietary products striking a balance between the best properties of C-Etch A through C-Etch E. Etching quality is indistinguishable from C-Etch A/B, but they have higher flashpoints and therefore lower volatility. Again, these two formulations allow for choice regarding sodium content.

C-Etch A, B, and F are classified as flammable liquids. C-Etch C, D, E, and M are classified as combustible liquids.

Thinned versions of each etchant formulation are also available if reduced viscosity is desired. If none of the standard C-Etchants meet your needs, we can provide custom formulations for your process needs.

CEI currently produces seven standard types of sodium-based etching solutions. These are specially formulated sodium naphthalene complexes, each with the ability to react with surface layers of most fluorinated polymers to allow them to be bonded to many materials. The reaction between the sodium solution and the polymer strips fluorine molecules from the surface allowing for the replacement of “bondable” molecules that can be used for adhesion.

ETCHANT SPECIFICATIONS

C-Etch A – Industrial Grade

(Strongest bond strength from a sodium naphthalide etch system)

Appearance: Black w/ Green Tint
Sodium: >3.0% wt.
Naphthalene: >15.0% wt.
Monoglyme: Balance
Flash point: 26° F

C-Etch B – Original Formulation

(Similar to C-Etch A)

Appearance: Black w/ Green Tint
Sodium: >3.0% wt.
Naphthalene: >15.0% wt.
Monoglyme: Balance
Flash point: 26° F

C-Etch C – High Flashpoint; High Sodium

(Non-flammable, less-aggressive surface etching)

Appearance: Black w/ Green Tint
Sodium: ≥3.0% wt.
Naphthalene: >15.0% wt.
Diglyme: Balance
Flash point: 150° F

C-Etch D – High Flashpoint; Median Sodium

(Non-flammable, less-aggressive surface etching)

Appearance: Black w/ Green Tint
Sodium: ≥2.0% wt.
Naphthalene: >10.0% wt.
Diglyme: Balance
Flash point: >123° F

C-Etch E – High Flashpoint; Low Sodium

(Non-flammable, less-aggressive surface etching)

Appearance: Black w/ Green Tint
Sodium: ≥1.5% wt.
Naphthalene: >5.0% wt.
Diglyme: Balance
Flash point: >123° F

C-Etch F – Mixed Solvent; Standard Sodium

(Strong bond, no heating required, reduced volatility)

Appearance: Black w/ Green Tint
Sodium: ≥3.0% wt.
Naphthalene: >15.0% wt.
Monoglyme: >10.0% wt.
Diglyme: Balance
Flash point: <86° F

C-Etch M – Mixed Solvent; High Sodium

(Strong bond, Non-flammable)

Appearance: Black w/ Green Tint
Sodium: ≥4.0% wt.
Naphthalene: >15.0% wt.
Monoglyme: >10.0% wt.
Diglyme: Balance
Flash point: >100° F

FILM ETCHING

CEI can supply
custom-designed
film etching systems



CEI EQUIPMENT CAPABILITIES

Small Diameter Tubing/Tubing on Wire

CEI provides a self-contained ETCH CART. This cart is designed to fit into the customer's system between the extruder or unspooling equipment and the rewind or other downstream equipment.

Thread/Yarn/String/Rod/Wire

The same cart used for small diameter tubing can be adapted to run string or fiber type materials as well as small diameter wire products.



Large Diameter Heavy Wall Tubing

Two options exist:

1. Ammonia etch system: CEI can design and provide a stationary or movable system to make a sodium ammonia solution, expose the tubing to the sodium-ammonia, and then rinse the tube of the sodium ammonia etch. Included would be a method to neutralize the etchant. Scrubber systems to handle the ammonia off-gas can also be provided.
2. Sodium naphthalide etch system: CEI can design and provide a stationary or movable system to make a naphthalene solution, expose the tubing to the sodium naphthalide, and then rinse the tube of the etch solution.



ORIGINAL ETCH CART DESIGN

Now constructing carts made of all stainless steel. Simple, effective, and very low etch consumption.



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