TETRA-ETCH[®] Fluorocarbon Etchant

The safe and easy way to etch fluorocarbon polymers for potting and bonding



Safe and easy

TETRA-ETCH[®] fluorocarbon etchant is a non-pyrophoric chemical solution for treating the surface of fluorocarbons to make them markable, bondable and pottable. A sodium compound in the solution reacts with highly fluorinated polymers to form a reactive film on the polymer surface. Nearly any adhesive can be used on this treated surface.

Physical and Safety Specifications

Boiling point approx Vapour pressure (20°C) Specific gravity Colour Odour Flash point pH value at 20 g/1 H₂0 Ignition temperature Explosibility limit Danger class to VbF (Directive on flammable fluids) Shelf life The active sodium in TETRA-ETCH[®] etchant reacts with the surface molecules of a halogenated polymer to form a carbonaceous film of free radicals. These radicals react with O2 and H2O and each other to form a layer of chemically active groups attached to the surface. These then react with adhesives and potting compounds to form a true chemical bond.

85°C (185°F) 48 mm Hg 0.96 g/cm³ dark green/black like naphthalene and ether - 0.5°C to BSENISO 13736 > 12.5 192°C 1.8 - 10.4 vol. % B dated 27th Feb. 1980

6 months at below 0°C

FOR ETCHING FLUOROCARBON POLYMERS

Key Features:

- Non-pyrophoric
- Suitable for PTFE, PFA and FEP
- Suitable for spot, batch or continuous etching
- Suitable for thinning by adding TETRA-THIN™ thinner

Key Benefits:

- Fast acting
- High strength
- Easy to use
- Guaranteed shelf life
- Available from stock

Typical Applications

- · Wire and cable products
- Electronic potting
- Engineering components
- Fluoropolymer sheet and tape stock
- · Medical or non-medical tubing
- Printed circuit boards (PTFE or microwave)
- Chemical tank liners



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Safety Information

TETRA-ETCH[®] does not ignite when exposed to air or immersed in water.

TETRA-ETCH^{\circ} however is highly flammable and must be kept away from sources of ignition. No smoking! Recommended extinguisher: CO₂, dry powder.

TETRA-ETCH[®] has a low toxic level.

Do not inhale vapour; ensure adequate ventilation. Avoid any contact with skin or eyes. If contact is made with skin, rinse liberally under water. When in contact with water, it forms sodium hydroxide. This can attack the skin. Wear protective gloves and protective goggles.

Disposal

Do not allow to enter the drains or sewers! Waste must be handled by the special waste disposal service, waste key number: 070204.

Guidelines on Use

We recommend immersion or coating by manual application. It can be applied using a brush, a sponge or with metal or plastic strips.

Allow the solution to reach room temperature before opening the bottle. Do not use a flame or hotplate to heat the bottle! The effectiveness of TETRA-ETCH[®] decreases as the temperature rises, when it is exposed to air or to ultraviolet light. The shape of the container in which TETRA-ETCH[®] is prepared should therefore be tall and narrow so that the surface area exposed to the air remains as small as possible. The reaction of the solution is also reduced if it comes into contact with humidity. If used in a continuous process, we advise the use of dry nitrogen or argon to flush the container. When large parts are etched, the surface of TETRA-ETCH[®] exposed to the air can be protected by applying dry nitrogen or argon.

Thinning

The use of the thinner TETRA-THIN[™] is recommended if the viscosity of unthinned TETRA-ETCH[®] at low temperatures (30 to 50 cps at 20°C) prevents correct processing. Continuous etching processes can be operated more economically

and reliably by thinning TETRA-ETCH[®].

Use the thinning agent depending on the application. A maximum mixture ratio of 2: $1(\text{TETRA-THIN}^{\text{TM}} : \text{TETRA-ETCH}^{\text{®}})$ should not be exceeded.

Pre-treatment and After-treatment

Before etching; the surface to be treated must be dry and clean. Surfaces which are not to be etched can be covered with polyethylene foil or paraffin wax.

To remove excess etchant: the etched components should be rinsed with warm water, (80°C min) then an organic solvent (acetone, methanol or petroleum ether). Since the adhesive property can be impaired by residue or crusts, they should be removed within an hour.

Reaction Time

The treatment time depends on the temperature and the desired strength of the etchant. It ranges from a few seconds to about one minute with PTFE or up to 2 minutes with FEP or PFA. The etching process is terminated when the treated surface turns a light-brown colour. If the surface of the part being treated is dark, the brown colour may not be visible. Then use the water test:

Pour a water drop onto the treated surface. If the water drop retains its shape, the etching process is not finished. If the water drop spreads out the etching process is finished. The etching time can be reduced in a continuous process by warming up the part to be etched to a temperature of 70°C.

Further Processing/Storage of Etched Parts

As a rule, etched surfaces are sensitive to ultraviolet (UV) light. Etched surfaces should be processed within 24 or max. 48 hours since UV light can destroy the film applied and reduce its adhesion properties.

Etched parts can be stored for many years in suitable containers which are dry and sealed against light and air.

How can you tell whether TETRA-ETCH[®] is still fully effective?

The colour of TETRA-ETCH[®] is a good indicator. If it is dark green to black in colour, it is fully effective. If the fluid is brown, yellow or white in colour, it is no longer effective.

Yield

In a continuous process, TETRA-ETCH $^{\circ}$ yields approx. 4 m² per 500ml. In manual processing, the yield is strongly dependent on air humidity, temperature and the type of application.



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The data provided in this document are based upon tests and experience by W.L. Gore & Associates. Reasonable care has been taken in the preparation of this information. W.L. Gore & Associates believes this data to be reliable. These data are supplied for illustration and information purposes only.

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