

TCA™

Triethylenetetramine Curing Agent



Building
&
Transportation



Oil, Gas
&
Industrial



Offshore
&
Onshore



Water
&
Wastewater

PRODUCT DESCRIPTION

CTech-LLC® Triethylenetetramine Curing Agent TCA™ is a moderately viscous, yellowish liquid, less volatile than diethylenetriamine, but resembles it in many other properties. It is soluble in water. CTech-LLC® Triethylenetetramine Curing Agent TCA™ is primarily used as a hardener in epoxy resins. Other uses include detergents and softening agents, synthesis of dyestuffs, pharmaceuticals, and rubber accelerators. CTech-LLC® Triethylenetetramine Curing Agent TCA™ is a colorless to light-yellow liquid containing linear, branched and cyclic molecules. TETA is mainly used in the manufacture of fuel oil additives, lubricating oil additives and epoxy curing agents. It is also used in the production of asphalt additives.

ADVANTAGES

- Not classified as a flammability hazard.
- freezing point about -20°C.
- The substance or mixture is not classified as oxidizing.
- Flash point about 118°C.

INSTALLATION PROCEDURE

CTech-LLC® PER™ can be cured or cross-linked with CTech-LLC® Triethylenetetramine Curing Agent TCA™. Some commonly used curing agents, recommended concentrations, typical cure schedules employed in major end-use applications, plus sources for these curing agents are displayed in Table Physical properties of cured epoxy.

PERFORMANCE CHARACTERISTICS OF CURED PER™

- Mechanical Properties: High performance, high strength materials are obtained when this resin is cured with CTech-LLC® Triethylenetetramine Curing Agent TCA™. Unfilled systems in common use have tensile values greater than 10,000 psi (69 MPa) with modulus values greater than 400,000 psi (2750 MPa). Such systems are normally very rigid. If greater flexibility is needed systems can be formulated to provide up to 300% elongation.

Adhesive Properties: One of the most widely recognized properties of cured CTech-LLC® PER™ is strong adhesion to a broad range of substrates. Such systems exhibit shear strength of up to 6,000 psi (41 MPa). One factor which contributes to this property is the low shrinkage shown by these systems during cure. Compared to other



polymers, epoxy resins have low internal stresses resulting in strong and durable finished products.

- Electrical Properties: CTech-LLC® PER™ cured systems have very good electrical insulating characteristics and dielectric properties. For example, systems can be obtained with anhydride and amine curing agents having volume resistivities up to 1×10^{16} ohm-cm, dielectric constants of 3-5 and dissipation factors of 0.002 to 0.020 at ambient conditions. Electrical encapsulations, laminates and molding compounds are frequently based on CTech-LLC® PER™.
- Chemical Resistance: Cured CTech-LLC® PER™ is highly resistant to a broad range of chemicals, including caustic, acids, fuels and solvents. Chemically resistant reinforced structures and linings or coatings over metal can be formulated with CTech-LLC® Triethylenetetramine Curing Agent TCA™.
- Formulating Techniques: The primary components of a thermosetting resin formula are the epoxy resin and the hardener or curing agent. However, in practice other materials are normally incorporated to achieve special properties. For example, inert fillers such as silicas, talcs, calcium silicates, micas, clays and calcium carbonate can be added to further reduce shrinkage and improve dimensional stability. Also, reactive diluents can be added to CTech-LLC® PER™ to reduce viscosity.

APPLICATION

- Adhesives, Casting and tooling

- Civil Engineering
- Composites Automotive Coatings
- Marine and Protective Coatings
- Potting and Encapsulation
- Fiber reinforced pipes, tanks and composites
- Tooling, casting and molding compounds
- Construction, electrical and aerospace adhesives
- High solids/low VOC maintenance and marine coatings
- Electrical encapsulations and laminates
- Chemical resistant tank linings, flooring and grouts

TECHNICAL DATA

	Unit	TCA™
Form	-	viscous liquid
Color	-	light yellow
pH	%	13 at 100 % solution
Odour	-	ammoniacal
Melting point/freezing point	°C	-20
Boiling point	°C	274,6
Flammability	-	Not classified as a flammability hazard
Flash point*	°C	118
Explosive properties	-	Not explosive
Vapour pressure**	hPa	0,0035
Oxidizing properties	-	The substance or mixture is not classified as oxidizing
Relative vapour density	-	5,04
Water solubility**	g/l	1000
Density	kg/m³	971
Solubility in other solvents	-	Soluble in Methanol, Acetone
Relative density	-	0,971
Viscosity, dynamic	mPa.s	13,9 - 20

* Method: closed cup
** Temperate at 20 °C

STORAGE & SHELF LIFE

At least 18 months from the date of manufacture in the original sealed container at ambient temperature. Store away from excessive heat and humidity in tightly closed containers.

CAUTION

The generation of waste should be minimized or avoided wherever possible. Reuse or recycle products wherever possible. This material

and its container must be disposed of in a safe way. Disposal of this product, process solutions, residues and by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any local authority requirements. When handling waste, the safety precautions applying to handling of the product should be considered. Care should be taken when handling emptied containers that have not been thoroughly cleaned or rinsed out. Empty containers or liners may retain some product residues and hence be potentially hazardous.

CTech-LLC®

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IMPORTANT NOTE:

Before using any CTech-LLC® product, the user must review the most recent version of the product's technical data sheet, material safety data sheet and other applicable documents, available at www.ctech-llc.com.

WARANTY:

CTech-LLC® warrants its products to be free from manufacturing defects. Buyer determines suitability of product for use and assumes all risks. Buyer's sole remedy shall be limited to replacement of product. Any claim for breach of this warranty must be brought within one month of the 'date of purchase. CTech-LLC® shall not be liable for any consequential or special damages of any kind, resulting from any claim or breach of warranty, breach of contract, negligence or any legal theory. The Buyer, by accepting the products described herein, agrees to be responsible for thoroughly testing any application to determine its suitability before utilizing.