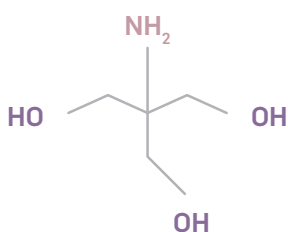
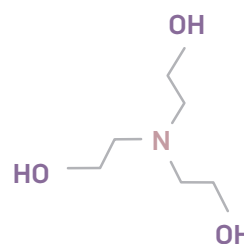


THE FACTS ABOUT FORMULATING WITH TRIS AMINO™ ULTRA PC

TROMETHAMINE (TRIS)



TRIETHANOLAMINE (TEA)



VS.

INCI: Tromethamine
IUPAC: 2-amino-2-(hydroxymethyl)-1,3-propanediol
MW: 121.14 g/mol
CAS: 77-86-1
EINECS: 201-064-4
Synonyms: TRIS AMINO™, Tris, tromethamine, trometamol, THAM, Tris (hydroxymethyl)- aminomethane, TRIZMA™

INCI: Triethanolamine
IUPAC: 2, 2', 2"-nitrilotriethanol
MW: 149.19 g/mol
CAS: 102-71-6
EINECS: 203-049-8
Synonyms: TEA, Trolamine, 2-[bis(2-hydroxyethyl)amino]ethan-1-ol, Tris (hydroxyethyl) amine, Trihydroxytriethylamine

SUMMARY OF CHEMISTRIES

TROMETHAMINE (TRIS)	TRIETHANOLAMINE (TEA)
Primary amine	Tertiary amine
α-carbon fully substituted	α-carbon not fully substituted
No α-hydrogen	6 abstractable α-hydrogen
Oxidatively more stable	Oxidatively less stable
Odorless	Mild ammonia odor

IMPLICATIONS OF CHEMICAL STRUCTURE

TROMETHAMINE (TRIS)	TRIETHANOLAMINE (TEA)
Stable and colorless	Yellows over time
Does not form stable nitrosamine	Potential to form the nitrosamine compound NDELA
Low dosages required for formulations	Higher dosages required for formulations
pKa = 8.1	pKa = 7.7
Effective formaldehyde scavenger	Ineffective formaldehyde scavenger

Tromethamine has become a preferred buffer and mild neutralizing amine versus commodity neutralizers typically used in personal care and cosmetics applications. TRIS AMINO™ ULTRA PC from ANGUS Chemical Company is a high-purity tromethamine that is globally compliant for use in cosmetic and personal care products.

PERFORMANCE OF FORMULATED PRODUCT	TROMETHAMINE (TRIS)	TRIETHANOLAMINE (TEA)
Salt tolerance	Minimal viscosity changes on storage; formulation able to withstand ion disruption after long-term storage	Viscosity decreases on storage; formulation unable to tolerate salt disruption after long-term storage
Color stability	Stable over long-term storage	Can yellow over time
Odor elimination	Rapidly eliminates common body off-odors like propionic acid and 2-nonenal	Unable to scavenge common body off-odors like 2-nonenal, and low reactivity with propionic acid
Foam formulation (cleanser formulation)	Good foaming capacity and stable foam with stearic acid and tromethamine	Lesser foaming capacity with stearic acid and triethanolamine
Product appearance (cleanser formulation)	Shiny and pearlescent appearance	Dull-looking appearance
Foam formulation (propellant-type shaving foam formulation)	Rich, creamy foam created with stearic acid, myristic acid, and tromethamine	Unable to produce rich and creamy foam with stearic acid, myristic acid, and triethanolamine
Propellant compatibility	Highly compatible with propellant type formulations	Limited compatibility with propellant type formulations
Nano TiO2 dispersion	Stable nano TiO2 dispersion at pH less than 7	Cannot stably disperse nano TiO2 at pH less than 7
Particle size	Smaller particle size in sunblock formulated at pH 7	Particle size larger in sunblock formulated at pH 7

FORMULATING TIP

TRIS AMINO ULTRA PC is sold as a crystalline solid and, for the best results, should be incorporated into aqueous phase or as aqueous solution into formulation.



DISCOVER A **BETTER** WAY.

angus.com

®™Trademark of ANGUS Chemical Company Notice: No freedom from infringement of any patent owned by ANGUS or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other government enactments. The product shown in this literature may not be available for sale and/or available in all geographies where ANGUS is represented. The claims made may not have been approved for use in all countries. ANGUS assumes no obligation or liability for the information in the document. References to "ANGUS" or the "Company" mean the ANGUS Chemical Company legal entity selling the products to Customer unless expressly noted. NO WARRANTIES ARE GIVEN: ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED. Published February 2018