

IMPROVE YOUR PRODUCTIVITY WITH OUR CUSTOMIZED SERVICES AND CAPABILITIES

ANGUS Life Sciences, a business of the ANGUS Chemical Company, provides dedicated support for biotechnology and pharmaceutical applications. Through specialized testing, custom blending, or dosage-specific package quantities, ANGUS can help optimize the cost effectiveness and efficiency of your operations.



PACKAGING

- Custom packaging
- Multiple container options
- IPEC-PQG compliance



ANALYTICAL

- ISO 9001:2015 certified
- Customized in-house testing and advanced instrumentation (ICP-MS, HPLC, GC)
- Adherence with IPEC and select cGLP principles



WAREHOUSING

- Temperature managed warehousing
- Inventory reservation and expedited shipments
- Adherence with IPEC and select cGDP principles



PURCHASING

- Global sourcing capabilities
- Formalized supplier lifecycle management program
- Non-animal origin

PRODUCT STEWARDSHIP

ANGUS encourages its customers to review their applications of ANGUS products from the standpoint of human health and environmental quality. To help ensure that ANGUS products are not used in ways for which they are not intended, ANGUS personnel will assist customers in dealing with environmental and product safety considerations. For assistance, product Safety Data Sheets, or other information, please visit angus.com or contact us at info@angus.com.



DISCOVER A **BETTER WAY**™

angus.com

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TRIS REAGENTS

Selection Guide

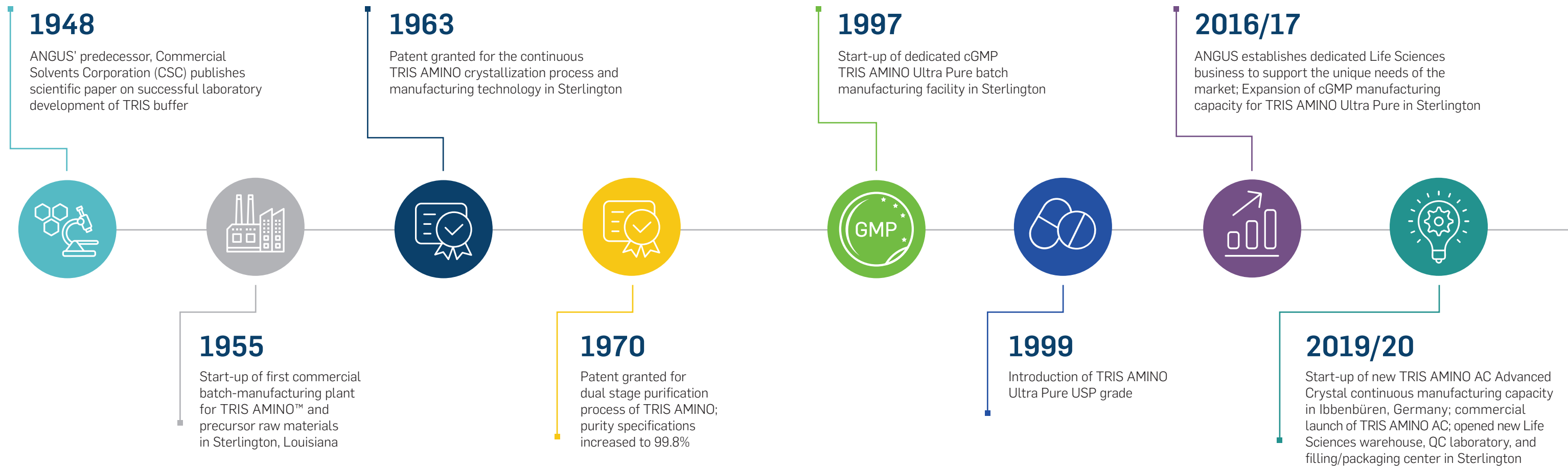
DISCOVER A **BETTER WAY**™

WE INVENT ... IT'S IN OUR DNA

As the original inventor of the Tromethamine molecule more than 70 years ago, ANGUS Chemical Company has built a proud history of driving performance and innovation in the TRIS AMINO buffer product space. Developing the right products for R&D, scale-up, and production is not only an ongoing commitment ... **It's what we do.**

WE INNOVATE ... TO ADDRESS INDUSTRY CHALLENGES WITH OUR NEW TRIS AMINO™ AC ADVANCED CRYSTAL

ANGUS continues to enhance its capabilities through new innovations in process manufacturing. Our next generation TRIS AMINO Advanced Crystals (AC) are less prone to clumping and hardness – without any change to the molecule itself – and may provide critical operational benefits when it comes to handling and preparation. Come see for yourself and Discover A Better Way™ with ANGUS.



WE INVEST ... TO PROVIDE A SECURE, SUSTAINABLE SUPPLY

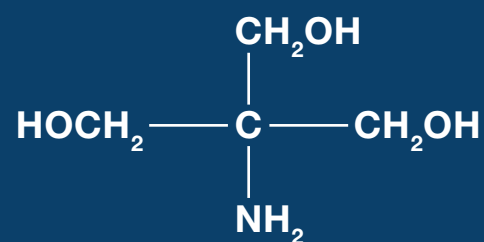
Recognized as the leading global manufacturer, ANGUS has continuously invested in our world-class facilities, processes and systems to meet the demanding quality and compliance standards of the Life Sciences markets we serve. With an eye on growing volume needs, we've expanded TRIS AMINO capacity over the years, which includes a second manufacturing location in Ibbenbüren, Germany, to ensure supply chain continuity for our critical chemistries. Both manufacturing facilities operate under our single Global Quality Management System, and are strategically located in U.S. and Europe, to provide efficient distribution to all regions of the globe.

DESIGNED WITH THE HIGHEST STANDARDS IN MIND, OUR TWO MANUFACTURING FACILITIES ARE AUDIT-READY AND OFFER:

- Adheres to current IPEC guidelines for cGMP compliant manufacturing of excipients
- ISO 9001: 2015 certification
- Automated in-process monitoring and facility control system
- In-house testing utilizing validated analytical methods
- Elemental impurity risk assessment using ICP-MS technology
- Comprehensive validation documentation
- State-of-the-art filling and packaging suites for Life Sciences products

TRIS AMINO

(tromethamine, trometamol) is a widely known excipient and processing buffer used in the purification of biological molecules. In addition to providing mild alkalinity for buffering at physiological pH levels, TRIS AMINO offers a number of advantages to bioprocessors, including aiding in chemical stabilization in aqueous formulations and exhibiting minimal salt effects. All grades of TRIS AMINO are GMO-free and BSE/TSE-free.



TRIS AMINO Tromethamine

CAS No.: 77-86-1

Molecular weight: 121.14

Appearance: white solid or crystal

TRIS AMINO BUFFERS AND REAGENTS

	INDUSTRIAL SERIES	BUFFER SERIES			ULTRA PURE SERIES	
	Ideal for industrial chemical applications, reprocessing and basic R&D.	Manufactured under ISO with process controls and monitoring in a non-cGMP environment. Buffer grades are ideal for applications where regulatory requirements are less stringent and do not require a monograph. Multiple purity levels available.			Highest purity product manufactured under cGMP for use as a raw material in regulated environments. Complete quality documentation available including validated process controls.	
Product	TRIS AMINO Crystals	TRIS AMINO Standard Buffer	TRIS AMINO Buffer ACS Grade	TRIS AMINO AC Buffer	TRIS AMINO Ultra Pure	TRIS AMINO AC Ultra Pure
Description	99.0% purity, industrial utility product with basic testing performed.	Cost effective buffer for lab and commercial applications requiring moderate purity.	Developed for applications demanding buffers that conform to American Chemical Society (ACS) standards.	Highest purity buffer grade manufactured with a unique crystal morphology that has been shown to help reduce caking, making it less prone to clumping and hardness.	Highest purity and testing requirements compliant to USP, EP, JPC, and ChP monographs. Suitable for use as a pharmaceutical excipient.	Identical purity and testing as Ultra Pure grade but manufactured with a unique morphology that has been shown to help reduce caking making it less prone to clumping and hardness.
Purity and Assay	99.0 (titration)	99.3 (titration)	99.8 (GC)	99.9 (GC)	99.9 (titration and GC)	99.9 (titration and GC)
Country of Origin	U.S. and Germany	U.S.	U.S.	Germany	U.S.	Germany
Shelf Life (Years)	5	5	5	5	3	3
Monograph	None	None	None	None	USP, EP, JPC, ChP, multi-compendial	USP, EP, JPC, ChP, multi-compendial
Quality Systems	ISO	ISO	ISO	ISO	ISO, IPEC, cGMP, select ICH Q7 principles	ISO, IPEC, cGMP, select ICH Q7 principles
APPLICATION						
Research and Analytical Chromatography	☑	☑	☑	☑	☑	☑
Electrophoresis and PCR	☑	☑	☑	☑	☑	☑
Diagnostics Reagents and Buffers		☑	☑	☑	☑	☑
Molecular Biology (IVF, Cell Line Storage)					☑	☑
Raw Material for API / Drug Substance Formulation			☑	☑	☑	☑
Commercial Protein Purification (Biologics DSP)		☑	☑	☑	☑	☑
Blood Plasma Fractionation		☑	☑	☑	☑	☑
Non-sterile Excipient					☑	☑

TRIS DERIVATIVE BUFFERS AND REAGENTS

TRIS derivatives are often used in conjunction with TRIS AMINO to adjust pH. They can be used in both upstream and downstream processing applications.

Product	BIS-TRIS	TRIS HCl Ultra Pure	TRIS HCl Prime
Description	Primarily used in protein and nucleic acid systems, BIS-TRIS is known to complex with various metals.	99.0% pure product manufactured under ISO with standard testing available.	Highest purity TRIS HCl product with the lowest known levels of elemental impurities on the market.
Purity and Assay	99.0 (titration)	99.0 (GC)	99.5 (GC)
Shelf Life (Years)	4	5	3
CAS Number	6976-37-0	1185-53-1	1185-53-1
Molecular Weight	209.24	157.60	157.60
Monograph	None	None	None
Quality Systems	None	Select IPEC and ICH principles	Select IPEC and ICH principles

APPLICATION

Research and Analytical Chromatography	☑	☑	☑
Electrophoresis and PCR	☑	☑	☑
Diagnostics Reagents and Buffers	☑	☑	☑
Molecular Biology			☑
Raw Materials for API / Drug Substance Formulation	☑		☑
Commercial Protein Purification (Biologics DSP)	☑	☑	☑
Blood Plasma Fractionation	☑	☑	☑
Non-sterile Excipient	☑	☑	☑

DISCOVER PEACE OF MIND AND STREAMLINE QUALIFICATION FOR TRIS AMINO PRODUCTS

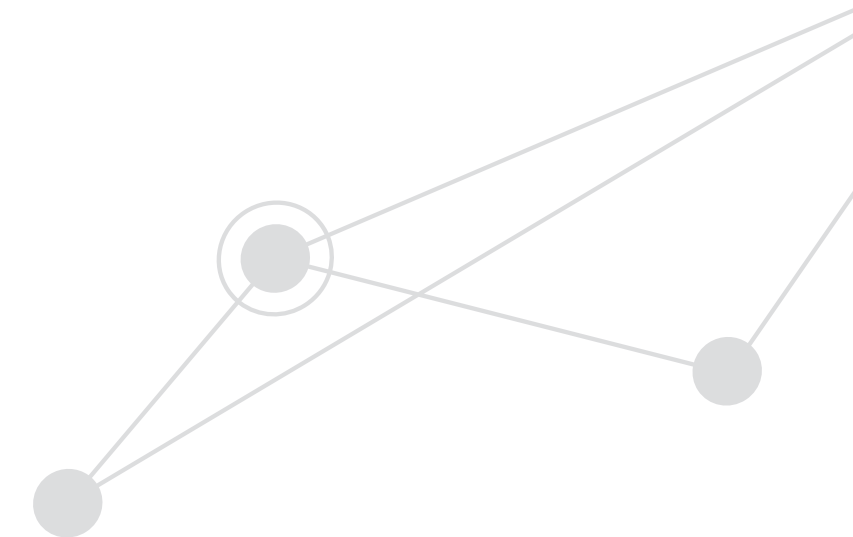
We understand in order to mitigate risk and meet regulatory guidelines for commercial manufacturing, you need a highly reliable supply chain, access to documentation, and a collaborative approach to understand and address your company's unique compliance requirements.

That's why, as the world's only fully integrated manufacturer for TRIS AMINO, ANGUS is uniquely positioned to offer a 100% traceable supply chain, with a clear line of sight back to raw materials - all of which are produced on-site to stringent specifications. This, combined with a single Global Quality Management System means absolute confidence you can readily qualify material and have a secure, sustainable supply.

STANDARD QUALIFICATION DOCUMENTS

- Safety Data Sheets (SDS)
- Product Sales Specifications
- Certificate of Analysis (CoA)
- ISO 9001:2015 Certificate
- High Level Manufacturing Process Flow
- Regulatory Data Sheets*
- Product Stability Data*
- cGMP Statement of Conformance*
- Excipient Information Packages*
- Precedence of Product Use*

*Available for select products



DID YOU KNOW?

ANGUS Life Sciences also offers a comprehensive portfolio of high-quality chemistries from the world's leading producers through a qualified, traceable and integrated supply chain. Our single Quality Management System is applicable to all our biochemical, buffer and salt products, including:

- AMINO ACIDS AND DERIVATIVES
- VITAMINS AND NUCLEOTIDES
- BIOCHEMICALS AND BUFFERS
- INORGANIC SALTS