

**ANGUS CHEMICAL COMPANY
SALES SPECIFICATION**

Effective Date: 11-23-2021

Supersedes Date: 09-03-2021

Name: TRIS AMINO® Hydrochloride, Biologics Plus (TRIS (Hydroxymethyl) Aminomethane, Hydrochloride)

Specification Number: 185-5-S

Additional Product Information: N/A

Final Testing Requirements

Test and Test Condition	Limit	Unit	Method	Note
Assay, by Titn, dried basis	99.5 Min	WT%	ANGUS 2256	
Appearance, white crystals or crystalline powder	Pass		ANGUS 1400	
Identification, IR matches reference	Pass		ANGUS 3200	
Solubility, 1M Soln in H2O, clear, complete and colorless	Pass		ANGUS 1450	
Loss on Drying @ 110degC	0.4 Max	WT%	ANGUS 1300	
Moisture, by K.F.	0.50 Max	WT%	ANGUS 2200	
pH, 1.0M Aqueous Solution	3.7 – 4.7		ANGUS 1200	
pKa @ 20 degrees C	8.0 – 8.4		ANGUS 2256	
UV Abs @ 260nm, 1.0M Aqueous Solution	0.02 Max		ANGUS 3000	
UV Abs @ 280nm, 1.0 M Aqueous Solution	0.02 Max		ANGUS 3000	
UV Abs @ 400nm, 1.0 M Aqueous Solution	0.01 Max		Current USP	
Melting Point	150.0 – 153.0	°C	ANGUS 1500	
Total Trace Metals (ICP MS)	5 Max	ppm	ANGUS 3511	
Residue on Ignition	0.1 Max	WT%	ANGUS 1311	
Endotoxin	2.5 Max	EU/G	Current USP	
Bioburden	100 Max	CFU/g	Current USP	
Yeast & Mold	100 Max	CFU/g	Current USP	

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RNASE, none detected	Pass		ANGUS 1260	
DNASE, none detected	Pass		ANGUS 1270	
Protease, none detected	Pass		ANGUS 1280	
ELEMENTAL IMPURITIES:				
Aluminum (Al)	2.000 Max	ppm	ANGUS 3511	
Antimony (Sb)	1.000 Max	ppm	ANGUS 3511	
Arsenic (As)	1.000 Max	ppm	ANGUS 3511	
Barium (Ba)	1.000 Max	ppm	ANGUS 3511	
Boron (B)	1.000 Max	ppm	ANGUS 3511	
Cadmium (Cd)	1.000 Max	ppm	ANGUS 3511	
Calcium (Ca)	2.000 Max	ppm	ANGUS 3511	
Chromium (Cr)	1.000 Max	ppm	ANGUS 3511	
Cobalt (Co)	1.000 Max	ppm	ANGUS 3511	
Copper (Cu)	1.000 Max	ppm	ANGUS 3511	
Iron (Fe)	1.000 Max	ppm	ANGUS 3511	
Lead (Pb)	1.000 Max	ppm	ANGUS 3511	
Magnesium (Mg)	1.000 Max	ppm	ANGUS 3511	
Manganese (Mn)	1.000 Max	ppm	ANGUS 3511	
Mercury (Hg)	1.000 Max	ppm	ANGUS 3511	

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Molybdenum (Mo)	2.000 Max	ppm	ANGUS 3511	
Nickel (Ni)	2.000 Max	ppm	ANGUS 3511	
Potassium (K)	1.000 Max	ppm	ANGUS 3511	
Sodium (Na)	5.000 Max	ppm	ANGUS 3511	
Vanadium (V)	1.000 Max	ppm	ANGUS 3511	
Zinc (ZN)	5.000 Max	ppm	ANGUS 3511	

End of Specification

Material Number	Packaging Size
376069	Sample
376070	5 KG Drum
376071	12 KG Drum
376072	25 KG Drum
376099	50 KG Drum

READ PRECAUTIONARY INFORMATION AND MATERIAL SAFETY SHEETS. THIS PRODUCT IS SHIPPED IN COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS REGARDING CLASSIFICATION, PACKAGING, SHIPPING AND LABELING.