

BIOSPECTRA

100 Majestic Way, Bangor, PA 18013 / www.biospectra.us

Effective Date:	17-Feb-2017	17-Feb-2020	: Date of Next Review
Prepared By:	Jamie Storm	16-000062 v3.0	: Supersedes
QA/QC Approval:	Nicole Fisher	Dora Meissner	: Management Approval
Reason for Revision:	See Revision History in ensur		

TRIS HCl

CERTIFICATE OF ANALYSIS

BIO EXCIPIENT GRADE / TH3220-K012

LOT: TH3220-100-1119

 $\text{NH}_2\text{C}(\text{CH}_2\text{OH})_3 \cdot \text{HCl}$ * F.W. 157.60 g/mol. * CAS# 1185-53-1

Manufacturing Date: 11/1/2019 Retest Date: 11/30/2021

Packaging Date: 11/17/2019

Manufacturing Site: 1474 Rockdale Lane, Stroudsburg, PA 18360

Packaging Site: 100 Majestic Way, Bangor PA, 18013

ANALYSIS	SPECIFICATION	TEST RESULT
Absorbance 280 nm	0.06 a.u. max.	<0.06a.u.
Appearance and Color	White / Crystals	White / Crystals
Assay	99.5% min.	99.9%
DNase	None Detected	None Detected
Enzymes RNase	None Detected	None Detected
Protease	None Detected	None Detected
Heavy Metals	2 ppm max.	< 2 ppm
Identification (IR)	Passes Test	Passes Test
Insoluble Matter	0.001% max.	<0.001%
Karl Fischer	0.5% max.	0.2%
Melting Range	150 – 153 °C	151-152°C
pH (0.5M)	4.0 – 5.0	4.3 @ 23.1°C
pK _a	8.0 – 8.4	8.2
Residue on Ignition	0.1% max.	<0.1%
Solubility	Passes Test	Passes Test
Arsenic (As)	1 ppm max.	< 1 ppm
Calcium (Ca)	1 ppm max.	< 1 ppm
Copper (Cu)	1 ppm max.	< 1 ppm
Trace Elements Iron (Fe)	1 ppm max.	< 1 ppm
Lead (Pb)	1 ppm max.	< 1 ppm
Magnesium (Mg)	1 ppm max.	< 1 ppm

The information contained herein is the property of BioSpectra. The recipient is responsible for its safe-keeping, and the prevention of unauthorized appropriation, use, disclosure and copying.

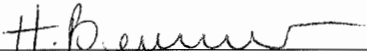
COUNTRY OF ORIGIN: U.S.A.

TEST METHOD REFERENCE: DCN: 16-000042

INTENDED USE: Material represented by this Certificate of Analysis is suitable to be used only as the following: ICH Q7 Compliant cGMP Manufactured Excipient for use in further manufacturing. The material represented by this Certificate of Analysis is not suitable to be used as an Active Pharmaceutical Ingredient, Drug Product or household item.

RESIDUAL SOLVENTS: Based on the manufacturing process and the controlled handling and storage of this product, there is no potential for any of the residual solvents listed in the current USP method <467> Tables 1, 2, 3, or 4 to be present at the specified limits; furthermore, if tested this product would comply with USP/NF requirements.

Prepared by:  Date: 11/18/19

Reviewed by:  Date: 11/18/19