

BIOSPECTRA

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

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|----------------------|-------------------------------|-----------------|-----------------------|
| Effective Date: | 23-Jun-2017 | 23-Jun-2020 | : Date of Next Review |
| Prepared By: | Jamie Storm | 16-000923 v.2.0 | : Supersedes |
| QA/QC Approval: | Crystal Hamelburg | Dora Meissner | : Management Approval |
| Reason for Revision: | See Revision History in ensur | | |

GUANIDINE THIOCYANATE

CERTIFICATE OF ANALYSIS

BIO PHARMA GRADE / GT4220-G500

LOT: GT4220-109-1218

$\text{NH}_2\text{C}(\text{NH})\text{NH}_2\text{-HSCN}$ F.W. 118.16 g/mol. CAS# 593-84-0
 Manufacturing Date: 04/25/2018 Retest Date: 04/30/2020
 Manufacturing Site: 100 Majestic Way, Bangor PA, 18013
 Packaging Date: 12/05/2018
 Packaging Site: 100 Majestic Way, Bangor PA, 18013

| ANALYSIS | SPECIFICATION | TEST RESULT | |
|----------------------|------------------|--------------------|---------------|
| Absorbance | 280 nm | 0.300 a.u. maximum | 0.0964 a.u. |
| | 300 nm | 0.050 a.u. maximum | 0.0122 a.u. |
| | 340 nm | 0.030 a.u. maximum | 0.0025 a.u. |
| Appearance and Color | White / Crystals | White / Crystals | |
| Assay | 99.5% minimum | 99.74% | |
| Enzymes | DNase | None Detected | None Detected |
| | Protease | None Detected | None Detected |
| | RNase | None Detected | None Detected |
| Identification (IR) | Passes Test | Passes Test | |
| Loss on Drying | 0.5% maximum | 0.2265% | |
| Melting Range | 115-121°C | 119.3 – 120.3°C | |
| pH (5% solution) | 5.0-7.0 | 5.48 @ 18.5°C | |
| Solubility (35%) | Clear | Clear | |
| Trace Metals | Arsenic (As) | 5 ppm maximum | < 5 ppm |
| | Copper (Cu) | 5 ppm maximum | < 5 ppm |
| | Iron (Fe) | 5 ppm maximum | < 5 ppm |
| | Lead (Pb) | 5 ppm maximum | < 5 ppm |

COUNTRY OF ORIGIN: U.S.A.

TEST METHOD REFERENCE: DCN: 16-000043

INTENDED USE: Material represented by this Certificate of Analysis is suitable to be used only as the following: IPEC Compliant GMP Manufactured Chemical, for use in further Manufacturing or as a Reagent for Laboratory and Research. The material represented by this Certificate of Analysis is not suitable to be used as an Active Pharmaceutical Ingredient, Drug, Drug Product or Household item.

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.

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: H. Bennett Date: 12/5/18

Reviewed by: Anna Mills Date: 12/5/18