

ALADDIN SCIENTIFIC CORPORATION

14078 Meridian Parkway, Riverside, CA. 92518

## Certificate of Analysis

|                          |                                  |
|--------------------------|----------------------------------|
| Date of Testing:         | 2023-01-09 16:20:09              |
| Date of Next Testing:    | 2024-12-29 16:20:09              |
| Product Name:            | <b>HEPES</b>                     |
| CAS Number:              | 7365-45-9                        |
| Specifications & Purity: | for molecular biology, ≥99.5%(T) |
| Lot #:                   | A2304547                         |
| SKU #                    | <b>H109408</b>                   |
| Version                  | <b>1</b>                         |
| <b>Analysis #:</b>       | <b>156880</b>                    |
| Storage Temperature:     | Room temperature                 |

| Parameter                                      | Limit Values | Result    |
|------------------------------------------------|--------------|-----------|
| Cadmium(Cd)                                    | 0-5 (ppm)    | 1.35 ppm  |
| (As)Arsenic                                    | 0-0.1 (ppm)  | 0.03 ppm  |
| Sodium(Na)                                     | 0-50 (ppm)   | 12.27 ppm |
| Zinc(Zn)                                       | 0-5 (ppm)    | 2.59 ppm  |
| Cobalt(Co)                                     | 0-5 (ppm)    | 2.59 ppm  |
| Lithium(Li)                                    | 0-5 (ppm)    | 1.58 ppm  |
| Magnesium(Mg)                                  | 0-5 (ppm)    | 2.48 ppm  |
| Chromium(Cr)                                   | 0-5 (ppm)    | 1.58 ppm  |
| UV Absorbance 260nm(0.5 M in H <sub>2</sub> O) | 0-0.1        | 0.03      |
| Iron(Fe)                                       | 0-5 (ppm)    | 0.00 ppm  |
| Nickel(Ni)                                     | 0-5 (ppm)    | 1.36 ppm  |
| Barium(Ba)                                     | 0-5 (ppm)    | 2.48 ppm  |
| UV Absorbance 280nm(0.5 M in H <sub>2</sub> O) | 0-0.1        | 0.03      |
| Aluminum(Al)                                   | 0-5 (ppm)    | 2.06 ppm  |
| useful PH range                                | 6.8-8.2      | 7.25      |
| Ignition Residue (as sulfate)                  | 0-0.1 (%)    | 0.02 %    |
| Sulfate(SO <sub>4</sub> <sup>2-</sup> )        | 0-50 (ppm)   | 6.85 ppm  |
| loss on drying, 110 °C                         | 0-0.5 (%)    | 0.03 %    |
| Calcium(Ca)                                    | 0-10 (ppm)   | 5.82 ppm  |
| Molybdenum(Mo)                                 | 0-5 (ppm)    | 1.53 ppm  |
| Strontium(Sr)                                  | 0-5 (ppm)    | 2.65 ppm  |
| Copper(Cu)                                     | 0-5 (ppm)    | 2.52 ppm  |
| (Pb)Lead                                       | 0-5 (ppm)    | 3.15 ppm  |
| Chloride (Cl <sup>-</sup> )                    | 0-50 (ppm)   | 12.85 ppm |
| Manganese(Mn)                                  | 0-5 (ppm)    | 1.85 ppm  |

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| Parameter                                                              | Limit Values             | Result                   |
|------------------------------------------------------------------------|--------------------------|--------------------------|
| Bismuth(Bi)                                                            | 0-5 (ppm)                | 2.08 ppm                 |
| PH(25 °C, 1 M in Water)                                                | 5-6.5                    | 5.23                     |
| Potassium(K)                                                           | 0-50 (ppm)               | 8.62 ppm                 |
| Purity (T)                                                             | 99.5-100.5 (%)           | 99.77 %                  |
| Appearance (H109408)                                                   | white crystalline powder | white crystalline powder |
| DNases                                                                 | none detected            | none detected            |
| phosphatases                                                           | none detected            | none detected            |
| proteases                                                              | none detected            | none detected            |
| Proton NMR spectrum                                                    | Conforms to Structure    | Conforms to Structure    |
| RNases                                                                 | none detected            | none detected            |
| Solubility in H <sub>2</sub> O , soluble , 1M , 20°C, clear, colorless | pass                     | Pass                     |
| Insoluble matter                                                       | pass                     | Pass                     |
| pKa                                                                    | 6.8                      | 6.8                      |

John Su  
QA & QC Manager