

## Certificate of Analysis

|                 |         |                           |              |
|-----------------|---------|---------------------------|--------------|
| <b>Product</b>  | Ethanol | <b>Batch No.</b>          | : 21 06 0138 |
| <b>Grade</b>    | AR.     | <b>Manufacturing date</b> | : 26/06/2021 |
| <b>Code No.</b> | AR1069  | <b>Best before</b>        | : 06/2025    |

| Items | Descriptions                         | Specifications | Test Results |
|-------|--------------------------------------|----------------|--------------|
| 1     | Assay (by GC.)                       | 99.9% min.     | 99.9%        |
| 2     | Color (APHA)                         | 10 max.        | < 10         |
| 3     | Water (by Coulometry)                | 0.2% max.      | 0.05%        |
| 4     | Acidity (mEq./g.)                    | 0.0005 max.    | < 0.0005     |
| 5     | Alkalinity (mEq./g.)                 | 0.0002 max.    | < 0.0002     |
| 6     | Residue on Evaporation               | 0.001% max.    | < 0.001%     |
| 7     | Acetone (GC.)                        | 0.001% max.    | < 0.001%     |
| 8     | Methanol (GC.)                       | 0.05% max.     | < 0.05%      |
| 9     | Propan-2-ol (GC.)                    | 0.003% max.    | < 0.003%     |
| 10    | Fusel oil                            | Passes test    | Passes test  |
| 11    | Solubility in water                  | Passes test    | Passes test  |
| 12    | Substances darkened by sulfuric acid | Passes test    | Passes test  |
| 13    | Substances reducing permanganate     | Passes test    | Passes test  |
| 14    | Aluminium (Al)                       | 0.1 ppm max.   | < 0.1 ppm    |
| 15    | Barium (Ba)                          | 0.02 ppm max.  | < 0.02 ppm   |
| 16    | Boron (B)                            | 0.02 ppm max.  | < 0.02 ppm   |
| 17    | Cadmium (Cd)                         | 0.05 ppm max.  | < 0.05 ppm   |
| 18    | Calcium (Ca)                         | 0.5 ppm max.   | < 0.5 ppm    |
| 19    | Chromium (Cr)                        | 0.02 ppm max.  | < 0.02 ppm   |
| 20    | Cobalt (Co)                          | 0.02 ppm max.  | < 0.02 ppm   |
| 21    | Copper (Cu)                          | 0.02 ppm max.  | < 0.02 ppm   |
| 22    | Iron (Fe)                            | 0.1 ppm max.   | < 0.1 ppm    |
| 23    | Lead (Pb)                            | 0.05 ppm max.  | < 0.05 ppm   |
| 24    | Magnesium (Mg)                       | 0.05 ppm max.  | < 0.05 ppm   |
| 25    | Manganese (Mn)                       | 0.02 ppm max.  | < 0.02 ppm   |
| 26    | Nickel (Ni)                          | 0.02 ppm max.  | < 0.02 ppm   |
| 27    | Potassium (K)                        | 0.1 ppm max.   | < 0.1 ppm    |
| 28    | Sodium (Na)                          | 0.5 ppm max.   | < 0.5 ppm    |
| 29    | Strontium (Sr)                       | 0.02 ppm max.  | < 0.02 ppm   |
| 30    | Tin (Sn)                             | 0.1 ppm max.   | < 0.1 ppm    |
| 31    | Zinc (Zn)                            | 0.1 ppm max.   | < 0.1 ppm    |

Denatured with 8-12 ppm Denatonium benzoate.  
Meet A.C.S. Specifications.

This is to certify the above batch has been tested and complies with this specification.

Ladaphan

Chemist

Achan

Technical Manager