

Certificate of Analysis

Product	Ethanol	Batch No.	: 21 05 0268
Grade	HPLC	Manufacturing date	: 23/05/2021
Code No.	LC1380	Best before	: 05/2025

Items	Descriptions	Specifications	Test Results
1	Assay (by GC.)	99.7% min.	99.7%
2	Appearance	Clear and colorless liquid	Clear and colorless liquid
3	Identity (IR)	Passes test	Passes test
4	Color (APHA)	10 max.	< 10
5	Color of solution	Passes test	Passes test
6	Clarity of solution	Passes test	Passes test
7	Water (by Coulometry)	0.1% max.	0.052%
8	Acid or alkalinity	30 ppm max.	< 30 ppm
9	Acidity (mEq./g.)	0.0002 max.	< 0.0002
10	Alkalinity (mEq./g.)	0.0002 max.	< 0.0002
11	Residue on Evaporation	0.0005% max.	< 0.0005%
12	Aldehydes (as Acetaldehyde)	0.001% max.	< 0.001%
13	Carbonyl compounds (as CO)	0.003% max.	< 0.003%
14	Acetone (GC.)	0.001% max.	< 0.001%
15	Ethylmethylketone (GC.)	0.02% max.	< 0.02%
16	Higher alcohols (GC.)	0.01% max.	< 0.01%
17	Isoamyl alcohol (GC.)	0.05% max.	< 0.05%
18	Methanol (GC.)	0.01% max.	< 0.01%
19	Propan-2-ol (GC.)	0.003% max.	< 0.003%
20	Acetaldehyde and Acetal	10 ppm max.	< 10 ppm
21	Benzene	2 ppm max.	< 2 ppm
22	Total of other impurities	300 ppm max.	< 300 ppm
23	Disregard limit	9 ppm max.	< 9 ppm
24	Fusel oil	Passes test	Passes test
25	Readily carbonizable substances	Passes test	Passes test
26	Solubility in water	Passes test	Passes test
27	Substances reducing permanganate	0.0002% max.	0.0002%
28	Chloride (Cl)	0.3 ppm max.	< 0.3 ppm
29	Nitrate (NO ₃)	0.3 ppm max.	< 0.3 ppm
30	Phosphate (PO ₄)	0.3 ppm max.	< 0.3 ppm
31	Sulfate (SO ₄)	0.3 ppm max.	< 0.3 ppm
32	Aluminium (Al)	0.5 ppm max.	< 0.5 ppm
33	Antimony (Sb)	0.02 ppm max.	< 0.02 ppm
34	Arsenic (As)	0.02 ppm max.	< 0.02 ppm
35	Barium (Ba)	0.1 ppm max.	< 0.1 ppm
36	Beryllium (Be)	0.02 ppm max.	< 0.02 ppm
37	Bismuth (Bi)	0.02 ppm max.	< 0.02 ppm
38	Cadmium (Cd)	0.05 ppm max.	< 0.05 ppm
39	Calcium (Ca)	0.5 ppm max.	< 0.5 ppm

Certificate of Analysis

Product	Ethanol	Batch No.	: 21 05 0268
Grade	HPLC	Manufacturing date	: 23/05/2021
Code No.	LC1380	Best before	: 05/2025

Items	Descriptions		Specifications		Test Results
40	Chromium (Cr)	0.02	ppm max.	< 0.02	ppm
41	Copper (Cu)	0.02	ppm max.	< 0.02	ppm
42	Gallium (Ga)	0.02	ppm max.	< 0.02	ppm
43	Gold (Au)	0.02	ppm max.	< 0.02	ppm
44	Indium (In)	0.02	ppm max.	< 0.02	ppm
45	Iron (Fe)	0.1	ppm max.	< 0.1	ppm
46	Platinum (Pt)	0.02	ppm max.	< 0.02	ppm
47	Lead (Pb)	0.1	ppm max.	< 0.1	ppm
48	Lithium (Li)	0.02	ppm max.	< 0.02	ppm
49	Magnesium (Mg)	0.1	ppm max.	< 0.1	ppm
50	Manganese (Mn)	0.02	ppm max.	< 0.02	ppm
51	Molybdenum (Mo)	0.02	ppm max.	< 0.02	ppm
52	Nickel (Ni)	0.02	ppm max.	< 0.02	ppm
53	Silver (Ag)	0.02	ppm max.	< 0.02	ppm
54	Tin (Sn)	0.1	ppm max.	< 0.1	ppm
55	Titanium (Ti)	0.02	ppm max.	< 0.02	ppm
56	Thallium (Tl)	0.02	ppm max.	< 0.02	ppm
57	Vanadium (V)	0.02	ppm max.	< 0.02	ppm
58	Zinc (Zn)	0.1	ppm max.	< 0.1	ppm
59	Zirconium (Zr)	0.02	ppm max.	< 0.02	ppm
60	UV Absorbance				
	270 - 340 nm	0.10	AU max.	0.002	AU
	250 - 260 nm	0.30	AU max.	0.025	AU
	240 nm	0.40	AU max.	0.048	AU

Denatured with Tert Butyl Alcohol less than 0.15% (v/v).
Conforms to ACS/BP/EP/USP/NF

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

Ladaphan
Chemist

Achon
Technical Manager