



HYDROFLUORIC ACID

CERTIFICATE OF ANALYSIS

PRODUCT NUMBER: S010501

LOT NUMBER: 5115123

RELEASE DATE: April, 2017

EXPIRY DATE: April, 2020

HF (47 - 51%): Properties

Molar Mass: 20.01g/mol

Density: 1.18 g/ml

Molarity: 29 moles/litre

Normality: 29 moles/litre

| Tests | Maximum Specification | Actual Value | Units |
|------------------|-----------------------|--------------|----------|
| Assay (HF, w/w): | 47 - 51% | 50% | % by w/w |
| Colour: | 10 | < 10 | APHA |

| Analyte | Maximum Specification | Actual Value (in ppb) | Analyte | Maximum Specification | Actual Value (in ppb) |
|-----------------|-----------------------|-----------------------|-------------------|-----------------------|-----------------------|
| Aluminum (Al) | 1 ppb | < 0.5 | Neodymium (Nd) | 0.1 ppb | < 0.1 |
| Antimony (Sb) | 0.2 ppb | < 0.1 | Nickel (Ni) | 0.5 ppb | < 0.1 |
| Arsenic (As) | 0.5 ppb | < 0.1 | Niobium (Nb) | 0.1 ppb | < 0.1 |
| Barium (Ba) | 0.1 ppb | < 0.1 | Palladium (Pd) | 0.2 ppb | < 0.2 |
| Beryllium (Be) | 0.1 ppb | < 0.1 | Platinum (Pt) | 0.2 ppb | < 0.2 |
| Bismuth (Bi) | 0.1 ppb | < 0.1 | Potassium (K) | 1 ppb | < 0.2 |
| Boron (B) | 1 ppb | < 0.5 | Praseodymium (Pr) | 0.1 ppb | < 0.1 |
| Cadmium (Cd) | 0.1 ppb | < 0.1 | Rhenium (Re) | 0.1 ppb | < 0.1 |
| Calcium (Ca) | 1 ppb | < 0.5 | Rhodium (Rh) | 0.1 ppb | < 0.1 |
| Cerium (Ce) | 0.1 ppb | < 0.1 | Rubidium (Rb) | 0.1 ppb | < 0.1 |
| Cesium (Cs) | 0.1 ppb | < 0.1 | Ruthenium (Ru) | 0.1 ppb | < 0.1 |
| Chromium (Cr) | 1 ppb | < 0.1 | Samarium (Sm) | 0.1 ppb | < 0.1 |
| Cobalt (Co) | 0.1 ppb | < 0.1 | Scandium (Sc) | 0.1 ppb | < 0.1 |
| Copper (Cu) | 0.5 ppb | < 0.1 | Selenium (Se) | 1 ppb | < 0.1 |
| Dysprosium (Dy) | 0.1 ppb | < 0.1 | Silver (Ag) | 0.5 ppb | < 0.1 |
| Erbium (Er) | 0.1 ppb | < 0.1 | Sodium (Na) | 1 ppb | < 0.5 |
| Europium (Eu) | 0.1 ppb | < 0.1 | Strontium (Sr) | 0.1 ppb | < 0.1 |
| Gadolinium (Gd) | 0.1 ppb | < 0.1 | Tantalum (Ta) | Information Only | < 0.1 |
| Gallium (Ga) | 0.1 ppb | < 0.1 | Tellurium (Te) | 0.1 ppb | < 0.1 |
| Germanium (Ge) | 0.1 ppb | < 0.1 | Terbium (Tb) | 0.1 ppb | < 0.1 |
| Gold (Au) | 0.2 ppb | < 0.2 | Thallium (Tl) | 0.1 ppb | < 0.1 |
| Hafnium (Hf) | 0.1 ppb | < 0.1 | Thorium (Th) | 0.1 ppb | < 0.1 |
| Holmium (Ho) | 0.1 ppb | < 0.1 | Thulium (Tm) | 0.1 ppb | < 0.1 |
| Indium (In) | 0.1 ppb | < 0.1 | Tin (Sn) | 0.5 ppb | < 0.1 |
| Iron (Fe) | 1 ppb | < 0.5 | Titanium (Ti) | 1 ppb | < 0.5 |
| Lanthanum (La) | 0.1 ppb | < 0.1 | Tungsten (W) | 0.5 ppb | < 0.5 |
| Lead (Pb) | 0.1 ppb | < 0.1 | Uranium (U) | 0.1 ppb | < 0.1 |
| Lithium (Li) | 0.1 ppb | < 0.1 | Vanadium (V) | 0.1 ppb | < 0.1 |
| Lutetium (Lu) | 0.1 ppb | < 0.1 | Ytterbium (Yb) | 0.1 ppb | < 0.1 |
| Magnesium (Mg) | 1 ppb | < 0.2 | Yttrium (Y) | 0.1 ppb | < 0.1 |
| Manganese (Mn) | 0.1 ppb | < 0.1 | Zinc (Zn) | 1 ppb | < 0.1 |
| Mercury (Hg) | 1 ppb | < 0.5 | Zirconium (Zr) | 0.1 ppb | < 0.1 |
| Molybdenum (Mo) | 0.1 ppb | < 0.1 | | | |

| Analyte | Maximum Specification | Actual Value (in ppm) | Analyte | Maximum Specification | Actual Value (in ppm) |
|-----------------------------|-----------------------|-----------------------|--------------------------------------|-----------------------|-----------------------|
| Chloride (Cl ⁻) | 4 ppm | < 4 | Total Sulphur (S) | 0.1 ppm | < 0.1 |
| Total Phosphorus (P) | 0.05 ppm | < 0.05 | Fluosilicic Acid (SiF ₆) | 20 ppm | < 20 |

Element concentrations are at the point of bottling. Concentrations of some elements in particular, Ca, Fe, Zn & Al will increase due to storage in polyethylene bottles.

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