Hydrogen Water Testing & Certification

Laboratory Report

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Report # H2A-240603-3

Introduction

This report summarizes the analysis of the Echo® H2 Machine manufactured by Echo Technologies, LLC, Pleasant Grove, UT, USA. The product was tested for dissolved hydrogen concentration.

Product Description

Echo® H2 Hydrogen Water Machine; Model # - Echo® H2 Hydrogen Water Machine ; Serial # - A1EHB3L0183

The product was received for testing on 2/9/2024

Methods

Dissolved hydrogen concentration (H_2)

Test water: ASTM Type I ultrapure ChemWorld, Salt Lake City, UT, USA; temperature: 25ºC ± 1.5º; ec: 0 us/cm; pH: 6.2
Laboratory elevation: 864 meters (0.91 atm); all measurements adjusted to SATP

Test Equipment: SRI 8610C gas chromatograph, Torrance, CA USA
Column: Hayesep-D 6M packed column temp: 60°; Detector: Tungsten-Rhenium TCD
Carrier gas: N_2, 20 PSI, 20 mL/min; Calibration: Performed on the day of testing using third-party calibration gas
Centrifuge: H2 Analytics, 2400 RPM
Water Pump: FloJet 5000

Test Method: Static headspace analysis

Prior to testing, the machine was connected to a distilled water supply and run in the H2 water mode for 10 consecutive minutes to ensure that the membrane was properly wetted and that the sediment was flushed from the internal filter. On the day of testing, the GC was permitted to warm up for two hours and then calibrated. For each test, the machine was run in the H2 water mode for 60 seconds after which a one-liter beaker was filled. A 1000 uL sample was immediately taken from the beaker using a gas-tight syringe. The sample was immediately injected into the headspace vial and placed on a centrifuge for three minutes to permit the dissolved H_2 to equilibrate with the headspace. After equilibration, a 1000 uL sample of the headspace was taken using a gas-tight syringe and injected into the gas chromatograph for analysis. Three tests were conducted for each cycle time, the results recorded, and the mean and standard deviations calculated. Based on the dissolved H_2 concentration and the water volume, the dose of H_2 delivered when drinking one liter was calculated and reported in milligrams.

Results

Dissolved H_2: Mean - 1.43 mg/L (ppm); SD - 0.07; Dose: 1.43 mg

Approved By: RSSharpe Randy Sharpe, Director of Testing

Report Date: 6/3/2024