H2 Analytics
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Henderson, NV 89052
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Report#: H2AR-240821-1

Laboratory Report

Introduction

This report summarizes the testing of a hydrogen water bottle distributed by Piurify LLC, Wilmington, DE, USA. The product is a battery-operated portable bottle that produces hydrogen water using electrolysis. The bottle is a sealed system that allows the internal gas pressure to build resulting in a higher concentration of molecular hydrogen gas (H_2) than can be attained under conditions of normal atmospheric pressure. This testing was requested by Piurify LLC. The bottle was received for testing on 8/19/2024 in a factory-new box and included a USB-C power cable and user manual.

Tests requested: Dissolved H_2 for the following cycle times: 5-min & 10-min

Product Description

Name: H2 Water Bottle Brand: Piurify Model #: Hydrogenator™

The bottle is a battery-operated device that uses electrolysis to produce and infuse hydrogen gas (H_2) into the drinking water. It has a single-walled reservoir with a volume of ≈ 280 mL and is sold in a variety of colors. Because the design allows for pressure to build during electrolysis, it is capable of dissolving hydrogen at concentrations higher than the maximum concentration at sea level, 1.57 mg/L (1570 ppb). To prevent an unsafe buildup of pressure, the cap includes an internal pressure relief valve. The unit has two pre-programmed cycle times, 5 minutes (by touching the power button once) and 10 minutes (by touching the power button a second time). The bottle has a rechargeable lithium-ion battery to permit portable use and includes a USB-C charging cable and a cannula with an adapter for inhalation of H_2. Because there are currently no performance standards for H_2 inhalation devices, the inhalation adapter was not tested. The front panel digital display shows the battery level and the amount of time remaining in the selected cycle. Because the design utilizes a proton-exchange membrane (PEM) sandwiched between two platinum electrodes, this unit will work with any type of drinking water, including distilled, regardless of the mineral content.

Materials & Methods

Water: generic, distilled, pH 6.46 ± 0.5; starting temperature 24.8°C ± 1.5 EC: 2 us/cm
Laboratory elevation: 883 meters (0.90 atm); all measurements adjusted to sea level where applicable.
Gas Chromatograph: SRI 8610C; column: Hayesep-D 6M; column/oven temp: 60°C; detector: TCD; carrier gas: N_2
GC Test Method: Static headspace analysis (HS-GC)
Calibration (H_2): 3-point (1.57 / 3.37 / 6.74 mg/L), performed on day of testing using H_2/N_2 calibration gas
pH meter: Oakton pH 6+ w/temp probe, three-point calibration (4.0, 7.0, 10.0) performed on the day of testing; digital stopwatch, generic software app
The battery was charged and the membrane wetted before testing using warm water. Tests were conducted with the USB charging cable connected.

For each dissolved H_2 test, the bottle was filled with distilled water to the “Max” fill line, the cap was securely tightened, and the power button was pressed either once to start the 5-minute cycle, or twice to start the 10-minute cycle. After each cycle was completed, the cap was removed, and a 1000 uL test sample was immediately drawn from the bottle using a gas-tight syringe and injected into the headspace vial. The test sample was then placed into a 2400 rpm centrifuge for 3 minutes to permit the dissolved H_2 in the water sample to equilibrate with the headspace. After equilibration, a 1000 uL aliquot of the headspace was drawn using a gas-tight syringe and injected into the GC for analysis. After completing three tests, the results were recorded, and the mean and standard deviations of the three dissolved H_2 concentrations were calculated. Based on the mean dissolved H_2 concentration and the volume of water in the bottle, the average amount of H_2 that would be ingested when drinking the entire contents was calculated and reported as “H_2 Ingested Dose”. Attachment 1 includes a sample chromatogram (10-minute cycle) and a picture of the bottle.

Results

Mean dissolved **H_2, 5-min**: 2.58 mg/L (**2550 ppb**); SD: 0.03; H_2 Ingested Dose: 0.72 mg
Mean dissolved **H_2, 10-min**: 4.09 mg/L (**4090 ppb**); SD: 0.17 H_2 Ingested Dose: 1.15 mg

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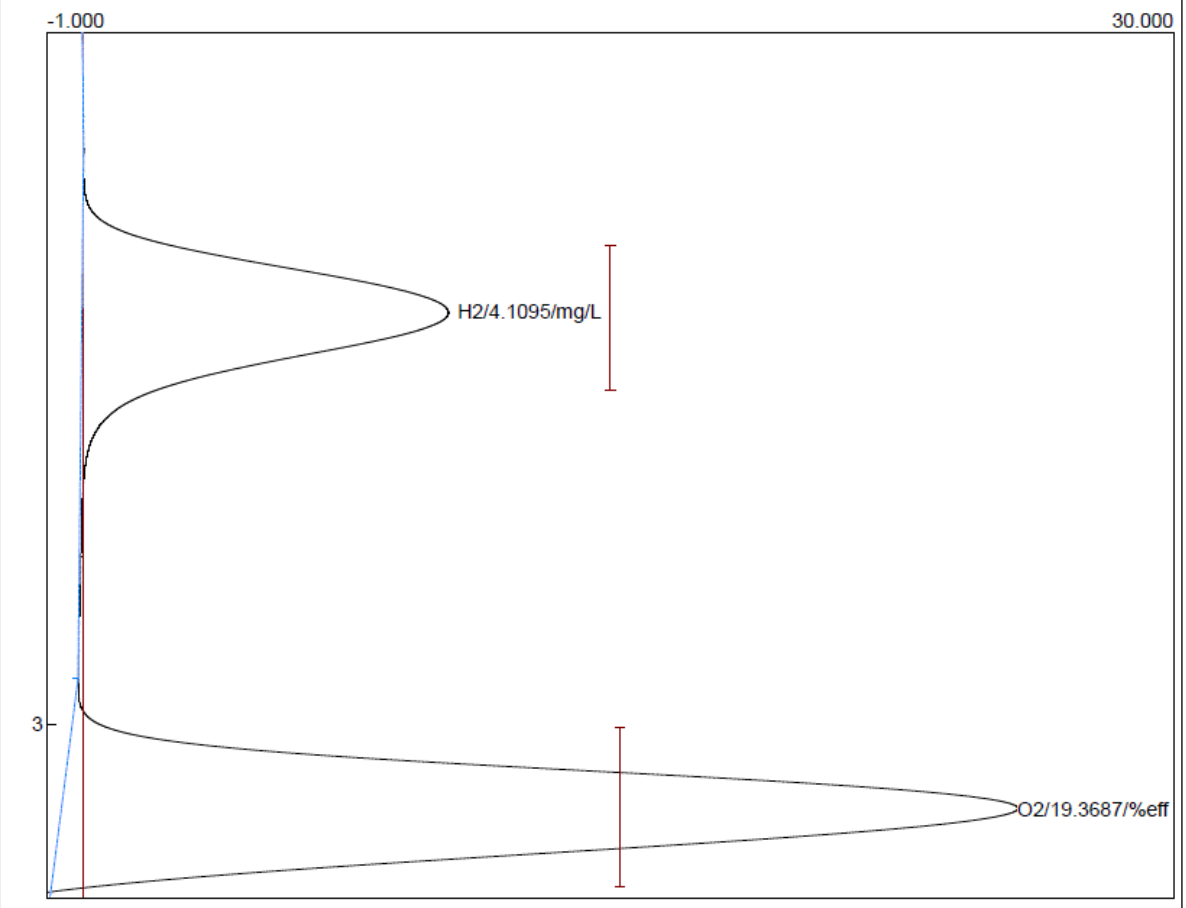
RSSharpe

Approved By: Randy Sharpe Title: Director of Testing Report Date: 8/21/2024

attachment 1

Lab name: H2 Analytics
Client: Piurify
Client ID: H2A-1041
Collected: 8-21-24
Holding time: 180 sec
Method: Static HS Analysis (GCHS)
Lab ID: HNV
Description: TCD CH1 60C
Column: Hayesep-D 6 meters 60C
Carrier: N2 @ 20psi (20 mL/min)
Components: H2Gas.cpt
Integration: Peak sens=90.0 Base sens=90.0 Min area= 10.00 Standard= 1.000 Sample= 1.000 Tangents=off
ɔntrol filename: E:\Peak498Win10\Piurify.CON
Data file: Piurify06. ()
Sample: Hydrogenator
Operator: rs
Comments: DH2 Test Run

H2 Analytics
Hydrogen Water Testing & Certification



Component	Retention	Area	External	Units
H2	2.403	92.9270	4.1095	mg/L
O2	3.123	220.0712	19.3687	%eff

Sample Chromatogram (10-min cycle)



Hydrogenator™ Hydrogen Water Bottle

Hydrogen Water Testing & Certification

Certificate of Compliance

Issued To: Piurify LLC
3422 Old Capitol Trail #842
Wilmington, DE, 19808

Registration #: 24-0916-1-PB
Issued: 9/16/2024
Expires: 9/16/2027

Product Name: Piurify H2 Water Bottle
Product Class: Electrolytic Bottle
Brand/Model: Hydrogenator™

H2 Analytics certifies that the product listed above was tested in accordance with the following standards and methods and was found to be in compliance:

- International Hydrogen Standards Association
- US EPA (SDWA) EPA 200.7, 200.8, 300.0, 6010B

This product is available in a variety of colors
The inhalation adapter was not tested (no IHSA test standards exist for H_2 inhalation)

This certificate is issued under the authority of the International Hydrogen Standards Association.

Randy S. Sharpe
Director of Testing, H2 Analytics
www.h2-analytics.com
9/16/2024

This certificate applies only to the listed product with installed filters as listed above and does not apply to products with similar names or model numbers unless specifically listed. Certificate is subject to revocation at any time and consumers are advised to confirm certificate status with H2 Analytics at h2-analytics.com. The recipient of this certificate is authorized to use the H2 Analytics seal and Certificate of Compliance in accordance with the H2 Analytics certification agreement. Except as it appears in this document, no other use of the IHSA logo is authorized.

Test Report

No.: CANEC23009501802 **Date:** Nov 16, 2023

Client Name: PLURIFY LLC.

Client Address: 3422 old Capitol Trail #842,Wilmington,DE,19808,United States

Sample Name: Hydrogenator® Bottle

Model No.: Hydrogenator® Bottle

The above sample(s) and information were provided by the client.

SGS Job No.: CP23-026176

Sample Receiving Date: Sep 07, 2023

Testing Period: Sep 07, 2023 ~ Nov 14, 2023

Test Requested: Select test(s) as requested by the client.

Test Method(s): Please refer to next page(s).

Test Result(s): Please refer to next page(s).

	Test Requirement	Conclusion
1	American Food and Drug Administration (US FDA) Compliance Policy Guides Sec.545.500 - Leachable Lead	Pass
2	US FDA 21 CFR 175.300 - Total extractives	Pass
3	US FDA 21 CFR 177.1580 - Total Extractives	Pass
4	US FDA 21 CFR 177.2600 - Total Extractives	Pass

Signed for and on behalf of
SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

Ivy Ren

Ivy Ren
Approved Signatory

scan to see the report

B0C6AF8C

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Test Result(s):

Test Part Description:

SN ID	Sample No.	SGS Sample ID	Description	Material (claimed by the client)
SN1	A2	CAN23-0095018-0001.C002	White plastic(semi-product)	PC
SN2	A3	CAN23-0095018-0001.C003	Colorless translucent silicone(A3)(semi-product)	Silicone
SN3	A4	CAN23-0095018-0001.C004	Colorless translucent silicone(A4)(semi-product)	Silicone
SN4	A5	CAN23-0095018-0001.C005	Black plastic(semi-product)	Plastic
SN5	A6	CAN23-0095018-0001.C006	Silvery white plated metal(semi-product)	Metal+Plating
SN6	A7	CAN23-0095018-0001.C007	Colorless transparent plastic(semi-product)	PC
SN7	A8	CAN23-0095018-0001.C008	Black sheet	Fluoro rubber
SN8	A9	CAN23-0095018-0001.C009	Colorless translucent silicone(A9)(semi-product)	Silicone

Remarks:

(1) mg/dm^2 = milligram per square decimeter
$mg/inch^2$ = milligram per square inches
$\mu g/cm^2$ = microgram per square centimeter
mg/L = milligram per litre
mg/kg = milligram per kilogram

(2) ℃ = degree Celsius
℉ = degree Fahrenheit

(3) <= less than

(4) RL = Reporting Limit

(5) ND = Not Detected (< RL).

American Food and Drug Administration (US FDA) Compliance Policy Guides Sec.545.500 - Leachable Lead

Test Method: With reference to AOAC 18th Ed. (2005) Section 973.32, analysis was performed by AAS/ICP-OES.

A6 Pass

	Extract volume (mL)	Surface Area (dm^2)
1	53	0.34
2	53	0.34
3	53	0.34
4	53	0.34
5	53	0.34
6	53	0.34

	Leachable Lead (μg/mL)
1	<0.05

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	Leachable Lead (µg/mL)
2	<0.05
3	<0.05
4	<0.05
5	<0.05
6	<0.05
Avg	<0.05
Limit	7

US FDA 21 CFR 175.300 - Total extractives

Test Method: With reference to US FDA 21 CFR 175.300.

Simulant used	Test Condition	Limit	Unit(s)	RL	A5	Comment
Distilled water	120°F, 24 hrs	18	mg/inch²	0.1	ND	Pass

Notes:
(1) Limit = Reference limit.

US FDA 21 CFR 177.1580 - Total Extractives

Test Method: With reference to US FDA 21 CFR 177.1580.

Simulant used	Test Condition	Limit	Unit(s)	RL	A2	Comment
50% Ethanol	Reflux Temperature, 6 hrs	0.15	%(w/w)	0.02	ND	Pass
n-Heptane	Reflux Temperature, 6 hrs	0.15	%(w/w)	0.02	0.10	Pass
Distilled water	Reflux Temperature, 6 hrs	0.15	%(w/w)	0.02	ND	Pass

Simulant used	Test Condition	Limit	Unit(s)	RL	A7	Comment
50% Ethanol	Reflux Temperature, 6 hrs	0.15	%(w/w)	0.02	0.02	Pass
n-Heptane	Reflux Temperature, 6 hrs	0.15	%(w/w)	0.02	0.02	Pass
Distilled water	Reflux Temperature, 6 hrs	0.15	%(w/w)	0.02	0.06	Pass

US FDA 21 CFR 177.2600 - Total Extractives

Test Method: With reference to US FDA 21 CFR 177.2600.

Simulant used	Test Condition	Limit	Unit(s)	RL	A3	Comment
Distilled water	Reflux Temperature 7.0 hrs	20	mg/inch²	0.5	ND	Pass

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Simulant used	Test Condition	Limit	Unit(s)	RL	A3	Comment
Distilled water Succeeding extraction	Reflux Temperature 2.0 hrs	1	mg/inch²	0.5	ND	Pass

Simulant used	Test Condition	Limit	Unit(s)	RL	A4	Comment
Distilled water	Reflux Temperature 7.0 hrs	20	mg/inch²	0.5	ND	Pass
Distilled water Succeeding extraction	Reflux Temperature 2.0 hrs	1	mg/inch²	0.5	ND	Pass

Simulant used	Test Condition	Limit	Unit(s)	RL	A8	Comment
Distilled water	Reflux Temperature 7.0 hrs	20	mg/inch²	0.5	0.6	Pass
Distilled water Succeeding extraction	Reflux Temperature 2.0 hrs	1	mg/inch²	0.5	ND	Pass

Simulant used	Test Condition	Limit	Unit(s)	RL	A9	Comment
Distilled water	Reflux Temperature 7.0 hrs	20	mg/inch²	0.5	0.6	Pass
Distilled water Succeeding extraction	Reflux Temperature 2.0 hrs	1	mg/inch²	0.5	ND	Pass

Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (*w*=0) stated in ILAC-G8:09/2019.

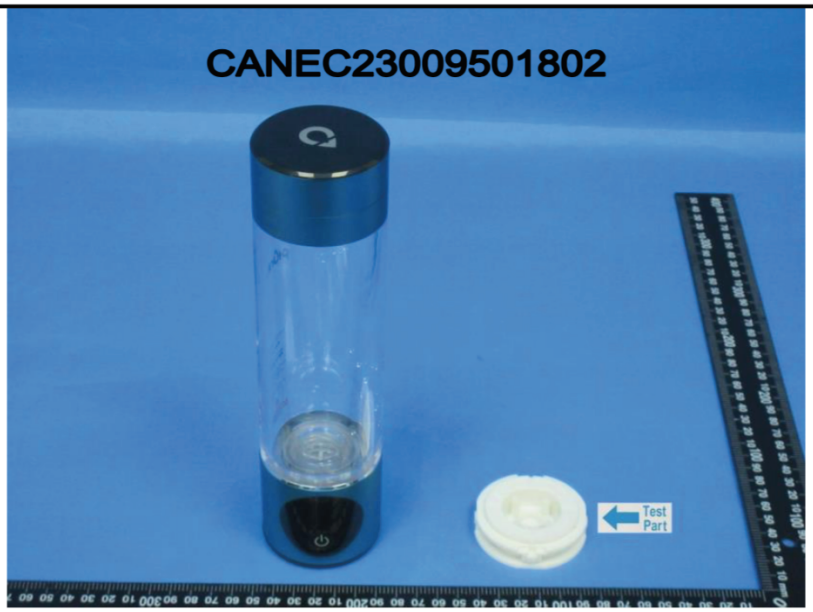
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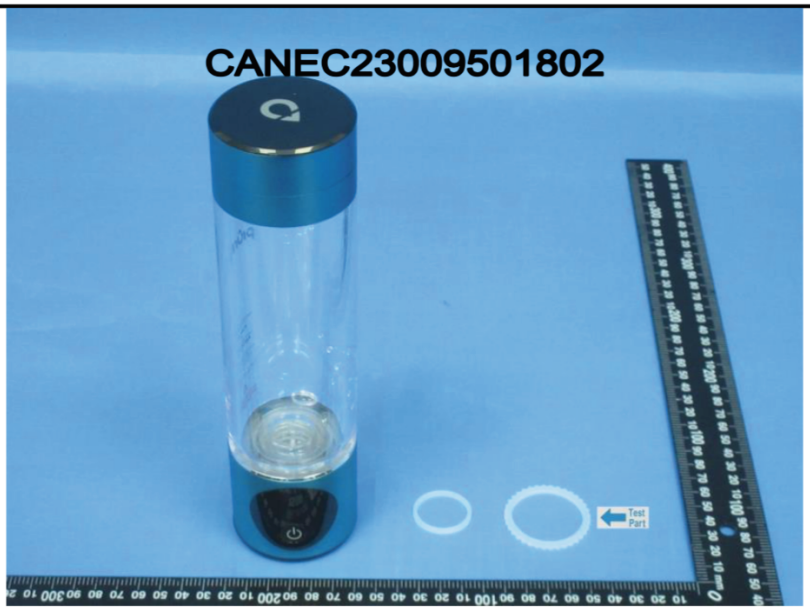
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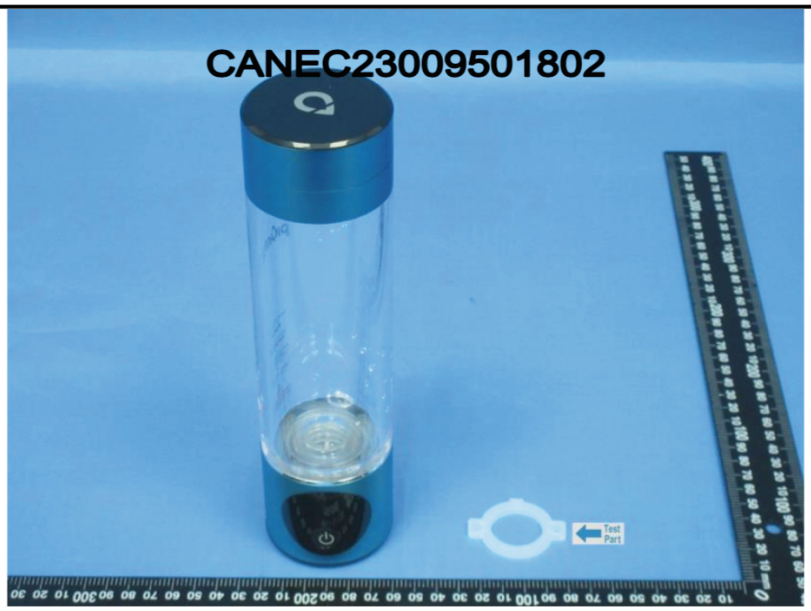
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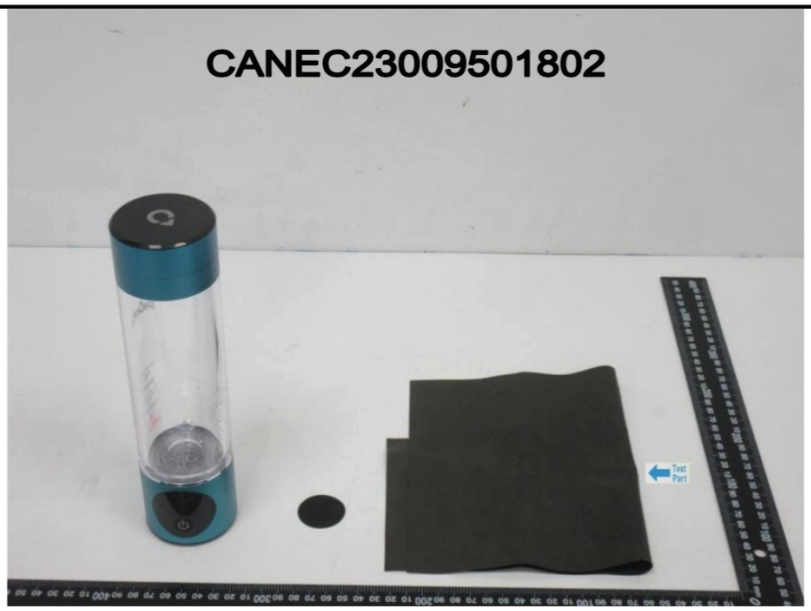
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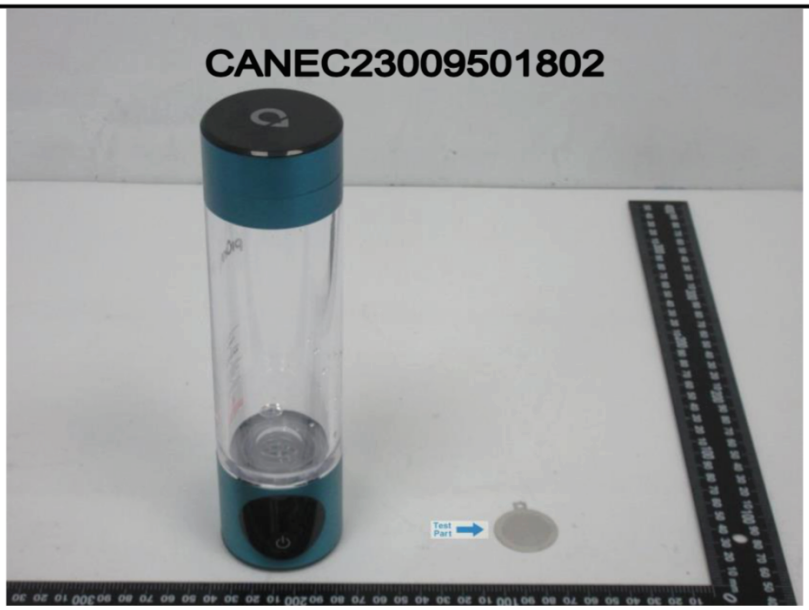


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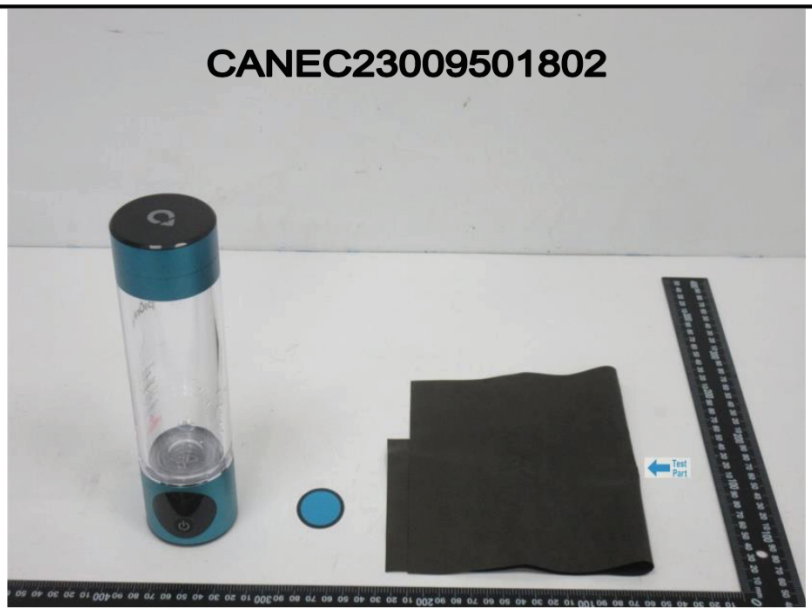


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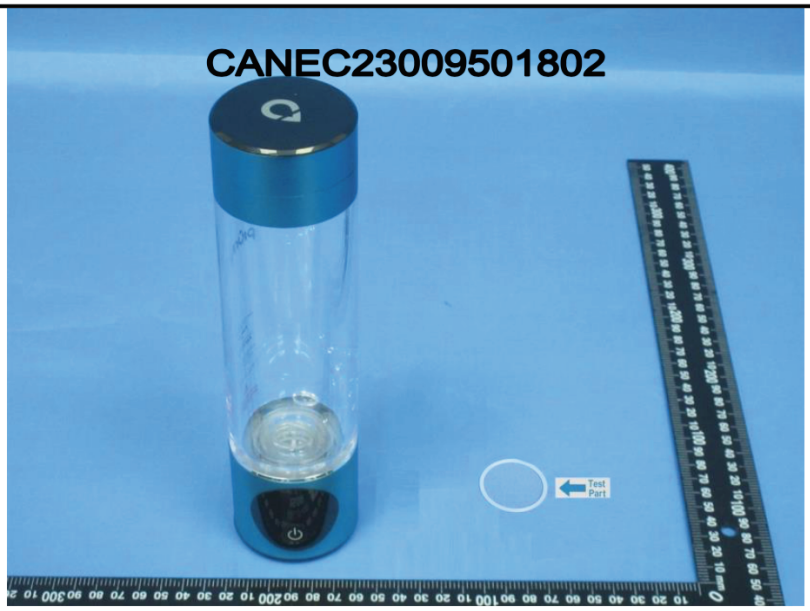
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