

QUANTA Flash® SARS-CoV-2 IgG



Reagents

For Emergency Use Authorization Only

For *In Vitro* Diagnostic Use Only

The results of this semiquantitative test should not be interpreted as an indication or degree of immunity or protection from infection.

REF

701370

Rx Only

Intended Use

The QUANTA Flash SARS-CoV-2 IgG is a chemiluminescent immunoassay intended for the qualitative and semi-quantitative detection of IgG antibodies to SARS-CoV-2 in human serum and sodium citrate plasma. The QUANTA Flash SARS-CoV-2 IgG is intended for use as an aid in identifying individuals with an adaptive immune response to SARS-CoV-2, indicating recent or prior infection. The QUANTA Flash SARS-CoV-2 IgG should not be used to diagnose or exclude acute SARS-CoV-2 infection. At this time, it is unknown for how long antibodies persist following infection and if the presence of antibodies confers protective immunity. Testing is limited to laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C 263a, that meet requirements to perform moderate or high complexity tests.

Results are for the detection of SARS CoV-2 IgG antibodies. IgG antibodies to SARS-CoV-2 are generally detectable in blood several days after initial infection, although the duration of time antibodies are present post-infection is not well characterized. Individuals may have detectable virus present for several weeks following seroconversion.

Laboratories within the United States and its territories are required to report all results to the appropriate public health authorities.

The sensitivity of the QUANTA Flash SARS-CoV-2 IgG early after infection is unknown. Negative results do not preclude acute SARS-CoV-2 infection. If acute infection is suspected, direct testing for SARS-CoV-2 is necessary.

False positive results for the QUANTA Flash SARS-CoV-2 IgG may occur due to cross-reactivity from pre-existing antibodies or other possible causes.

Samples should only be tested from individuals that are 15 days or more post symptom onset.

The QUANTA Flash SARS-CoV-2 IgG assay is only for use under the Food and Drug Administration's Emergency Use Authorization.

Background

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). First identified in December 2019 in Wuhan, Hubei, China, SARS-CoV-2 is one of coronaviruses that can cause respiratory disease in humans. While 4 of these viruses generally cause mild disease, SARS-CoV2, SARS-CoV (which caused an outbreak of severe acute respiratory syndrome in 2002-2003), and the Middle East Respiratory Syndrome CoV (MERS) are associated with severe disease.¹ As of March 30th 2021, more than 128.1 million cases have been reported across 188 countries and territories. While most people have recovered, over 2.8 million have died (<https://coronavirus.jhu.edu>).²

Common symptoms include fever, cough, fatigue, shortness of breath, and loss of smell.^{3,4} Increased risk of more severe disease is associated with increased age and the presence of comorbidities. About

80% of cases result in mild symptoms, about 15% may require hospitalization, and about 5% are classified critical, possibly precipitated by “cytokine storm”, resulting in acute respiratory distress syndrome (ARDS), multi-organ failure, and septic shock.^{3,4,5}

The time from exposure to onset of symptoms is typically around five days but may range from two to fourteen days.⁶ Treatment for COVID-19 is largely supportive, although multiple treatment options are evolving as understanding of the SARS-CoV-2 virus and COVID-19 disease natural history increase.

The QUANTA Flash SARS-CoV-2 IgG, unlike total antibody detection methods, detects IgG anti-SARS-CoV-2 antibodies only.

Principles of the Procedure

Nucleocapsid (NP) and spike (S) structural proteins of SARS-CoV-2 are used as antigens in the QUANTA Flash SARS-CoV-2 IgG assay.

Antigen is coated onto paramagnetic beads, which are stored in the reagent cartridge under conditions that preserve the antigen in its reactive state. When the assay cartridge is ready to be used for the first time, the entire cartridge is inverted several times to thoroughly mix the reagents. The reagent cartridge is then loaded onto the BIO-FLASH instrument.

A patient serum or sodium-citrate plasma sample is loaded in the instrument and a small amount of sample, coupled beads, and assay buffer are combined into a disposable plastic cuvette, and mixed. This cuvette is incubated at 37°C. The beads are then magnetized and washed several times. Isoluminol conjugated anti-human IgG antibody is then added to the cuvette, and incubated at 37°C. Again, the beads are magnetized and washed repeatedly. The isoluminol conjugate produces a luminescent reaction when “Trigger” reagents are added to the cuvette.

The light produced from this reaction is measured as Relative Light Units (RLU) by the BIO-FLASH optical system. RLU values are proportional to the amount of bound isoluminol conjugate, which in turn is proportional to the relative amount of anti-SARS-CoV-2 IgG antibodies bound to the antigen on the beads.

The QUANTA Flash SARS-CoV-2 IgG utilizes a predefined lot specific Master Curve that is uploaded into the instrument through the reagent cartridge barcode. Based on the results obtained by running the calibrators, an instrument specific Working Curve is created, which is used by the software to calculate chemiluminescent units (CU) from the RLU value obtained for each sample.

Reagents

1. QUANTA Flash SARS-CoV-2 IgG reagent cartridge contains the following reagents for 100 determinations:
 - a. SARS-CoV-2 NP/S coated paramagnetic beads.
 - b. Assay buffer – colorless, containing protein stabilizers and preservatives.
 - c. Tracer IgG – Isoluminol labeled anti-human IgG antibody, containing buffer, protein stabilizers and preservative.

Warnings

1. This test is for use under Emergency Use Authorization only.
2. This test is for *In Vitro* Diagnostic Use only.
3. This test is for prescription use only.
4. This test has not been FDA cleared or approved but has been authorized for emergency use by FDA under an EUA for use by authorized laboratories;
5. This test has been authorized only for detecting IgG antibodies to SARS-CoV-2, not for any other viruses or pathogens; and
6. The emergency use of this test is only authorized for the duration of the declaration that

circumstances exist justifying the authorization of emergency use of in vitro diagnostics for detection and/or diagnosis of COVID-19 under Section 564(b)(1) of the Federal Food, Drug and Cosmetic Act, 21 U.S.C. § 360bbb-3(b)(1), unless the declaration is terminated or authorization is revoked sooner.

7. Sodium azide is used as a preservative. Sodium azide is a poison and may be toxic if ingested or absorbed through the skin or eyes. Sodium azide may react with lead or copper plumbing to form potentially explosive metal azides. Flush sinks, if used for reagent disposal, with large volumes of water to prevent azide build-up.
8. Use appropriate personal protective equipment while working with the reagents provided.
9. Spilled reagents should be cleaned up immediately. Observe all federal, state and local environmental regulations when disposing of wastes.

Precautions

1. This test is only for use in the BIO-FLASH® instrument.
2. Strict adherence to the mixing protocol is recommended.
3. Once opened, this reagent cartridge must be stored in the instrument's reagent carousel. Care should be taken to avoid spilling the reagents when the reagent cartridge is first placed into the instrument.
4. Chemical contamination of the reagents can result from improper cleaning or rinsing of the instrument. Residues from common laboratory chemicals such as formalin, bleach, ethanol, or detergent can cause interference in the assay. Be sure to follow the recommended cleaning procedure of the instrument as outlined in the BIO-FLASH operator's manual.
5. Reagents should not be used beyond their expiration date.

Storage Conditions

1. Store unopened reagent cartridges and resuspension buffer at 2-8°C. Do not freeze. Reagents are stable until the expiration date when stored and handled as directed.
2. Opened reagent cartridges should be stored onboard the instrument. The BIO-FLASH software monitors the onboard (in-use) expiration as well as the reagent lot expiration (shelf-life) of the reagent cartridge. The system will not allow use of a cartridge which has expired.

Specimen Collection, Preparation and Handling

This procedure should be performed on a serum or sodium citrate plasma specimen. Microbially contaminated, heat-treated, or specimens containing visible particulates should not be used. Grossly hemolyzed or icteric samples should not be used.

Following collection, samples should be separated from the clot. CLSI Document GP44-A4 recommends the following storage conditions for samples: 1) Store samples at room temperature no longer than 8 hours. 2) If the assay will not be completed within 8 hours, refrigerate the sample at 2-8°C. 3) If the assay will not be completed within 48 hours, or for shipment of the sample, freeze at -20°C or lower. Samples may be frozen once. Frozen specimens must be mixed well after thawing and prior to testing.

Procedure

Materials Provided

- 1 QUANTA Flash SARS-CoV-2 IgG Reagent Cartridge

Additional Materials Required and Provided Separately

BIO-FLASH instrument with operating computer (BIO-FLASH software version 2.4 and newer)

BIO-FLASH System Rinse (Part Number: 3000-8205)

BIO-FLASH Triggers (Part Number: 3000-8204)

BIO-FLASH Cuvettes (Part Number: 3000-8206)

QUANTA Flash SARS-CoV-2 IgG Calibrators (Part Number: 701371)

QUANTA Flash SARS-CoV-2 IgG Controls (Part Number: 701372)

Using the BIO-FLASH Chemiluminescent Analyzer

1. Refer to the operator's manual provided with the BIO-FLASH system for detailed operating instructions of the BIO-FLASH chemiluminescent analyzer and the BIO-FLASH software. For additional information and for troubleshooting problems with this assay, contact Inova Diagnostics, Inc. technical service at the address or telephone number found at the end of this Direction Insert.
2. To empty the solid waste container, open the waste drawer. Remove the solid waste container and dispose of the used cuvettes properly. Replace the solid waste container, close the waste drawer, and click **Yes** in the **Empty Waste Drawer** window.
3. To replace the triggers, click the **Bulks Inventory F9** button (upper right).
 - a. In the **Inventory – Bulks** screen, click the **Triggers** button on the left. A new window will pop up titled **Add Triggers – Remove old bottles**.
 - b. Open and remove the waste drawer on the BIO-FLASH instrument. Dispose of any cuvettes in the dry waste drawer. Click **Yes** on the **Empty Waste Drawer** window. Remove the trigger bottles from their holders and click the **Next** button. Unscrew the old trigger bottles from their caps and replace with new triggers. Be sure to do them one at a time, and match the color-coded caps (white to white and red to red).
 - c. Follow the instructions in the new window **Add Triggers – Add Trigger 2 bottle**. Once the barcode has been accepted, place Trigger 2 into the color-coded white holder. Click **Next**.
 - d. Follow the instructions in the window **Add Triggers – Add Trigger 1 bottle**. Once the barcode has been accepted, place Trigger 1 into the color-coded red holder. Click **Finish**. Replace and close the waste drawer.
4. To replace the System Rinse container, click the **Bulks Inventory F9** button (upper right corner). In the **Inventory – Bulks** screen, click the **Sys. Rinse** button. In the new window **Add System Rinse – Remove bottles**, click **Next**. Follow the instructions in the new window **Add System Rinse – Add bottle**. Once the barcode has been accepted, click **Finish** if necessary.
5. To empty the Fluid Waste Container, from the **Inventory – Bulks** screen, click the **Fluid Waste** button. Remove and dispose of the fluid waste. Click **Next**. Once the empty bottle has been replaced, click **Finish**.

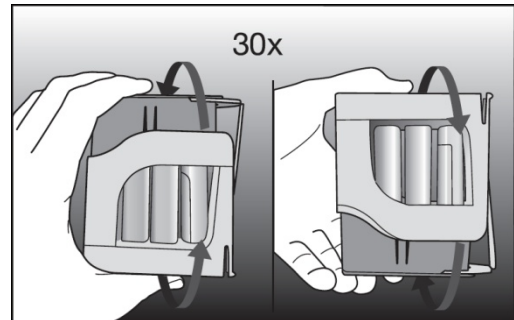
Method

Reagent Cartridge Preparation

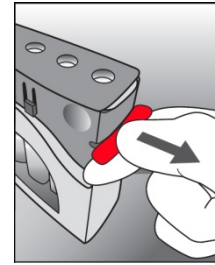
The first time the reagent cartridge is to be used, the following steps must be followed to accurately install the cartridge onto the BIO-FLASH instrument. Note: Do not use the reagent cartridge if any signs of damage are observed.

QUANTA Flash SARS-CoV-2 IgG Reagent Cartridge: Microparticles settle during shipment and storage and require mixing to resuspend.

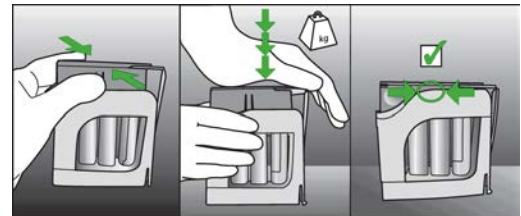
1. The first time that the cartridge is used, gently invert the cartridge 30 times, avoiding the formation of foam. Check for the complete resuspension of the microparticles. If the microparticles are not totally resuspended continue to invert the cartridge until the microparticles have been completely resuspended. If the microparticles do not resuspend, DO NOT USE CARTRIDGE.



2. Once the microparticles have been resuspended, place the reagent cartridge on a solid surface to remove the red pull-tab. Hold the reagent cartridge in place with one hand. With your other hand, firmly grasp the red pull-tab on the back of the reagent cartridge and pull it out completely.



3. Press the two tabs on the sides of the piercing cap (grey part) and apply pressure to the top portion of the reagent cartridge until it snaps down into a locked position. The tabs should no longer be visible. DO NOT INVERT THE OPEN CARTRIDGE.



4. Carefully place the reagent cartridge into any open slot on the reagent carousel of the BIO-FLASH instrument. Once the cartridge is placed into the reagent carousel, the instrument performs additional periodic mixing of the beads.

Assay Calibration

1. Each new lot of reagent cartridge must be calibrated prior to first time use. The software will not allow a new lot to be used until it is calibrated.
2. Refer to the **QUANTA Flash® SARS-CoV-2 IgG Calibrators 701371** Direction Insert for detailed instructions of how to calibrate the reagent cartridge.
3. Once the calibration is validated, the reagent cartridge lot on which the calibration was performed is ready for use.

Programming and Running Samples

1. Press the **Worklist** button at the top of the screen and select the **Racks** tab at the bottom.
2. Select the sample rack to be used by highlighting the rack on the screen or by scanning its barcode with the handheld barcode reader. Scan or type in the sample name, select the sample type, container type (tube/cup) and select SARSCoV2IgG from the assay panel. Repeat these steps for all samples.
3. Load the samples into the selected positions in the sample rack, and load the rack into the sample carousel of the instrument.
4. If all required materials are onboard the instrument, the start icon will be available, in green, at the top of the screen. Press the **Start F4** icon to begin the run.

Quality Control

The QUANTA Flash SARS-CoV-2 IgG Controls (sold separately - Inova Item Number 701372) contains both SARS-CoV-2 IgG Positive and Negative Controls. Refer to the **QUANTA Flash® SARS-CoV-2 IgG Controls 701372** Direction Insert for detailed instructions on how to input all required information of each control into the software, as well as how to run the controls. Controls are recommended to be run once each day the assay is used; however, users should also consider national/local regulatory requirements.

Calculation of Results

A Master Curve is created at Inova for each new lot of the QUANTA Flash SARS-CoV-2 IgG assay. The parameters of the curve are encoded in the barcode of each reagent cartridge. During calibration, an instrument specific working curve is created automatically by the system based on the Master Curve, and is used to convert the RLU values to CU. The IgG antibody reactivity to SARS-CoV-2 can then be classified according to the table below.

<u>Reactivity</u>	<u>CU</u>
Negative	<20
Positive	≥20

Reactivity in CU is directly related to the titer of the IgG antibody in the patient sample. Increases and decreases in patient IgG antibody concentrations will be reflected in a corresponding rise or fall in CU, which is proportional to the amount of antibody.

The analytical measuring range (AMR) of the assay is 2.3-450.0 CU. If a patient result is less than 2.3 CU, the BIO-FLASH system will report it as "<2.3 CU". Since this is less than 20 CU, it is considered a negative result. Numeric results below 20 CU should not be reported outside of the laboratory. If a patient result is greater than 450.0 CU, the BIO-FLASH system will report it as ">450.0 CU". This is considered a positive result. The BIO-FLASH software has an Auto-rerun option available. If this option is selected, the instrument will automatically rerun any sample that has a result of >450CU after additional 10-fold dilution, thereby bringing the measured value within the AM. The final result will be calculated by the software by taking into account the additional dilution factor. As the highest value that can be measured is 450.0 CU, the highest value that can be reported is 4,500.0 CU.

Interpretation of Results

Assessment of QUANTA Flash SARS-CoV-2 IgG results should be performed after the positive and negative controls have been examined and determined to be valid and acceptable. If the controls are not valid, results should not be reported, and the samples should be retested.

Result Interpretation Table:

CU Value*	Result	Result Description
< 20	Negative	IgG antibodies to SARS-CoV-2 are NOT detected.
≥ 20	Positive	IgG antibodies to SARS-CoV-2 ARE detected, numeric value within the measuring range*

*Numeric results are reported for samples with CU values between 20CU and 4500 CU. Numeric results below 20 CU should not be reported outside of the laboratory. Results above 4500 CU are reported as >4500.

As indicated in the result interpretation table above, results below 20 CU are considered negative and results equal to or greater than 20 CU are considered positive.

It is suggested that the results reported by the laboratory should include the statement: “The following results were obtained with the Inova QUANTA Flash SARS-CoV-2 IgG chemiluminescent immunoassay. Values obtained with different manufacturers’ assay methods must not be used interchangeably.”

Limitations of the Procedure

1. This test should only be used for testing samples collected 15 days or more post symptom onset.
2. Results of this assay should be used in conjunction with clinical findings.
3. Failure to adequately mix the SARS-CoV-2 NP/S coated beads may yield lower values than if the beads are properly mixed.
4. The performance characteristics of this assay have not been established for matrices other than serum and citrated plasma.
5. Results obtained with this assay may not be used interchangeably with results obtained with different manufacturers’ test methods.
6. SARS-CoV-2 serology tests should not be used to diagnose acute COVID-19. An assay that directly detects the virus should be used to evaluate symptomatic individuals for acute COVID-19, particularly those who have been in contact with the virus.
7. Negative results do not rule out SARS-CoV-2 infection
8. The clinical applicability of semi-quantitative results is currently unknown and cannot be interpreted as an indication or degree of immunity, nor protection from infection, nor compared to other SARS-CoV-2 antibody assays.
9. A positive result may not indicate previous SARS-CoV-2 infection. Consider other information including clinical history and local disease prevalence, in assessing the need for a second but different serology test to confirm an immune response.
10. It is unknown at this time if the presence of antibodies to SARS-CoV-2 confers immunity to infection.
11. This test should not be used for blood donor screening.
12. Samples containing high concentration of SARS-CoV2 IgG may be susceptible to IgM interference which may result in depressed results of up to -15.3%

13. The performance of this test has not been established in individuals that have received a COVID-19 vaccine. The clinical significance of a positive or negative antibody result following COVID-19 vaccination has not been established, and the result from this test should not be interpreted as an indication or degree of protection from infection after vaccination.
14. The performance of this test was established based on the evaluation of a limited number of clinical specimens collected between April, 2020 - June, 2020 in the USA. The clinical performance has not been established in all circulating variants but is anticipated to be reflective of the prevalent variants in circulation at the time and location of the clinical evaluation. Performance at the time of testing may vary depending on the variants circulating, including newly emerging strains of SARS-CoV-2 and their prevalence, which change over time.

Conditions of Authorization for the Laboratory

The QUANTA Flash SARS-CoV-2 IgG Letter of Authorization, along with the authorized Fact Sheet for Healthcare Providers, the authorized Fact Sheet for Recipients, and authorized labeling are available on the FDA website: <https://www.fda.gov/medical-devices/coronavirus-disease-2019-covid-19-emergency-use-authorizations-medical-devices/vitro-diagnostics-euas>

Authorized laboratories using the QUANTA Flash SARS-CoV-2 IgG (“your product” in the conditions below), must adhere to the Conditions of Authorization indicated in the Letter of Authorization as listed below

- A. Authorized laboratories* using your product must include with test result reports, all authorized Fact Sheets. Under exigent circumstances, other appropriate methods for disseminating these Fact Sheets may be used, which may include mass media.
- B. Authorized laboratories must use your product as outlined in the authorized labeling. Deviations from the authorized procedures, including the authorized instrument, authorized clinical specimen types, authorized control materials, authorized other ancillary reagents and authorized materials required to use your product are not permitted.
- C. Authorized laboratories that receive your product must notify the relevant public health authorities of their intent to run your product prior to initiating testing.
- D. Authorized laboratories using your product must have a process in place for reporting test results to healthcare providers and relevant public health authorities, as appropriate.
- E. Authorized laboratories must collect information on the performance of your product and report to DMD/OHT7-OIR/OPEQ/CDRH (via email: CDRH-EUA-Reporting@fda.hhs.gov) and to you (www.inovadx.com/support) any suspected occurrence of false positive or false negative results and significant deviations from the established performance characteristics of your product of which they become aware.
- F. All laboratory personnel using your product must be appropriately trained in immunoassay techniques and use appropriate laboratory and personal protective equipment when handling this kit, and use your product in accordance with the authorized labeling. All laboratory personnel using the assay must also be trained in and be familiar with the interpretation of results of the product.
- G. Inova Diagnostics, Inc., authorized distributor(s), and authorized laboratories using your product must ensure that any records associated with this EUA are maintained until otherwise notified by FDA. Such records will be made available to FDA for inspection upon request.

* The letter of authorization refers to, “Laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a, to perform moderate or high complexity tests” as “authorized laboratories.”

Cut-off (Reference Range)

The assay cut-off was determined using 139 samples from subjects consisting of 50 apparently healthy blood donors, 40 patients with infectious diseases and 49 patients suffering from different autoimmune diseases. All samples were collected before December 2019. In addition to the 139 subjects, five samples from COVID-19 patients were used to help setting the cut-off position. The cut-off was established based on the 99th percentile of the results obtained on the reference subjects. The cut-off was assigned a value of 20 CU.

Expected Values

The expected result for normal population is negative. IgG antibody levels to SARS-CoV-2 were analyzed using the QUANTA Flash SARS-CoV-2 IgG on a panel of 500 apparently healthy blood donors (273 females/227 males, with ages from 18 to 73 years, with an average and median age of 36.2 and 36 years respectively). With a cut-off of 20 CU, one sample tested positive with the QUANTA Flash SARS-CoV-2 IgG, reporting a result of 34.1 CU. The mean concentration was 6.2 CU and the values ranged from <2.3 to 34.1 CU.

Clinical Agreement

A retrospective clinical agreement study was conducted between April, and June, 2020 in the United States.

A total of 1079 serum and plasma samples were evaluated with the QUANTA Flash SARS-CoV-2 IgG test to assess the clinical performance of the test. Out of the 1079, 51 samples (38 serum samples and 13 Sodium-citrate plasma samples) were collected from individuals previously confirmed SARS-CoV-2 positive by RT-PCR. Out of 1079 samples, 1028 samples were collected prior to December 2019, and were assumed SARS-CoV-2 negative. Negative Percent Agreement and Positive Percent Agreement analyses are presented below.

Negative Percent Agreement (NPA)

A total of 1028 retrospective samples were collected before December 2019 from unique individuals, apparently healthy or with underlying conditions as specified in the Potential Cross-Reactivity section described in the table above. Results for the negative percent agreement of the assay are shown in the table below:

Group	Samples Tested	Reactive	Nonreactive	Negative Percent Agreement (95% CI)
Apparently Healthy	500	1	499	499/500 99.8% (98.9 – 100.0%)
with underlying conditions	528	0	528	528/528 100.0% (99.3 – 100.0%)
Total	1028	1	1027	1027/1028 99.9% (99.5 – 100.0%)

Positive Percent Agreement (PPA)

A total of 51 retrospective samples were collected from individuals previously confirmed COVID-19 positive by RT-PCR and tested to determine the positive percent agreement of the QUANTA Flash SARS-CoV-2. The following table describes the positive percent agreement of the assay segregated by time of sampling following a positive RT-PCR result:

Days Post RT-PCR Positive	Samples Tested	Reactive	Positive Percent Agreement (95% CI)
0 – 7	9	6	66.7% (35.4 – 87.9%)
8 – 14	13	8	61.5% (35.5 – 82.3%)
≥ 15	29	29	100.0% (88.3 – 100.0%)

Reproducibility

Reproducibility of the QUANTA Flash SARS-CoV-2 IgG assay was evaluated on 7 human serum samples containing various concentrations of IgG antibodies to SARS-CoV-2 in accordance with CLSI EP5-A3, Evaluation of Precision Performance of Quantitative Measurement Procedures - Approved Guideline. Samples were run in replicates of five, once a day, for 5 days on two different sites, which used two different lots of reagents and calibrators. Between sites reproducibility was calculated and summarized in the table below:

Sample ID	N	Mean (CU)	Repeatability		Between-Day		Within-Site		Between-Site		Reproducibility	
			SD (CU)	CV (%)	SD (CU)	CV (%)	SD (CU)	CV (%)	SD (CU)	CV (%)	SD (CU)	CV (%)
Serum 1	50	8.2	0.2	2.9%	0.3	3.4%	0.4	4.4%	0.5	6.3%	0.6	7.7%
Serum 2	50	9.4	0.3	3.4%	0.2	2.6%	0.4	4.3%	0.0	0.0%	0.4	4.3%
Serum 3	50	17.9	0.5	3.0%	0.7	3.9%	0.9	5.0%	0.0	0.0%	0.9	5.0%
Serum 4	50	20.0	0.9	4.5%	1.2	6.2%	1.5	7.6%	0.7	3.5%	1.7	8.4%
Serum 5	50	61.9	1.2	2.0%	6.6	10.6%	6.7	10.8%	0.0	0.0%	6.7	10.8%
Serum 6	50	116.6	2.3	2.0%	2.3	2.0%	3.2	2.8%	6.9	5.9%	7.6	6.5%
Serum 7	50	222.0	9.1	4.1%	3.7	1.6%	9.8	4.4%	2.8	1.2%	10.2	4.6%

Analytical Measuring Range

The analytical measuring range (AMR) of the assay is 2.3 CU to 450.0 CU. The linearity of the AMR was evaluated by a study according to CLSI EP6-A, Evaluation of the Linearity of Quantitative Measurement Procedures: A Statistical Approach; Approved Guideline. Three serum samples with various concentrations of IgG antibodies to SARS-CoV-2 were serially diluted to obtain values that cover the AMR. All specimens showed dilution linearity.

The Limit of Detection (LoD) of the QUANTA Flash SARS-CoV-2 IgG assay is 1.0 CU. It was determined consistent with CLSI EP17-A2 guideline with proportions of false positives (alpha) less than 5% and false negatives (beta) less than 5%; based on 360 determinations, with 60 measurements on blank samples and 120 measurements of low level samples per lot. The Limit of Blank (LoB) is 0.5 CU.

The Limit of Quantitation (LoQ) for the QUANTA Flash SARS-CoV-2 IgG assay is 2.3 CU, determined consistent with CLSI EP17-A2 guideline, based on total imprecision of four low level samples tested twice a day for 3 days in replicates of 5 on two different reagent lots, obtaining a total of 30 determinations per sample, per lot. Total imprecision CV% to be <20%. LoQ is at the lower limit of the analytical measuring range.

Matrix Equivalency

Fifteen (15) natural matched serum or Sodium-Citrate plasma samples collected from the same donors were used to evaluate if the performance of QUANTA Flash SARS-CoV-2 IgG is equivalent between serum and Sodium-Citrate plasma. Samples contained varying levels of IgG antibodies to SARS-CoV-2 spanning across the analytical measuring range of the assay were used. The study was conducted according to CLSI EP35-Ed1, Assessment of Equivalence or Suitability of Specimens Types for Medical Laboratory Measurement Procedures. Results supported equivalent performance between the matrices and were evaluated using a linear regression analysis model obtaining the following results:

Matrices	N	Interval (CU)	Slope (95% CI)	Y-Intercept (95% CI)	R ²
Serum vs Sodium-Citrate Plasma	15	9.6 – 155.8	1.00 (0.96-1.04)	0.0 (-3.4 – 3.3)	1.00

Potential Cross-Reactivity

Cross-reactivity was determined in accordance with CLSI EP07-ed3, Interference Testing in Clinical Chemistry. The QUANTA Flash SARS-CoV-2 IgG was evaluated for potential cross-reactivity using samples containing antibodies to other pathogens and other diseases and conditions. No false positive results were obtained. A summary of the samples used to test for potential cross-reactivity and the results are shown in the table below:

Patient Group	N	Positive Results with QUANTA Flash SARS-CoV-2 IgG
Anti-Nuclear Antibody Positive	246	0
Celiac Disease	60	0
Rheumatoid Arthritis	46	0
Primary Antiphospholipid Syndrome	40	0
Sjögren's syndrome	18	0
Ulcerative Colitis	15	0
Crohn's Disease	5	0
Chronic Obstructive Pulmonary Disease	12	0
Mycoplasma Pneumonia	9	0
Hashimoto's Disease	10	0
Chronic Kidney Disease	8	0
Psoriasis	8	0
Osteoporosis	6	0
Dermatitis	5	0
Allergy	3	0
Liver Cancer	1	0
Human Immunodeficiency Virus	15	0
Syphilis	5	0
Hepatitis B Virus	5	0
Hepatitis C Virus	11	0
Total Controls	528	0

References

1. Yan Y, Chang L, Wang L. **Laboratory testing of SARS-CoV, MERS-CoV, and SARS-CoV-2 (2019-nCoV): Current status, challenges, and countermeasures.** Rev Med Virol 2020;30:e2106.
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5. Ye Q, Wang B, Mao J. **The pathogenesis and treatment of the 'Cytokine Storm' in COVID-19.** J Infect 2020;80:607-613.
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Symbols Used



In vitro diagnostic medical device



Indicates revision change



Consult instructions for use



Manufacturer



Temperature limitation



Contains sufficient for < n
> tests



Do not reuse



Recycle paper box



Biological risks



Authorized representative



Batch code



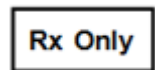
This end up



Catalog number



Use by



Prescription only per US
FDA

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Manufactured By:
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621370EN

April 2021
Revision 1

QUANTA Flash® SARS-CoV-2 IgG Controls

For Emergency Use Authorization Only
For *In Vitro* Diagnostic Use

REF

701372

Rx Only

Intended Use

The QUANTA Flash SARS-CoV-2 IgG Controls are intended for use to monitor the performance of the QUANTA Flash SARS-CoV-2 IgG on the BIO-FLASH instrument.

Summary and Principles of the Procedure

The QUANTA Flash SARS-CoV-2 IgG Controls are a Negative Control and a Positive Control with different amounts of IgG antibodies to SARS-CoV-2 (below and above the assay cutoff). The Negative Control and Positive Control are used to monitor the analytical performance of the QUANTA Flash SARS-CoV-2 IgG chemiluminescent immunoassay.

Reagents

1. QUANTA Flash SARS-CoV-2 IgG Negative Control: Two (2) barcode labeled tubes containing 0.5 mL, ready to use reagent. Controls contain recombinant antibodies to SARS-CoV-2 in bovine serum albumin, stabilizers, and preservatives.
2. QUANTA Flash SARS-CoV-2 IgG Positive Control: Two (2) barcode labeled tubes containing 0.5 mL, ready to use reagent. Controls contain recombinant antibodies to SARS-CoV-2 in bovine serum albumin, stabilizers, and preservatives.

Warnings

1. This product is for use under Emergency Use Authorization only.
2. This product is for *In Vitro* Diagnostic Use only.
3. This product is for prescription use only.
4. This product has not been FDA cleared or approved but has been authorized for emergency use by FDA under an EUA for use by authorized laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a, that meet requirements to perform moderate or high complexity tests.
5. This product is for use with a test authorized only for detecting IgG antibodies to SARS-CoV-2, not for any other viruses or pathogens.
6. The emergency use of this product is only authorized for the duration of the declaration that circumstances exist justifying the authorization of emergency use of in vitro diagnostics for detection and/or diagnosis of COVID-19 under Section 564(b)(1) of the Federal Food, Drug, and Cosmetic Act, 21 U.S.C. § 360bbb-3(b)(1), unless the declaration is terminated or authorization is revoked sooner.
7. Use appropriate personal protective equipment while working with the reagents provided.
8. Spilled reagents should be cleaned up immediately. Observe all federal, state and local environmental regulations when disposing of wastes.

Precautions

1. The QUANTA Flash SARS-CoV-2 IgG Controls are for use with the QUANTA Flash SARS-CoV-2 IgG.
2. Do not transfer the control reagents to secondary tubes. The barcodes on the tubes are used by the instrument to identify the control.
3. Once opened, each control tube is good for up to 15 uses with an average time of 10 minutes onboard the instrument per use, for a total of 2 ½ hours.
4. Chemical contamination of the reagents can result from improper cleaning or rinsing of the instrument. Residues from common laboratory chemicals such as formalin, bleach, ethanol, or detergent can cause interference in the assay. Be sure to follow the recommended cleaning procedure of the instrument as outlined in the BIO-FLASH operator's manual.
5. Controls should not be used beyond their expiration date.

Storage Conditions

1. Store unopened controls at 2-8°C. Do not freeze. Reagents are stable until the expiration date when stored and handled as directed.
2. Opened controls can be used for up to 15 times, with an average time of 10 minutes onboard the instrument per use. The total time the control tubes can be uncapped, onboard the instrument is 2 ½ hours. If the controls are left uncapped, onboard, for a total time greater than 2 ½ hours, they should be discarded.
3. For optimal stability, remove controls from the system immediately after sampling and store them at 2-8°C capped in the original vial.

Materials Provided

- 2 QUANTA Flash SARS-CoV-2 IgG Negative Control
- 2 QUANTA Flash SARS-CoV-2 IgG Positive Control

Additional Materials Required But Not Provided

BIO-FLASH instrument with operating computer (BIO-FLASH software version 2.4 and newer)
BIO-FLASH System Rinse (Part Number: 3000-8205)
BIO-FLASH Triggers (Part Number: 3000-8204)
BIO-FLASH Cuvettes (Part Number: 3000-8206)
QUANTA Flash SARS-CoV-2 IgG Reagents (Part Number: 701370)
QUANTA Flash SARS-CoV-2 IgG Calibrators (Part Number: 701371)

Procedure

To Create New QC Materials for the SARS-CoV-2 IgG Assay:

1. Prior to using QUANTA Flash SARS-CoV-2 IgG Controls for the first time on the instrument, enter the name, lot, expiration, value (or dose), and target standard deviation (SD) information into the software.
2. From the **Instrument Summary** screen, click the **Choose more options – Ctrl-M (▼)** arrow button. Select **QC Ctrl-F2**. Click the **New QC Material** button.
3. A lot specific data sheet is included with each Control set. First enter the name, lot number, expiration from this data sheet into the software. Next, click the **Add Assay** button. In the new window, make sure the **Show All Assays** box is checked. Select the SARS-CoV-2 IgG assay from the list and click **Add**. Finally, enter in the target dose and target SD. Click **Save**. Perform this process for both controls.

To Create a New Lot for Existing QC Materials:

1. Prior to using a new lot of QUANTA Flash SARS-CoV-2 IgG Controls for the first time, enter the lot, expiration, value (or dose), and target SD information into the software.
2. From the **Instrument Summary** screen, click the **Choose more options – Ctrl-M (▼)** arrow button. Select **QC Ctrl-F2**. Highlight the SARS-CoV-2 IgG assay in the column on the left. Then highlight the appropriate control material on the right (either “CoV2GN” for the Negative Control or “CoV2GP” for the Positive Control). Click the **New QC Lot** button.
3. A lot specific data sheet is included with each Control set. Enter the information from this data sheet into the software. This should include the lot number, expiration, target dose, and target SD. If necessary, click the **Add Assay** button. In the new window, make sure the **Show All Assays** box is checked. Select the SARS-CoV-2 IgG assay from the list and click **Add**. Click **Save**. Perform this process for both controls.

Controls are recommended to be run in singlicate, once each day that the assay is used; however, users should also consider national/local regulatory requirements.

If control values lie within the expected ranges provided on the control vial labels, the test is valid. If control values lie outside the expected ranges, the test is invalid, patient results cannot be reported and should be retested.

Each control must be gently mixed before use to insure homogeneity. Avoid foam formation, as bubbles may interfere with the instrument’s liquid level detection. Uncap each control tube and place both into a sample rack, with the barcodes facing forward through the gaps in the rack. Place the sample rack into the sample carousel of the BIO-FLASH instrument and close the door. The instrument will read the barcodes on the control tubes and identify the required reagent cartridge. Refer to the operator’s manual provided with the BIO-FLASH system for detailed operating instructions of the BIO-FLASH chemiluminescent analyzer and the BIO-FLASH software.

Limitations

These controls are designed for 15 uses. The label of each control tube has a row of 15 boxes that may be checked off so as to track the number of uses. The total time the control tubes can be uncapped onboard the instrument is 2 ½ hours. If the controls are left uncapped, onboard, for any longer period of time, they should be discarded.

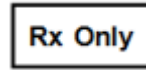
Performance Characteristics/Expected Values

Refer to the QUANTA Flash SARS-CoV-2 IgG Reagents directional insert (Part Number 621370) for performance characteristics.

Symbols Used



In vitro diagnostic medical device



Prescription only per US FDA



Consult instructions for use



Manufacturer



Temperature limitation



Contains sufficient for < n > tests



Do not reuse



Positive Control



Biological risks



Negative Control



Batch code



Recycle paper box



Catalog number



Indicates revision change



Use by



This end up

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621372EN

April 2021
Revision 1

QUANTA Flash® SARS-CoV-2 IgG Calibrators

For Emergency Use Authorization Only

For *In Vitro* Diagnostic Use

REF **701371** Rx Only

Intended Use

QUANTA Flash SARS-CoV-2 IgG Calibrators are intended for use with the QUANTA Flash SARS-CoV-2 IgG on the BIO-FLASH instrument. Each calibrator establishes a point of reference for the working curve that is used to calculate unit values.

Summary and Principles of the Procedure

The QUANTA Flash SARS-CoV-2 IgG chemiluminescent immunoassay (CIA) utilizes a predefined lot specific Master Curve that is stored in the reagent cartridge barcode. The QUANTA Flash SARS-CoV-2 IgG Calibrators are designed to produce an instrument specific Working Curve from the parameters of the Master Curve, with a decision point based on the performance characteristics and clinical evaluation of the QUANTA Flash SARS-CoV-2 IgG CIA. Calibrators are tested on multiple instruments with multiple lots of reagents prior to value assignment.

Reagents

1. QUANTA Flash SARS-CoV-2 IgG Calibrator 1: Two (2) barcode labeled tubes containing 0.3 mL prediluted, ready to use reagent. Calibrators contain recombinant antibodies to SARS-CoV-2 at a target concentration of 11.5 ± 2.3 CU in bovine serum albumin, stabilizers, and preservatives.
2. QUANTA Flash SARS-CoV-2 IgG Calibrator 2: Two (2) barcode labeled tubes containing 0.3 mL prediluted, ready to use reagent. Calibrators contain recombinant antibodies to SARS-CoV-2 at a target concentration of 183.6 ± 27.6 CU in bovine serum albumin, stabilizers, and preservatives.

Warnings

1. This product is for use under Emergency Use Authorization only.
2. This product is for *In Vitro* Diagnostic Use only.
3. This product is for prescription use only.
4. This product has not been FDA cleared or approved but has been authorized for emergency use by FDA under an EUA for use by authorized laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a, that meet requirements to perform moderate or high complexity tests.
5. This product is for use with a test authorized only for detecting IgG antibodies to SARS-CoV-2, not for any other viruses or pathogens.
6. The emergency use of this product is only authorized for the duration of the declaration that circumstances exist justifying the authorization of emergency use of in vitro diagnostics for detection and/or diagnosis of COVID-19 under Section 564(b)(1) of the Federal Food, Drug, and Cosmetic Act, 21 U.S.C. § 360bbb-3(b)(1), unless the declaration is terminated or authorization is revoked sooner.

7. Use appropriate personal protective equipment while working with the reagents provided.
8. Spilled reagents should be cleaned up immediately. Observe all federal, state and local environmental regulations when disposing of wastes.

Precautions

1. The QUANTA Flash SARS-CoV-2 IgG Calibrators are for use with the QUANTA Flash SARS-CoV-2 IgG.
2. Do not transfer the calibrator reagents to secondary tubes. The barcodes on the tubes are used by the instrument to match the calibrators to the proper assay type.
3. Once a calibrator tube is opened, it is good for up to 8 hours kept uncapped, onboard the instrument, after which the reagent must be discarded.
4. Chemical contamination of the reagents can result from improper cleaning or rinsing of the instrument. Residues from common laboratory chemicals such as formalin, bleach, ethanol, or detergent can cause interference in the assay. Be sure to follow the recommended cleaning procedure of the instrument as outlined in the BIO-FLASH operator's manual.
5. Calibrators should not be used beyond their expiration date.

Storage Conditions

1. Store unopened calibrators at 2-8°C. Do not freeze. Reagents are stable until the expiration date when stored and handled as directed.
2. Opened calibrators must be discarded after 8 hours kept uncapped, onboard the instrument.

Materials Provided

- 2 QUANTA Flash SARS-CoV-2 IgG Calibrator 1
- 2 QUANTA Flash SARS-CoV-2 IgG Calibrator 2

Additional Materials Required But Not Provided

BIO-FLASH instrument with operating computer (BIO-FLASH software version 2.4 and newer)
BIO-FLASH System Rinse (Part Number: 3000-8205)
BIO-FLASH Triggers (Part Number: 3000-8204)
BIO-FLASH Cuvettes (Part Number: 3000-8206)
QUANTA Flash SARS-CoV-2 IgG Reagents (Part Number: 701370)
QUANTA Flash SARS-CoV-2 IgG Controls (Part Number: 701372)

Procedure

1. Each new lot of reagent cartridge must be calibrated prior to first time use. The software will not allow a new lot to be used until it is calibrated.
2. Each calibrator must be gently mixed before use to insure homogeneity. Avoid foam formation, as bubbles may interfere with the instrument's liquid level detection. Uncap each calibrator tube and place them into a sample rack, with the barcodes facing forward through the gaps in the rack. Place the sample rack into the sample carousel of the BIO-FLASH instrument, and close the door. The instrument will read the barcodes on the calibrator tubes, and identify the required reagent cartridge. Refer to the operator's manual provided with the BIO-FLASH system for detailed operating instructions of the BIO-FLASH chemiluminescent analyzer and the BIO-FLASH software.
3. The instrument will run each calibrator in duplicate. After the Calibrators have been run, the software will require the calibration to be validated. From the **Instrument Summary** screen, click the **Choose more options – Ctrl-M (▼)** arrow button. Select **Calibration Ctrl-F3**. In the Calibration window, highlight the desired assay, and click **Details**.
4. In the new **Calibration Details** window, select the calibration that was just performed. The Master Curve appears as a dashed line, while the new Working Curve appears as a solid line. If the calibration results are valid, a validation button will appear in the lower left of the screen. Click the **Validate Calibration** button.
5. Once the calibration is validated, the reagent cartridge lot on which the calibration was performed is ready for use. It is recommended that the QUANTA SARS-CoV-2 IgG Controls (sold separately – part number 701372) be run after a reagent cartridge lot is calibrated.

Limitations

These calibrators are designed for 4 calibrations. The total time the calibrator tubes can be uncapped onboard the instrument is 8 hours. If the calibrators are left uncapped, onboard, for any longer period of time, they should be discarded. Using the same calibrator tubes for more than 8 hours can result in improper calibration of the assay, which in turn could give erroneous results.

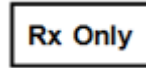
Performance Characteristics/Expected Values

Refer to the QUANTA Flash SARS-CoV-2 IgG Reagents directional insert (Part Number 621370) for performance characteristics.

Symbols Used



In vitro diagnostic medical device



Prescription only per US FDA



Consult instructions for use



Manufacturer



Temperature limitation



Contains sufficient for < n > tests



Do not reuse



Calibrator 1



Biological risks



Calibrator 2



Batch code



Recycle paper box



Catalog number



Indicates revision change



Use by



This end up

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Revision 1