



COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) Instruction for Use

REF Cat: GCCOV-402a

IVD *In Vitro* Diagnostic Medical Device

For Emergency Authorization Use (EUA) only
For *in vitro* diagnostic use only
For prescription use only

INTENDED USE

The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is a lateral flow immunoassay intended for the qualitative detection and differentiation of IgM and IgG antibodies to SARS-CoV-2 in human venous whole blood (lithium heparin, dipotassium EDTA and sodium citrate), plasma (lithium heparin, dipotassium EDTA and sodium citrate), or serum. The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is intended for use as an aid in identifying individuals with an adaptive immune response to SARS-CoV-2, indicating recent or prior infection. At this time, it is unknown how long antibodies persist following infection and if the presence of antibodies confers protective immunity. The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) should not be used to diagnose acute SARS-CoV-2 infection. Testing is limited to laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C 263a, to perform moderate or high complexity tests.

Results are for the detection of SARS CoV-2 antibodies. IgM and 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 COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) 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 COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) may occur due to cross-reactivity from pre-existing antibodies or other possible causes. Due to the risk of false positive results, confirmation of positive results should be considered using second, different IgG or IgM assay.

The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is only for use under the Food and Drug Administration's Emergency Use Authorization.

INTRODUCTION

Coronaviruses are enveloped RNA viruses that are distributed broadly among humans, other mammals, and birds and that cause respiratory, enteric, hepatic, and neurologic diseases. Seven coronavirus species are known to cause human disease. Four viruses - 229E, OC43, NL63, and HKU1 - are prevalent and typically cause common cold symptoms in immunocompetent individuals. The three other strains - severe acute respiratory syndrome coronavirus (SARS-CoV), Middle East respiratory syndrome coronavirus (MERS-CoV) and 2019 Novel Coronavirus (COVID-19) - are zoonotic in origin and have been linked to sometimes fatal illness. IgG and IgM antibodies to 2019 Novel Coronavirus can be detected with 1-3 weeks after exposure. The seroconversion rate and the antibody levels increased rapidly during the first two weeks.

PRINCIPLE

The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is a lateral flow immunochromatographic assay. The test uses anti-human IgM antibody (test line IgM), anti-human IgG (test line IgG) and rabbit IgG (control line C) immobilized on a nitrocellulose strip. The burgundy colored conjugate pad contains colloidal gold conjugated to recombinant COVID-19 antigens (SARS-CoV-2 Spike

S1 antigen) conjugated with colloid gold (COVID-19 conjugates). When a specimen followed by assay buffer is added to the sample well, IgM &/or IgG antibodies if present, will bind to COVID-19 conjugates making an antigen antibodies complex. This complex migrates through nitrocellulose membrane by capillary action. When the complex meets the line of the corresponding immobilized antibody (anti-human IgM &/or anti-human IgG) the complex is trapped forming a burgundy colored band which confirms a reactive test result. Absence of a colored band in the test region indicates a non-reactive test result.

To serve as a procedural control, a colored line will always change from blue to red in the control line region, indicating that the proper volume of specimen has been added and membrane wicking has occurred.

MATERIALS SUPPLIED



25 sealed pouches each containing a test cassette, a dropper and a desiccant
1 Buffer
1 Package insert

MATERIAL REQUIRED BUT NOT PROVIDED

1. Specimen collection containers
2. Centrifuge (for plasma only)
3. Timer
4. COVID-19 IgG/IgM CONTROL Kit (available separately from Healgen Scientific LLC, cat# GCCOV-PN10/GCCOV-PN20)

Negative control: Negative human plasma, 0.1 mL per vial

Positive control: Containing SARS-CoV-2 Spike protein specific recombinant human IgG and SARS-CoV-2 Spike protein specific recombinant human IgM diluted with human plasma, 0.1 mL per vial

Controls can be stored at -20°C for long-term storage for up to 12 months. Once opened, the remaining controls may be stored at 2-8°C for 30 days. Unopened controls can be stored at 2-8°C for up to 90 days and 37°C for up to 5 days. Controls should avoid repeated freeze and thaw cycles. Do not freeze-thaw more than 5 times.

STORAGE AND STABILITY



The kit can be stored at room temperature or refrigerated (2-30°C). The test device is stable through the expiration date printed on the sealed pouch. The test device must remain in the sealed pouch until use. DO NOT FREEZE. Do not use beyond the expiration date.

WARNINGS AND PRECAUTIONS

1. For prescription use only. For *in vitro* diagnostic use only. Do not use after expiration date.
2. Use of this product is limited to laboratories certified under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), 42 U.S.C. §263a, to perform moderate or high complexity tests.
3. This test should be performed at 15 to 30°C. If stored refrigerated, ensure that the pouch and buffer are brought to operating temperature before performing testing.
4. This package insert must be read completely before performing the test. Failure to follow the insert gives inaccurate test results.
5. Do not use if the tube/pouch is damaged or broken.
6. Test is for single use only. Do not re-use under any circumstances.
7. Handle all specimens as if they contain infectious agents. Observe established

precautions against microbiological hazards throughout testing and follow the standard procedures for proper disposal of specimens.

- Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimens are assayed.
- Humidity and temperature can adversely affect results (especially with an RH over 80%). Testing must be performed within one hour after opening the pouch.
- Do not perform the test in a room with strong air flow, ie. electric fan or strong air-conditioning.
- Practice a few times the use of the mini dropper prior to testing if you are not familiar with the mini dropper. For better precision, transfer specimen by pipette capable to deliver 5 μ L of volume.
- 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.
- This product has been authorized only for detecting the presence of IgG and IgM antibodies to SARS-CoV-2, not for any other viruses or pathogens.
- 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.

SPECIMEN COLLECTION

- COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) can be performed using either venous whole blood, serum or plasma.
- The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) test has not been evaluated with fingerstick specimens. Use of this test with fingerstick blood is not recommended.
- Separate serum or plasma from blood as soon as possible to avoid hemolysis. Use only clear, non-hemolyzed specimens.
- Testing should be performed immediately after specimen collection. Do not leave the specimens at room temperature for prolonged periods. Serum and plasma specimens may be stored at 2-8°C for up to 3 days. For long term storage, specimens should be kept below -20°C for up to one month. Whole blood specimens must be stored at 2-8°C if not tested immediately and tested within 24 hours of collection. Do not freeze whole blood specimens.
- Bring specimens to room temperature prior to testing. Frozen specimens must be completely thawed and mixed well prior to testing. Specimens cannot be frozen and thawed more than 3 times.
- If specimens are to be shipped, they should be packed in compliance with local regulations covering the transportation of etiologic agents.

TEST PROCEDURE

Allow test cassette, specimen, buffer and/or controls to equilibrate to room temperature (15-30°C) prior to testing.

- Remove the test cassette from the sealed foil pouch and use it as soon as possible. Results must be obtained within one hour.
- Place the test device on a clean and level surface.

For Serum or Plasma Specimens:

With a 5 μ L mini plastic dropper provided, draw serum/plasma specimen to exceed the specimen line as showed in the following image and then transfer drawn serum/plasma specimen into the sample well (S). Then add 2 drops (about 80 μ L) of sample buffer to the buffer well (B) immediately. Avoid air bubbles.

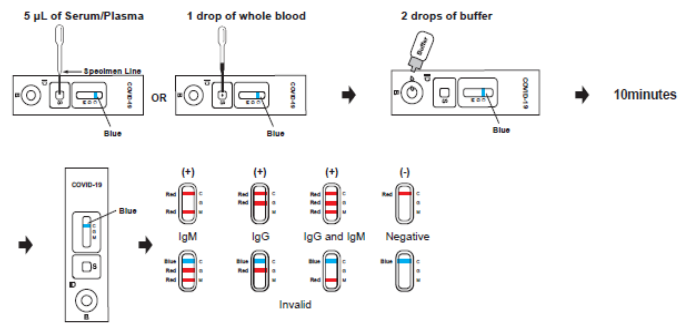
Note: Practice a few times prior to testing if you are not familiar with the mini dropper. For better precision, transfer specimen by pipette capable to deliver 5 μ L of volume.

For Venous Whole Blood Specimen:

Hold the 5 μ L mini plastic dropper vertically and transfer 1 drop of whole blood (about 10 μ L) to the specimen well (S) of the test device, then add 2 drops (about 80 μ L) of sample buffer to the buffer well (B) immediately. Avoid air bubbles.

- Wait for the colored line(s) to appear. After 2 minutes, if the red color has not moved across the test window or if blood is still present in the specimen well (S), add 1 additional drop of the sample buffer to the buffer well (B).
- The result should be read in 10 minutes. Positive results may be visible as soon as 2 minutes. Do not interpret the result after 15 minutes.

2



INTERPRETATION OF RESULTS

NEGATIVE:

The colored line in the control line region (C) changes from blue to red. No line appears in the test line regions M or G. The result is negative.

IgM POSITIVE:

The colored line in the control line region (C) changes from blue to red, and a colored line appears in test line region M. The test result indicates the presence of IgM anti-SARS-CoV-2 antibodies.

IgG POSITIVE:

The colored line in the control line region (C) changes from blue to red, and a colored line appears in test line region G. The test result indicates the presence of IgG anti-SARS-CoV-2 antibodies.

IgG and IgM POSITIVE:

The colored line in the control line region (C) changes from blue to red, and two colored lines appear in test line regions M and G. The test results indicate the presence of IgM and IgG anti-SARS-CoV-2 antibodies.

INVALID:

Control line is partially red, and fails to completely change from blue to red. Insufficient specimen volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the test with a new test cassette. If the problem persists, discontinue using the test kit immediately and contact your local distributor.

QUALITY CONTROLS

A procedural control is included in the test. A red line appearing in the control region (C) is the internal procedural control. It confirms sufficient specimen volume and correct procedural technique.

External controls are not supplied with this kit. COVID-19 IgG/IgM CONTROL Kit are available for purchase from Healgen Scientific LLC (cat # GCCOV-PN10/GCCOV-PN20). Positive and negative controls should be tested as a good laboratory practice to confirm the test procedure and to verify proper test performance. Refer to the COVID-19 IgG/IgM CONTROL Kit instructions for use for more information.

LIMITATIONS

For use under an Emergency Use Authorization only.

- Use of COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is limited to laboratory personnel who have been trained. Not for home use.
- This product is only used for testing of individual serum, plasma (Li+ heparin, K₂EDTA and sodium citrate), and venous whole blood. Other specimen types have not been evaluated and should not be used with this assay.
- Use fresh samples whenever possible. Frozen and thawed samples (especially repeatedly) contain particles that can block the membrane. This slows the flow of reagents and can lead to high background color, making the interpretation of results difficult.
- The Assay Procedure and the Interpretation of Assay Result must be followed closely when testing for the presence of SARS-CoV-2 virus specific antibodies in the serum, plasma or whole blood specimen from individual subjects. For optimal test performance, proper sample collection is critical. Failure to follow the procedure may give inaccurate results.
- Reading test results earlier than 10 minutes after the addition of Buffer may yield erroneous results. Do not interpret the result after 15 minutes.
- This test detects the presence of SARS-CoV-2 IgM/IgG in the specimen and

should not be used to diagnose or exclude SARS-CoV-2 infection. Testing with a molecular diagnostic must be performed to evaluate for active infection in symptomatic individuals.

7. It is not known at this time if the presence of antibodies to SARS-CoV-2 confers immunity to re-infection.
8. 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 adaptive immune response.
9. A negative result for an individual subject indicates absence of detectable anti-SARS-CoV-2 antibodies. Negative results do not preclude SARS-CoV-2 infection and should not be used as the sole basis for patient management decisions. IgM antibodies may not be detected in the first few days of infection; the sensitivity of the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) early after infection is unknown. False positive results for IgM and IgG antibodies may occur due to cross-reactivity from pre-existing antibodies or other possible causes. Samples with positive results should be confirmed with alternative testing method(s) and clinical findings before a diagnostic determination is made. A negative result can occur if the quantity of the anti-SARS-CoV-2 antibodies present in the specimen is below the detection limits of the assay, or the antibodies that are detected are not present during the stage of disease in which a sample is collected.
10. Some specimens containing unusually high titer of heterophile antibodies or rheumatoid factor may affect expected results.
11. The COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) is limited to the qualitative detection of antibodies specific for the SARS-CoV-2 virus. The intensity of the test line does not necessarily correlate to SARS-CoV-2 antibody titer in the specimen. Neither the quantitative value nor the rate anti-SARS-CoV-2 IgM/IgG concentration can be determined by this qualitative test.
12. The sensitivity of the test is impacted after being open for two hours—the density of T line becomes weak. Testing must be performed within one hour after opening the pouch.
13. The performance of this device has not been established in individuals that have received a COVID-19 vaccine. The clinical significance of a positive or negative antibody test following COVID-19 vaccination has not been established, and the result from this assay 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. Clinical performance has not been established with 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 COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) 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/in-vitro-diagnostics-euas>

Authorized laboratories using the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) ("your product" in the conditions below), must adhere to the Conditions of Authorization indicated in the Letter of Authorization as listed below:

1. 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
2. Authorized laboratories using your product must use your product as outlined in the authorized labeling. Deviations from the authorized procedures, authorized clinical specimen types, authorized control materials, authorized other ancillary reagents and authorized materials required to use your product are not permitted.
3. Authorized laboratories that receive your product must notify the relevant public health authorities of their intent to run your product prior to initiating testing.
4. 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.
5. 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 Healgen Scientific LLC (info@healgen.us) 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.

6. All laboratory personnel using your product must be appropriately trained in immunochromatographic 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
7. Authorized distributors, 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."

PERFORMANCE CHARACTERISTICS

1. Assay Clinical Performance

Study 1: Healgen Clinical Agreement Validation

The clinical performance of the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) was evaluated by testing a total of 191 plasma (K2EDTA) clinical samples—90 positive samples and 101 negative samples) from individual patients exhibiting pneumonia, respiratory symptoms and fever etc. Testing was performed at two sites in China from January to mid-March 2020. COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) results for IgM and IgG detection were compared to the results of RT-PCR assays for SARS-CoV-2 from oropharyngeal swabs (Site #1) and sputum (Site #2). At Site #1, 61 retrospective specimens and 4 prospective specimens were included in the study. At Site #2, 95 retrospective specimens and 31 prospective specimens were included in the study. The time from RT-PCR result to collection of specimens (plasma) ranged from 15-45 days (Site #1) and 0-38 days (Site #2). The time from collection of specimens (plasma) from each individual to testing ranged from 12-23 days (Site #1) and 3-29 days (Site #2). Overall study results are shown in below (Table 1).

Table 1: Assay Clinical Study Results

Method			RT-PCR		Subtotal
			Positive	Negative	
COVID-19 IgG/IgM Rapid Test Cassette	Positive	IgG+/IgM+	78	0	78
		IgG-/IgM+	0	1	1
		IgG+/IgM-	9	2	11
	Negative	IgG-/IgM-	3	98	101
Subtotal			90	101	191

IgG

Positive Percent agreement (PPA): 96.7% (87/90) (95%CI: 90.7%~98.9%)
Negative Percent agreement (NPA): 98.0% (99/101) (95%CI: 93.1%~99.5%)

IgM

Positive Percent agreement (PPA): 86.7% (78/90) (95%CI: 78.1%~92.2%)
Negative Percent agreement (NPA): 99.0% (100/101) (95%CI: 94.6%~99.8%)

Overall (either IgG+ or IgM+)

Positive Percent agreement (PPA): 96.7% (87/90) (95%CI: 90.7%~98.9%)
Negative Percent agreement (NPA): 97.0% (98/101) (95%CI: 91.6%~99.0%)

Study 2: Independent Clinical Agreement Validation

The test was validated against a panel of previously frozen samples consisting of 30 SARS-CoV-2 antibody-positive serum samples and 80 antibody-negative serum and plasma samples. Each of the 30 antibody-positive samples were confirmed with a nucleic acid amplification test (NAAT) and both IgM and IgG antibodies were confirmed to be present in all 30 samples. The presence of antibodies in the samples was confirmed by several orthogonal methods prior to testing with the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma). The presence of IgM and IgG antibodies specifically was confirmed by one or more comparator methods. Antibody-positive samples were selected at different antibody titers.

All antibody-negative samples were collected prior to 2020 and include: i) Seventy (70) samples selected without regard to clinical status, "Negatives" and ii) Ten (10) samples selected from banked serum from HIV+ patients, "HIV+". Testing was performed by one operator using one lot of the COVID-19 IgG/IgM Rapid Test

Cassette (Whole Blood/Serum/Plasma). Confidence intervals for sensitivity and specificity were calculated per a score method described in CLSI EP12-A2 (2008).

For evaluation of cross-reactivity with HIV+, it was evaluated whether an increased false positive rate among antibody-negative samples with HIV was statistically higher than the false positive rate among antibody-negative samples without HIV (for this, a confidence interval for the difference in false positive rates was calculated per a score method described by Altman). The results and data analysis are shown in the tables below.

Table 2. Summary Results

COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma)		Comparator Method			Total
		Positive (IgM/IgG)	Negative (IgM/IgG)	Negative, HIV+	
Positive	IgM+/ IgG+	29	0	0	29
	IgM+, IgG-	1	0	0	1
	IgM-, IgG+	0	2	0	2
Negative	IgM- / IgG-	0	68	10	78
Total (n=110)		30	70	10	110

Table 3. Summary Statistics

Measure	Estimate	Confidence Interval
IgM Sensitivity	100% (30/30)	(88.7%; 100%)
IgG Sensitivity	96.7% (29/30)	(83.3%; 99.4%)
(IgM+ or IgG+; Total) Sensitivity (PPA)	100% (30/30)	(88.7%; 100%)
(IgM-/IgG-; Total) Specificity (NPA)	97.5% (78/80)	(91.3%; 99.3%)
Cross-reactivity with HIV+	0% (0/10) not detected	

Limitations of Study 2

- Samples were not randomly selected, and sensitivity and specificity estimates may not be indicative of the real-world performance of the device.
- These results are based on serum and plasma samples only and may not be indicative of performance with other sample types, such as whole blood, including finger stick blood.
- Information about anticoagulants used is not known.
- The number of samples in the panel is a minimally viable sample size that still provides reasonable estimates and confidence intervals for test performance, and the samples used may not be representative of the antibody profile observed in patient populations.

2. Assay Cross Reactivity

Cross-reactivity of the COVID-19 IgG/IgM Rapid Test (Whole Blood/Serum/Plasma) was evaluated using serum samples which contain antibodies to the pathogens listed below. A total of 120 specimens from 24 different categories were tested. No false Positives were found with the following (Table 4):

Table 4: Assay Cross Reactivity Results

Sample Categories	Tested Sample Number
Influenza A virus IgG	5
Influenza B virus IgG	5
Respiratory syncytial virus IgG	5
Adenovirus IgG	5
Rhinovirus IgG	5
Human metapneumovirus IgG	5
Mycoplasma pneumoniae IgG	5
Chlamydia pneumoniae IgG	5
HCV IgG	5
Haemophilus influenza IgG	5
HBV core antibody IgG	5
Bacterial pneumonia	5

Sample Categories	Tested Sample Number
Influenza A virus IgM	5
Influenza B virus IgM	5
Respiratory syncytial virus IgM	5
Adenovirus IgM	5
Rhinovirus IgM	5
Human metapneumovirus IgM	5
Mycoplasma pneumoniae IgM	5
Chlamydia pneumoniae IgM	5
HCV IgM	5
Haemophilus influenza IgM	5
HBV core antibody IgM	5
Antinuclear antibodies (ANA)	5

3. Potentially Endogenous Interfering Substances

Low titer COVID-19 antibody positive serum samples and COVID-19 antibody negative serum samples were spiked with one of the following substances to specified concentrations and tested in multiple replicates. No false Positives or false Negatives were found with the following (Table 5).

Table 5: Assay Interfering Substance Results

Name of Substances	Concentration
Ascorbic Acid	20 mg/dL
Hemoglobin	1000 mg/dL
Bilirubin	10 mg/dL
Albumin	2000 mg/dL
Triglyceride	500 mg/dL

4. Class Specificity

A Class Specificity Study was conducted to determine the impact of DTT treatment on the detection of IgM and/or IgG positive samples by the COVID-19 IgG/IgM Rapid Test Cassette (Whole blood/Serum/Plasma). IgM samples treated with DTT showed no visible IgM line with the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma), whereas the IgG samples were not affected by DTT treatment. Test results with IgM positive samples after DTT treatment showed 100% agreement to the expected results. Test results with IgG positive samples after DTT treatment showed 100% agreement to the expected results. The results observed confirm the class specificity of the test.

5. Study of: Venous Whole Blood and Plasma Specimens with Anticoagulants

To evaluate if various anticoagulants have an effect on the results of the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma), negative plasma specimens and positive plasma specimens (with 2 different low positive IgG and IgM concentrations) were mixed with three different anticoagulants (lithium heparin, EDTA, sodium citrate) in separate tubes and tested in triplicate in plasma only or spiked into venous whole blood. IgG and IgM were correctly identified in all spiked whole blood specimens by the test, similar to results obtained with the plasma only specimens. There was a 100% concordance rate with expected results when IgM or IgG positive venous whole blood specimens or plasma specimens were tested with anticoagulants.

REFERENCE:

1. Weiss SR, Leibowitz JL. Coronavirus pathogenesis. Adv Virus Res 2011; 81: 85-164.
2. Masters PS, Perlman S. Coronaviridae. In: Knipe DM, Howley PM, eds. Fields virology. 6th ed. Lippincott Williams & Wilkins, 2013: 825-58.
3. Su S, Wong G, Shi W, et al. Epidemiology, genetic recombination, and pathogenesis of coronaviruses. Trends Microbiol 2016; 24: 490-502.
4. Cui J, Li F, Shi ZL. Origin and evolution of pathogenic coronaviruses. Nat Rev Microbiol 2019; 17: 181-192.

INDEX OF SYMBOLS

	Consult instructions for use		Tests per kit		Authorized Representative
	For <i>in vitro</i> diagnostic use only		Use by		Do not reuse
	Store between 2-30°C		Lot Number		Catalog#



COVID-19 IgG /IgM CONTROL Kit

INSTRUCTIONS FOR USE

For use under an Emergency Use Authorization (EUA) Only

For prescription use only

For *In Vitro* Diagnostic Use Only

Configurations	
REF	Description
GCCOV-PN10	5 positive vials, 5 negative vials
GCCOV-PN20	10 positive vials, 10 negative vials

Instructions for use must be carefully followed. Reliability of assay results cannot be guaranteed if there are any deviations from the instructions.

For prescription use only.

NAME

COVID-19 IgG/IgM CONTROL Kit

INTENDED USE

The COVID-19 IgG/IgM CONTROL Kit is an external quality control (ready to use liquid) intended to monitor the performance of the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma). The COVID-19 IgG/IgM CONTROL Kit provides users with assurance that the device is performing within specification.

CONTENTS

Human plasma based negative control. Volume: 0.1 mL.

Positive control containing SARS-CoV-2 Spike protein specific recombinant human IgG and SARS-CoV-2 Spike protein specific recombinant human IgM diluted with human plasma. Volume: 0.1 mL.

Preservatives: sodium azide, 0.02%

PRECAUTIONS

1. For Emergency Use Authorization only.
2. For *in vitro* diagnostic use only
3. For prescription use only.
4. Do not use after expiration date.
5. If there is evidence of microbial contamination or excessive turbidity in the product discard the vial.
6. Only use with Healgen's COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma). Do not use with other manufacturer test kits.
7. Follow Good Laboratory Practices, wear protective clothing, use disposable gloves, do not eat or drink in the area.
8. 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.

9. This product is authorized for use with a test authorized only for detecting the presence of IgG and IgM antibodies to SARS-CoV-2, not for any other viruses or pathogens.
10. 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.
11. This control contains human source material that was tested and found nonreactive for the Human Immunodeficiency Virus (HIV 1 and 2) antibody, Hepatitis B Surface Antigen (HbsAg) and Hepatitis C Virus (Anti-HCV) at the donor stage. This product, as with all human based specimens, should be treated as potentially infectious and handled with proper laboratory safety procedures to minimize the risk of transmission of infectious disease.
12. All components of this kit can be discarded as Biohazard waste according to the local guidelines.
13. All the specimens should be considered potentially hazardous and handled in the same manner as an infectious agent.
14. The control and test device should be discarded in a proper biohazard container after testing.

Safety Precautions

1. **CAUTION:** This product contains human-sourced and/or potentially infectious components. Refer to the CONTENTS section of this package insert. No known test method can offer complete assurance that products derived from human sources or inactivated microorganisms will not transmit infection. Therefore, all human-sourced materials should be considered potentially infectious. It is recommended that this product, human specimens, and all consumables contaminated with potentially infectious materials be handled in accordance with the OSHA Standard on Blood borne Pathogens. Biosafety Level 2 or other appropriate regional, national, and institutional biosafety practices should be used for materials that contain, are suspected of containing, or are contaminated with infectious agents.¹⁻⁴
2. The human-sourced materials used in the positive control have been tested and found to be reactive both for anti-SARS-CoV-2 IgG and anti-SARS-CoV-2 IgM and nonreactive for HBsAg, Syphilis, anti-HIV-1/HIV-2, and anti-HCV.
3. The human-sourced material used in the negative control have been tested and found to be nonreactive for anti-SARS-CoV-2 IgG, anti-SARS-CoV-2 IgM, HBsAg, Syphilis, anti-HIV-1/HIV-2, and anti-HCV.

STORAGE

1. This product is shipped on ice packs.
2. Store at -20°C for long-term storage for up to 12 months. Once opened, the remaining controls may be stored at 2-8°C for up to 30 days. Unopened, controls can be stored at 2-8°C up to 90 days and 37°C for up to 5 days. Controls should avoid repeated freeze and thaw cycles. Do not freeze-thaw more than 5 times.
3. Do not use past the expiration date.
4. Vials should always be stored upright.

WHEN TO RUN THE CONTROL KIT

Positive Control / Negative Control kits are sold separately. Testing external positive and negative controls should be conducted on the COVID-19 IgG/IgM Rapid Test Cassette (Whole Blood/Serum/Plasma) under the following circumstances:

- A new operator uses the test kits.
- A new shipment of test kits is received.
- A new lot of test kits is used.
- Device storage falls out of the 2-8°C range.
- The temperature of the test area falls outside 15-30°C range.
- To verify a higher or lower than expected frequency of positive or negative results.
- To investigate the cause of repeated invalid results

PREPARATION FOR USE

Allow controls to equilibrate to room temperature (15-30°C/59-86°F) prior to testing.

Prior to each use, mix by gentle inversion and spin down.

CONTROL KIT TEST PROCEDURE

Allow test cassette, buffer, and controls to equilibrate to room temperature (15 to 30°C/59-86°F) prior to testing.

Use a test cassette for the positive control and another for the negative control.

Negative Control Testing

1. Remove the test cassette from the sealed foil pouch and use it as soon as possible. Best results will be obtained if the assay is performed within one hour.

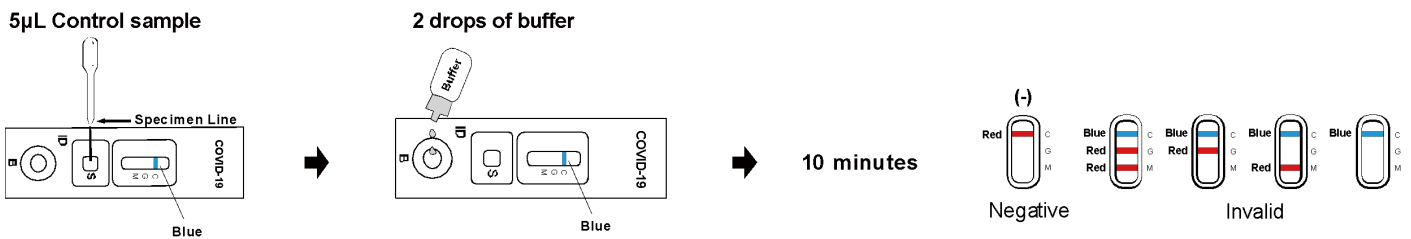
2. Place the test device on a clean and level surface.

3. With the 5 µL mini plastic dropper provided with the test, draw negative control to exceed the specimen line as shown in the following image and then transfer drawn negative control specimen into the sample well (S). Then add 2 drops (about 80 µL) of sample buffer to the buffer well (B) immediately. Avoid air bubbles.

Note: Practice a few times prior to testing if you are not familiar with the mini dropper. For better precision, transfer specimens by pipette capable of delivering 5 µL of volume.

4. Wait for the colored line(s) to appear. After 2 minutes, if the red color has not moved across the test window, add 1 additional drop of the sample buffer to the buffer well (B).

5. The result should be read in 10 minutes. Do not interpret the result after 15 minutes.



Positive Control Testing

1. Remove the test cassette from the sealed foil pouch and use it as soon as possible. Best results will be obtained if the assay is performed within one hour.

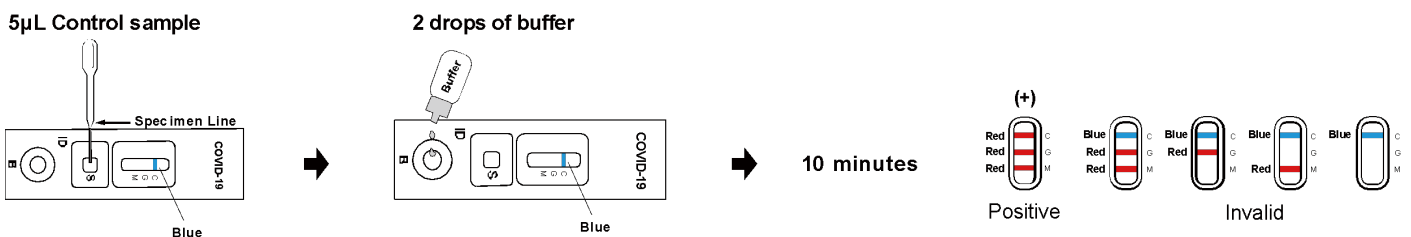
2. Place the test device on a clean and level surface.

3. With the 5 µL mini plastic dropper provided with the test, draw positive control to exceed the specimen line as shown in the following image and then transfer drawn positive control specimen into the sample well (S). Then add 2 drops (about 80 µL) of sample buffer to the buffer well (B) immediately. Avoid air bubbles.

Note: Practice a few times prior to testing if you are not familiar with the mini dropper. For better precision, transfer specimens by pipette capable of delivering 5 µL of volume.

4. Wait for the colored line(s) to appear. After 2 minutes, if the red color has not moved across the test window, add 1 additional drop of the sample buffer to the buffer well (B).

5. The result should be read in 10 minutes. Do not interpret the result after 15 minutes.



EXPECTED RESULTS

To monitor the test kit performance prior to testing clinical specimens the controls should show the following expected results:

NEGATIVE CONTROL: The colored line in the control line region (C) should change from blue to red. No lines should appear in the test line regions M or G.

POSITIVE CONTROL:

The colored line in the control line region (C) should change from blue to red, and two colored lines should appear in test line regions M and G.

If the controls do not provide expected results, stop testing and contact customer support.

INVALID:

Control line is still completely or partially blue and fails to completely change from blue to red. Insufficient specimen volume or incorrect procedural techniques are the most likely reasons for control line failure. Review the procedure and repeat the test with a new test cassette. If the problem persists, discontinue using the test kit immediately and contact your local distributor.

BIBLIOGRAPHY

1. US Department of Labor, Occupational Safety and Health Administration, 29 CFR Part 1910.1030, Blood borne pathogens.
2. US Department of Health and Human Services. Biosafety in Microbiological and Biomedical Laboratories. 5th ed. Washington, DC: US Government Printing Office; December 2009.
3. World Health Organization. Laboratory Biosafety Manual. 3rd ed. Geneva: World Health Organization; 2004.
4. Clinical and Laboratory Standards Institute (CLSI). Protection of Laboratory Workers From Occupationally Acquired Infections; Approved Guideline—Fourth Edition. CLSI Document M29-A4. Wayne, PA: CLSI; 2014.

Manufactured by

Healgen Scientific Limited Liability Company

Address: 3818 Fuqua Street, Houston, TX 77047, USA.

Tel: +1 713-733-8088

Fax: +1 713-733-8848

Website: www.healgen.com

Revision Date: 2022-01-27