SARS-CoV-2 Antigen Rapid Test (Colloidal Gold)

Instructions for Use

INTENDED USE

SARS-CoV-2 Antigen Rapid Test (Colloidal Gold) is intended for the qualitative detection of SARS-CoV-2 Antigen (Nucleocapsid protein) in nasal swab specimens in vitro.

The positive results indicate the existence of SARS-CoV-2 antigen. It should be further diagnosed by combining the patient's history and other diagnostic information [1]. The positive results do not exclude bacterial infection or other viral infection. Pathogens detected are not necessarily the main cause of disease symptoms.

The negative results do not exclude SARS-CoV-2 infection, and should not be the only basis for treatment or patient management decisions (including infection control decisions). Pay attention to the patient's recent contact history, medical history and the same signs and symptoms of COVID-19, if necessary, it is recommended to confirm these samples by PCR test for patient management.

It is for laboratory personnel who have received professional guidance or training and have professional knowledge of in vitro diagnosis, also for relevant personnel who have received infection control or nursing training [2].

SUMMARY

The SARS-CoV-2 is an enveloped β-coronavirus, circular or elliptical particle diameter of about 60 ~ 140nm, often pleomorphic, obviously different from SARS-CoV and MERS-CoV in genetic characteristics. The main clinical manifestations include fever, fatigue and other systemic symptoms, accompanied by dry cough, dyspnea, etc., which can rapidly develop into severe pneumonia, respiratory failure, acute respiratory distress syndrome, septic shock, multi-organ failure, severe acid-base metabolism disorder, and even life-threatening. SARS-CoV-2 has been identified as the main means of transmission through respiratory droplets (sneezing, coughing, etc.) and contact (picking nostril with the hand in contact with the virus, rubbing eyes, etc.).

SARS-CoV-2 is sensitive to ultraviolet ray and heat, and can be inactivated at 56℃ for 30 minutes and by fat soluble solvent such as ethyl ether, 75% ethanol, chlorine disinfectant, peracetic acid and chloroform.

PRINCIPLE

SARS-CoV-2 Antigen Rapid Test (Colloidal Gold) employs immuno-lateral chromatography technology for the qualitative detection of antigens [3, 4]. The colloidal gold particles labeled with the anti-SARS-CoV-2 antibody 1 are fixed on the conjugation pad. The anti-SARS-CoV-2 antibody 2 is bound on the “T” test line of nitrocellulose membrane. The Goat Anti-Mouse IgG is bound on the “C” control line of nitrocellulose membrane. When the concentration of SARS-CoV-2 in the specimen is higher than the minimum detection limit, which can conjugate with the anti-SARS-CoV-2 antibody 1 labeled with colloidal gold particles to form a complex. This complex migrates on the membrane via capillary action until the test line, where it will be captured by the anti-SARS-CoV-2 antibody 2 bound on the test line, forming “Au-Anti-SARS-CoV-2 antibody 1-(SARS-CoV-2) -Anti-SARS-CoV-2 antibody 2 complex. These complexes are deposited to display color as the determination of antigen positive, the rest of anti-SARS-CoV-2 antibody 1 labeled with colloidal gold particles conjugate with the Goat Anti-Mouse IgG and deposit to display color as the determination of quality of the “C” control line. When the concentration of SARS-CoV-2 in the specimen is lower than the minimum detection limit or no SARS-CoV-2, the complexes only deposit and display color in the “C” control line.

KIT COMPONENTS

Type A：The extraction solution of a plastic foam vial is only used for one test.

Catalogue number	51232801	51232803	51232805	51232807
Specifications	1 test/kit	2 tests/kit	20 tests/kit	25 tests/kit

Test device	1	2	20	25
Extraction solution	1	2	20	25
Extraction tube	1	2	20	25
Disposable swabs*	1	2	20	25
Instructions for Use	1	1	1	1

Type B：The extraction solution of a plastic tube is only used for one test.

Catalogue number	51232802	51232804	51232806	51232808
Specifications	1 test/kit	2 tests/kit	20 tests/kit	25 tests/kit
Test device	1	2	20	25
Extraction solution	1	2	20	25
Disposable swabs*	1	2	20	25
Instructions for Use	1	1	1	1

**CE information of disposable swab : CE0123 MDD 93/42/EEC.*

Materials required but not provided: Timer.

Active ingredients of main components

- Test device: Mouse anti- SARS-CoV-2 monoclonal antibody, Goat Anti-Mouse IgG polyclonal antibody.
- Extraction solution: Phosphate Buffer solution (0.01M, pH7.4±0.2)

REAGENT STORAGE AND STABILITY

Store the kit at 2-30°C/ 36-86°F, out of direct sunlight, valid for 24 months. Do not freeze the kit. The test device should be used within 60 minutes after opening the foil pouch. For production date and expiration date, please refer to the product label.

SPECIMEN REQUIREMENTS

1. Specimen collection:

①Tilt the patient's head back 70 degrees. While gently rotating the swab, insert swab less than one inch (about 2cm) into nostril (until resistance is met at the turbinates).

②Rotate the swab five times against the nasal wall then slowly remove from the nostril.

③Using the swab repeat the collection procedure with the second nostril.

Caution: If the swab stick breaks during sample collection, repeat sample collection with a new swab.

2. Sample Preparation：

Due to the different components and accessories in different types, there are some differences in sample handling methods. The operation method of corresponding type should be strictly followed.

Type A：

①Remove one specimen extraction tube from the kit before testing.

②Label one specimen extraction tube or write specimen number on it.

③Place the labeled specimen extraction tube in a rack in the designated area of the workspace.

④Remove a vial of extraction solution from the kit, screw off or cut off the sealing head of the extraction solution, and squeeze all the extraction solution into the extraction tube.

⑤Dip the swab head into the extraction solution in the extraction tube and rotate the swab close to the specimen extraction tube wall for about 10 seconds or 10 times to dissolve the specimens in the solution as much as possible.

⑥Squeeze the tip of the swab along the inner wall of the specimen extraction tube to keep the liquid in the tube as much as possible, remove and discard the swab.

⑦Tighten tube lid and stand by.

Type B：

①Remove one specimen extraction tube from the kit before testing.

②Label one specimen extraction solution or write specimen number on it.

③Place the labeled specimen extraction solution in a rack in the designated area of the workspace.

④Dip the swab head into the extraction solution to the bottom of the bottle and gently rotate the swab clockwise or anticlockwise for about 10 times to dissolve the specimens in the solution as much as possible.

⑤Squeeze the tip of the swab along the inner wall of the specimen extraction solution to keep the liquid in the tube as much as possible, remove and discard the swab.

⑥Tighten tube lid and stand by.

⑦Before testing, the upper part of the extraction solution tube lid should be broken off, and then the extraction solution can be dropped out.

3. Specimen storage

After treatment, the specimens can be stored at room temperature (15-30℃) for up to 24 hours, at 2-8℃ for up to 72 hours and at -20℃ for up to 36 months. The specimens are allowed to be frozen and thawed for three times.

ASSAY PROCEDURE

Before using the reagent, operate it strictly according to the Instruction for Use to ensure the accuracy of the results.

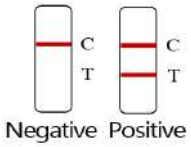
1. Before the detection, the test device and the sample are taken out from the storage condition and balanced to room temperature (15-30℃).
2. Tearing the packaging of the aluminum foil pouch, take out the test device, and place it horizontally on the test table.
3. Vertically invert the specimen extraction tube (the extraction tube with processed specimens), add 2 drops vertically into the sample well of the test device.
4. The test results should be interpreted within 15 to 20 minutes, invalid If more than 30 minutes.
5. Visual interpretation can be used in result interpretation.

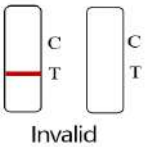
POSITIVE VALUE/LIMIT OF DETECTION

Positive value/limit of detection: 1.7×10^2 $TCID_{50}$/mL.

Select the confirmed inactivated SARS-CoV-2 medium, (concentration 3.4×10^5 $TCID_{50}$/mL), use gradient dilution method to find out the virus medium to reach the critical value of the detection. Repeat the action for 20 times and the test result is positive for at least 19 times.

INTERPRETATION OF TEST RESULTS





- **Negative:** The red line in the "C" control line region appears. No line appears in the "T" test line regions.

Negative result indicates that the content of the SARS-CoV-2 antigen in the sample is below the limit of detection or no antigen.

- **Positive:** The red line in the "C" control line region appears and a red line appears in the "T" test line region.

Positive result indicates that the content of the SARS-CoV-2 antigen in the sample is higher than the limit of detection.

- **Invalid:** Once the red line in the "C" control line region doesn't appear which will be treated as invalid.

The invalid result indicates that the procedure is not correct or that the test device is out of date or invalid. In this case, the package insert should be read carefully and repeat the test with a new test device. If the problem persists, discontinue using the test kit of this Lot number immediately and contact your local distributor.

Note: The color of the test strip will vary with different samples. However, regardless of the color of the test strip, it should be judged as positive result within the specified detection time.

LIMITATION

1. The product is for in vitro diagnostic use only. The test should be used for the detection of SARS-CoV-2 Antigen in nasal swab specimens only.

2. This test kit can only be used for the qualitative detection of SARS-CoV-2 antigens, and can't determine the quantity of SARS-CoV-2 antigens in samples.

3. If the test result is negative and clinical symptoms persist. It is recommended to repeat sampling or use other testing methods for testing. A negative result cannot preclude the possibility of exposure to or infection with SARS-CoV-2 virus at any time.

4. The test results of the test kits are for clinicians' reference only, and should not be used as the only basis for clinical diagnosis. The clinical management of patients should be comprehensively considered in combination with their symptoms/signs, medical history, other laboratory tests and treatment responses, etc.

5. Due to the limitation of the detection reagent methodology, the limit of detection of this reagent is generally lower than that of nucleic acid reagents. Therefore, the test personnel should pay more attention to the negative results and need to combine other test results to make a comprehensive judgment. It is recommended to use nucleic acid testing or virus isolation and culture identification methods to review negative results which have doubts.

6. Positive test results do not exclude co-infection with other pathogens.

7. False negative results may occur when the SARS-CoV-2 antigen level in the sample is lower than the detection limit of the kit or the specimen collection and transportation are not appropriate. Therefore, even if the test results are negative, the possibility of SARS-CoV-2 infection can't be ruled out.

8. Positive and negative predictive values are highly dependent on prevalence rates. Positive test results are more likely to represent false positive results during periods of little/no SARS-CoV-2 activity when disease prevalence is low. False negative test results are more likely when prevalence of disease caused by SARS-CoV-2 is high.

9. Monoclonal antibodies may fail to detect, or detect with less sensitivity, SARS-CoV-2 viruses that have undergone minor amino acid changes in the target epitope region.

10. Analysis of the possibility of false negative results:

(1)Unreasonable specimen collection, transportation and processing, low virus titer in the sample, no fresh sample or freezing and thawing cycling of the sample may lead to false negative results.

(2)The mutation of viral gene may lead to changes in antigenic determinants, which lead to negative results.

(3)The research on the SARS-CoV-2 has not been completely thorough; the virus may mutate and cause the differences for best sampling time (virus titer peak) and sampling location. Therefore, for the same patient, we can collect samples from multiple locations or follow up for multiple times reduce the possibility of false negative results.

CLINICAL PERFORMANCE

The performance of the SARS-CoV-2 Antigen Rapid Test (Colloidal Gold) was established with 859 samples prospectively collected from individual symptomatic patients who were suspected of COVID-19. Swab sample were collected and tested according to the requirements of the Instructions for Use. The storage, transportation and detection of samples after collection met the relevant requirements of the Instructions for Use. At the same time, SARS-CoV-2 was detected by emergency nucleic acid detection reagent.

Summary of the Performance of the WIZ'S SARS-CoV-2 Antigen Rapid Test (Colloidal Gold) Compared to RT-PCR

WIZ Results	Reference PCR Results		
	POS	NEG	Total
POS	328	0	328
NEG	14	517	531
Total	342	517	859

PPA: 95.91% (C.I. 93.25%~97.55%) NPA: 100.00% (C.I. 99.26%~100.00%) OPA：98.37% (C.I. 97.28~99.03%)

EXPLANTION OF TERMS:

C.I.: Confidence Interval

PPA: Positive Percent Agreement=True Positives/(True Positives+False Negatives)

NPA: Negative Percent Agreement=True Negatives /(True Negatives +False Positive)

OPA: Overall Percent Agreement=(True Positives+True Negatives)/Total Samples

PERFORMANCE CHARACTERISTICS

- Using enterprise reference for testing, the results meet the requirements of enterprise reference.
- Cross reaction

Name	Concentration	Test result
Influenza B/Yamagata	$1.83\times10^{6}TCID_{50}/mL$	Negative
Influenza B/Voctoria	$2.07\times10^{6}\ TCID_{50}/mL$	Negative
Influenza A H1N1	$1.00\times10^{6}\ TCID_{50}/mL$	Negative
Influenza A H3N2	$1.15\times10^{6}\ TCID_{50}/mL$	Negative
Influenza A H5N1	$1.32\times10^{6}\ TCID_{50}/mL$	Negative
H7N9 Avian Influenza	$1.60\times10^{6}\ TCID_{50}/mL$	Negative
SARS Coronavirus	$2.14\times10^{6}\ TCID_{50}/mL$	Negative
Adenovirus 1	$1.39\times10^{6}\ TCID_{50}/mL$	Negative
Adenovirus 3	$1.24\times10^{6}\ TCID_{50}/mL$	Negative
Adenovirus 7	$1.87\times10^{6}\ TCID_{50}/mL$	Negative
Human coronavirus 229E	$2.00\times10^{6}\ TCID_{50}/mL$	Negative
Human coronavirus OC43	$2.34\times10^{6}\ TCID_{50}/mL$	Negative
Human coronavirus NL63	$2.00\times10^{6}\ TCID_{50}/mL$	Negative
Human coronavirus HKU1	$2.00\times10^{6}\ TCID_{50}/mL$	Negative
MERS-coronavirus	$1.00\times10^{6}\ TCID_{50}/mL$	Negative
Cytomegalovirus	$1.00\times10^{6}\ TCID_{50}/mL$	Negative

Enterovirus 71	2.55×10^6 $TCID_{50}$/mL	Negative
Human parainfluenza virus 1	1.35×10^6 $TCID_{50}$/mL	Negative
Human parainfluenza virus 2	6.31×10^6 $TCID_{50}$/mL	Negative
Human parainfluenza virus 3	3.25×10^6 $TCID_{50}$/mL	Negative
Human parainfluenza virus 4	3.31×10^6 $TCID_{50}$/mL	Negative
Measles virus	6.31×10^6 $TCID_{50}$/mL	Negative
Mumps virus	6.31×10^6 $TCID_{50}$/mL	Negative
Respiratory syncytial virus	2.00×10^6 $TCID_{50}$/mL	Negative
Rhinovirus 1A	1.26×10^6 $TCID_{50}$/mL	Negative
Norovirus	1.30×10^6 $TCID_{50}$/mL	Negative
Epstein Barr Virus	2.18×10^6 $TCID_{50}$/mL	Negative
Varicella zoster virus	1.00×10^6 $TCID_{50}$/mL	Negative
Bacillus pertussis	1.30×10^6 CFU/mL	Negative
Chlamydophila pneumoniae	1.00×10^6CFU/mL	Negative
Escherichia coli	1.00×10^6CFU/mL	Negative
Haemophilus influenzae	1.20×10^6CFU/mL	Negative
Mycobacterium binding	1.00×10^6CFU/mL	Negative
Mycoplasma Pneumoniae	1.00×10^6CFU/mL	Negative
Candida Albicans	1.00×10^6CFU/mL	Negative
Neisseria meningococcus	1.00×10^6CFU/mL	Negative
Neisseria gonorrhoeae	1.00×10^6CFU/mL	Negative
Pseudomonas aeruginosa	3.70×10^6CFU/mL	Negative
Staphylococcus aureus	2.20×10^6CFU/mL	Negative
Streptococcus pneumoniae	1.00×10^6CFU/mL	Negative
Streptococcus pyogenes	1.28×10^6CFU/mL	Negative
Streptococcus salivarius	1.00×10^6CFU/mL	Negative
Iegionella Pneumophila	1.58×10^6CFU/mL	Negative

- Interfering Substance

Interfering substance name	Concentration	Negative interference result	Positive interference result
Mucin	5%	Negative	Positive
Whole blood	5% (V/V)	Negative	Positive
α-interferon	500 thousand IU/mL	Negative	Positive
Zanamivir	500ng/mL	Negative	Positive
Ribavirin	20μg/mL	Negative	Positive
Oseltamivir	5μg/mL	Negative	Positive
Peramivir	0.2mg/mL	Negative	Positive
Lopinavir	8 mg/mL	Negative	Positive
Ritonavir	530μg/mL	Negative	Positive

Umifenovir	4μg/mL	Negative	Positive
Levofloxacin	30μg/mL	Negative	Positive
Azithromycin	4.5μg/mL	Negative	Positive
Ceftriaxone	0.8mg/mL	Negative	Positive
Meropenem	1.1mg/ml	Negative	Positive
Tobramycin	4ng/mL	Negative	Positive
Phenylephrine	20μg/mL	Negative	Positive
Oxymetazoline	0.1mg/mL	Negative	Positive
Beclomethasone	0.1mg/mL	Negative	Positive
Dexamethasone	2 mg/mL	Negative	Positive
Flunisolide	0.1mg/mL	Negative	Positive
Triamcinolone acetonide	10.5ng/mL	Negative	Positive
Budesonide	2.75ng/mL	Negative	Positive
Mometasone	10ng/mL	Negative	Positive
Fluticasone	55μg/mL	Negative	Positive
Histamine Hydrochloride	10ng/mL	Negative	Positive
Sodium chloride	5%	Negative	Positive

- Hook effect

Within the concentration of 3.4×10^5 $TCID_{50}$/mL for cell culture medium of SARS-CoV-2 antigen, the test results of this product showed no Hook effect.

- Repeatability

The product was established using internal reference, there were no differences observed within-run, between-run.

WARNINGS AND PRECAUTIONS

1. The kit is only for in vitro diagnosis.

2. This kit can only be used to detect SARS-CoV-2 antigen, not any other virus or pathogen.

3. The reagents should be stored according to the requirements of storage conditions, and should be used within the validity period.

4. Do not open the aluminum foil bag before testing. If the aluminum foil bag is damaged or damp, stop using it immediately.

5. Do not use the reagent that has exceeded the validity period of the kit label.

6. Test results are meant to be visually determined.

7. In order to avoid wrong results, sample collection and reagent testing should be carried out in strict accordance with the instructions.

8. Do not reuse any kit components.

9. Correct sample collection, storage and transportation can ensure the correct test results.

10. Specific training or guidance is recommended if operators are not experienced with specimen collection and handling procedures. Wear protective clothing such as laboratory coats, disposable gloves, and eye protection when specimens are collected and evaluated. Pathogenic microorganisms, including hepatitis viruses and Human Immunodeficiency Virus, may be present in clinical specimens. Standard precautions and institutional guidelines should always be followed in handling, storing, and disposing of all specimens and all items contaminated with blood or other body fluids.

11. Dispose of used test kits as biohazardous waste in accordance with federal, state and local requirements.

12. Please wear appropriate protective clothing and gloves and protect your eyes / face during testing.

LITERATURE REFERENCES

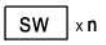
[1] NMPA. The Technical Key Points for Coronavirus (COVID-19) Antigen-antibody Detection Reagent Registration Review (Trial). (2020).

[2] Xu Chao, Li Ran. Analysis on the Risk Management of in Vitro Diagnostic Reagents[J]. China Medical Device Information. 2020, 26(13):8-10.

[3] Wu Jinhui, Meng Li. Immunocolloidal Gold Technology: Advances and Application[J]. Chinese Agricultural Science Bulletin. 2019, 35(13): 146-151.

[4] Li Yongqin, Yang Ruifu. Rapid test of immunocolloidal gold with membrane as solid phase carrier[J]. Progress in Microbiology and Immunology, 2003, 31(1): 74-78.

SYMBOLS

Symbol	Used for	Symbol	Used for	Symbol	Used for
	Consult instructions for use		Tests per kit		Manufacturer
	In Vitro Diagnostic Medical Device		Use-by date		Do not re-use
	Store at 2℃ ~ 30℃		Catalogue number		Batch code
	Authorized Representative in the European Community		Caution		Biological risks
	Don't use the product when the package is damaged		Keep dry		n Test devices
	n Extraction tubes		n Extraction solution		n Disposable swabs


Xiamen Wiz Biotech Co., Ltd.
Address: 3-4 Floor, NO.16 Building, Bio-medical Workshop, 2030 Wengjiao Xi Road, Haicang District, Xiamen City, Fujian Province, 361026, P.R. China
Tel: +86-592-6808278 Fax: +86-592-6808279


Qarad EC-REP BV
Pas 257, 2440 Geel, Belgium

CE-01.0103-2021.02.11 Eng

CE