RESZON **REF** RDG-RD0301 **IVD**

Reszon Dengue Rapid Combo Dengue NS1 & IgG/IgM Test

(A rapid test for the detection of Dengue Fever)

INTENDED USE

Reszon Dengue Rapid Combo Dengue NS1 & IgG/IgM Test device is a qualitative test for the simultaneous detection of Dengue NS1 Antigens and specific IgM and IgG antibodies to dengue virus in human serum, plasma, or whole blood. The test provides a differential detection of anti-dengue IgM and anti-dengue-IgG antibodies and can be used for the presumptive distinction between a primary and secondary dengue infection. This test is for professional *In-Vitro* Diagnostic use only. The results obtained should not be the sole determinant for clinical decision.

SUMMARY AND EXPLANATION OF THE TEST

Dengue virus, a virus belonging to the Flavivirus group of viruses, is one of the most significant mosquito-borne diseases in the world in terms of morbidity and mortality. It is transmitted principally by the mosquito types *Aedes aegypti* and *Aedes albopictus*. The virus is found commonly throughout the tropic and subtropic regions of the world. There are four known serotypes of Dengue. Symptoms of Dengue fever include high fever, headache, muscle pain and skin rash. Occasionally it develops into a potentially lethal complication called severe dengue (dengue hemorrhagic fever or dengue shock syndrome). There is no specific treatment for Dengue/ severe Dengue, but early detection and access to proper medical care lowers fatality rates to below 1%.

Dengue NS1 (nonstructural protein 1) is a highly conserved glycoprotein that is circulating in patient sera during the early clinical phase of the disease. NS1 antigen is found in patient samples from the first day up to 9 days after onset of fever. The detection of NS1 antigen provides a tool for the early diagnosis of Dengue infection before serological antibodies are detectable.

The immune response to this virus includes the production of IgM antibodies by the 5th day of symptoms, which remain in the circulatory system for 30-60 days. IgG antibodies appear by the 14th day of infection and persist for life. A secondary infection often results in high fever and, in many cases, initiates hemorrhagic events and circulatory failure. A secondary infection also induces an IgM antibody response after 20 days of infection and IgG antibodies rise within 1-2 days after the onset of symptoms. Therefore, patients with secondary infections will have a positive IgG result, usually with a positive IgM result as well. Thus, the use of a reliable and sensitive rapid serological test that can simultaneously detect the presence of anti-dengue IgG and IgM antibodies is of great clinical utility.

Reszon Dengue Rapid Combo Dengue NS1 & IgG/IgM Rapid Test provides an excellent tool for the diagnosis of Dengue infection from the early infection stage to the later stage after the onset of antibodies, enhancing the accuracy of the diagnosis of Dengue infection. Additional advantages includes:

- fast, simple and reliable
- simple to perform and no additional sample preparation required
- no special equipment is needed
- results are easy to interpret
- minimal sample volume used

PRINCIPLE OF THE TEST

Dengue Rapid NS1 Test is a sandwich solid-phase immunochromatographic assay. First a specimen is added onto the sample well, the gold antibody conjugate will bind to Dengue antigen in the specimen sample, if present, and form a complex. As the reagent moves across the membrane, the anti-Dengue NS1 antibody on the membrane will bind to the antibody-antigen complex causing pale or dark pink-purplish line to form at the test line region of the test membrane. The intensity of the lines will vary depending upon the amount of antigen present in the sample. The appearance of pink-purplish line in the test region should be considered as positive result. A purplish-pink procedural control band will always appear in the control region if the test has been performed properly.

Dengue Rapid IgG/IgM is an indirect solid-phase immunochromatographic assay. When a specimen is added to the test device, IgG and IgM antibodies in the specimen sample, if present, will react with particles coated with dengue envelope proteins to form a complex. As this complex moves across the membrane, the anti-dengue IgG/IgM antibody particle complex is captured by the relevant anti-human IgG and/or IgM test bands immobilized on the membrane, causing a pale to dark pink-purplish band to form at the IgG or IgM region of the test device window. The intensity of the bands will vary depending upon the amount of antibody present in the sample. The appearance of any color in a specific test region (G or M) should be considered as positive for that particular antibody type (IgG or IgM). A pink-purplish procedural control band should always develop in the test device window to indicate that the test has been performed properly.

REAGENTS AND MATERIALS SUPPLIED

1. Dengue Rapid NS1 cassette & Dengue Rapid IgG/IgM cassette (25 pieces each, packed in individually sealed aluminium pouch)
2. One bottle of assay buffer (for Dengue Rapid IgG/IgM test)
3. One copy of instruction manual (product insert)
4. 25 pcs disposable droppers

MATERIALS REQUIRED BUT NOT SUPPLIED

1. Sample dispensing apparatus such as pipette capable of delivering 10-100 µl sample volume
2. Clock or timer

STORAGE AND STABILITY

Store at 4-30 ºC, do not freeze. Keep the test device sealed until used. Keep away from direct sunlight, moisture and heat.

WARNINGS AND PRECAUTIONS

1. For professional *In-Vitro* Diagnostic use only.
2. This product insert must be strictly followed in order to produce accurate test results.
3. Keep the test device sealed until use. Once the device pouch has been opened, the test device must be used immediately.
4. All test devices and specimens must be at room temperature (15-30°C) before running the assay.
5. Do not use device if the sealed pouch is visibly damaged.
6. Do not use the kit contents beyond the expiration date.
7. Handle all specimens as being potentially infectious. Dispose all materials that come in contact with the specimen as infectious waste.
8. Wipe any spills of sera or plasma promptly with disinfectant.
9. Do not reuse test device.

LIMITATION OF THE TEST

1. This product is designed for use with human serum, plasma or whole blood only.
2. This test detects the presence of Dengue NS1 antigens and specific IgM and IgG antibodies to dengue virus in human serum/ plasma and should not be used as the sole criterion for the diagnosis of a Dengue Fever infection.
3. Strict adherence to the test procedure is required. Optimal assay performance requires strict adherence to the assay procedure described in this Instruction sheet and any deviations from the procedure may lead to aberrant results.
4. Do not re-use negative devices.
5. The test is a qualitative assay and cannot be used to monitor therapy or to estimate the titer of the infection.
6. The results obtained should only be interpreted in conjunction with other diagnostic results and clinical information. If the test result is negative and Dengue Fever infection suspicion still exists, additional follow-up testing using other clinical methods is recommended.
7. A negative result at any time does not preclude the possibility of an early infection.
8. A final diagnosis should be based on these test results in conjunction with other clinical and laboratory findings.

PERFORMANCE CHARACTERISTICS

Sensitivity and specificity for Reszon Dengue NS1 Ag Rapid Test are 95.80% and 96.15% respectively. Sensitivity and specificity for Dengue Fever Rapid IgG/IgM are 96.72% and 97.58% respectively.

WARRANTY AND LIMITED LIABILITY

The performance characteristics stated were obtained by using the assay procedure in this insert. Failure to follow the assay procedure may derive inaccurate results. In such event, the manufacturer disclaims all warranties expressed, implied or statutory, including the implied warranty of merchantability and the fitness for use.

The manufacturer will not be liable for any damage caused by misuse, improper handling and storage, non-compliance with warnings and procedures, damage caused by events occurring after the product is released, failure to ensure the product is in proper condition before use, or any warranty given by independent distributor.

SAMPLE COLLECTION AND PREPARATION

1. Handle all specimens as capable of transmitting infectious diseases. Dispose of all materials that come in contact with the specimen as infectious waste.
2. Specimens should be collected aseptically by fingerstick or venipuncture according to standard methods. The use of grossly lipemic or turbid samples should be avoided.
3. Separate the serum or plasma from blood as soon as possible to avoid hemolysis. Only clear, non-hemolyzed specimens can be used. Whole blood samples should be used immediately, if possible.
4. Testing should be performed immediately after the specimens have been collected. Do not leave the specimens at room temperature for prolonged periods. Specimens may be stored at 2-8°C for up to 3 days. For long-term storage, specimens should be kept below -20°C.
5. Bring specimens to room temperature prior to testing. Frozen specimens must be completely thawed and mixed well prior to testing. Specimens should not be frozen and thawed repeatedly.

ASSAY PROCEDURE

Reminder:

- Bring test cassettes and assay buffer to room temperature (15-30°C) before testing.
- If precipitates are noted in the assay buffer reagent, shake the bottle vigorously and allow to warm up further.
- Gently tear open the pouch, remove the test cassettes. Lay the test devices on a clean, flat surface and label the test cassette with the sample name.

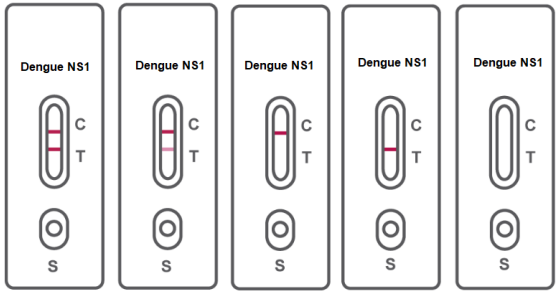
Dengue NS1 Ag Rapid Test:

1. Add 75 µl (or 3 drops using disposable dropper) of serum, plasma, or whole blood into the sample well.
2. Wait for the pink-purplish line(s) to appear. The test result should be read at between 15 and 20 minutes. Result may be read up to 30 minutes.

NOTE: Positive results may appear as early as 5-10 minutes. Negative results must be confirmed only after 15 minutes. Do not interpret the results after 20 minutes.

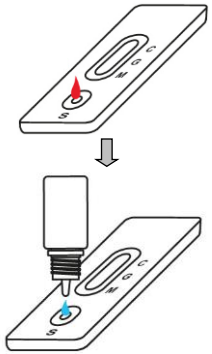
INTEPRETATION OF RESULTS

The background of the strip should be pinkish-white, not red, prior to confirming a negative result. Positive results may appear as early as 5 minutes. Negative results must be confirmed after 15 minutes. Results should not be read after 20 minutes.



1. **Positive:**
   Coloured bands appear at the control line (C) and test line (T), indicate a positive result for Dengue NS1 antigen.
2. **Negative**:
   Only control line (C) is visible. No NS1 antigen was detected.
3. **Invalid:**
   Control line (C) is absent. If this occurs, the assay should be repeated using a new test cassette.

NOTE: The intensity of the color in the test line region will vary depending on the concentration of NS1 antigen present in the specimen. However, neither the quantitative value nor the rate of increase in NS1 antigen can be determined by this qualitative test. The diagnosis of Dengue fever should be made using the results of this test together with the other clinical and laboratory findings.

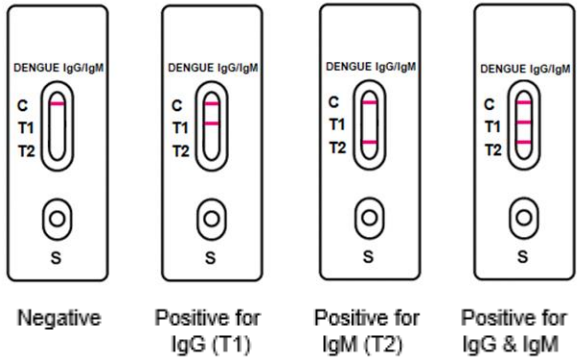


Dengue Rapid IgG/ IgM Test

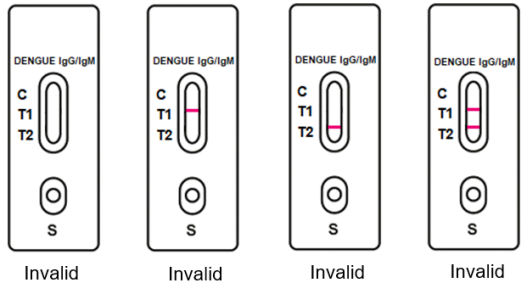
1. Add 10 µl of serum, plasma, or whole blood into the upper portion of the sample well (as marked in the image above). Make sure that there are no air bubbles.
2. Hold the buffer bottle vertically and add 1 drop of buffer into the same sample well of the test device. Sample will start wicking up.
3. Read the test result within 15-20 minutes.

NOTE: Positive results may appear as early as 5-10 minutes. Negative results must be confirmed only after 15 minutes. Do not interpret the results after 20 minutes.

INTERPRETATION OF RESULTS



1. **Negative**:
   Only control line (C) is visible. No IgG or IgM antibodies were detected. The result does not exclude dengue infection. If symptoms persist, a new sample should be drawn from the patient in 3-5 days and then should be retested (see the limitations section).
2. **Positive for IgG:**
   Coloured bands appear at the control line (C) and test line (T1). The test is positive for IgG antibodies. This is indicative of a past dengue infection (see the limitations section).
3. **Positive for IgM:**
   Coloured bands appear at the control line (C) and test line (T2). The test is positive for IgM antibodies. This is indicative of a primary dengue infection (see the limitations section).
4. **Positive for IgM and IgG:**
   Coloured bands appear at the control line (C) and both test lines (T1 and T2). The test is positive for IgM and IgG antibodies. This is indicative of a secondary dengue infection (see the limitations section).



Invalid: Control line (C) is absent. If this occurs, the assay should be repeated using a new test cassette.

QUALITY CONTROL

An internal procedural control has been incorporated into the test to ensure proper kit performance and reliability. A coloured line appearing in the control line region (C) confirms sufficient specimen volume, adequate membrane wicking and correct procedural technique.

Control standards are not supplied with this kit. However, it is recommended that positive and negative controls be tested as good laboratory practice to confirm the test procedure and to verify proper test performance.

REFERENCES

1. Sabin, AB and Schlesinger RW. Production of immunity to Dengue with virus modified by propagation in mice: Science (1945), 101:640.
2. Lam, SK. Dengue haemorrhagic fever. Rev. Med. Micro. (1995), 6:39-48.
3. Innis, BL, Nisalak, A., et.al. An enzyme-linked immunosorbent assay to characterize dengue infections where dengue and Japanese encephalitis co-circulate. Am. J. Trap. Med. Hygiene (1989), 40:418-427.
4. CDC/NIH Guidelines. Biosafety in Microbiological and Biomedical Laboratories. 2nd Edition, 1988.
5. Siti-Strong. Diagnosis, prevention, and treatment of tropical disease, 7th ed., Philadelphia, the Ablakiston Company.

ORDER INFORMATION

Product Code	*Description*	*Packing Size*
RDG-RD0301	Reszon Dengue Rapid Combo Dengue NS1 & IgG/IgM Test	25 tests / kit

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IFU No.: RDG-RD0301-EN-MY
Version: 01
Effective date: 2023.05.25