THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH

TANZANIA MEDICINES AND MEDICAL DEVICES AUTHORITY

PUBLIC ASSESSMENT REPORT FOR OF LABOREX HEPATITIS C TEST STRIPS (WHOLE BLOOD/SERUM/PLASMA)

Version number 2.0, 12/09/2024

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1. Introduction

Laborex is a class *D in-vitro diagnostic device* belonging to the *Clinical Laboratory* specialty category. It is approved in Tanzania as a *kit* for use in *adults, children, and elderly* by *well-trained healthcare professionals.*

1.1. Administrative Information

Registration number	*TAN 24 MDR 0039*
Brand Name (if relevant)	*Laborex*
Common name	*HCV Hepatitis C Test Strips (Whole blood/Serum/Plasma)*
Class of the device and rule applied	*Class D, Rule 1*
GMDN code and term	*30829 & Hepatitis C Virus Total Antibody IVD, Kit, Rapid ICT, Clinical*
Name and complete address of the Market Authorization Holder	CROWN HEALTHCARE (T) LIMITED, Plot no. 45A & 45B Ursino Street, Regent Estate, Dar es Salaam, **Tanzania.** Tel: + 255 222775335, Mob: 0768 100444, Email: tzcrownafrica@gmail.com,
Name and address (es) of local responsible person (LRP).	CROWN HEALTHCARE (T) LIMITED, Plot no. 45A & 45B Ursino Street, Regent Estate, Dar es Salaam, **Tanzania**. Tel: + 255 222775335, Mob: 0768 100444, Email: tzcrownafrica@gmail.com,

1.2. Assessment Procedure

The application for registration of *Laborex* was submitted on *11/12/2017*. The product underwent *full* assessment. Assessment was completed in five rounds of evaluation. *Laborex* was registered on *08/02/2024.*

2. Technical information

2.1. Intended use

The intended use of *Laborex* as declared by the manufacturer and approved by TMDA is *for qualitative detection of antibodies (IgG, IgM, and IgA) anti- Hepatitis C virus (HCV) in human whole blood, serum or plasma. It is intended to be used as a screening test and as an aid in the diagnosis of infection with HCV. Laborex* is approved for use *in the clinical laboratory well-trained clinical laboratory professionals.*

2.2. Device details and features

Laborex has been registered as a *kit* which consists of *Test Strip, pipette dropper, desiccant, buffer and package Insert.*

Laborex is a *rapid test* device. It is used to *aid diagnosis* of *Hepatitis C virus. Laborex* operates by principle of the double antigen-sandwich technique. The test out-put is *qualitative*.

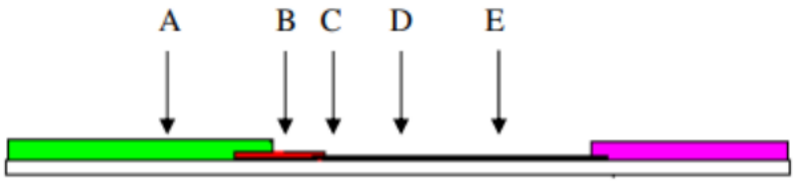
The type of specimen used is *whole blood, serum, or plasma* and is collected by *venipuncture or fingerstick.*

The HCV Ab Rapid Test Strip (Whole Blood/Serum/Plasma) is a sandwich lateral flow chromatographic immunoassay for the qualitative detection of antibodies (IgG, IgM, and IgA) antiHepatitis C virus (HCV) in human whole blood, serum or plasma. It is intended to be used as a screening test and as an aid in the diagnosis of infection with HCV. Any reactive specimen with the HCV Ab Rapid Cassette must be confirmed with alternative testing method(s) and clinical findings.
Hepatitis C Virus (HCV) is a small, enveloped, positive-sense, single-stranded RNA virus. Antibody to HCV is found in over 80% of patients with well-documented non-A, non-B hepatitis. Conventional methods fail to isolate the virus in cell culture or visualize it by electron microscope. Cloning the viral genome has made it possible to develop serologic assays that use recombinant antigens. Compared to the first-generation HCV EIAs using single recombinant antigen, multiple antigens using recombinant protein and/or synthetic peptides have been added in new serologic tests to avoid nonspecific cross-reactivity and to increase the sensitivity of the HCV antibody tests HCV Ab Rapid Test Strip (Whole Blood/Serum/Plasma) is a rapid test to qualitatively detect the presence of antibody to HCV in a whole blood, serum or plasma specimen. The test utilizes a combination of recombinant antigen to selectively detect elevated levels of HCV antibodies in whole blood, serum or plasma.
The HCV Ab Rapid Test Strip is a lateral flow chromatographic immunoassay based on the principle of the double antigen–sandwich technique. The test strip consists of: 1) a burgundy-colored conjugate pad containing HCV antigens conjugated with colloidal gold (HCV Ag and rabbit IgG-gold conjugates, 2) a nitrocellulose membrane strip containing a test band (T band) and a control band (C band). The T band is pre-coated with non-conjugated HCV antigens, and the C band is pre-coated with goat anti-rabbit IgG. When an adequate volume of test specimen is dispensed into the sample well of the strip, the specimen migrates by capillary action across the strip. The antibodies: The IgG, the IgM,

or the IgA, to HCV if present in the specimen will bind to the HCV Ag conjugates. The immunocomplex is then captured on the membrane by the pre-coated HCV antigens, forming a burgundy-colored T band, indicating a HCV Ab positive test result. Absence of the T band suggests a negative result. The test contains an internal control (C band) which should exhibit a burgundy-colored band of the immunocomplex of goat anti-rabbit IgG/rabbit IgG-gold conjugate regardless the presence of any antibodies to HCV. Otherwise, the test result is invalid and the specimen must be retested with another device

Description of test principles

Figure 1: Test Principle



As shown in Figure 1 above, the specimen (A) migrates via capillary action along the membrane to react with the colored conjugate (B). HCV present in the specimen below cutoff will not react the binding sites of the gold-conjugated anti-HCV antigen and not form a colored antibody-antigen complex(C). The gold-conjugated antibodies will then be not captured by immobilized HCV conjugate and no red band formation indicating a negative result (D). A red line formation in the test line region indicates a positive reading and that the HCV level of the test specimen is above the detection sensitivity of the test. In the control line region of the membrane, immobilized reagents capture colored conjugate regardless of the presence of the test specimen composition. The resulting visible red band (E) confirms that the assay is functioning correctly

2.3. Commercial presentation

There is one approved commercial presentation for a *pack of 50 test strips in carton box. Each package contains test strips, pipette dropper, desiccant, buffer and package Insert.*

2.4. Items required but not submitted

a) *Specimen collection containers*
b) *Lancets (for fingerstick whole blood only)*
c) *Centrifuge (for plasma only)*
d) *Timer*
e) *Heparinized capillary tubes and dispensing bulb (for fingerstick whole blood only)*

3. Storage instructions

3.1.1. Shelf-life

The approved shelf-life is *24* months.

3.1.2. Storage conditions

The recommended storage condition is *at room temperature or refrigerated (2-30°C).*

3.1.3. Shipping conditions

It was shown in the device validation report that a study was conducted to mimic the harsh shipping conditions. Stressed tests were stored at 25℃ thereafter for subsequent stability testing: The stress conditions included the following.

1. *3XFT/25°C: Perform 3 freeze/thaw cycles and at the last thaw, transfer to 25℃ for the remainder of the study.*
2. *Two (2) Days @ 55 °C /25 °C: Place test strips in a 55 °C oven for 2 days and then transferred to 25 °C for the remainder of the study.*

4. Manufacturing site audit

The manufacturer of the device *is Zhejiang Orient Gene Biotech Co., Ltd, 3787#, East Yangguang Avenue, Dipu Street, Anji* 313300, Huzhou, *Zhejiang, P.R. China.* Quality audit *was paid for on 21/10/2024 and the report is yet to be produced.*

5. Performance Evaluation

5.1. Analytical Performance

The analytical performance characteristic of the device was established through the following test parameters: repeatability and reproducibility, analytical sensitivity and analytical specificity

5.2. Clinical Performance

Clinical performance was conducted *on 1886 specimens. 107 positive specimens and 1779 negative specimens confirmed by EIA were tested using one lot of the Orient Gene HCV Rapid Test. The study was conducted at Anji Traditional Medicine Hospital in China.* The *sensitivity and specificity* parameters were tested.

Based on results of the performance studies, it was concluded that the *test sensitivity and specificity are 98.1% and 98.9% respectively.* The studies further concluded that *Laborex* is capable of consistently producing accurate and reliable test output.

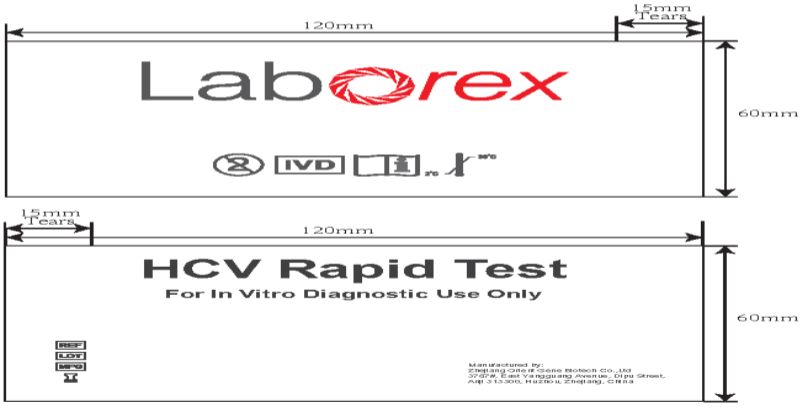
6. Product label and instructions for use

The content of the primary and secondary labels is in line with TMDA labeling requirements in terms of content, layout and design. The label contains sufficient information for proper identification of the device and post marketing follow up of the product in the market.

The *instructions for use* include all the relevant information to ensure correct and safe use of the device by intended user.

6.1. Primary pack

物料名称：	HCV Test Pouch(Laborex)
尺寸：	120-60mm
物料编码：	B10681-03
材质：	PET12/AL7/CPPS5
工艺：	彩色印刷
日期：	2016-5-20



6.2. Secondary pack

6.3 Instructions for use/Package insert

Instructions for use can be accessed by clicking here

7. Risk – Benefit Analysis

On basis of the data submitted, the current state of knowledge and compliance of the manufacturer to ISO 13485, the benefit of the product outweighs the risks associated with its use when used in accordance with the manufacturer instruction. *Laborex* was recommended for registration.

8. Post-approval updates

8.1. Variation applications

Reference number	Date submitted	Change requested	Recommendation	Granting date
NA	NA	NA	NA	NA

8.2. Feedback from pharmacovigilance, post marketing surveillance and enforcement activities

Type of feedback	Impact	Response
No recorded Adverse Event	NA	NA

8.3. Re-registration applications

NA

CHANGE HISTORY

Version number	Date	Description of update	Section(s) Modified	Approval date

HCV Ab Rapid Test Strip
(Whole Blood/Serum/Plasma)

INTENDED USE

The HCV Ab Rapid Test Strip (Whole Blood/Serum/Plasma) is a sandwich lateral flow chromatographic immunoassay for the qualitative detection of antibodies (IgG, IgM, and IgA) anti- Hepatitis C virus (HCV) in human whole blood, serum or plasma. It is intended to be used as a screening test and as an aid in the diagnosis of infection with HCV. Any reactive specimen with the HCV Ab Rapid Strip must be confirmed with alternative testing method(s) and clinical findings.

INTRODUCTION

Hepatitis C Virus (HCV) is a small, enveloped, positive-sense, single-stranded RNA Virus. Antibody to HCV is found in over 80% of patients with well-documented non-A, non-B hepatitis. Conventional methods fail to isolate the virus in cell culture or visualize it by electron microscope. Cloning the viral genome has made it possible to develop serologic assays that use recombinant antigens [1, 2]. Compared to the first generation HCV EIAs using single recombinant antigen, multiple antigens using recombinant protein and/or synthetic peptides have been added in new serologic tests to avoid nonspecific cross-reactivity and to increase the sensitivity of the HCV antibody tests [3, 4].

HCV Ab Rapid Test Strip (Whole Blood/Serum/Plasma) is a rapid test to qualitatively detect the presence of antibody to HCV in a whole blood, serum or plasma specimen. The test utilizes a combination of recombinant antigen to selectively detect elveated levels of HCV antibodies in whole blood, serum or plasma.

PRINCIPLE

The HCV Ab Rapid Test Strip is a lateral flow chromatographic immunoassay based on the principle of the double antigen–sandwich technique. The test strip consists of: 1) a burgundy colored conjugate pad containing HCV antigens conjugated with colloidal gold (HCV Ag conjugates) and rabbit IgG-gold conjugates, 2) a nitrocellulose membrane strip containing a test band (T band) and a control band (C band). The T band is pre-coated with non-conjugated HCV antigens, and the C band is pre-coated with goat anti-rabbit IgG. When an adequate volume of test specimen is dispensed into the sample well of the strip, the specimen migrates by capillary action across the strip. The antibodies: either the IgG, the IgM, or the IgA, to HCV if present in the specimen will bind to the HCV Ag conjugates. The immunocomplex is then captured on the membrane by the pre-coated HCV antigens, forming a burgundy colored T band, indicating a HCV Ab positive test result. Absence of the T band suggests a negative result. The test contains an internal control (C band) which should exhibit a burgundy colored band of the immunocomplex of goat anti-rabbit IgG/rabbit IgG-gold conjugate regardless the presence of any antibodies to HCV. Otherwise, the test result is invalid and the specimen must be retested with another device.

PRODUCT CONTENTS

HCV Ab Rapid Test Strip(Whole Blood/Serum/Plasma) containing HCV antigen coated particles and HCV antigen coated on the membrane.

MATERIALS SUPPLIED

1. Test Strip 2. Pipette Dropper 3.Desiccant 4.Buffer 5.Package Insert

MATERIAL REQUIRED BUT NOT PROVIDED

1.Specimen collection containers 2.Lancets (for fingerstick whole blood only)
3.Centrifuge (for plasma only) 4.Timer
5.Heparinized capillary tubes and dispensing bulb (for fingerstick whole blood only)

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 professional In Vitro diagnostic use only. Do not use after expiration date.
2.Warning: the reagents in this kit contain sodium azide which may react with lead or copper plumbing to form potentially explosive metal azides. When disposing of such reagents, always flush with large volumes of water to prevent azide build-up.
3. Do not use it if the tube/pouch is damaged or broken.
4.Test is for single use only. Do not re-use under any circumstances.
5.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.
6. Wear protective clothing such as laboratory coats, disposable gloves and eye protection when specimens are assayed.
7. Humidity and temperature can adversely affect results .

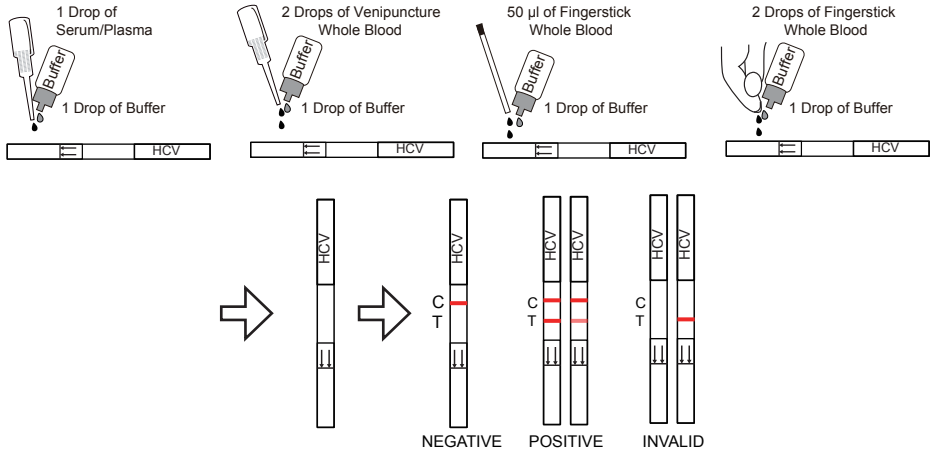
SPECIMEN COLLECTION

1.The HCV Rapid Test Strip (Whole Blood/Serum/Plasma) can be performed using whole blood (from venipuncture or fingerstick), serum or plasma.
2.To collect Fingerstick Whole Blood specimens:
▪Wash the patient's hand with soap and warm water or clean with an alcohol swab. Allow to dry.
▪ Massage the hand without touching the puncture site by rubbing down the hand towards the fingertip of the middle or ring finger.
▪Puncture the skin with a new sterile lancet for each person. Wipe away the first sign of blood.
▪Gently rub the hand from wrist to palm to finger to form a rounded drop of blood over the puncture site.
▪ Add the Fingerstick Whole Blood specimen to the test strip by using a capillary tube:
·Touch the end of the capillary tube to the blood until filled to approximately 50 µL. Avoid air bubbles.
·Place the bulb onto the top end of the capillary tube, then squeeze the bulb to dispense the whole blood into the sample pad of the test strip.
▪Add the Fingerstick Whole Blood specimen to the test strip by using hanging drops:
·Position the patient's finger so that the drop of blood is just above the sample pad of the test strip.
·Allow 2 hanging drops of fingerstick whole blood to fall into the center of sample pad of the test strip or, move the patient's finger so that the hanging drop touches the center of the sample pad. Avoid touching the finger directly to the sample pad.
3.Separate serum or plasma from blood as soon as possible to avoid hemolysis. Use only clear, non-hemolyzed specimens.
4.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. Whole blood collected by venipuncture should be stored at 2-8°C if the test is to be run within 2 days of collection. Do not freeze whole blood specimens. Whole blood collected by fingerstick should be tested immediately.
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.
6.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 strip, specimen, buffer and/or controls to equilibrate to room temperature (15-30°C) prior to testing.
1.Remove the test device from the 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.
For Serum or Plasma Specimens: Hold the dropper vertically and transfer 1 drop of serum or plasma (approximately 30 µL) to the sample pad of the test strip, then add 1 drop of buffer (approximately 30 µL) and start the timer. See illustration below.
For Venipuncture Whole Blood Specimens: Hold the dropper vertically and transfer 2 drops of venipuncture whole blood (approximately 50µL) to the sampel pad of the strip, then add 1 drop of buffer (approximately 30 µL) and start the timer. See illustration below.
For Fingerstick Whole Blood Specimens: Allow 2 hanging drops of fingerstick whole blood (approximately 50 µL) to fall into the center of the sample pad on the test strip, then add 1 drop of buffer (approximately 30 µL) and start the timer. See illustration below.
3. Wait for the red line(s) to appear. The result should be read in 15 minutes. Do not interpret the result after 15 minutes.

HCV Ab Rapid Test Strip
(Whole Blood/Serum/Plasma)



INTERPRETATION OF RESULTS

(please refer to the illustration above)
Positive: Two lines appear. One colored line should be in the control line region (C) and another apparent colored line should be in the test line region (T).
Negative: One colored line appears in the control line region(C). No line appears in the test line region (T).
Invalid: Control line fails to appear. 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 device. If the problem persists, discontinue using the test kit immediately and contact your local distributor.

QUALITY CONTROL

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. Control standards are not supplied with this test. However, it is recommended that positive and negative controls are sourced from a local competent authority and tested as a good laboratory practice, to confirm the test procedure and verify the test performance.

LIMITATIONS

1. The HCV Ab Rapid Test Cassette (Whole Blood/ Serum/Plasma) is for in vitro diagnostic use only. This test should be used for the detection of antibodies to HCV in whole blood, serum or plasma specimen.
2. The HCV Ab Rapid Test Cassette (Whole Blood/Serum/Plasma) will only indicate the presence of antibodies to HCV in the specimen and should not be used as the sole criteria for the diagnosis of Hepatitis C viral infection.
3. As with all diagnostic tests, all results must be considered with other clinical information available to the physician.
4. If the test result is negative and clinical symptoms persist, additional follow-up testing using other clinical methods is recommended. A negative r esult at any time does not preclude the possibility of Hepatitis C Virus infection.
5. A negative result can occur if the quantity of the antibodies to HCV 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.
6. Some specimens containing unusually high titer of heterophile antibodies or rheumatoid factor may affect expected results.

PERFORMANCE CHARACTERISTICS

Sensitivity: HCV Ab Rapid Test Strip (Whole Blood/ Serum/Plasma) has passed a seroconversion panel and compared with leading commercial HCV EIA test using clinical specimens.

Specificity: The recombinant antigens used for HCV Ab Rapid Test Strip (Whole Blood/Serum/Plasma) are encoded by genes for both structural (nucleocapsid) and non-structural proteins. HCV Ab Rapid Test Strip (Whole Blood/Serum/Plasma) is highly specific for antibodies to Hepatitis C Virus compared with a leading commercial HCV EIA test.
The HCV Ab Rapid Test Strip vs.EIA test

Method		EIA		Total Results
HCV Ab RapidTest	Results	Positive	Negative	
	Positive	105	19	124
	Negative	2	1760	1762
Total Results		107	1779	1886

Relative sensitivity: 98.1%
Relative specificity: 98.9%
Accuracy: 98.9%

REFERRENCE

1. Choo, Q.L., G.Kuo,A.J. Weiner, L.R. Overby,D.W. Bradley, andM. Houghton. Isolation of a cDNA clone derived from a blood-borne non-A, non-B viral hepatitis genome Science 189;244:359
2. Kuo, G., Q.L. Choo, H.J. Alter, and M. Houghton. An assay for circulating antibodies to a major etiolog Virus of human non-A, non-B hepatitis. Science 1989; 244:362.
3. Van der Poel, C.L., H.T.M. Cuypers, H.W. Reesink, and P.N. Lelie .Confirmation of hepatitis C Virus infection by new four- antigen recombinant immunoblot assay. Lancet 1991;337:317
4. Wilber, J.C.Development and use of laboratory tests for hepatitis Cinfection: a review.J. Clin. Immunoassy 1993;16:204.