

Instructions for Use

RealLine Helicobacter pylori Fla-Format

KIT FOR THE QUALITATIVE DETECTION OF *HELICOBACTER PYLORI* DNA USING REAL-TIME PCR METHOD










In vitro Diagnostics



RealLine Helicobacter pylori (Fla-format)	VBD3796	50 Tests
valid from	November 2019	

RealLine Helicobacter pylori Fla-Format

Explanation of symbols used in labeling

	<i>In vitro</i> diagnostic medical device
	Batch code
	Catalogue number
	Contains sufficient for <n> tests
	Use-by-date
	Temperature limit
	Consult instructions for use
	Keep away from sunlight
	Manufacturer



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Trademarks:

Rotor-Gene® is a registered trademark of Qiagen Group, Germany.

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1. INTENDED USE

Clinical Information:

Helicobacter pylori is a gram-negative, microaerophilic bacterium found in the stomach. The most people infected with *H.pylori* show no symptoms, but an acute infection may appear as an acute gastritis with abdominal pain (stomach ache) or nausea. Where an acute gastritis cause a chronic gastritis, the symptoms, are often those of non-ulcer dyspepsia: stomach pains, nausea, bloating, belching, and sometimes vomiting or black stool. The presence of *H.pylori* is a risk factor for gastric cancer.

RealLine *Helicobacter pylori* (Fla-format) assay kit is designed to detect *Helicobacter pylori* DNA isolated from clinical specimens using extraction kits:

RealLine DNA-Extraction 2 (REF VBC8897)

RealLine Extraction 100 (REF VBC8896)

RealLine *Helicobacter pylori* (Fla-format) kit is designed for the analysis of clinical materials (stomach tissue samples).

The assay is based on the real-time polymerase chain reaction (PCR) method with fluorescent detection of the amplified product.

The **Fla-format** Kit contains 5 vials with the lyophilized Mastermix, each vial with 10 reactions, for volume of 50 µl per reaction. The kit contains reagents required for 50 tests, including the positive control samples.

The kit is designed for use with block cyclers iQ™ iCycler, iQ5™ iCycler, CFX96™ (Bio-Rad, USA), DT96 (DNA-Technology, Russia), RealLine Cycler (BIORON Diagnostics GmbH); and rotor type cyclers Rotor-Gene® 3000 and Rotor-Gene® 6000 (Qiagen, Germany).

The use of:

- ! **Extraction Kits for nucleic acids from clinical specimen from other supplier**
- ! **other real-time PCR devices**
- ! **appropriate reaction volumes, other than 50µl**

have to be validated in the lab by the user. The special notes regarding the internal control IC have to be strongly followed.

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2. KIT CONTENTS

Positive Control sample (PC)	1 vial, 1 ml
Master Mix (MM), lyophilized	5 test-tubes (for 10 assays each);
Recovery solution (RS)	1 vial, 2 ml
Internal Control sample (IC), lyophilized	2 vials

Note: The RealLine Helicobacter Kit contains a special Internal Control Sample!

3. PRINCIPLE OF THE METHOD

The Real time PCR is based on the detection of the fluorescence, produced by a reporter molecule, which increases as the reaction proceeds. Reporter molecule is dual-labeled DNA-probe, which specifically binds to the target region of pathogen DNA. Fluorescent signal increases due to the fluorescent dye and quencher separating by Taq DNA-polymerase exonuclease activity during amplification. PCR process consists of repeated cycles: temperature denaturation of DNA, primer annealing and complementary chain synthesis.

Threshold cycle value – Ct – is the cycle number at which the fluorescence generated within a reaction crosses the fluorescence threshold, a fluorescent signal rises significantly above the background fluorescence. Ct depends on initial quantity of pathogen DNA template.

The use of **Internal Control (IC)** prevents generation of false negative results associated with possible loss of DNA template during specimen preparation. IC indicates if PCR inhibitors occur in the reaction mixture. IC template should be added in each single sample (including control samples) prior to DNA extraction procedure. The amplification and detection of IC does not influence the sensitivity or specificity of the target DNA PCR.

Note: IC is a component of the NA extraction kits of RealLine series. Internal Control is added to the sample during NA isolation step and is used throughout the whole process of NA extraction, amplification, detection.

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4. SPECIFICATIONS

- 4.1. Sensitivity** – the detection of 100 *Helicobacter pylori* DNA copies in 5 samples prepared from the Standard Reference Sample (*Helicobacter pylori* DNA SRS) equals 100 %.
- 4.2. Specificity** of *Helicobacter pylori* DNA detection using the Standard Reference Panel of negative samples equals 100 %.
- 4.3. Diagnostic sensitivity:** clinical trials performed in two independent medical centers on 44 specimens (biopsy materials of gastric mucosa), containing *Helicobacter pylori* according to histology test, showed 100 % sensitivity (interval 93 % -100 % with a confidence level of 90 %).
- 4.4. Diagnostic specificity:** clinical trials performed in two independent medical centers on 44 specimens (biopsy materials of gastric mucosa), not containing *Helicobacter pylori* according to histology test, showed 100 % sensitivity (interval 93 % -100 % with a confidence level of 90 %).

Analysis by the CE-marked reference kit showed full match of results.

5. PRODUCT USE LIMITATIONS

- This assay must not be used on the clinical specimen directly. Appropriate nucleic acids extraction methods have to be conducted prior to using this assay.
- The presence of PCR inhibitors (e.g. heparin) may cause false negative or invalid results.
- When monitoring a patient the same extraction method must be used in all determinations. Otherwise, results may not be comparable.
- The kit is designed for use in patients with a clinical history and/or symptoms consistent with *Helicobacter pylori* infections. The kit may be used for screening purposes.
- Diagnostic sensitivity of the kit may vary depending on the pathogen prevalence and characteristics of the enrolled cohort.
- Reliable results depend on adequate specimen sampling.
- Positive results indicate active or asymptomatic infection; clinical history and symptoms should be taken into account.
- Negative results indicate lack of detectable DNA but do not exclude the infection or disease.
- Potential mutations within the target regions of the *Helicobacter pylori* genome covered by the primers and/or probes used in the kit may result in failure to detect the presence of the pathogens.
- The kit is not intended to replace culture and other methods (e.g., cervical exam) for diagnosis of infections.

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6. WARNING AND PRECAUTIONS

- ☞ For in vitro use only.
- ☞ The kits must be used by skilled personnel only.
- ☞ When handling the kit, follow the national safety requirements for working with pathogens.
- ☞ To prevent contamination, the stages of DNA isolation and PCR test run must be spatially separated.
- ☞ Wear protective disposable gloves, laboratory coats and eye protection when handling specimens and kit reagents.
- ☞ Every workplace must be provided with its own set of variable-volume pipettes, necessary auxiliary materials and equipment. It is prohibited to relocate them to other workplaces.
- ☞ To conduct real-time amplification reaction with PCR products detection, use only disposable tips with filters.
- ☞ Never use the same tips for different samples.
- ☞ Do not pool reagents from different lots or from different vials of the same lot.
- ☞ Dispose unused reagents and waste in accordance with country, federal, state and local regulations.
- ☞ Do not use the kit after the expiration date at the side label of the kit.

7. ADDITIONAL MATERIALS AND DEVICES REQUIRED BUT NOT SUPPLIED

- real time PCR system, like described in p.1
- DNA-Extraction Kit, see p.1 Extractions Kits;
- Plates or Tubes suitable for the used device with caps or a sealing foil for PCR
- laminar safety box;
- refrigerator;
- microcentrifuge for 1.5-2 ml tubes;
- vortex mixer with adjustable rotation speed;
- half-automatic variable-volume single-channel pipettes with disposable tips;
- disposable medical non-sterile powder-free gloves;
- disposable pipette tips with filters;
- biohazard waste container.

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8. PREPARATION OF THE SPECIMEN

The assay is performed on extracted DNA samples obtained from the clinical material using one of the DNA extraction kits listed in p.1, according to the Instruction Manual to the kit.

*Each group of samples undergoing the procedure of DNA isolation must include a **Positive Control sample (PC)** from this kit and a **Negative Control sample (NC)** which is a component of the DNA extraction kit.*

We strongly recommend the implementation of the Internal Control IC, the Negative Control NC and Positive Control PC samples to the extraction procedure.

When using kits of another supplier for the extraction of nucleic acids as recommended in chapter 1: add **20 µl** of **IC (VBC8881)** to each tube.

- For the NC use **100 µl** of the Negative Control Sample
- For the PC use **70 µl** of Negative Control Sample and **30 µl** of Positive Control to the tube marked PC.

If samples of isolated DNA were stored frozen prior the assay, thaw them and keep at least 30 minutes at a temperature of (18 – 25) °C.

The isolated DNA can be stored at (2 – 8) °C for 24 hours

After initial opening shelf life of Positive Control sample is 1 month at (2 – 8) °C or for 50 µl aliquots 3 month at (-18 ... -60) °C

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9. PROCEDURE

9.1. Preparation of Kit Components

Prior to the test, take the kit out of the refrigerator, open the package, take the necessary number of tubes with the **Master Mix (MM)**, taking into account prepared specimens and control samples.

1 NC and 1 PC for each test is required. Keep the tubes at (18 – 25) °C for at least 30 min.

Attention! Each tube is intended for 10 tests.

After initial opening, store MM at (2 – 8) °C for no more than 3 months.

Put the remaining tubes immediately back into the foil pouch, squeeze the air out and tightly close with the clip.

9.2. In the process of *Helicobacter pylori* DNA extraction use IC provided with the kit.

Add 1000 µl of Recovery Solution (RSC) for Control samples, which is a component of DNA extraction kit, to the tube with IC, mix gently, keep at (18 – 25) °C during 15 min, and mix thoroughly one more time.

Store prepared IC at (2 - 8) °C for no more than 1 month.

Perform *Helicobacter pylori* DNA extraction in accordance with Instruction Manual to the respective extraction kit.

9.3. To prepare diluted Master Mix, add **300 µl** of **RSC** to each tube with MM. Mix gently, keep at (18-25) °C during 15 min, and mix thoroughly one more time. Collect the tube contents by brief centrifugation.

Store diluted MM at (2 – 8) °C for no more than 7 days.

9.4. Prepare an appropriate number of 0.2 ml tubes or a plate for PCR. Label each tube for each specimen and control.

Attention! *Labels should be placed on the caps of tubes for rotor-type cyclers and for block-type cyclers labels should be placed on the lateral side of the tubes.*

9.5. Add **25 µl** of prepared **Master Mix** to each 0.2 ml tube.

9.6. Add **25 µl** of corresponding isolated DNA solution to each tube using a separate pipette tip with filter. Tightly close the tubes.

9.7. Place the tubes into the real-time PCR system.

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9.8. Program real time PCR system.

For Rotor-Gene® 3000 (6000,Q)

Step 1:	50°C	2 min	
Step 2:	95°C	2 min	
Step 3:	94°C	10 sec	50 cycles
	60°C*	40 sec	

* Measure the fluorescence at 60°C.

For RealLine Cyclers, iQ™ iCycler, iQ™5 iCycler, CFX96™, DT-96:

Step 1:	50°C	2 min	
Step 2:	95°C	2 min	
Step 3:	94°C	10 sec	50 cycles
	60°C*	20 sec	

* Measure the fluorescence at 60°C

9.9. Select the amplification detection channels:

- Collect data through **FAM** channel (iQ5 iCycler, CFX96, RealLine Cyclers, DT-96, Rotor-Gene 3000) or **Green** channel (Rotor-Gene 6000, Rotor-Gene Q) for the detection of amplification signal of IC DNA;
- Collect data through **ROX** channel (iQ5 iCycler, CFX96, RealLine Cyclers, DT-96, Rotor-Gene 3000), or **Orange** channel (Rotor-Gene 6000, Rotor-Gene Q) for the detection of amplification signal of *Helicobacter pylori* DNA;

9.10. Program the positions of test tubes with samples, positive and negative controls according to the instruction manual for the real time PCR system in use.

9.11. Run the program.

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10. DATA ANALYSIS AND INTERPRETATION

- 10.1** The program should detect in **Positive Control** sample:
- increase of the IC DNA amplification signal along channel **FAM** (*Green*) and determine the threshold cycle, IC **Ct**;
 - increase of the *Helicobacter pylori* DNA amplification signal along channel **ROX** (*Orange*) and determine the **Ct** value;
- 10.2** For **NC** the program should detect the increase of the amplification signal of IC DNA along channel **FAM** (*Green*) and determine the threshold cycle, IC **Ct**. No significant **ROX** (*Orange*) fluorescent increase should appear (*no Helicobacter pylori DNA amplification*).
- 10.3** For each sample the program should detect the increase of the amplification signal of IC DNA along channel **FAM** (*Green*) and determine IC **Ct**.
- 10.4** Calculate (IC **Ct**)_{av} as an average IC **Ct** of all analyzed samples (including PC and NC). IC **Ct** values that differ by more than 2 cycles from the (IC **Ct**)_{av} should be ignored. Recalculate the (IC **Ct**)_{av} for the remaining values after the screening.
- 10.5** The sample is considered **positive**, i.e. contains *Helicobacter pylori* DNA, when **Ct** value via **ROX** (*Orange*) channel for this sample is **less than or equals to 40**.
- 10.6** The sample is considered **negative** (not containing *Helicobacter pylori* DNA), if **Ct** value via **ROX** (*Orange*) channels for this sample is **above 40** or is not determined.
If IC **Ct** value for such sample differs from the (IC **Ct**)_{av} value by more than 2, the result is regarded as equivocal. A repeated analysis of the sample, starting with the DNA isolation step is necessary.
- 10.7** If **Ct** value for NC through **ROX** (*Orange*) channels is **less than or equal to 40**, this indicates the presence of contamination. In this case, all positive results of this individual PCR run are considered equivocal. Actions are required to identify and eliminate the source of contamination, and repeat the analysis of all samples of this run that were determined as positive. Samples that showed negative results in this run should be considered as negative

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11. STORAGE AND TRANSPORTATION

- Store and transport the assay kit at (2 - 8) °C in the manufacturer's packing.
- Transportation at 25 °C for up to 10 days is allowed.
- Do not freeze the kit!
- Do not pool reagents from different lots or from different vials of the same lot.
- Strictly follow the Instruction manual for reliable results.
- Do not use kits with damaged inner packages and get in contact with BIORON Diagnostics GmbH.
- **Storage and shelf life of solutions and components of the kit after initial opening:**
 - Positive Control sample: 1 month at (2 - 8) °C or in 50 µl aliquots at minus (18 - 60) °C for up to 3 months *or for 50 µl aliquots 3 month at (-18 ... -60) °C*
 - Ready Master Mix (MM): unused MM at (2 - 8) °C for no more than 3 months
 - Diluted MM: at (2 - 8) °C for 7 days in a dark surrounding
 - Recovery Solution: at (2 - 8) °C for 3 months.

Technical support: techsupport@bioron.de

ANNEX I: Settings for RealLine Cyclers and DT96:

for these cyclers the measurement exposure must be adjusted. Choose the **Operation with the device** mode in the **Settings** menu, select the item **Measurement exposition:**

- **FAM to 250**
- **HEX and ROX to 1000**

Confirm that the current exposure value is saved by pressing **YES**

Attention! The specified exposure values are applicable only for RealLine kits and, if necessary, must be changed for other purposes.

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ANNEX II: Programming the device and analysis of results using Rotor-Gene cyclers:

Rotor-Gene 3000, Rotor-Gene 6000 (Corbett research, Australia), Rotor-Gene Q (Qiagen, Germany)

Hereinafter, detection channels and terms corresponding to different versions of devices and software are listed in the following order: Rotor-Gene 3000 (Rotor-Gene 6000, Rotor-Gene Q).

- 1) Click **New** button.
- 2) Select an **Advanced** template from the tab of the New Run wizard. Click **New** button.
- 3) Select **36-Well Rotor** type, check that No Domed 0.2 ml Tubes are used. Click **Next** button.
- 4) In the new window, determine Reaction volume as **50 µl**. Click **Next** button.
- 5) The temperature profile of real time PCR should be set. Click **Edit Profile** button.

Step 1:	50°C	2min	50 cycles
Step 2:	95°C	2min	
Step 3:	94°C	10 sec	
	60°C*	40 sec	
- * Measure the fluorescence at 60°C
- 6) Then temperature profile is set, click **OK** button.
- 7) In the **New Run Wizard** window click **Calibrate (Gain optimization)** button. The window **Auto Gain Calibration Setup** opens. In the line **Channel Settings** choose **ROX (Orange)**, click **Add**. Set **Tube Position 1**, **Min Reading 5**, **Max Reading 10**, click **OK**. In the line **Channel Settings** choose **FAM (Green)**, click **Add**. Set **Tube Position 1**, **Min Reading 5**, **Max Reading 10**, click **OK**.
- 8) Tick off **Perform Calibration Before 1st Acquisition**. Click **Close** button.
- 9) Click **Next** button, start the amplification process by clicking **Start Run** button.
- 10) Save a file in the Rotor-Gene/templates folder, named RealLine with *.ret extension. In subsequent work RealLine template would be presented in New run wizard.
- 11) Save reaction result file with Rotor-Gene Run File *.rex extension.
- 12) Record the positions of the controls and specimens according to the instruction manual of the operating device. Click **Start run** button.

Results of IC DNA amplification

- 1) Click **Analysis** button, choose **Quantitation** from the list, choose **Cycling A. FAM («Cycling A. Green»)**, click **Show** button.
- 2) Click **OK** button, and cancel automatic **Threshold** determination.
- 3) Click **Linear scale** button. Settings should change to **Log. scale**.
- 4) In the **Quantitation analysis** menu buttons **Dynamic tube** and **Slope Correct** should be pressed.
- 5) Click **More Settings (Outlier Removal)** button, determine **NTC threshold** value as **5 %**.
- 6) In the column **CT Calculation (right part of the window)** determine **Threshold** value as **0.04**.
- 7) In the result table (**Quant. Results window**) **Ct** will be displayed.

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Results of *Helicobacter pylori* DNA amplification

- 1) Click **Analysis** button, choose **Quantitation** from the list, choose **Cycling A. ROX** (*Cycling A. Orange*) click, **Show** button.
- 2) Click **OK** button, and cancel automatic **Threshold** determination.
- 3) Click **Linear scale** button. Settings should change to **Log. scale**.
- 4) In the **Quantitation analysis** menu buttons **Dynamic tube** and **Slope Correct** should be pressed.
- 5) Click **More Settings** (*Outlier Removal*) button, determine **NTC threshold** value as **5 %**.
- 6) In the column **CT Calculation** (*right part of the window*) determine **Threshold** value as **0.04**.
- 7) In the result table (*Quant. Results window*) Ct will be displayed.

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