



For Professional Use Only

# eSens *N.gonorrhoeae* / *M.genitalium* / *T.vaginalis* QL PCR kit

**REF** ES3050A

## Instructions for Use

### 1 INTENDED USE

**eSens *N.gonorrhoeae*/*M.genitalium*/*T.vaginalis* QL PCR kit** is an *in vitro* nucleic acid amplification test for simultaneous detection of DNA of *Neisseria gonorrhoeae*, *Mycoplasma genitalium*, and *Trichomonas vaginalis* in the clinical material (urogenital, rectal and oropharyngeal swabs; conjunctival discharge; prostate gland secretion; and urine samples) using real-time hybridization-fluorescence detection of amplified products.

NOTE: The results of PCR analysis are taken into account in complex diagnostics of disease.

### 2 PRINCIPLE OF PCR DETECTION

*N.gonorrhoeae* / *M.genitalium* / *T.vaginalis* detection by the multiplex polymerase chain reaction (PCR) is based on the amplification of pathogen genome specific regions using specific *N.gonorrhoeae* / *M.genitalium* / *T.vaginalis* primers. In the real-time PCR, the amplified product is detected with the use of fluorescent dyes. These dyes are linked to oligonucleotide probes, which bind specifically to the amplified product during thermocycling. The real-time monitoring of fluorescence intensities during the real-time PCR allows the detection of accumulating product without re-opening the reaction tubes after the PCR run.

**eSens *N.gonorrhoeae*/*M.genitalium*/*T.vaginalis* QL PCR kit** is a qualitative test that contains the Internal Control (Internal Control-FL (IC)). It must be used in the extraction procedure in order to control the extraction process of each individual sample and to identify possible reaction inhibition.

**eSens *N.gonorrhoeae*/*M.genitalium*/*T.vaginalis* QL PCR kit** uses "hot-start", which greatly reduces the frequency of nonspecifically primed reactions. "Hot-start" is guaranteed by the separation of nucleotides and Taq-polymerase by using chemically modified polymerase (TaqF). The chemically modified polymerase (TaqF) is activated by heating at 95 °C for 15 min.

The PCR kit contains the system for prevention of contamination by amplicons using the enzyme uracil-DNA-glycosylase (UDG) and deoxyuridine triphosphate. The enzyme UDG recognizes and

catalyzes the destruction of the DNA containing deoxyuridine, but has no effect on DNA containing deoxythymidine. Deoxyuridine is absent in the authentic DNA, but is always present in amplicons, because deoxyuridine triphosphate is a part of dNTP mixture in the reagents for the amplification. Due to the deoxyuridine containing contaminating amplicons are sensitive to the destruction by UDG before the DNA-target amplification. So, the amplicons cannot be amplified.

The enzyme UDG is thermolabile. It is inactivated by heating at temperature above 50 °C. Therefore, UDG does not destroy the target amplicons which are accumulated during PCR.

The results of amplification are registered in the following fluorescence channels.

**Table 1**

Channel for fluorophore	FAM	ROX	Cy5	Cy5.5
DNA-target	<i>N.gonorrhoeae</i>	<i>M.genitalium</i>	Internal Control-FL	<i>T. vaginalis</i>
Target gene	<i>16s rRNA</i> gene	<i>gyrB</i> gene	Genetically engineered construction	DNA repeats for PCR identification

### 3 CONTENT

eSens *N.gonorrhoeae/M.genitalium/T.vaginalis* QL PCR kit (ES3050A) contains:

Reagent	Description	Volume, ml	Quantity
PCR-mix-1-FL <i>N.gonorrhoeae</i> / <i>M.genitalium</i> / <i>T.vaginalis</i>	clear liquid from colorless to blue grey colour	1.2	1 tube
PCR-mix-2-FRT	colorless clear liquid	0.6	1 tube
Polymerase (TaqF)	colorless clear liquid	0.06	1 tube
Positive Control complex (C+)	colorless clear liquid	0.2	1 tube
DNA-buffer	colorless clear liquid	0.5	1 tube
Negative Control (C-)*	colorless clear liquid	1.2	1 tube
Internal Control-FL (IC)**	colorless clear liquid	1.0	1 tube

\* must be used in the extraction procedure as Negative Control of Extraction.

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\*\* add **10 µl** of **Internal Control-FL (IC)** during the DNA extraction procedure directly to the sample/lysis mixture.

**eSens *N.gonorrhoeae/M.genitalium/T.vaginalis* QL PCR kit** is intended for 110 reactions (including controls).

## 4 ADDITIONAL REQUIREMENTS

- Transport medium.
- DNA extraction kit.
- Disposable powder-free gloves and a laboratory coat.
- Pipettes (adjustable).
- Sterile pipette tips with aerosol filters (up to 200 µl).
- Tube racks.
- Vortex mixer.
- Desktop centrifuge with a rotor for 2-ml reaction tubes.
- PCR box.
- Real-time instruments (for example, Rotor-Gene Q (QIAGEN, Germany), CFX 96 Touch, CFX 96 Opus (Bio-Rad, USA), QuantStudio 5 (Thermo Fisher Scientific), or equivalent).
- Disposable polypropylene 0.2-ml PCR tubes with flat caps or strips of four 0.1-ml Rotor-Gene PCR tubes when working with PCR kit variant FRT-100 F:
- Refrigerator for 2–8 °C.
- Deep-freezer at the temperature from minus 24 to minus 16 °C.
- Reservoir for used tips.

## 5 GENERAL PRECAUTIONS

The user should always pay attention to the following:

- Use sterile pipette tips with aerosol barriers and use a new tip for every procedure.
- Store all extracted positive material (specimens, controls and amplicons) away from all other reagents and add it to the reaction mix in a distantly separated facility.
- Thaw all components thoroughly at room temperature before starting an assay.
- When thawed, mix the components and centrifuge briefly.
- Use disposable protective gloves and laboratory cloths, and protect eyes while samples and reagents handling. Thoroughly wash hands afterwards.
- Do not eat, drink, smoke, apply cosmetics, or handle contact lenses in laboratory work areas.
- Do not use a kit after its expiration date.
- Dispose of all specimens and unused reagents in accordance with local regulations.
- Samples should be considered potentially infectious and handled in biological cabinet in compliance with appropriate biosafety practices.
- Clean and disinfect all samples or reagents spills using a disinfectant, such as 0.5 % sodium hypochlorite or another suitable disinfectant.
- Avoid samples and reagents contact with the skin, eyes, and mucous membranes. If these solutions come into contact, rinse the injured area immediately with water and seek medical advice immediately.
- Safety Data Sheets (SDS) are available on request.
- Use of this product should be limited to personnel trained in DNA amplification techniques.
- Workflow in the laboratory must be one-directional, beginning in the Extraction Area and moving to the Amplification and Detection Area. Do not return samples, equipment and reagents in the area where the previous step was performed.

 Some components of this kit contain sodium azide as a preservative. Do not use metal tubing for reagent transfer.

## 6 SAMPLING AND HANDLING

**eSens N.gonorrhoeae/M.genitalium/T.vaginalis QL PCR kit** is intended for analysis of DNA extracted with DNA extraction kits from the clinical material (urogenital swabs, rectal swabs, oropharyngeal swabs, conjunctival discharge, prostate gland secretion, urine samples).

## 7 WORKING CONDITIONS

**eSens N.gonorrhoeae/M.genitalium/T.vaginalis QL PCR kit** should be used at 18–25 °C.

## 8 PROTOCOL

### 8.1 DNA extraction

Any commercial nucleic acid extraction kit, if IVD-CE validated for the indicated specimen types, could be used.

#### **Ecoli Dx, s.r.o. recommends:**

- For the manual extraction

- **DNA-sorb-AM** (K1-12-100-CE)

- For the automatic extraction

- **ePure STD DNA Extraction Kit** (E2007)

The DNA extraction of each test sample is carried out in the presence of **Internal Control-FL (IC)**.

NOTE: Extract DNA according to the manufacturer's protocol.

### 8.2 Preparing PCR

#### 8.2.1 Preparing tubes for PCR

The type of tubes depends on the PCR instrument used for analysis. Use disposable filter tips for adding reagents, DNA and control samples into tubes.

The total reaction volume is **25 µl**, the volume of DNA sample is **10 µl**.

1. Prepare the required number of tubes or strips for amplification of DNA from clinical and control samples.
2. For carrying out N reactions (including 2 controls), mix in a new tube: **10·(N+1) µl** of **PCR-mix-1-FL N.gonorrhoeae / M.genitalium / T.vaginalis**, **5.0·(N+1) µl** of **PCR-mix-2-FRT** and **0.5·(N+1) µl** of **polymerase (TaqF)**. Vortex the tube, then centrifuge briefly. Transfer **15 µl** of the prepared mixture into each tube.
3. Add **10 µl** of **DNA** samples obtained at the DNA extraction stage into prepared tubes.
4. Carry out the control amplification reactions:

<b>NCA</b>	Add 10 µl of DNA-buffer to the tube labeled NCA (Negative Control of Amplification).
<b>C+</b>	Add 10 µl of Positive Control complex to the tube labeled C+ (Positive Control of Amplification).
<b>C-</b>	Add 10 µl of the sample extracted from the Negative Control (C-) reagent to the tube labeled C- (Negative control of Extraction).

## 8.2.2 Amplification

1. Create a temperature profile on your instrument as follows:

**Table 2**

### eSens-1 amplification program

Step	Temperature, °C	Time	Cycles
Hold	95	15 min	1
Cycling	95	5 s	5
	60	20 s	
	72	15 s	
Cycling 2	95	5 s	40
	60	20 s (fluorescence detection)	
	72	15 s	

Fluorescent signal is detected in the channels for the FAM, ROX, Cy5 and Cy5.5 fluorophores.

2. Adjust the fluorescence channel sensitivity.
3. Insert tubes into the reaction module of the device.
4. Run the amplification program with fluorescence detection.
5. Analyze results after the amplification program is completed.

## 8.3 Instrument Settings

### Test settings for rotor-type instruments

Channel	Calibrate/Gain Optimisation	Threshold	Dynamic tube	Slope Correct	More Settings/ Outlier Removal
FAM/Green	from 5 FI to 10 FI	0.1	On	Off	0%
ROX/Orange	from 4 FI to 8 FI	0.1	On	Off	5%
Cy5/Red	from 4 FI to 8 FI	0.07	On	On	5%
Cy5.5/Crimson	from 4 FI to 8 FI	0.1	On	On	10%

### Test settings for plate-type instruments

Note - Set **Ramp Rate 2,5 °C/s** by clicking the *Step Options* button for each step of cycling.

Channel	Threshold
FAM, ROX, Cy5, Cy5.5	The threshold line for each channel is to be set at the level corresponding to 10-20 % of maximum fluorescence obtained for the Positive Control of Amplification (C+) in the last amplification cycle.

## 9 DATA ANALYSIS

Analysis of results is performed by the software of the real-time PCR instrument used by measuring fluorescence signal accumulation in four channels:

- The signal of the ***Neisseria gonorrhoeae*** DNA amplification product is detected in the channel for the FAM fluorophore.
- The signal of the ***Mycoplasma genitalium*** DNA amplification product is detected in the channel for the ROX fluorophore.
- The signal of the **IC** DNA amplification product is detected in the channel for the Cy5 fluorophore.
- The signal of the ***Trichomonas vaginalis*** DNA amplification product is detected in the channel for the Cy5.5 fluorophore.

Results are interpreted by the crossing (or not-crossing) the fluorescence curve with the threshold line set at the specific level that corresponds to the presence (or absence) of a Ct value of the DNA sample in the corresponding column of the results grid.

Principle of interpretation is the following:

- ***Neisseria gonorrhoeae*** DNA is **detected** if the Ct value is determined in the results grid in the channel for the FAM fluorophore. Moreover, the fluorescence curve of the sample should cross the threshold line in the area of typical exponential growth of fluorescence.
- ***Mycoplasma genitalium*** DNA is **detected** if the Ct value is determined in the results grid in the channel for the ROX fluorophore. Moreover, the fluorescence curve of the sample should cross the threshold line in the area of typical exponential growth of fluorescence.
- ***Trichomonas vaginalis*** DNA is **detected** if the Ct value is determined in the results grid in the channel for the Cy5.5 fluorophore. Moreover, the fluorescence curve of the sample should cross the threshold line in the area of typical exponential growth of fluorescence.
- ***Neisseria gonorrhoeae*, *Mycoplasma genitalium* and *Trichomonas vaginalis*** DNA is **not detected** in a sample if the Ct values are not determined (absent) in the channels for the FAM, ROX and Cy5.5 fluorophores, whereas the Ct value determined in the channel for the Cy5 fluorophore is less than the boundary Ct value.
- The result is **invalid** if the Ct value in the channel for the Cy5 fluorophore is not determined (absent) or greater than the specified boundary Ct value, and the Ct value in the channels for the FAM, ROX and Cy5.5 fluorophores is not determined (absent) or greater than the specified boundary Ct value. In such cases, the PCR should be repeated. If the same result is obtained in the second run, the analysis should be repeated starting from the DNA extraction stage.

**The result of the analysis is considered reliable only if the results obtained for Positive and Negative Controls of amplification as well as for the Negative Control of extraction are correct (see Table 3 and 4).**

**Table 3**

**Results for controls**

Control	Stage for control	Ct value in the channel for fluorophore	
		FAM, ROX and Cy5.5	Cy5
<b>C-</b>	DNA extraction	Absent	<boundary value
<b>NCA</b>	PCR	Absent	Absent
<b>C+</b>	PCR	<boundary value	<boundary value

Table 4

## Boundary Ct values

Sample	Rotor-type instrument				Plate-type instrument			
	Channel for fluorophore							
	FAM	ROX	Cy5	Cy5.5	FAM	ROX	Cy5	Cy5.5
C-	Ct is absent		33	Ct is absent	Ct is absent		36	Ct is absent
NCA	Ct is absent				Ct is absent			
C+	33	33	33	33	36	36	36	36
Test samples	-	-	33	-	-	-	36	-

## 10 TROUBLESHOOTING

Results of analysis are not taken into account in the following cases:

1. If no signal is detected for Positive Control of Amplification (C+) or the signal is greater than the specified boundary Ct value in the channels for the FAM, ROX and Cy5.5 fluorophores, PCR should be repeated for all samples for which Ct values in these channels were not detected.
2. If a Ct value is determined for the Negative Control of Extraction (C-) and/or for the Negative Control of Amplification (NCA) in the channels for the FAM, ROX and Cy5.5 fluorophores, PCR analysis should be repeated for all samples for which a Ct value in these channels was determined.
3. If a positive result (the fluorescence curve crosses the threshold line) is detected for a sample with a fluorescence curve without the area of typical exponential growth (the fluorescence curve is approximately linear), this may indicate incorrect setting of the threshold line or incorrect calculation of baseline parameters. Such a result should not be considered as positive. If such result was obtained in the presence of the correct setting of threshold line, PCR analysis of the sample should be repeated.

## 11 TRANSPORTATION

**eSens N.gonorrhoeae/M.genitalium/T.vaginalis QL PCR kit** should be transported at 2–8 °C for no longer than 5 days.

## 12 STABILITY AND STORAGE

All components of the **eSens N.gonorrhoeae/M.genitalium/T.vaginalis QL PCR kit** are to be stored at 2–8 °C when not in use (except for polymerase (TaqF) and PCR-mix-2-FRT). All components of the **eSens N.gonorrhoeae/M.genitalium/T.vaginalis QL PCR kit** are stable until the expiry date stated on the label. The shelf life of reagents before and after the first use is the same, unless otherwise stated.

NOTE: PCR-mix-1-FL *N.gonorrhoeae* / *M.genitalium* / *T.vaginalis* is to be kept away from light.

NOTE: Polymerase (TaqF) and PCR-mix-2-FRT are to be stored at the temperature from minus 24 to minus 16 °C.

## 13 SPECIFICATIONS

### 13.1 Sensitivity

Clinical material	Nucleic acid extraction kit	PCR kit	Microorganism	Sensitivity, GE/ml*
Cervical or urethral swabs** Urine***	DNA-sorb-AM	ES3050A	<i>Neisseria gonorrhoeae</i>	5x10 <sup>2</sup>
			<i>Mycoplasma genitalium</i>	1x10 <sup>3</sup>
			<i>Trichomonas vaginalis</i>	5x10 <sup>2</sup>
Cervical or urethral swabs** Urine***	ePure STD DNA Extraction Kit M	ES3050A	<i>Neisseria gonorrhoeae</i>	1x10 <sup>3</sup>
			<i>Mycoplasma genitalium</i>	2x10 <sup>3</sup>
			<i>Trichomonas vaginalis</i>	1x10 <sup>3</sup>

\* The quantity of genome equivalents of microorganism per 1 ml of the sample placed in a transport medium specified.

\*\* Cervical and urethral swabs are to be placed in the transport medium for swabs or Transport Medium with Mucolytic Agent (REF 952-CE).

\*\*\* Pretreatment is required for urine samples.

NOTE: The analytical sensitivity of each microorganism does not change even in the case of high concentration of the other analyzed microorganisms – up to 10<sup>9</sup> GE/ml.

### 13.2 Specificity

The analytical specificity of **eSens N.gonorrhoeae/M.genitalium/T.vaginalis QL PCR kit** is ensured by the selection of specific primers and probes as well as stringent reaction conditions. The primers and probes have been checked for possible homologies to all sequences published in gene banks by sequence comparison analysis.

Nonspecific responses were absent while testing human DNA samples and DNA samples of the following microorganisms: *Gardnerella vaginalis*, *Lactobacillus* spp., *Escherichia coli*, *Staphylococcus* spp., *Streptococcus* spp., *Candida albicans*, *Mycoplasma hominis*, *Ureaplasma urealyticum*, *Ureaplasma parvum*, *Mycoplasma genitalium*, *Chlamydia* bulletin

, *Neisseria* spp., *Neisseria gonorrhoeae*, *Trichomonas vaginalis*, *Treponema pallidum*, *Toxoplasma gondii*, HSV1 and 2, CMV, and HPV.

The clinical specificity of **eSens N.gonorrhoeae/M.genitalium/T.vaginalis QL PCR kit** was confirmed in laboratory clinical trials.

## 14 QUALITY CONTROL

The production process, including batch release, is carried out in accordance with an established quality management system certified according to ISO 13485.

## 15 KEY TO SYMBOLS USED

	Catalogue number		Caution
	Batch code		Contains sufficient for <n> tests
	<i>In vitro</i> diagnostic medical device		Use-by Date
	Version		Consult instructions for use
	Temperature limit		Keep away from sunlight
	Manufacturer	NCA	Negative control of amplification
	Date of manufacture	C-	Negative control of extraction
	Authorized representative in the European Community	C+	Positive control of amplification
		IC	Internal control

### List of Changes Made in the Instruction Manual

VER	Location of changes	Essence of changes
01_04/2022		

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