AmpliSens® *Chlamydia trachomatis*-FRT PCR kit

CE 1023

IVD

For Professional Use Only

Instruction Manual

KEY TO SYMBOLS USED

REF	Catalogue number	⚠	Caution
LOT	Batch code	Σ	Sufficient for
IVD	*In vitro* diagnostic medical device		Use-by Date
VER	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
EC REP	Authorized representative in the European Community	C+	Positive control of amplification
		IC	Internal control

1. INTENDED USE

AmpliSens® *Chlamydia trachomatis*-FRT PCR kit is an *in vitro* nucleic acid amplification test for qualitative detection of *Chlamydia trachomatis* DNA in the clinical material (urogenital, rectal, and oropharyngeal swabs; conjunctival discharge; urine; and prostate gland secretion) 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

Chlamydia trachomatis detection by the polymerase chain reaction (PCR) is based on the amplification of pathogen genome specific region using special *Chlamydia trachomatis* 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.

AmpliSens® *Chlamydia trachomatis*-FRT 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.

AmpliSens® *Chlamydia trachomatis*-FRT PCR kit uses "hot-start", which greatly reduces the frequency of nonspecifically primed reactions. In variant FRT, "hot-start" is guaranteed by the separation of nucleotides and Taq-polymerase by using a wax layer. Wax melts and reaction components mix only at 95 °C. In variant FRT-100 F, "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 variant FRT-100 F contains the system for prevention of contamination by amplicons using the enzyme uracil-DNA-glycosylase (UDG) and dUTP. 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	JOE
DNA-target	*Chlamydia trachomatis*	Internal Control-FL (IC)
Target gene	*cryptic plasmid*	genetically engineered construction

3. CONTENT

AmpliSens® *Chlamydia trachomatis*-FRT PCR kit is produced in 2 forms:

variant FRT REF R-B1(RG)-CE;

variant FRT-100 F REF R-B1-F(RG,iQ)-CE.

Variant FRT includes:

Reagent	Description	Volume, ml	Quantity
PCR-mix-1-FL *Chlamydia trachomatis* ready-to-use single-dose test tubes (*under wax*)	clear liquid from colorless to light lilac colour	0.01	110 tubes of 0.2 ml volume
PCR-mix-2-FL-red	red clear liquid	1.1	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.

** add **10 µl** of **Internal Control-FL (IC)** during the DNA extraction procedure directly to the sample/lysis mixture (see **DNA-sorb-AM** REF K1-12-100-CE protocol).

Variant FRT is intended for 110 reactions (including controls).

Variant FRT-100 F includes:

Reagent	Description	Volume, ml	Quantity
PCR-mix-1-FL *Chlamydia trachomatis*	clear liquid from colorless to light lilac colour	1.2	1 tube
PCR-mix-2-FRT	colorless clear liquid	0.3	2 tubes
Polymerase (TaqF)	colorless clear liquid	0.03	2 tubes
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.

** add **10 µl** of **Internal Control-FL (IC)** during the DNA extraction procedure directly to the sample/lysis mixture (see **DNA-sorb-AM** REF K1-12-100-CE protocol)).

Variant FRT-100 F 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 rotor for 2 ml reaction tubes.
- PCR box.
- Real-time instruments (for example, Rotor-Gene 3000/6000 (Corbett Research, Australia); Rotor-Gene Q (QIAGEN, Germany), iCycler iQ5 (Bio-Rad, USA), Mx3000P (Stratagene, USA).
- Disposable polypropylene PCR tubes (0.1- or 0.2-ml) when working with PCR kit variant FRT-100 F:
  a) 0.2-ml thin-walled PCR tubes domed caps if a plate-type instrument is used;
  b) 0.2-ml thin-walled PCR tubes with flat caps or strips of four 0.1-ml Rotor-Gene PCR tubes if a rotor-type instrument is used.
- Refrigerator for 2–8 °C.
- Deep-freezer at the temperature from minus 24 to minus 16 °C.
- Reservoir bin 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

NOTE: Obtaining samples of biological materials for PCR-analysis, transportation and storage is described in manufacturer's handbook [1]. It is recommended that this handbook is read before starting work.

AmpliSens® *Chlamydia trachomatis*-FRT PCR kit is intended for analysis of the DNA extracted with the use of DNA extraction kits from the clinical material (urogenital, rectal, and oropharyngeal swabs; conjunctival discharge; urine (a sediment of the first portion of the morning specimen), prostate gland secretion).

7. WORKING CONDITIONS

AmpliSens® *Chlamydia trachomatis*-FRT PCR kit should be used at 18–25 °C.

8. PROTOCOL

8.1. DNA Extraction

It is recommended to use the following nucleic acid extraction kits:

- **DNA-sorb-AM**, REF K1-12-100-CE.
- Other nucleic acid extraction kits recommended by FBIS CRIE (see Guidelines [2]).

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.

Variant FRT

The total reaction volume is **30 µl**, the volume of DNA sample is **10 µl**.

1. Collect the required number of the tubes with **PCR-mix-1-FL *Chlamydia trachomatis*** and wax for amplification of DNA from clinical and control samples.
2. Add **10 µl** of **PCR-mix-2-FL-red** to the surface of the wax layer into each tube ensuring that it does not fall under the wax and mix with **PCR-mix-1-FL *Chlamydia trachomatis*.**

Variant FRT-100 F

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

1. Thaw the **PCR-mix-2-FRT** tube. Vortex the tubes with **PCR-mix-1-FL *Chlamydia trachomatis*, PCR-mix-2-FRT, and polymerase (TaqF)** and centrifuge them briefly. Take the required number of strip or unstrip tubes for amplification of DNA from clinical and control samples.
2. For N reactions (including 2 controls), add to a new tube:
   10*(N+1) µl of **PCR-mix-1-FL *Chlamydia trachomatis***,
   5.0*(N+1) µl of **PCR-mix-2-FRT,**
   0.5*(N+1) µl of **polymerase (TaqF).**
   Vortex the tube and then centrifuge briefly. Transfer **15 µl** of the prepared mixture to each tube.

Steps 3 and 4 are required in both variants.

3 Using filter tips, add **10 µl** of **DNA samples** obtained at the stage of DNA extraction.
4 Carry out the control amplification reactions:
- **NCA** – Add **10 µl** of **DNA-buffer** to the tube labeled NCA (Negative Control of Amplification).
- **C+** – Add **10 µl** of **Positive Control complex** to the tube labeled C+ (Positive Control of Amplification).
- **C–** – Add **10 µl** of **the sample extracted from the Negative Control 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

«AmpliSens-1» program

	Rotor-type instruments[1]			Plate-type instruments[2]		
Step	**Temperature, °C**	**Time**	**Cycles**	**Temperature, °C**	**Time**	**Cycles**
1	**95**	**15 min**	**1**	**95**	**15 min**	**1**
2	**95**	**5 s**	**5**	**95**	**5 s**	**5**
	60	**20 s**		**60**	**20 s**	
	72	**15 s**		**72**	**15 s**	
3	**95**	**5 s**	**40**	**95**	**5 s**	**40**
	60	**20 s Fluorescence detection**		**60**	**30 s Fluorescence detection**	
	72	**15 s**		**72**	**15 s**	

Fluorescent signal is detected in the channels for the FAM and JOE fluorophores (if other tests are performed simultaneously, the detection is assigned in other used channels).

2. Adjust the fluorescence channel sensitivity according to the *Important Product Information Bulletin* and Guidelines [2].
3. Insert tubes into the reaction module of the instrument.
4. Run the amplification program with fluorescence detection.
5. Analyze results after the amplification program is completed.

9. DATA ANALYSIS

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

– The signal of the *Chlamydia trachomatis* DNA amplification product is detected in the channel for the FAM fluorophore.
– The signal of the IC DNA amplification product is detected in the channel for the JOE 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:

– *Chlamydia trachomatis* DNA is **detected** if *Ct* value is determined 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.
– *Chlamydia trachomatis* DNA is **not detected** if the *Ct* value is not determined (absent) in the channels for FAM fluorophores, whereas the *Ct* value determined in the channel for the JOE fluorophore is less than the boundary *Ct* value specified in the *Important Product Information Bulletin*.
– The result is **invalid** if the *Ct* value is not determined (absent) in the channel for FAM fluorophores, whereas the *Ct* value in the channel for the JOE fluorophore is not determined (absent) or greater than the specified boundary *Ct* value. In such cases, the PCR analysis should be repeated for the corresponding clinical sample.

NOTE: Boundary *Ct* values are specified in the *Important Product Information Bulletin* enclosed to the PCR kit. See also Guidelines [2]

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

Table 3

Results for controls

Control	**Stage for control**	***Ct* value in the channel for fluorophore**	
		FAM	**JOE**
C–	DNA extraction	Absent	<boundary value
NCA	PCR	Absent	Absent
C+	PCR	<boundary value	<boundary value

10. TROUBLESHOOTING

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

1. If the *Ct* value of the Positive Control of Amplification (C+) in the channel for the FAM fluorophore is absent or greater than the boundary value, the amplification should be repeated for all samples in which *Chlamydia trachomatis* cDNA was not detected.
2. If the *Ct* value is determined for the Negative Control of Extraction (C–) and/or Negative Control of Amplification (NCA) in the channel for the FAM fluorophore, repeat PCR analysis for all samples in which *Chlamydia trachomatis* DNA was detected starting from the DNA extraction stage.

If you have any further questions or if encounter problems, please contact our Authorized representative in the European Community.

11. TRANSPORTATION

AmpliSens® *Chlamydia trachomatis*-FRT PCR kit should be transported at 2–8 ºC for no longer than 5 days.

12. STABILITY AND STORAGE

All components of the **AmpliSens® *Chlamydia trachomatis*-FRT** PCR kit are to be stored at 2–8 ºC when not in use (except for Polymerase (TaqF) and PCR-mix-2-FRT). All components of the **AmpliSens® *Chlamydia trachomatis*-FRT** 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: Polymerase (TaqF) and PCR-mix-2-FRT are to be stored at the temperature from minus 24 to minus 16 ºC when not in use.

NOTE: PCR-mix-1-FL *Chlamydia trachomatis* is to be stored away from light.

[1] For example, Rotor-Gene Q or equivalent.
[2] For example, CFX 96 or equivalent.

13. SPECIFICATIONS

13.1. Sensitivity

The analytical sensitivity of **AmpliSens® *Chlamydia trachomatis*-FRT** PCR kit is specified in the table below.

Clinical material	Transport medium	DNA extraction kit	Analytical sensitivity, GE/ml[3]
Urogenital swabs	**Transport Medium for Swabs** REF 987-CE or **Transport Medium with Mucolytic Agent** REF 953-CE	**DNA-sorb-AM**	5 x 10^2
Urine[4]	–	**DNA-sorb-AM**	1 x 10^3

13.2. Specificity

The analytical specificity of **AmpliSens® *Chlamydia trachomatis*-FRT** 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 during examination of human DNA as well as a DNA panel of the following microorganisms: *Gardnerella vaginalis, Lactobacillus* spp., *Escherichia coli, Staphylococcus aureus, Streptococcus pyogenes, Streptococcus agalactiae, Candida albicans, Mycoplasma hominis, Ureaplasma urealyticum, Ureaplasma parvum, Mycoplasma genitalium, Neisseria flava, Neisseria subflava, Neisseria sicca, Neisseria mucosa, Neisseria gonorrhoeae, Trichomonas vaginalis, Treponema pallidum, Toxoplasma gondii, HSV* type 1 and 2, *CMV,* and *HPV.*

The clinical specificity of **AmpliSens® *Chlamydia trachomatis*-FRT** PCR kit was confirmed in laboratory clinical trials.

14. REFERENCES

1. Handbook "Sampling, Transportation, and Storage of Clinical Material for PCR Diagnostics", developed by Federal Budget Institution of Science "Central Research Institute for Epidemiology" of Federal Service for Surveillance on Consumers' Rights Protection and Human Well-Being, Moscow, 2010.
2. Guidelines "Real-Time PCR Detection of STIs and Other Reproductive Tract Infections", developed by Federal Budget Institution of Science "Central Research Institute for Epidemiology" of Federal Service for Surveillance on Consumers' Rights Protection and Human Well-Being, Moscow.

15. QUALITY CONTROL

In compliance with Federal Budget Institute of Science "Central Research Institute for Epidemiology" ISO 13485-Certified Quality Management System, each lot of the **AmpliSens® *Chlamydia trachomatis*-FRT** PCR kit has been tested against predetermined specifications to ensure consistent product quality.

List of Changes Made in the Instruction Manual

VER	Location of changes	Essence of changes
23.06.11 LA	Cover page, text	The name of Institute was changed to Federal Budget Institute of Science "Central Research Institute for Epidemiology"
24.09.15 PM	Text	Corrections according to the template
	1. Intended use	The clinical material was specified
	6. Sampling and handling	
	3. Content, Footer	REF R-B1(iQ)-CE was deleted
	13.1. Sensitivity	The catalogue numbers for the transport media were added
21.12.17 PM	3. Content	The color of the reagent was specified
05.12.18 PM	2. Principle of PCR detection	The table with targets and the information about the enzyme UDG were added
	Through the text	The text formatting was changed
27.02.20 PM	Footer	The phrase "Not for use in the Russian Federation" was added
01.03.21 VA	—	The name, address and contact information for Authorized representative in the European Community was changed

AmpliSens®

EC REP

Ecoli Dx, s.r.o., Purkyňova 74/2
110 00 Praha 1, Czech Republic
Tel.: +420 325 209 912
Cell: +420 739 802 523

Federal Budget Institute of Science "Central Research Institute for Epidemiology"
3A Novogireevskaya Street
Moscow 111123 Russia

[3] Genome equivalents (GE) of the microorganism per 1 ml of a clinical material placed into the specified transport medium.
[4] Pretreatment is required.