



Republic of the Philippines
 NATIONAL POLICE COMMISSION
NATIONAL HEADQUARTERS PHILIPPINE NATIONAL POLICE
OFFICE OF THE CHIEF, PNP
 Camp BGen Rafael T Crame, Quezon City

DEC 03 2020

MEMORANDUM CIRCULAR
 NO.: 2020-084

**PRESCRIBING THE MINIMUM TECHNICAL SPECIFICATIONS
 FOR REVERSE TRANSCRIPTION POLYMERASE CHAIN REACTION SYSTEM**

1. REFERENCES:

- a. NAPOLCOM Resolution No. 2020-0761 entitled, "Prescribing the Minimum Standard for Reverse Transcription Polymerase Chain Reaction System" dated September 11, 2020;
- b. NAPOLCOM Memorandum Circular (MC) No. 2019-002 entitled, "Defining the Duty and Authority of the NAPOLCOM to Prescribe Minimum Standards for Uniforms, Arms, and Equipment to be Procured by the PNP" dated January 29, 2019;
- c. PNP MC No. 2019-016 entitled, "Implementing Guidelines of NAPOLCOM Resolution No. 2019-002 Defining the Commission's Function to Prescribe Minimum Standards for Uniforms, Arms and Equipment for the Philippine National Police and Delineation of Authority to the Chief, Philippine National Police and to Set Technical Specifications of PNP Uniforms, Arms and Equipment" dated April 4, 2019; and
- d. PNP UESB Resolution No. 2020-027 entitled, "Approving the Proposed Minimum Technical Specifications for Reverse Transcription Polymerase Chain Reaction System" dated October 22, 2020.

2. RATIONALE:

This MC sets forth the minimum technical specifications for Reverse Transcription Polymerase Chain Reaction System that will serve as reference in the procurement of the said equipment.

3. SITUATION:

The Reverse Transcription Polymerase Chain Reaction (RT-PCR) System will be procured by the PNP in strengthening its fight against COVID-19. It has a temperature control technology and its thermal cycling exposes reactants in a repeated cycles of maximum heating and cooling to permit different temperature-dependent reactions; DNA double helix are physically separated on the process of appropriate temperature range and capable of transcribing RNA to DNA thru reverse transcription.

4. PURPOSE:

To provide and establish the minimum technical specifications for Reverse Transcription Polymerase Chain Reaction System that will serve as reference in the procurement of the said equipment.

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 POLICE LIEUTENANT COLONEL
 Chief, Administrative Section
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5. DEFINITION OF TERMS:

For purposes of this MC, the following terms shall mean:

- a. **Amplify** – refers to the increase of the volume, especially using an amplifier.
- b. **CCD Camera** – refers to a video camera that contains a charged-coupled device (CCD), which is a transistorized light sensor on an integrated circuit. In plain English, CCD devices convert or manipulate an electrical signal into some kind of output, including digital values.
- c. **Dynamic range** – refers to the ratio between the largest and smallest values that a certain quantity can assume. It is often used in the context of signals, like sound and light. It is measured either as a ratio or as a base-10 or base-2 logarithmic value of the difference between the smallest and largest signal values.
- d. **DNA Sequencing** – refers to the process of determining the sequence of nucleotides within a DNA molecule.
- e. **Excitation** – refers to the state of enhanced activity or potential activity of a cell, organism, or tissue that results from its stimulation.
- f. **FAM** – refers to the most commonly used fluorescent dye attachment for oligonucleotides and is compatible with most fluorescence detection equipment
- g. **Linear** – relating to, resembling, or having a graph that is a line and especially a straight line.
- h. **Multiplex PCR** – refers to a widespread molecular biology technique for amplification of multiple targets in a single PCR experiment. In a multiplexing assay, more than one target sequence can be amplified by using multiple primer pairs in a reaction mixture.
- i. **Nucleic Acid** – refers to a complex organic substance present in living cells, especially DNA or RNA, whose molecules consist of many nucleotides linked in a long chain.
- j. **Oligonucleotides** – refer to short DNA or RNA molecules, oligomers, that have a wide range of applications in genetic testing, research, and forensics.
- k. **Pathogen** – refers to any organism such as a virus, fungus, or a bacterium that causes a disease in another organism. Diseases caused by organisms can range from the common cold to food poisoning to meningitis. They can be spread in many ways, such as by coming in contact with bodily fluids, ingesting undercooked food, or swimming in contaminated water.

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- l. **Peltier** – refers to the cooling of one junction and the heating of the other when electric current is maintained in a circuit of material consisting of two dissimilar conductors; the effect is even stronger in circuits containing dissimilar semiconductors.
- m. **Peltier Effect** – is when it creates a heat flux at the junction of two different types of materials.
- n. **Photomultiplier Tubes (PMT)** – refer to members of the class of vacuum tubes, and more specifically vacuum phototubes, are extremely sensitive detectors of light in the ultraviolet, visible, and near-infrared ranges of the electromagnetic spectrum. These detectors multiply the current produced by incident light by as much as 100 million times or 10^8 , in multiple dynode stages, enabling individual photons to be detected when the incident flux of light is low. Dynodes inside a photomultiplier tube.
- o. **Photodiode** – refers to a semiconductor device that converts light into an electrical current. The current is generated when photons are absorbed in the photodiode. Photodiodes may contain optical filters, built-in lenses, and may have large or small surface areas. Photodiodes usually have a slower response time as their surface area increases.
- p. **Primer** – refers to a single stranded nucleic acid utilized by all living organisms in initiation of DNA synthesis.
- q. **Sensitivity** – refers to the quality or state of being sensitive: such as the capacity of an organism or sense organ to respond to stimulation.
- r. **SYBR Green** – refers to an asymmetrical cyanine dye used as a nucleic acid stain in molecular biology. The SYBR family of dyes is produced by Molecular Probes Inc., now owned by Thermo Fisher Scientific. SYBR Green I binds to DNA.

6. SPECIFICATIONS:

a. Description:

Reverse Transcription Polymerase Chain Reaction (RT-PCR) System is a laboratory equipment composed of hardware and software used to generate complimentary DNA (c-DNA) templates, and the inclusion of RNA polymerase promoter sequence in the amplification reaction using fluorescence, a technique called real time or quantitative PCR (q-PCR). Combined RT-PCR and qPCR are routinely used for analysis of gene expression and quantification of viral RNA in research and clinical setting.

b. Technical Specifications:

- 1) Hardware : 96 wells
- 2) Software : Multiplex PCR in simultaneous detection of 5 targets

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- 3) Compatible/Supported Dyes : FAM/SYBR Green
- 4) Dynamic Range : 9 Orders of magnitude or logs of Linear
- 5) Temperature Control Technology : Peltier
- 6) Heating and cooling : 6.0°C/s Max
- 7) Temperature accuracy : ± 0.25°C Max
- 8) Temperature Uniformity : ± 0.50°C, 30 seconds after clock start
- 9) Temperature Range : 4 to 100°C
- 10) Reaction Volume Range : 1-50 µl
- 11) Sensitivity : Single copy
- 12) Excitation : Halogen lamp
- 13) Detection Device : CCD camera or PMT
- 14) Channels : 5 Channels


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7. EFFECTIVITY:

This MC shall take effect immediately after 15 days from filing a copy thereof at the UP Law Center in consonance with Section 3, Chapter 2, Book VII of Executive Order 292 otherwise known as the "Revised Administrative Code of 1987," as amended.




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 Police General
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