American Journal Of Philological Sciences
(ISSN – 2771-2273)
VOLUME 04 ISSUE 08 PAGES: 64-68
OCLC – 1121105677

Publisher: Oscar Publishing Services

Journal Website: https://theusajournals.com/index.php/ajps

Research Article

THERMOMETERS USED IN MEDICINE AND RULES FOR THEIR USE

Submission Date: Aug 17, 2024, Accepted Date: Aug 22, 2024,
Published Date: Aug 27, 2024
Crossref doi: https://doi.org/10.37547/ajps/Volume04Issue08-10

Akhmedova Setora Askar's daughter
KarIEE MSS-222-22 group student, Uzbekistan

ABSTRACT

This article discusses the concept of infrared medical thermometers used in medicine and their use.

KEYWORDS

Thermometer, liquid, gas, electronic and infrared medical thermometer.

INTRODUCTION

Thermometer (thermo... - hot and meter) - a device for measuring temperature. Its purpose is based on the temperature dependence of the expansion of substances, electrical resistance, gas pressure, etc. There are liquid, gas and resistance thermometers. The simplest of them are liquid thermometers, which mainly consist of a reservoir, a tube and a scale. The reservoir is filled with a liquid such as mercury. As the temperature increases, the mercury in the reservoir expands and the mercury in the tube connected to it rises. The higher the temperature, the more the mercury expands and the higher it rises through the tube. For example: - when measuring temperatures from 35° to 750°, thermometers filled with mercury (from - 80° to 170° - ethyl alcohol, from -200° to 20° - pentane, - from 20° to 300° - kerosene) are used. Liquid thermometers are used in life, medicine and meteorology.

In science and technology, gas thermometers are used to measure temperatures from 269° to 1063°. These thermometers consist of a container filled with a gas (helium at low temperatures and nitrogen at high

American Journal Of Philological Sciences
(ISSN – 2771-2273)
VOLUME 04 ISSUE 08 PAGES: 64-68
OCLC – 1121105677
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

temperatures), a precise mercury manometer, and the temperature is determined by changes in the volume or pressure of the gas. In industry, a manometric thermometer is often used to measure temperatures from 60° to 550°. This thermometer consists of a cylinder filled with gas (nitrogen), butane (ethyl chloride) or liquid (mercury) and a hermetic system consisting of a capillary and spring manometer. As the temperature changes, the pressure in the system changes, the spring is deformed, and as a result, it moves along the scale. Resistance thermometers based on the dependence of electrical resistance and thermocouples based on the dependence of thermoelectric driving force are also widely used in science and technology. Such thermometers consist of a capillary that can measure temperatures from 200° to 500°.

With the development of science and technology, many types of new thermometers have appeared. The electronic thermometer shows the body temperature in digital form using the exact relationship between the physical parameters of some substances (resistance, voltage, current, etc.) and the ambient temperature. Easy to read and easy to carry. Its disadvantage is that the accuracy of the indicator is affected by factors such as electronic components and battery power supply, which is not as good as a glass thermometer.

Electronic thermometer consists of temperature sensor, liquid crystal display, button battery, special integrated circuit and other electronic components. It can measure human body temperature quickly and accurately. Compared with the traditional mercury glass thermometer, it has the advantages of convenient reading, short measurement time, high measurement accuracy, memory and sound alarm. The electronic thermometer does not contain mercury, which is harmless to the human body and the environment. It is especially suitable for families, hospitals and other occasions.

Although people are already used to using a modern device, people are still interested in how infrared thermometers work and the requirements for their correct use.

Three types of mercury, electronic and infrared medical thermometers are used to measure human body temperature. Until that time, our people used more mercury, electronic thermometer. But due to the spread of the coronavirus infection, the demand for infrared thermometers has increased. The fact is that infrared medical thermometers can measure the temperature of several patients in a short period of time, in addition to quickly determining the temperature of the human body from a distance. This is useful in organizations where many people work, in public places.

These thermometers are designed for remote measurement of the surface temperature of the

American Journal Of Philological Sciences
(ISSN – 2771-2273)
VOLUME 04 ISSUE 08 PAGES: 64-68
OCLC – 1121105677
Publisher: Oscar Publishing Services

human body and solid objects. Therefore, it is used in industry and healthcare. But industrial thermometers cannot be used to measure human body temperature.

The correct use of each measuring tool is directly proportional to obtaining an accurate and reliable measurement result. Here, let's talk about the measuring tool. According to Article 3 of the Law of the Republic of Uzbekistan "On Metrology", a measuring instrument is a technical instrument used for measurements and having standardized metrological characteristics, according to which an infrared medical thermometer is also a measuring instrument is considered (figure 1).

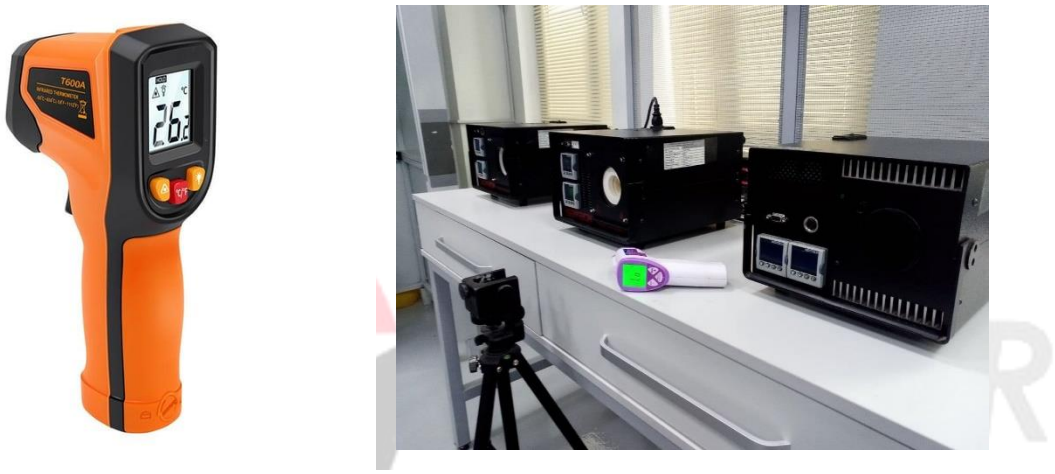

Figure 1. Infrared medical thermometer

In order to use the device correctly, several aspects should be taken into account. First of all, familiarize yourself with the instructions for use of the thermometer. It is also important to consider the range and error of each thermometer. When using infrared thermometers intended for use in the health sector, first of all, it is necessary to make sure that it has passed the state metrology inspection, more precisely, to check the presence of a certificate of conformity.

Until now, this type of thermometer was mainly used in pediatrics - when it is necessary to measure the child's body temperature. That is, since the child cannot hold the traditional thermometer for 5-7 minutes, this method is useful. When using an infrared thermometer, it should be directed to the top of the ear, forehead or temple.

The principle of operation of the device is based on measuring the amplitude of electromagnetic radiation from an object in the infrared part of the spectrum and then converting the measured value into heat radiation power. The thermal radiation directed by the optical system is transmitted to the sensor transducer and an

American Journal Of Philological Sciences
(ISSN – 2771-2273)
VOLUME 04 ISSUE 08 PAGES: 64-68
OCLC – 1121105677
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

electrical signal is generated in proportion to the value of the measured surface temperature. This signal passes through an electronic converter to a computer, and the result is displayed on the display.

It is natural for infrared thermometers to have errors. Especially if the transmitter is not wiped before use. In this device, the error occurs because the beam travels a longer distance than in electronic and mercury thermometers. Nevertheless, the device has a number of advantages.

First, the infrared thermometer is also used on sick people, but the patient does not touch it. That is, since the measurement process is carried out by another person, from a certain distance, there is less chance of virus particles getting into the thermometer. In addition, the thermometer memory allows you to see the dynamics of temperature changes. The device stores 8 - 50 measurements. Some models have signals that inform you that the measurement is complete. It is also possible to turn off the alarm and light in order not to disturb the patient during temperature measurement. Another plus is that thermometers like these are color-coded based on temperature.

Often, we witness cases of temperature measurement by touching the device to the forearm and palm of the hand, forehead and various other parts of the body. In most cases, incorrect measurements occur because of this. After all, in the process of using an infrared thermometer, it is very important to be able to correctly choose the distance that corresponds to the surface of the object to which it is directed. Therefore, in most infrared medical thermometers, the distance between the measured object and the thermometer is required to be in the range of 3÷8 centimeters. Of course, you can find out from the thermometer's manual and the instructions on the body of some infrared thermometers.

As the infrared thermometer moves away from the object, the measuring surface increases and its error also changes. It can be compared to pointing a flashlight at a wall, and the light expands as you move away from it.

In fact, the infrared thermometer has been widely used since the outbreak of the coronavirus epidemic in our country. Since the device is relatively new to us, it is necessary to make sure that it works properly and undergo a metrological inspection. According to the established rules, the implementation of state metrological inspection and control is mandatory for all individuals and legal entities that use measuring instruments in the field. First of all, measuring instruments used in the fields of health care, veterinary medicine, and environmental protection should be subjected to state tests with their type approval. This ensures that they are usable, safe and work properly.

REFERENCE

American Journal Of Philological Sciences
(ISSN – 2771-2273)
VOLUME 04 ISSUE 08 PAGES: 64-68
OCLC – 1121105677
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

1. https://lex.uz/uz/docs/3560526
2. https://uz.wikipedia.org/wiki/Haroratni_o%CA%BBlchash_usullari
3. Shoniyozov Sh.Sh. Issiqliq texnika o'lchovlari fanidan ma'ruza matnlari. ToshDTU. 2000.
4. B.E.Muhamedov Metrologiya. Texnologik ko'rsatkichlarini o'lchash usullari va asboblari Toshkent, - O'qituvchi. 1991.
5. SHoyunusov Sh.SH., Raximdjanov R.T. Issiqlik texnika o'lchovlari fanidan tajriba ishlari uchun-uslubiy qo'llanma. ToshDTU. 1999.