PHYSICAL PROPERTIES OF AIR AND THEIR HYGIENIC CHARACTERISTICS

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Annotation: The article provides information on the physical properties of air and their hygienic characteristics.

Keywords: Temperature, Humidity, Absolute humidity, Maximum humidity, Relative humidity, Sanitary practice, Atmospheric pressure, Caisson, Air ionization.

Factors that constantly affect the human environment include temperature, humidity, movement, atmospheric pressure, and air ionization. It should be noted that these factors are dynamic (variable) in contrast to the stability of the chemical composition of atmospheric air, and many of them have a complex effect on the body. When sunlight passes through the atmosphere, it practically does not heat it. Air heating occurs due to the return of heat from the soil, which absorbs solar radiation and transforms it from one form to another. The suspended air rises, freeing up space for colder air layers. This causes the air masses to mix (convection) and allow a uniform heating of the atmospheric layer on the surface. Atmospheric conditions vary depending on the climatic zone, the season, the time of day, the intensity of solar radiation, and so on. The hygienic value of air temperature is determined by its effect on heat exchange in the body. heat transfer by radiation to colder objects; convection due to direct heating of the air layers approaching the skin. A small amount of heat is transferred during respiration (when exhaled, the air is heated almost to body temperature) and through the excretory organs. At room temperature, the body loses 45% of heat at rest due to

radiation, 30% due to convection and 25% due to evaporation of sweat. As the temperature of the air, walls, and surrounding objects rises, heat transfer through convection and radiation decreases, and heat transfer through evaporation increases. The amount of sweat released during strenuous physical activity at high temperatures can reach 6-10 liters per day. When exposed to very low temperatures, heat transfer through radiation and convection increases significantly, and heat loss through evaporation decreases.

If the temperature fluctuates sharply and over a long period of time, it can cause overheating (at high temperatures) or cooling (at low temperatures).

Humidity. Water vapor is released into the atmosphere by the evaporation of water from the sea, oceans, lakes and rivers. In dwellings, the evaporation of moisture from the surface of the lungs and skin during cooking, washing, drying, etc., serves as an additional source of moisture. Humidity is the amount of water vapor present in the air. Humidity, like temperature, varies with climate. The amount of water vapor in the air is measured in terms of their elasticity (in millimeters of mercury) or in grams of water vapor in 1 m3 of air. Humidity is defined by the concepts of absolute, maximum and relative humidity.

The product is the elasticity of water vapor in the air measured in millimeters of mercury during the test, or the amount of water vapor in grams per liter of air.

Maximum humidity is the elasticity of water vapor measured in millimeters of mercury at saturation of the air at a certain temperature or required for complete saturation of 1 liter of air with water vapor at a certain temperature. means the amount of water vapor in grams.

Relative humidity is the ratio of absolute humidity to maximum humidity, expressed as a percentage, ie the percentage of saturation of air with water vapor.

Humidity, like its temperature, has a significant effect on the exchange of heat between the body and the environment. Excessive humidity reduces the release of heat due to the reduction of sweat evaporation from the skin surface at high temperatures, which leads to overheating of the body. At low temperatures, high

humidity increases heat production (increases the thermal conductivity of clothing and ambient air and the absorption of heat by external objects) and accelerates the cooling of the body. Under normal meteorological conditions, a relative humidity of 40-60% is most favorable.

In sanitary practice, the speed of air movement and the direction of the wind are determined. The speed of air movement is expressed in meters per second (m / s). The movement of air increases the release of heat due to convection, as the heated air layer under the clothes is carried away by the moving air, which is replaced by colder layers. When the temperature is high, the wind releases excess heat, which has a beneficial effect. At low temperatures, wind has a negative effect on the body, as it causes a large release of heat and increases the risk of cooling. Strong winds can worsen a person's mood and lead to a number of chronic illnesses and difficulty breathing.

Air velocity norms are determined by the type of air. The speed is 0.1-0.3 m / s in residential rooms, up to 0.5 m / s in gyms, and 1-1.5 m / s in production and hot shops. The hygienic importance of air movement is that it improves the ventilation of residential areas and buildings and the self-cleaning of the atmosphere from pollution.

Atmospheric pressure. Due to the force of gravity, the atmosphere exerts pressure on objects and the earth's surface. At sea level, each centimeter occupies a vertical surface of 1,033 kg per square meter of surface area or 760 mm of mercury (normal pressure). is rare and imperceptible to a healthy person. However, in sick people, the pain increases before the weather vane, neuralgia develops, and old wounds ache. Atmospheric pressure in cities is lower than in open areas. The drop in pressure is accompanied by a decrease in the partial pressure of oxygen, which leads to a condition called altitude sickness. This condition can cause shortness of breath, palpitations, dizziness, nausea, and nosebleeds. Elevation can occur when climbing mountains and flying. Climbers, pilots, and mountaineers adapt to low oxygen levels by increasing the number of erythrocytes and hemoglobin, accelerating respiration, and so on (this is called the body's condenser response).

At an altitude of 8-10 km, there may be pain in the muscles and joints. To prevent this, flights are carried out in spacesuits or aircraft with airtight cabins.

Caisson and the miners and divers are exposed to high atmospheric pressure. When submerged, the pressure increases by about 1 atm every 10.3 m depth.

It is known that at normal atmospheric pressure, about 1.8 cm3 of nitrogen dissolves in 100 cm3 of blood. As atmospheric pressure increases, the amount of dissolved nitrogen in the blood increases, which in turn increases the saturation of tissues with nitrogen. During the transition from high pressure to normal pressure, nitrogen enters the bloodstream from the tissues due to the difference in partial pressure and is excreted through the lungs. In rapid decompression (when the pressure drops), due to the large difference between the partial pressure of nitrogen in the environment and the partial pressure of dissolved nitrogen in body tissues, nitrogen in the tissues rapidly forms bubbles and is released into the blood. gas embolism (caesarean section) can occur in various organs. The essence of disease prevention is to normalize the duration of working hours and maintain a decompression regime.

The transition from high pressure to normal pressure should be gradual. The duration of decompression is determined by the amount of pressure.

Air ionization. There is a constant exchange of ions in the atmosphere, which are formed under the influence of radioactive elements, electric charges, ultraviolet and cosmic rays.

Fresh air contains a large number of light negative ions, while polluted air contains a large number of positive light and heavy ions. The polluted air of the city is less ionized than the air of rural areas and resort areas. The ionization of indoor air depends on its physical properties. The more dust and carbon dioxide in the air, the higher the temperature and humidity, the more heavy ions there are. Therefore, the level of ionization of air in residential and public buildings is an indicator of air quality.

At present, it is known that negative ionizing air, dominated by light ions, has a healing effect on the body and increases physical and mental performance.

Highly ionized air is used in the treatment of some diseases (hypertension, bronchial asthma, etc.). According to some researchers, positive light ions can worsen the functional state of the body, reduce the ability to work and cause high blood pressure.

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