EFFECTS OF ALTERNATING ELECTROMAGNETIC FIELDS ON THE HUMAN BODY

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The effect of electromagnetic fields on the human body depends on the strength of electric and magnetic fields, the intensity of energy flux, the frequency of vibration, the accumulation of radiation on a certain surface of the body and individual characteristics of the human body.

The main reason for the effect of electromagnetic fields on the human body is that atoms and molecules in the body of the human body begin to split into positive and negative poles under the influence of this field. The polarized molecules begin to move in the direction in which the electromagnetic field is propagated.

It has been confirmed in experiments that the bulk of the waves, shorter than 10 cm in length, are absorbed in skin cells. Radiation in the range of 10-30 cm is poorly absorbed in skin cells (30-40 percent), and mostly their absorption falls on the internal organs of a person. Such radiation is incredibly dangerous.

Excess heat generated in the body can be lost due to the thermoregulation of the human body up to a certain limit. Starting from a certain amount (I >10 MW/cm2), the so-called heat limit is not able to be released in the human body and body temperature rises, which in turn causes great damage to the body. Heat absorption is well carried out in water-rich parts of the human body (blood, muscles, lungs, liver, etc.). The permissible levels of radiation allowed in our country are very few units. Therefore, even if the organism is exposed to radiation for a long time, there may not be any change in the hyech.

According to SN 848-70 "Sanitary norms and rules for those who work at sources of electromagnetic fields of high, extremely high and extremely high frequency" establishes the following permissible norms and limits: the radio frequency voltage of the electromagnetic field at work should not exceed 20 V / m in the frequency range of 100 kHz-30 MGs in terms of electrical composition, 5 V / m in the frequency range of 30-300 MGs. As for the magnetic composition, the frequency range of 100 kHz-1.5 MGs should be 5 V/m.

Maximum allowable radiation flux voltage during the working day in the range of supernatural frequency waves (SVCh) in the range of 30-300 000 MGs should not exceed 10 μg / cm2, radiation not more than 2 hours of working day - 100 μg W / cm2,

radiation not more than 15-20 minutes - not more than 1000 μg W / cm2. In this, safety glasses should definitely be worn. During the remaining working time, the irradiation intensity should not exceed 10μWh/cm2. For persons whose profession is not associated with radiation and permanent residents in the extreme frequency range of waves, the radiation flux density should not exceed 1μWh/cm2.

Analysis of the above formulas, placement of workplaces farther away from the electromagnetic field and extension of the distance between workplaces with antennas directing fluxes of electromagnetic fields, reduction of radiation voltage of the generator, installation of absorbing and reflective screens between workplaces and antennas to which radiation currents are transmitted, as well as the use of personal protective equipment from electromagnetic fields at workplaces are the main means of protection.

Proper use of radiation absorbing devices and attenuators will ensure a decrease of electromagnetic energy dissipation into the external environment by more than 60 dB, and it will be possible to ensure a radiation voltage flux of not more than 10 μM W/cm2.

The result is the merger of both fields, and from the two fields, an area with little power remains. It is possible to calculate the thickness of the screen that can be lost of the surface and a certain amount of radiation. We define the strength and density of the light flux passing through the screen by Ro and Io, and the strength and density of the light flux without the screen by R and I. Based on the strength of the screen, they are made of round materials with good electrical conductivity, not less than 0.5 mm thick. For observation and from the point of view of technology, the cell of open areas left should be fenced with a metal mesh of at least 4x4 mm. The screen must be connected to the ground.

The degree of voltage loss of the electromagnetic field with the screen is conditionally determined by the fact that the depth of penetration of electromagnetic waves into the screen material is less than the thickness of the screen.

If the depth of penetration of the magnetic field into the screen is d, the degree of detension in it is n = 2,718 times, it is determined by the following formula:

$$\delta = 1/\sqrt{\mu\sigma\pi f},$$

In this case: μ-absolute magnetic resistance of the screen material g/m; σ-specific conductivity of screen material, Sm/m; f-frequency, Gs.

At the same time, the protection efficiency of the screen should satisfy the following disparity:

$$E > jd/\sigma,$$

wherein: the thickness of the d-screen material, mm; μ, σ, the larger the f-, the less depth of penetration of the area into the screen thickness, which allows the screen to be thinner.

References:

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