

Hygienic assessment of aero ionization level of the air environment in rooms with video display terminals

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The article deals with the analysis of aero ionization level of the air environment in higher educational institution rooms, the subsequent assessment of compliance to hygienic criteria was carried out. This research reveals the lack of both positive and negative ions during a day in mentioned rooms.

The assessment of positive and negative aero ions level and the assessment of unipolarity coefficient was carried out in laboratory students' rooms with video display terminals (VDT). The actual measurements were carried out at the height of 0,5 - 1 m from a floor in an average room zone while the equipment and ventilation work in a usual mode. We used the instrument MAS-01 — equipment the small-sized aero ionic counter — it is used when carrying out sanitary and hygienic inspection of rooms and workplaces, as well as when monitoring environment. We checked the aero ions quantity of both polarities in computer classes three times a day at the certification and a "continuous" mode of measurement during the day. Statistical processing was carried out with the help of Microsoft Excel.

We used the actual value $90 \cdot \text{cm}^3$ for calculations when defining the level of the maintenance of aero ions of $N_s(t) < 100 \text{ cm}^3$. The actual measurements of aero ionization level of the air in investigated rooms for work with VDT at universities defined aero ionization level of $203,22 \pm 95 \text{ cm}^3$ during a cold period of a year and $207,21 \pm 119,9 \text{ cm}^3$ during a warm period of a year. The actual measurements revealed violations in hygienic norms: at the beginning of a day aero ions level varied from 125 cm^3 to $410,4 \text{ cm}^3$ on the average, in the afternoon it had average values of $129-131,5 \text{ cm}^3$, and finally $140,83-350 \text{ cm}^3$ at the end of a day.

The results of the actual measurements of aero ionization level testify to a lack of both positive and negative aero ions in air in rooms with VDT which are used students education. Results of average values of aero ions of two polarities are presented in table 1.1.

Table 1.1. The average level of aero ionization of air

Period of a year		Minimum necessary level		Number of Ions level of 1 cm^3 of air	
		N_t^+	N_s^-	$N_t(\text{av})^+$	$N_s(\text{av})^-$
Education establishment					
cold	PSU BNTU	400	600	379,74 160,89	229,55 187,7
	International Sakharov Environmental University			111,61	149,82
warm	PSU BHTV			443,67 156,8	180,45 201,2
	International Sakharov Environmental University			120,45	140,7

We didn't notice the typical increase in negative aero ions level during the warm period of a year. Insignificant quantitative differences of positive and negative aero ions during two periods of year are caused by the various aero ions maintenance in the air and by the airing mode which is, as a rule, complicated during the cold period of a year.

After determination of the actual values of positive and negative aero ions level (with the help of continuous measurement) we revealed the dynamics, presented in figure 1.2.

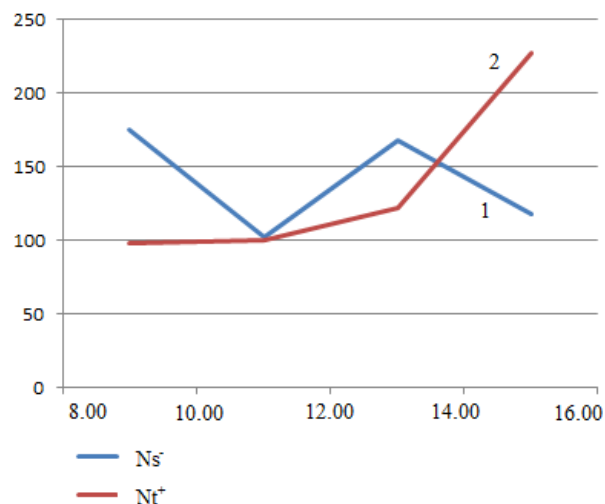


Figure 1.2 – Dynamics of positive (Nt +) and negative (Ns-) aero ions level in the room with VDT during the day

The maintenance of positive ions increases from a minimum level at the beginning of a day, as figure 1.2 has it (see curve 2). The maintenance of positive ions is less 100cm^3 , as a rule, at the beginning of day (with the subsequent significant increase in the maintenance of Nt +) doesn't reach the level established by hygienic criteria. The maintenance of negative aero ions (Ns-) in air during the day changes ambiguously (see a curve 1 in figure 1.2), with quantity reduction at 12.00 and 16.00.

According to the maintenance of positive aero ions in air, a hygienic assessment of working conditions showed that 77,8% of rooms didn't correspond to modern hygienic criteria, according to the maintenance of negative ions in air 83,6%, of rooms were not suitable, unipolarity coefficient revealed 80,6% of rooms with violations. The use of a large number of computer equipment, as well as the presence of materials promoting accumulation of an electrostatic charge, in certain cases caused the reduction of ions of both polarities level in air of rooms with VDT up to hygienic requirements violation.

The literature:

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