



## **HYGIENIC ASSESSMENT OF WORKING CONDITIONS AND ENVIRONMENTAL PROTECTION AT GLASS PRODUCTION PLANTS**

**Ahmadaliev Rustamjon Umaralievich**

PhD. Fergana Medical Institute of Public Health. Fergana, Uzbekistan.

**Ismoilov Dilmurod Tavakkal ugli**

clinical residency. Fergana Medical Institute of Public Health. Fergana, Uzbekistan.

**Ubaydullayeva Farangisxon Ulugbek qizi**

3rd year student of general doctor. Fergana Medical Institute of Public Health. Fergana, Uzbekistan.

**Umarov Humoyunmirzo Nabijon ugli**

3rd year student of general doctor.

Fergana Medical Institute of Public Health. Fergana, Uzbekistan.

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| <p><b>Received:</b> July 26<sup>th</sup> 2021<br/><b>Accepted:</b> August 26<sup>th</sup> 2021<br/><b>Published:</b> September 29<sup>th</sup> 2021</p> | <p>The article describes the measures aimed at studying and eliminating negative factors that affect the health of employees in the glass production enterprise located in Kuvasoy city of Fergana region. The results of the study showed that the concentration of dust, vapor, gas, aerosols from chemicals in the air of the working area is higher than all workplaces at the enterprise. In the hot period of the year, the microclimate indicators in the workplace did not meet the hygienic requirements, and the content of dolomite and quartz dust, nitrogen oxides, carbon and sulfur in the emissions of atmospheric air was higher than normal. These conditions have a negative impact on the health of employees, leading to stress in the thermoregulatory process and changes in the functional state of the cardiovascular system.</p> |

**Keywords:** Glass, enterprise, negative factor, employees' health, microclimate, warm and cold period.

Glass production is one of the leading sectors of the national economy. Today, the degree of complex mechanization and automation of technological processes in this industry is increasing. Working conditions in glass production are characterized by work intensity, forced posture during work, intense noise and air pollution with harmful chemicals. [1,2,3,7]

Researchers have studied occupational health and physiological issues in glass production and have established the negative impact of production factors on the health of stackers, glass blowers, machinists and persons involved in filling the batch. [4,5,6]

According to the United Nations in the world is available to 1 million titles per year previously existing products, including up to 100 thousand chemical compounds, of which about 15. Thousands are on - potentially toxicants. It is believed that up to 80% of chemistry compounds entering into the environment, sooner or later fall into the natural water with industrial, household and stormwater into the soil, and then to food materials and food products. As a result, food and drinking water can simultaneously be dozens, and sometimes hundreds of current - -toxic chemicals that can adversely affect human health. [7,8,9]

### **PURPOSE OF THE STUDY.**

The purpose of this work was a comprehensive hygienic assessment of working conditions and environmental protection at glass-making enterprises.

### **RESEARCH METHODS.**

To assess working conditions and attestation of workplaces, at the object under study, we carried out a comprehensive instrumental study of physical and chemical factors - air temperature, relative humidity and air velocity, illumination, noise level, determined the severity of labor - the mass of the lifted and moved load manually (kg), labor intensity - the duration of concentrated observation (%) of the shift, chemical factors such as dust, silicon oxide and other harmful substances are determined. To assess the health status of workers, the effectiveness of medical and preventive services and ongoing health-improving measures, the incidence of workers with temporary disability was studied.

To assess the environment, the conditions for disposal and the formation of wastewater were studied in accordance with the "Rules for the protection of surface waters from pollution by wastewater", according to № 1166, the calculation of the dispersion of harmful emissions into the atmospheric air was carried out, in accordance with the "Guidelines for the calculation of dispersion in the atmosphere of



emissions" №369 and questionnaire survey of the population living at different distances from sources. To carry out measures for the organization of therapeutic and prophylactic nutrition, a sanitary and hygienic assessment of the actual nutrition of workers was given.

To assess the actual nutrition, special questionnaires were used. In the main shops, the microclimate indicators were assessed in accordance with Sanitary Regulations and Norms №0058-96, and the presence of harmful substances in accordance with GOST 12.1.005-88.

### **THE RESULTS OBTAINED AND THEIR DISCUSSION.**

The polished glass production process consists of the following operations: storage and preparation of raw materials, batch preparation, melting of glass mass, molding, annealing of sheet glass, glass quality control, cutting, transportation and cutting of glass, powder application, packaging of sheet glass, storage of finished products. In the process of preparing the charge and when dosing raw materials, an automatic control system for the dosing and mixing line is used. The true state of nutrition of workers of a manufacturing enterprise of a quartz product and the composition of the diet of food was studied using a questionnaire method, a survey and a measurement method. The information obtained from the questionnaires is statistically analyzed. The control system of the dosage and mixing line in accordance with the cycle program of the technological process and the values of technological parameters is carried out according to a given program using a Modern computer, which led to a significant decrease in industrial injuries and temporary disability. The work schedule takes place in 3 shifts. It has been established that the leading unfavorable factors of the production environment are: heating microclimate of the radiation-convection type in most workplaces of the bottle production shop; cooling microclimate at the loader's workplace in the batch preparation shop; intense industrial noise exceeding hygienic standards by 15-16 dB; the presence of chemicals and dust in the air of the working area, the average concentration of which in the charge preparation shop exceeded the allowable amount by 1.4-2.8 times.

The questionnaire analyzed milk and dairy products: milk, curd, cheese, etc. from meat and meat products: beef, lamb and chicken, eggs, etc. from vegetables: potatoes, carrots, beets, tomatoes; from fruits: apples, grapes, pomegranates, pears, persimmons, figs, peaches, citrus fruits, cereal product: bread, flour, peas, rice. In the questionnaire, based on the objectives of the survey,

questions were drawn up, the questionnaire was discussed and approved at a scientific and methodological meeting. It was found that the workers consumed cow's milk 0.03-0.05 mg, cottage cheese 0.01-0.013 mg, cheese 0.01-0.02 mg, eggs 0.011-0.013 mg. In total, milk and dairy products amounted to 0.061-0.096 on average 0.078 mg. When the results were compared with the hygienic standards, it was determined that their number is 1.5 times lower than the hygienic standards. Analysis of meat and meat products consumed per day on average: 0, 05-0, 07 kg of beef, 0,01-0, 032 kg lamb, pork 0.001-0.005 kg. The total quantity of meat and meat products 0,06-0.10 kg average, 0,08 kg. Comparison of the obtained results with the hygienic norms is 45.5% lower than the hygienic norms. Analysis of grain and cereal products consumed per day on average: bread 0.335- 0.750 kg, rice 0.010- 0.012 kg, peas 0.001-0.005 kg, wheat flour 0.25- 0.3 kg. The total amount of grain and grain products is 0.55-1.6 kg. The amount of grain products in the daily ration of workers at the enterprise for the production of quartz glass was given. On the basis of the results obtained, it was revealed that the body receives protein from bread 24.5 mg, from rice 0.76 mg, from peas 2.38 mg, from flour 33.2 mg. A large amount of amino acids comes from bread and flour. For example, tryptophan 0.35 mg, threonine - 0.86 mg, isoleucine 1.32 mg, leucine 2.0 mg, methionine 0.45 mg, cystine 0.51 mg, phenylalanine 0.51 mg, in alin 0.51 mg and others.

### **CONCLUSIONS.**

The main harmful factors in the production of glass products are silica dust, nitrogen oxide, carbon monoxide,  $SO_2$ , noise, and high temperature. With the growth and re-equipment of the glass procurement industry, there is a significant improvement in the working conditions of workers, the number of workers in hazardous conditions is steadily decreasing, which leads to a decrease in injuries, a pronounced decrease in occupational diseases. The task of further improving working conditions continues to be relevant. Establishing the dispersion of emissions into the atmosphere in the production of glass products made it possible to substantiate the volume of the total emission, the sanitary protection zone and the height of the chimneys. Calculations showed that the amount of total emission of carbon monoxide was equal to  $0.0559 \text{ g / m}^3$ , and for nitrogen dioxide it was equal to  $0.0169 \text{ g/m}^3$ . The maximum surface concentration is set at  $0.66 \text{ mg / m}^3$ . Establishment of the dilution ratio, determination of the initial concentrations of chemical factors (silicon oxide) in waste water, made it possible to tentatively establish the permissible degree of their pollution in the water of the reservoir and to determine the conditions for



the discharge of waste water by organoleptic indicators, by the value of allowed dose, by dissolved oxygen, by the reaction of water (pH), by smell, by the limiting concentration of sulfates and chlorides. On the basis of the conducted research, a set of measures was developed to improve working conditions and environmental protection, which were introduced into the production of glass products.

In the daily ration of workers at an enterprise for the production of quartz glass, dairy products, meat, fish and chicken meat is 12-50% lower than the hygienic standard, especially essential amino acids (methionine, tryptophan, phenylalanine, lysine, leucine, tryptophan), 40-55 % below normal. Workers in workshops for glass production have working conditions according to Sanitary Regulations and Norms №0141-03 3-class 2-3-4 degree of hazard, working conditions are 3.4 and 3.3 class of hazard degree. The main task of organizing preventive nutrition for workers of the enterprise is to compare a special diet with the daily diet and provide a biological one completely, and introduce an additional diet according to the value and below the calories given.

## **CONCLUSIONS.**

To optimize working conditions working at modern enterprises for the production of glass containers, consider the following as priority areas in the system of sanitary-hygienic and medical-preventive measures:

1. The use of modern technological equipment that meets the existing sanitary standards.
2. To reduce the adverse effects of industrial noise and heating microclimate, it is recommended to install remote control panels (time protection) with the introduction of interchangeable professions and the mandatory use of personal protective equipment.

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