



Harmful Production Factors and Safety Regulations in the Food Industry

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Annotation: The work studied the safety rules in the food industry. The characteristics of dangerous and harmful production factors, measures to combat noise, the requirement of labor protection in the bakery, pasta, and confectionery industries are given. The safety rules in the production of caramel, dragee, sweets, toffee and chocolate are widely covered.

Keywords: Occupational diseases, harmful factors, noise, labor protection

The following harmful production factors are encountered at food enterprises:

- a) The release of a large amount of dust when moving grain, flour, feed, etc.;
- b) increased noise in the grinding department of mills, grinders at feed mills and oil and fat enterprises, bottle-washing shops of wine-making and beer-non-alcoholic enterprises, dough-cutting and shaping shops of bakery and pasta enterprises, etc.;
- c) Significant heat generation in the baking shops of bakery and confectionery enterprises, food departments of sugar factories, etc.

The presence of dust in the enterprises of the food and grain processing industry is dangerous by the possibility of explosions and, with prolonged exposure, can lead to occupational diseases, the presence of wet and slippery floors in wet shops can lead to falls and bruises.

Technological processes in a number of food industries - baking, alcohol, non-alcoholic beer, yeast, wine - are characterized by the release of carbon dioxide (carbon dioxide CO₂), which requires special attention in the design and operation of ventilation equipment. In the production process, there are also cases of environmental pollution with emissions of large amounts of ethyl alcohol, etc.

For the operation of compressor-refrigeration units, ammonia is used, which, if the tightness of pipelines and cylinders is broken, can penetrate into the room where people work. An



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increase in its concentration in the air over 20 mg/m³ can lead to serious illness and in some cases death.

The danger is represented by rotating parts of machines and mechanisms that must be protected.

To prevent or reduce the impact on workers of dangerous and harmful production factors, personal protective equipment is used - the installation of fences and their blocking with an electric motor, a ventilation device, etc., which must be selected taking into account the specific safety requirements for a given process or type of work.

The development of measures to reduce the impact of vibrations and noise on workers should begin at the stages of design decisions. Thus, when developing enterprise plans, the most noisy production facilities are allocated to separate buildings (for example, compressor station premises) located on the leeward side of the industrial site. Inside buildings, noisy areas are fenced off into independent rooms, separated from others by soundproof walls.

The reduction of vibrations and noise at workplaces is achieved by a number of measures: the attenuation of vibrations and noise at the source of their formation by constructive, technological and operational solutions; artificial increase in energy losses in the system (vibration and sound absorption); reduction of intensity of vibrations and noise on the way of their propagation (vibration and sound insulation); use of personal protective equipment.

Currently, a wide range of sound-absorbing materials and products from them is produced. The choice of these materials and products is made taking into account the spectral characteristics, the sound absorption coefficient and depending on the construction and mechanical requirements for sound absorbers (fire resistance, moisture resistance, strength, hygiene, efficiency, etc.). An additional requirement is the admissibility of the sound absorber material getting into food products due to mechanical or other violation of the integrity of the structure or design of the sound absorber. In sound-absorbing structures intended for explosive areas, it is possible to use only non-combustible materials.

At food enterprises, ventilation, pneumatic transport and compressor installations and systems are widely used, which are sources of aerodynamic noise. The noise of fans and compressors, propagating through the air ducts, penetrates through the supply and exhaust grilles into the premises or the atmosphere and can create noise levels there that exceed the permissible levels.

The main measure to combat aerodynamic noise is to reduce travel speeds, eliminate vortex formation and install mufflers. Silencers of aerodynamic noise are divided into active and reactive. In active type mufflers, noise reduction is achieved by lining the duct with sound-absorbing material.



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At the enterprises of the baking, pasta and confectionery industries, there is a danger of injury to the attendants in case of violation of safety regulations during operation and mechanisms. . .

When using electrical installations (electric motors, etc.), there is a danger of electric shock; excess pressure in pressure vessels (steam boilers, cylinders, heat exchangers) threatens to explode, etc. One of the main types of raw materials in these industries are flour and sugar. Their movement in production workshops, a flour warehouse and other premises is accompanied by a significant release of dust. Exceeding its MPC, specified in the rules for safety and industrial sanitation for the relevant industries (2-6 mg / m³), can lead to occupational diseases, an increase in dust concentration of more than 10-15 g / m³ in the presence of a spark source - to an explosion.

In the baking industry, many technological processes associated with fermentation are accompanied by the release of carbon dioxide into the environment (capacities of bunker dough mixing units, vats for fermenting dough when conducting a technological process in a liquid phase, etc.). The MPC of carbon dioxide in the air is 0.5%. Exceeding this concentration adversely affects the health of workers, in some cases, if the MPC is significantly exceeded (above 6-7%), it can lead to death.

Unsatisfactory working conditions may turn out to be in case of insufficient illumination, with an insufficient degree of mechanization in a number of areas, for example, when moving a bowl during the operation of batch mixers, etc.

At bakery enterprises, after sifting, flour enters the dough mixing department for kneading, where kneading is carried out on intermittent dough kneading machines with rolling bowls of various capacities and continuous dough kneading units. At pasta factories, flour after sifting is fed to screw presses for kneading, at confectionery factories - to dough mixing units.

When servicing intermittent dough mixers, guards must be installed and their blocking with an electric motor should be provided. The blocking ensures that the electric motor is turned off when the guard is removed, the cover, cap (shield) is raised.

Dough mixers with rolling bowls must have devices that securely lock the bowl on the base plate of the machine during kneading. When installing tilters with bowl lifting, it is necessary to ensure their safe operation by providing guards for both transmission devices and bowl lifting points.

Dough descents must be equipped with removable safety grilles.

When conducting a technological process using the liquid phase dough method and, in connection with this, using fermentation tanks, it is necessary to ensure the removal of carbon dioxide produced during the fermentation process and, if necessary, tank cleaning, observe the safety measures adopted for working in tanks.



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To reduce noise, it is necessary to replace worn parts (especially gears) in a timely manner, ensure the grounding of the electric motor, paint the equipment in light colors, and line the walls with glazed tiles.

In the dough mixing department of bakery, pasta and confectionery enterprises, lighting (natural and artificial) and the frequency of air exchange must be provided in accordance with SNiP, as well as industry safety and industrial sanitation rules for the baking, pasta and confectionery industries. In accordance with these rules, the illumination in the dough mixing shops should be 200 lux. Air exchange should provide comfortable working conditions. The air exchange rate is calculated depending on the conditions at the workplace and can vary from 2 to 4.

The steam pipeline and hot water pipeline (all heat-generating surfaces of furnaces, dryers, etc.) must be thermally insulated with a temperature on the surface of not more than 45 °C.

Platforms for servicing pasta presses and continuous dough mixing units should be provided with comfortable ladders (if installed above the floor level) and railings 1 m high.

The premises of the dough-dividing department of bakeries and the press department of pasta factories should be spacious, well lit (natural and artificial light).

In the dough-cutting department, workplaces should be provided with good lighting in accordance with safety regulations for food industry workers (200 lux). All motors must be grounded and guards for moving equipment must be interlocked with the motors.

The blocking of the guards should ensure that the electric motor is turned off when the guard is removed (or absent). In the room of the dough-cutting department, as well as in the room where the pasta presses are installed, there must be supply and exhaust ventilation that ensures the frequency of air exchange in accordance with the working conditions in this workshop and the safety regulations for the baking industry.

In the shops for the production of caramel, dragees, sweets, toffee, chocolate and marmalade, ventilation of the premises and the creation of normal meteorological conditions (temperature 18-22 ° C, humidity 60-70%, air flow speed 0.5-1 m / s) must be ensured ; good lighting (natural and artificial).

In the shops of candy, toffee and chocolate production, a large number of various machines and equipment are used, the use of which can lead to cases of injury if the rules are violated; in case of violation of meteorological conditions (temperature, air humidity) - to colds or overheating of the body; in case of improper arrangement of equipment and insufficiency of fences - to injuries and damage to body organs (arms, legs, bruised head, etc.); in case of insufficient thermal insulation of steam pipelines - to burns; in case of violation of electrical safety rules - to electric shock phenomena.



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At the enterprises of the confectionery industry, as well as at other enterprises of the food industry, improper operation of the equipment creates unfavorable noise conditions. To reduce noise, it is necessary to systematically check the wear of rubbing parts and, if wear of parts (gears, rollers, bushings) is detected.

Noisy mechanisms (fans, etc.) are installed in isolated rooms.

Compliance with the norms and rules on labor protection ensures the necessary safety at work, the creation of rational and comfortable working conditions in the workplace, the reduction of injuries and occupational diseases, the increase in labor productivity and the preservation of health.

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