

УДК 62.781

Olena Skuibida

cand. oftechn. sciences, doc. of ZNTU

ASSESSMENT OF DUSTINESS OF WORKING ZONE AIR IN INDUSTRIAL PREMISES

Occupational hygiene practice mainly focuses on hazardous conditions occurring in workplaces in order to implement measures on labour protection. An unrecognized hazard can never be controlled, and you have to know the basic background information about dust for developing dust protection methods.

According to the International Standardization Organization ISO 4225 dustiness is the tendency of particles to become or stay airborne. Dusts are small particles which settle out under their own weight but which may remain suspended for some time. Materials in dry powder form are generally more dusty than those in

slurries or liquid suspensions, with particles embedded in a solid matrix being the least dusty.

Dust particles can be formed during such industrial processes as milling, grinding, sifting, transportation and other industrial processes, so the types of dusts found in the work environment include mineral (such as those containing free crystalline silica, coal, cement), metallic dusts (lead, cadmium, nickel, beryllium), chemical dusts (chemicals and pesticides) and biohazards (molds, spores).

International standard ГОСТ 12.1.005-88 «OSSH. General sanitary requirements for working zone air» gives classification of harmful substances, e.g. irritants, poisons, mutagens, carcinogens and permissible concentrations of harmful substances in work area.

A cloud of dust of a combustible material behaves similar to a flammable gas-air mixture; in a limited small space it can produce an explosion. Typical combustible dusts may be obtained from natural, synthetic and inorganic materials. In general a high risk of explosion exists where concentrations of combustible dust exceed 10 mg/m³. Sources of ignition include accidental fires, sparks from electrical apparatus, static electrification and others. Dust clouds in a working area considerable reduce visibility and increase the risk of accidents. It may also affect the quality of products. Dust deposition on machines, apparatus and mechanisms may cause damages of equipment and, therefore, injuries of the stuff.

Dusty materials tend to generate aerosols with high particle concentrations measured in number or mass. The dusty level of powdery directly affects worker exposure scenarios and is associated with health risks in occupational settings. Powder-based aerosol particles can pose adverse effects when deposited in human respiratory system via inhalation.

Various laboratory systems have been developed to test dustiness of fine powders. A European standard on dustiness testing has been established by the European Committee for standardization. This standard is especially related to human exposure in workplace (EN 15051) and describes 2 methods – the rotating drum system and continuous drop system.

In general dust level at the workplace can be defined with the help of the following methods:

- weight method (determination of weight of analytic filter after blowing of a certain volume of air through it);

- calculative method (precipitation of dust particles on wet-glass and calculation of their amount);

- photoelectric method (measurement of light fluxes before and after dusted air blowing);

- electrometric method (electrification of aerosol dust particles and further measurement of electric charge on the walls of test chamber).

The problem of dustiness is an important question of ecological safety. The heightened level of dustiness can cause poisonings, diseases, traumas and accidents. That's why measures against dustiness in workplaces should be provided: local and general ventilation, pressurization of dust sources combined with aspiration, moistening of dust powders, individual protection means, periodic medical examinations and others.