



METHODS AND MEANS OF FIGHTING INDUSTRIAL DUST

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ABSTRACT

This thesis reviews the main methods and technical means used to control industrial dust in manufacturing enterprises. Industrial dust poses serious risks to worker health, production efficiency, and environmental safety.

The study analyzes sources of dust formation, modern dust suppression technologies, filtration equipment and personal protective equipment.

Air purification, gas filtration, and dust collection technologies are being introduced in industrial plants to reduce dust in filtration and purification systems. Modern dust removal filtration devices are used in industrial processes to reduce and retain dust, gas and harmful substances present in the air. These devices provide effective and environmentally friendly air conditioning methods. Modern technologies play an important role in reducing air pollution, protecting the environment, and maintaining health. It is used to trap dust from the air stream. Bag filters trap dust through a filter cloth or backpack. Air is transferred from fabrics (usually woven, polyester or nylon), which are made up of several rows of materials. Dust particles are trapped on the surface of the material, and clean air is released. It has the advantages of high efficiency (captures fine dust such as PM2.5 and PM10), adapts to work in various industrial processes, and effectively removes large amounts of dust. It also requires filter cleaning or replacement and there are operating costs (cleaning processes and parts).

Modern dust collector filtration systems are highly efficient and can effectively capture fine particles down to 0.1 microns. These systems are also adapted to different processes in the industry, and several types of systems are used depending on the user's needs. The efficiency of filters will depend mainly on particle size, material type, and operating conditions. Bag filters are effective at capturing large dust particles, but electrostatic precipitators or HEPA filters are more useful for fine particles. Some systems (such as electrostatic precipitators) help conserve energy, but venturi scrubbers and wet scrubber systems require high energy. Each system has a different maintenance process. For example, bag filters may need to be cleaned and replaced, while electrostatic sinks require less maintenance. High-performance technologies reduce the amount of dust and harmful effects using modern equipment. These include electrostatic filters, liquid and dry air purification systems. Environmental monitoring is established by governments and organizations to monitor and regulate the release and impact of dust on the environment. Reducing toxic

substances involves the use of clean technologies and the introduction of recycling methods to reduce harmful substances in industrial processes.

Industrial dust reduction methods and technologies play an important role in protecting the environment from pollution and ensuring the health of workers. The emission of industrial dust is observed in various industries such as metallurgy, construction, food production, chemical industry, etc. There are several effective technologies and methods for their reduction.

Air purification systems (absorbent systems) various filters are used to trap dust in the air. Of the most common filtration technologies, bag (bag) filters are used, and bags made of fabric or other materials are used to absorb dust.

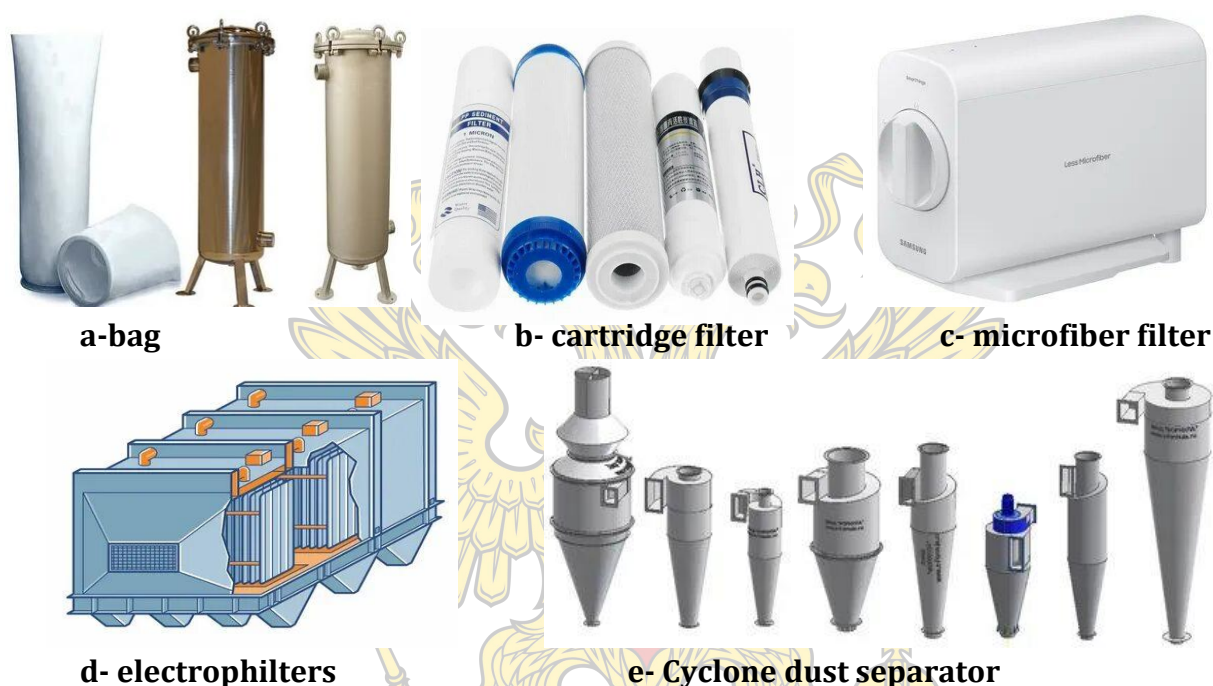


Figure 1. Industrial dust reduction technologies

This technology is very effective and is used in many industrial applications. Cartridge filters are also highly effective dust collectors and are capable of capturing even small dust particles. Nowadays, high-quality microfiber materials are used to trap very small dust particles. Dust particles are attracted by an electric field. This system is usually used in large industrial enterprises (for example, metallurgy, cement production) and is considered very effective.

In large industrial enterprises, cyclone separators are highly efficient, in which dust is used to collect and collect dust into the center using air flow. This system is mainly effective for large and heavy particles. Particulate matter is removed by electrostatic separation (electrostatic precipitators) through an electric field.

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