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INTENSIFICATION OF DUST GAS CLEANING PROCESS

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A B S T R A C T

The article provides information on the processes of cleaning various heterogeneous waste generated in the production processes of industrial enterprises and the basis of their selection of the types of constructions suitable for the process. Based on the physico-chemical characteristics of the generated heterogeneous wastes, the issues of selecting cleaning devices were considered. There was also talk about the trend of wet cleaning devices.

Мақолада саноат корхоналарининг ишлаб чиқариш жараёнларида ҳосил бўладиган турли гетероген ташламаларни тозалаш жараёнлари ва жараёнга мос конструкцяиларнинг турлари уларни танлаш асослари тўғрисида маълумотлар

K E Y W O R D S

wet method, gas mixture, heterogeneous, tendency, sedimentation under the influence of gravity, centrifugal, sedimentation in electric and other force field, filter, washing of gases.

ҳўл усул, газ аралашмаси, гетероген, тенденция, оғирлик кучи таъсирида чўктириш, марказдан қочма, электр ва бошқа кучлар майдонида чўктириш,

келтирилган. Ҳосил бўладиган гетероген ташламаларнинг физик-кимёвий хусусиятидан келиб чиқиб тозалаш қурилмаларини танлаш масалалари кўрилган. Ҳамда ҳўл усулда тозалаш қурилмаларининг тенденцияси хақида сўз борган.	филтрла, газларни ювиш.
В статье приведены сведения о процессах очистки различных разнородных отходов, образующихся в производственных процессах промышленных предприятий, и на их основе выбор типов конструкций, подходящих для данного процесса. На основании физико-химических характеристик образующихся разнородных отходов рассмотрены вопросы выбора очистных устройств. Говорили и о тренде устройств для влажной уборки.	мокрый метод, газовая смесь, неоднородная, склонность, седиментация под действием силы тяжести, центробежная, седиментация в электрическом и других силовых полях, фильтрация, промывка газов.

In the chemical industry, building materials production, pharmaceuticals, food and other industries, a number of gaseous heterogeneous systems dusts, fumes, mists are formed during the processes of grinding, feeding, mixing, transferring, drying, cooking and processing of granular materials. If dust with a particle size of 3 ÷ 70 μm is formed in the above processes, smoke and mists with a size of 0.3 ÷ 5 μm of solid and liquid particles are formed during fuel burning and condensation of industrial vapors.

Industrial gases and air must be cleaned of dust for proper implementation of technological processes. Mixers, dispersers, most substance exchange devices, and a number of industrial devices cannot function well without effective gas and dust cleaning schemes.

Industrial dust gases are cleaned for the following purposes [8,9,10]:

1. Extraction of valuable products from gas mixtures and re-use in production;
2. Removal of substances from gas mixtures that adversely affect the process and accelerate device breakdown;
3. Environment - to reduce air pollution.

Currently, the following methods of cleaning dust gases are used in industrial enterprises:

1. Sinking under the influence of gravity;
2. Centrifuge;
3. Deposition in the field of electricity and other forces;
4. Filtering;
5. Wash gases.

It is possible to increase the level of gas purification in various devices used in the above-mentioned methods. For this, the size of solid particles in the gas should be increased before the cleaning process. For example, acoustic coagulation, that is, it is necessary to influence the gas mixture with acoustic vibration sound and ultrasound frequencies. Sudden changes in sound and ultrasound cause ultra-small particles to vibrate intensively. As a result, particle collisions and size increase dramatically. Gases are

given an acoustic effect with a sound level of 145...150 dB and a vibration frequency of 2...50 kHz [11].

There are other ways to increase particle size. For example, condensation of water vapor on solid particles. This can be achieved by spraying very small cold water droplets into the hot gas flow, and by spraying cold water into the cold gas flow.

When choosing gas purification devices, it is necessary to take into account their technical and economic indicators. Key indicators include:

- degree of gas purification;
-hydraulic resistance of the device;
- consumption of electricity, steam and water for cleaning;
- price of equipment and gas cleaning.

In addition, factors affecting the cleaning efficiency should also be taken into account, i.e. gas humidity and concentration, temperature and chemical aggressiveness, properties of dust (hygroscopicity, fiber, viscosity, dryness), particle size, its fractional composition, etc. [1,2, 3,4].

Table 1.1 below shows some average characteristics of gas treatment plants.

As can be seen from the data in Table 1.1, cyclone and inertial dust collectors can be used for coarse separation of gases only from large particles [2,5,6,7].

Technician of dust gas cleaning devices
indicators

Table 1.1

Қурилма тури	**Газдаги чангнинг максимал миқдори, кг/м^3**	**Айрим заррачалар ўлчами, мкм**	**Тозаланиш даражаси, %**	**Гидравлик қаршилик, Н/м^2**
Чанг чўктириш камераси	чегараланмаган	>100	30…40	-
Циклон	0,4	>10	70…95	400…700
Батареяли циклон	0,1	>10	85…90	500…800
Енгли (матоли) филтр	0,02	>1	98…99	500…2500
Марказдан кочма скрубберлар	0,05	> 2	90…95	400…800
Кўпикли чанг ушлагичлар	0,3	>0,5	95…99	300…900
Вентури скрубберлар	0,05	>1	95…99	3000…7000
Электрофилтр	0,01…0,05	>0,005	99…99,9	100…200

Of course, these gases must be dry and their particles must not be sticky or fibrous. At the same time, these devices do not require large capital and operating costs. Therefore, devices of this type are used for rough, preliminary cleaning of various gaseous systems, and then for complete cleaning in electrofilters and light filters. In addition, such rough cleaning prevents the fan blades from corroding. Cyclone and battery cyclones are recommended for cleaning high concentration gases, battery cyclones are recommended to be used when consumption of gaseous heterogeneous systems is high.

Light filters are used for gentle cleaning of dry and difficult-to-dissolve dusts with a particle size of more than 1 μm. However, these filters cannot be used to clean sticky and wet dust.

Cleaning of dusty gases under the influence of an electric field in industry allows to achieve high cleaning performance. Electrofilters have small hydraulic resistance and low energy consumption. It consumes 0.2...0.3 kW□ hours of electricity to clean 1000 m3 of dusty gas per hour.

Plate filters are often used to clean dry gases, and tubular electrofilters are used to clean fog and stubborn dust. These types of devices are expensive and more complicated to operate. In addition, if the gas is aggressive and the particles in it have a small relative electrical resistance, the use of electrofilters will not be effective or cannot be used at all.

The most effective of the above gas and dust cleaning methods is the gas and dust washing method. That is why there is a tendency to use this method in industrial enterprises.

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