Industrial Waste Gas Purification Catalysts

I. Working Process

This catalyst is mainly designed for organic waste gas catalytic combustion purification processes. As a low-temperature high-efficiency catalytic consumable, it utilizes the principle of catalytic oxidation to reduce the activation energy for oxidative decomposition of organic pollutants in waste gas without changing its own chemical composition in VOCs, benzene series, alkanes, and other pollutants, achieving low-temperature flame less combustion purification.

The entire system uses honeycomb ceramic substrate as the base, loaded with precious metals (platinum, palladium) or rare earth metal oxides as active components. After high-temperature calcination and curing, during operation, preheated organic waste gas passes evenly through the catalyst honeycomb channels At low temperatures ranging from 200C to 400C, organic pollutants in the waste gas fully contact with oxygen at the catalyst active sites, rapidly undergoing oxidation reactions and completely decomposing into carbon dioxide and water

The entire process involves no open flame and no secondary pollutants. Compared to traditional high-temperature incineration, the reaction temperature is significantly reduced with significantly reduced energy consumption. It also efficiently destroys organic waste gas molecular structures to achieve compliant waste gas purification. When combined with catalytic combustion equipment, it forms a complete closed-loop treatment process, suitable for continuous and stable industrial waste gas treatment operations It can also work with activated carbon adsorption-desorption devices to treat medium and low concentration high-volume organic waste gas.

II. Core Parameters

The catalysts are divided into two major series: precious metal type and rare earth composite type, both designed according to industrial waste gas purification standards. Models can be flexibly selected based on waste gas composition, concentration, and air volume The core performance parameters are stable and reliable.

The carrier material is high-temperature resistant cor die rite honeycomb ceramic. Standard pore density is 100 cells/sq.in and 200cells/sq.in, with open channels and low airflow resistance. Compressive strength is greater than or equal to 10MPa, with excellent high-temperature resistance. Short-term temperature resistance can reach 850C , Long-term applicable temperature range 200C to 650C , to avoid high-temperature sintering deactivation.

The precious metal catalyst active component is platinum-palladium alloy with adjustable loading of 0.1%-0.5%, achieving greater than or equal to 95% purification efficiency for benzene series, esters, and alcohols. Light-off temperature is as low as 200C. The rare earth composite type uses cerium dioxide and manganese dioxide as active components, offering better cost performance. Suitable for alkanes, ketones, and common waste gas, with purification efficiency greater than or equal to 90%. Light-off temperature is260C to320C.

Standard product dimensions are 100mm x 100mm x 50mm and 150mm x 150mm x 50mm. Custom splicing sizes are available. Bulk density is0.65g/cm3 to0.75g/cm3, Space velocity range 10000h_ 1 to30000h_ 1, Suitable for different air volume equipment. Service life under normal conditions can reach 8000to 12000hours. It has excellent sulfur and dust resistance and is not prone to rapid poisoning deactivation.

III. Usage Instructions

Before installing the catalyst, it is necessary to maintain the original sealed packaging to avoid moisture, oil contamination, and dust. During installation, the interior of the catalytic combustion equipment furnace should be cleaned to remove impurities and welding slag, ensuring that the inner wall of the equipment is clean and free of debris. The catalyst module should be placed flat and tightly in the equipment furnace, without gaps between the modules, to prevent the exhaust gas from bypassing the catalyst and affecting the purification effect. After placement, check and fix it firmly to avoid vibration and displacement during operation.

Before starting the equipment, it is necessary to preheat the furnace and raise the temperature to above the catalyst ignition temperature before introducing organic waste gas. It is strictly prohibited to directly introduce high concentration waste gas at low temperatures to prevent catalyst deactivation caused by waste gas condensation and adsorption; During operation, control the exhaust gas velocity and furnace temperature to

maintain a stable temperature of 300 ℃ to 400 ℃, avoiding overheating, sudden cooling and heating. At the same time, the front end must be equipped with primary and medium efficiency filters and activated carbon pre filters to remove dust, paint mist, oil stains, sulfur, phosphorus, heavy metals and other toxic substances from the exhaust gas. It is strictly prohibited for such impurities to directly contact the catalyst.

Daily operation does not require special maintenance. Regularly monitor the concentration of exhaust gas at the inlet and outlet of the equipment, furnace temperature, and fan air pressure. If there is a decrease in purification efficiency or an increase in ignition temperature, it indicates a decrease in catalyst activity. It is necessary to check whether the front-end filtration is ineffective or to perform high-temperature activation regeneration on the catalyst. If it is severely deactivated, it should be replaced in a timely manner.

When stored, keep it in a dry, ventilated, and cool place, away from sources of fire, oil stains, and corrosive gases, and avoid crushing. Unopened products have a shelf life of 18 months.

IV. Product Advantages

This catalyst adopts a high activity component loading process with low ignition temperature and high catalytic efficiency, which can achieve rapid decomposition of organic waste gas at low temperatures. Compared with traditional high-temperature incineration processes, energy consumption is reduced by more than 60%, significantly reducing equipment operating costs. At the same time, it operates without open flames, completely avoiding the safety hazards of high-temperature incineration, and is suitable for various industrial scenarios with strict requirements for explosion prevention and fire prevention.

The honeycomb structure design is reasonable, the airflow distribution is uniform, the wind resistance is small, and it will not significantly increase the load on the equipment fan. It is suitable for high air volume and low to medium concentration waste gas treatment, with a wide range of applicable airspeed and strong equipment adaptability. The carrier has excellent high temperature resistance and impact resistance, and the active components are firmly attached, not easy to fall off or sinter and become inactive. Its service life far exceeds that of ordinary catalytic consumables,

and its long-term operation performance is stable without frequent replacement, reducing later operation and maintenance costs.

It has good anti poisoning performance, strong tolerance to trace sulfur and chlorine impurities, and is suitable for complex industrial organic waste gases. It is thoroughly purified without secondary pollution, and the decomposition products are only carbon dioxide and water, which meets environmental emission requirements and does not require subsequent secondary treatment.

The product specifications are standardized and can be flexibly assembled and customized. It is easy to install and disassemble without the need for a professional construction team. It can be used in conjunction with various catalytic combustion equipment and adsorption desorption catalytic combustion integrated machines, with strong compatibility and outstanding overall cost-effectiveness.

V. Applicable Industries

Catalysts are mainly used for the purification and treatment of industrial organic waste gases (VOCs), and are widely applicable to various production industries involving painting, printing, chemical, injection molding, and coating processes. They are the core consumables of environmental waste gas treatment equipment.

In the painting industry, it is suitable for exhaust gas treatment in automotive vehicle and component painting, furniture painting, hardware painting, and mechanical equipment baking workshops, efficiently removing volatile benzene compounds, xylene, and paint mist odors from paint; The printing and packaging industry is suitable for purifying ester, alcohol, and ketone waste gases generated by gravure printing, flexographic printing, and laminating processes.

The petrochemical, plastic injection molding, and rubber products industries can handle volatile organic hydrocarbons and odorous waste gases during the production process; In the electronic manufacturing industry, VOCs exhaust gas treatment is suitable for circuit board production, electronic component bonding, and packaging processes to meet the environmental protection requirements of clean workshops.

In addition, it is also suitable for organic waste gas purification in industries such as chemical fiber, textile, leather, and composite material production, as well as laboratory waste gas and sewage treatment plant odor treatment. It can be used in

conjunction with RCO catalytic combustion equipment and activated carbon adsorption desorption catalytic combustion equipment, covering the vast majority of industrial scenes that produce low to medium concentration organic waste gas,

Assist enterprises in meeting environmental emission standards.

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