

Breath Easy with Air Cleaning Bricks

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Abstract: Air pollution has emerged as a critical environmental challenge, significantly impacting public health and urban living conditions. Air- cleaning bricks present an innovative solution by integrating advanced photocatalytic materials, such as titanium dioxide (TiO₂), with traditional brick manufacturing processes. These specialized bricks, made from a combination of clay and industrial by- products like fly ash. sunlight to activate photocatalytic reactions that break down harmful airborne pollutants, including nitrogen oxides (NO_x), volatile organic compounds (VOCs), particulate matter (PM), and carbon dioxide (CO₂).The photocatalytic mechanism converts these pollutants into less harmful substances, such as nitrates, which can be washed away by rain, effectively enhancing urban air quality. The incorporation of fly ash not only improves the bricks' structural integrity but also promotes sustainability by repurposing waste materials, reducing the environmental impact of construction. The self-cleaning properties of air-cleaning bricks reduce maintenance needs, as they minimize the accumulation of grime and biological growth on surfaces.Field studies have demonstrated significant reductions in local pollution levels where these bricks have been used, showcasing their effectiveness as a passive air purification technology. Importantly, the reaction can also reduce CO₂ concentrations, contributing to climate change mitigation efforts. Their aesthetic versatility allows for seamless integration into diverse architectural designs, supporting urban planners in creating healthier and more sustainable environments. As cities face increasing air quality challenges, the adoption of air-cleaning bricks can play a vital role in mitigating pollution and promoting public health. Ongoing research is essential to further optimize their performance, explore long-term effectiveness, and identify additional applications in urban infrastructure. Ultimately, air- cleaning bricks represent a promising advancement in sustainable construction, contributing to the development of cleaner, healthier urban spaces while addressing broader environmental concerns..

Keywords: Air pollution