

Removes the NOx in the atmosphere 100 times as efficiently as photocatalysts.

# ACF Unit for Atmosphere Purification

## Features

- Purifies roadside NOx 100 times as efficiently as photocatalyst-coated sound insulation walls.
- Converts eliminated NOx into nitric acid ions, thus recovering the purification performance of the unit washed in water.
- Uses the natural wind or air streams caused by cars to purify the atmosphere with no fans or other driving mechanisms required.

## Overview

(Technical principles, actions, etc.)

1. Unlike photocatalyst-coated sound insulation walls, the highly activated carbon fiber (ACF) purifies a large quantity of air brought by natural wind. The technology does not require sunlight, and purifies the air night and day. The purification performance has been proven to be about 100 times that of photocatalysts.
2. The ACF oxidizes and absorbs NOx as a result of catalysis, and removes nitric oxide (NO), which had been difficult to remove by conventional technologies. The ACF also oxidizes NOx into nitric acid ions, and the purification performance can be restored by rain or rinsing. With appropriate maintenance, the performance will last for 7 years or longer.
3. The ACF unit has a slit structure comprised of alternate layers of ACF felt sheets and separators for aeration. It utilizes natural wind or the air streams generated by vehicles, and does not require electric power.
4. The standard ACF units employ lightweight aluminum weighing only 3 to 4 kg to facilitate installation on site.
5. NNC panel, a general sound insulation panel incorporating ACF to achieve both air purification and noise reduction effects, is now commercially available.



ACF unit



Example



An example of NNC panel installation

## Introductory Track Record

### In Japan

- Proof test on National Highway Route 3 in Fukuoka (conducted by the Fukuoka Institute of Health and Environmental Sciences in a project commissioned by the Environmental Restoration and Conservation Agency)
- Trial installation on National Highway Route 43 in Osaka's Nishiyodogawa Ward (installed by the Osaka National Highway Office, Ministry of Land, Infrastructure, Transport and Tourism Kinki Regional Development Bureau)
- Intersection maintenance project on National Highway Route 43 in Osaka's Minato Ward (implemented by the Osaka National Highway Office, Ministry of Land, Infrastructure, Transport and Tourism Kinki Regional Development Bureau)
- Air purification test at the Yamatocho intersection in Tokyo's Itabashi Ward (conducted by the Tokyo National Highway Office, Ministry of Land, Infrastructure, Transport and Tourism Kanto Regional Development Bureau)
- Installation of the sound insulation panels on National Highway Route 23 in Minami-ku, Nagoya (conducted by the Nagoya National Highway Office of the Chubu Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism)

### Countries in Asia

- Proof test at Tsinghua University in Beijing, China

## Effects

- The Ministry of Land, Infrastructure and Transport's Kinki Regional Development Bureau on a trial basis mounted ACF units to fences in Osaka's Nishiyodogawa Ward and conducted a proof examination. According to the measurement data of the Ministry, the average purification rate of NO<sub>2</sub> passing the ACF units was 84% and that of NO passing the ACF units was 19%, which demonstrated the high purification performance of the units. With this purification rate and the quantity of passing winds, the rate of NOx passing the ACF fences in the area recorded 1.4 g/m<sup>2</sup> per day, which is more than 100 times as high as that measured on photocatalysts (i.e., 0.009 gram).

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Applicable field  
Roadsides with serious air pollution,  
underground parking lots, and store parking lots.

Water

Energy saving/Energy recovery

Energy storage/Energy creation

New energy

Waste disposal/  
Recycling/  
Resource saving

Air

Soil

Other