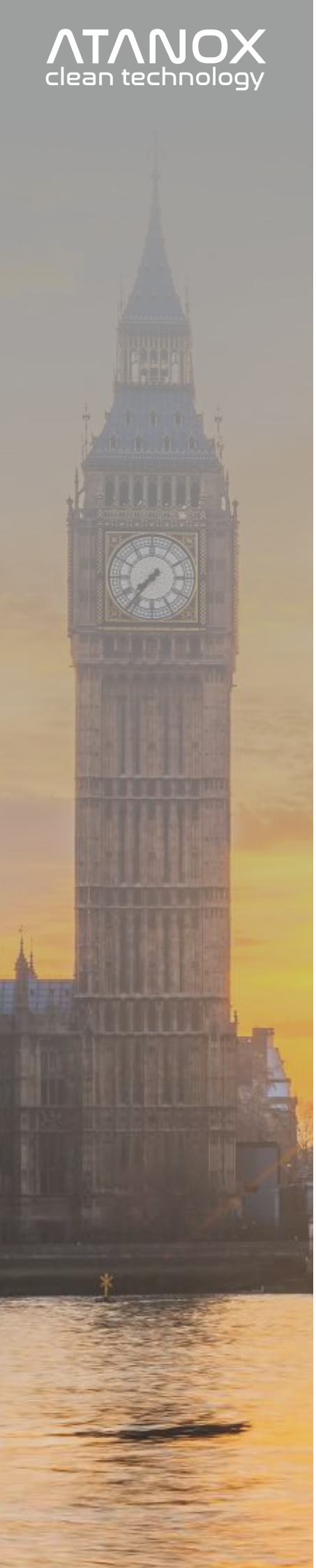
AIR TREATMENT TECHNOLOGY

Air Filtration Device ATANOX has been submitted to the Polish Patent Office as a utility model to ensure legal protection.

ATANOX TECHNOLOGY

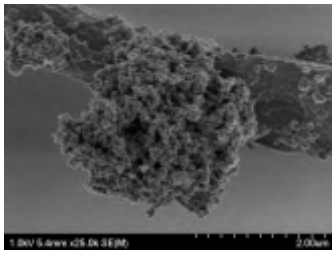
Innovation for environment

ATANOX
clean technology



What is smog?

The atmospheric phenomenon, which is characteristic of urban areas. It is a product in the form of dense fog resulting from the chemical transformation of air pollutants. It occurs due to the incorporation of harmful chemicals into the atmosphere under windless conditions. Among those chemicals are, for instance, sulfur oxides as well as nitrogen oxides. In this respect, it also should be noted the existence of solid substances such as suspended particulates and carcinogenic polycyclic aromatic hydrocarbons.



Health impact

PM10 <10 µM.
PM2.5 <2.5 µm
PM1 <2.5 µM and smaller
Benzoapires (BaP)
Nitrogen dioxide (NO2)
Sulfur oxides (SO3)
Sulphur dioxide (So2)

< 10,0
DECREASED LUNG FUNCTION
< 2,5
SKIN AND EYE DISEASES
< 1,0
CANCERS
< 0,1
HEART AND LUNG DISEASES

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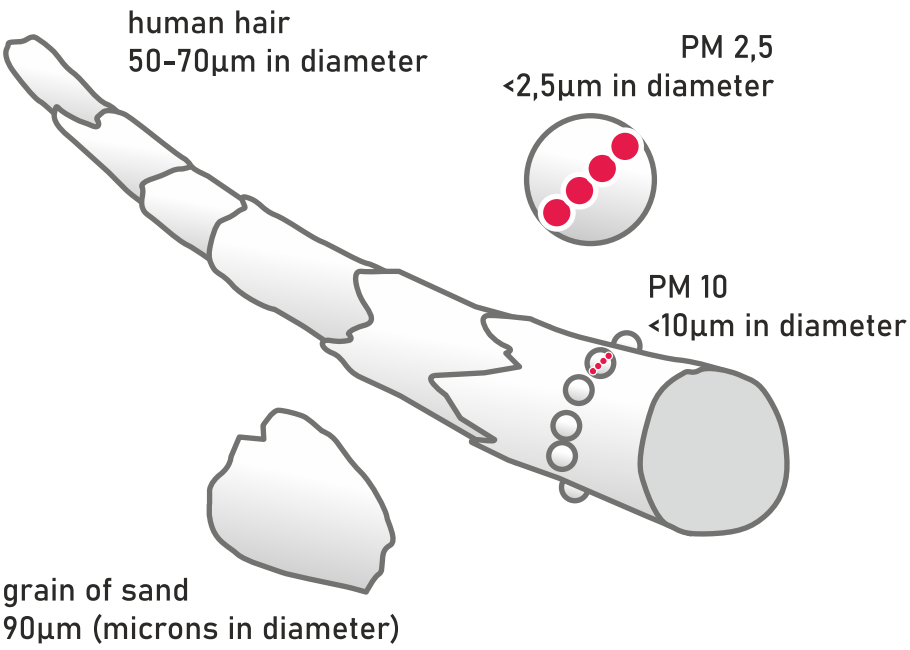


The effectiveness of this technology is scientifically proven.

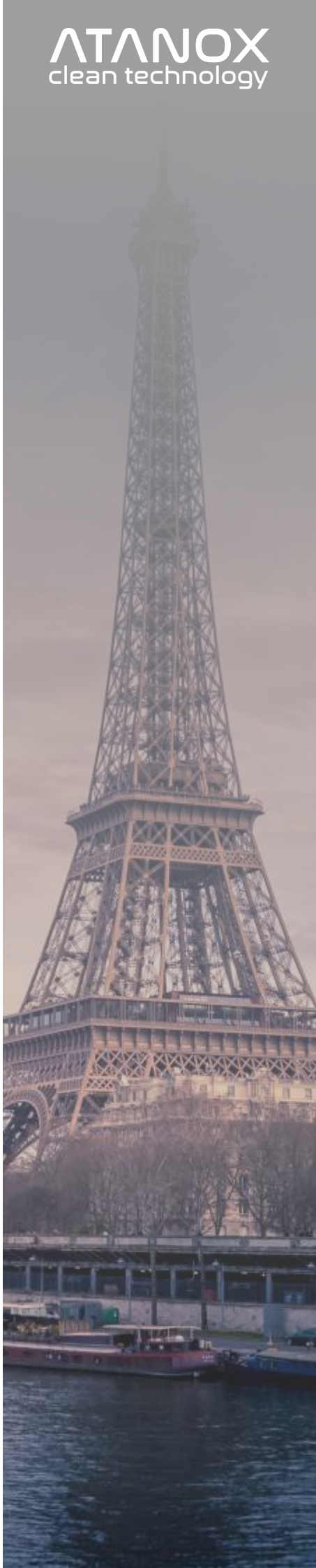
The scientific studies have been conducted by the Faculty of Chemical and Process Engineering, Warsaw University of Technology. Thus, it has been confirmed by expert reports and research that the effectiveness of ATANOX Technology is in the range from 63% to 90% of captured PM0,3 – PM10 molecules. The efficiency of the filtration depends on the quantity of sputtering ATANOX nanofiber.

„The essence of ATANOX Technology success is creating nanofiber, which properly sputtered, does not cause significant pressure drop."

prof. dr hab. inż. Arkadiusz Moskal

How it works

During aerosol flow through the non-woven layer, there is the deposition process of pollution particles on the surface of the fibres. Because of that fact, particles' concentration in the stream of the flowing air decreases. This may occur due to physical mechanisms such as direct attachment, inertia, diffusion effects, electrostatic interactions. Presence of few submicron fibres (with diameters < 1) in the composite structure of the filtering layer increases the efficiency of particulates separation. To be more precise, especially those nanoaggregates, emitted by diesel engines. Those particles are present in so-called urban smog (PM2. 5) and are responsible for toxic properties.
It is primarily the diffusion mechanism that is responsible for air cleaning from nanoparticles. This diffusion mechanism increases its efficiency by decreasing the diameter of the fibre (representing a collector for particulate matter). The filtering layer is in the form of interchangeable cartridges. Appropriate porosity of the filtering structure and proper distribution of nanofibres in the structure provides the device a relatively low value of pressure drop on the filtering layer. Therefore, it is possible to reduce the energy consumption which is used to move the air through the unit.



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Why nanotechnology?

The manufacture of a nonwoven structure containing nanofibres with a given spatial and numerical distribution requires appropriate techniques. The technique of ATANOX nanofiber creation (and its composition) must ensure the control of the diameter of the fibres obtained. In addition, it must provide arranging them in the proper configuration of space along the aerosol flow path.

Depth filtration (in the gas dedusting process) is carried out on nonwoven layers as the last step in the air purification procedure. This is because of its high efficiency against particles of small diameters while maintaining the relatively small size of the equipment. It is possible because of the adequate packing of a large amount of filtering surface in the volume of the apparatus. Filters (containing nonwoven cartridge filters) are characterized by three basic parameters: fractional filtration efficiency (for particles from various diameter fractions), resistance to the flow through the filter (drop pressure on the filter) and dust-holding capacity, which determines filter life. The selection of the filter's filtration efficiency is related to the purpose for which each filter was made. Some filters, designed to remove dust from the air with particles over 1 micrometre in dimension, will be having another fractional filtration efficiency than those created to remove, on the contrary, nanoparticles.
The air resistance determines the total energy expenditure involved in the filtration process. Therefore, while filtering large streams of airflow, the energy cost should be as low as possible. Dust-holding capacity, which should be as large as possible, determines the frequency of the filter's replacement and other associated costs. For filtering nonwoven layers, the growth in fractional efficiency is related to the pressure drop increase. As well as increasing dust-holding capacity becomes possible by expanding layer thickness. That implies that the creation of the „perfect" nonwoven filter requires particular optimization of its internal structure.

scientific partner
of the project

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Device models

SUP
filtration and air treatment

SUP4000/CKP/
filtration and air monitoring 2 in 1

MKA4000
multimedia, filtration and air quality testing 3 in 1

Specification:

Maximum filtration power	4000 m3/h	8000 m3/h
Filter efficiency	1 440 000 m3/month	2 880 000 m3/month
Parameters of filter efficiency		
Efficiency for Pm03	45%	45%
Efficiency for PM2,5	75%	75%
Efficiency for Pm10	90%	90%
Efficiency for N02	80%	80%
Capacity of filter	3,5 kg	5 kg
Filter life	12 months(max3,5kg)	12 months(max3,5kg)
Technical parameters		
Operating modes	12/24 v 24/24 v individual	12/24 v 24/24 v individual
Operating modes – manipulation	8 v 16 modes	8 v 16 modes
Operating temperature (°C)	od -20 do +80	od -20 do +80
Pressure (Pa)	160	170
Loudness (dB(A))	68	74
Rotational speed (rpm)	1350	1350
Amperage (A)	0,85	1,49
Power (W)	185	320
Energy consumption (kWh) / y	810 (12/24)	1400 (12/24)
Power supply	230V,50 HZ	230V,50 HZ
Capacitor (uF/V)	6 uF, 450 V	6 uF, 450 V
Tightness class	IP 55	IP 55
Warranty	120 months (10 years)*	120 months (10 years)*
Weight of device	70 kg	75 kg
Dimensions given in cm	300 x 75 x 75	300 x 75 x 75

*The warranty does not cover the replacement of operational filters.

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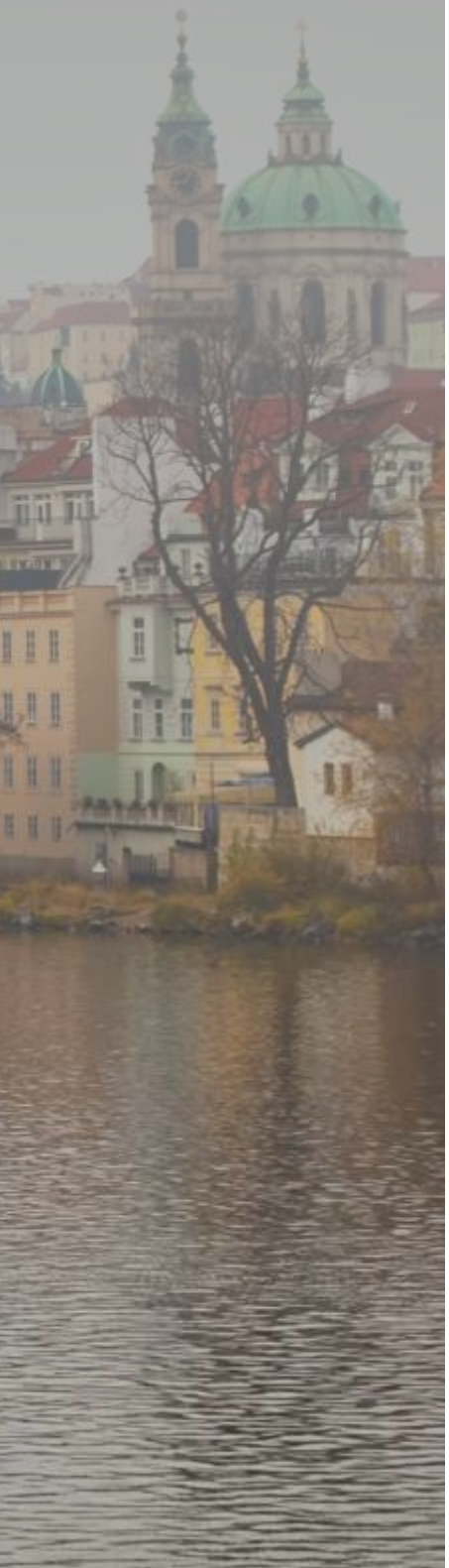
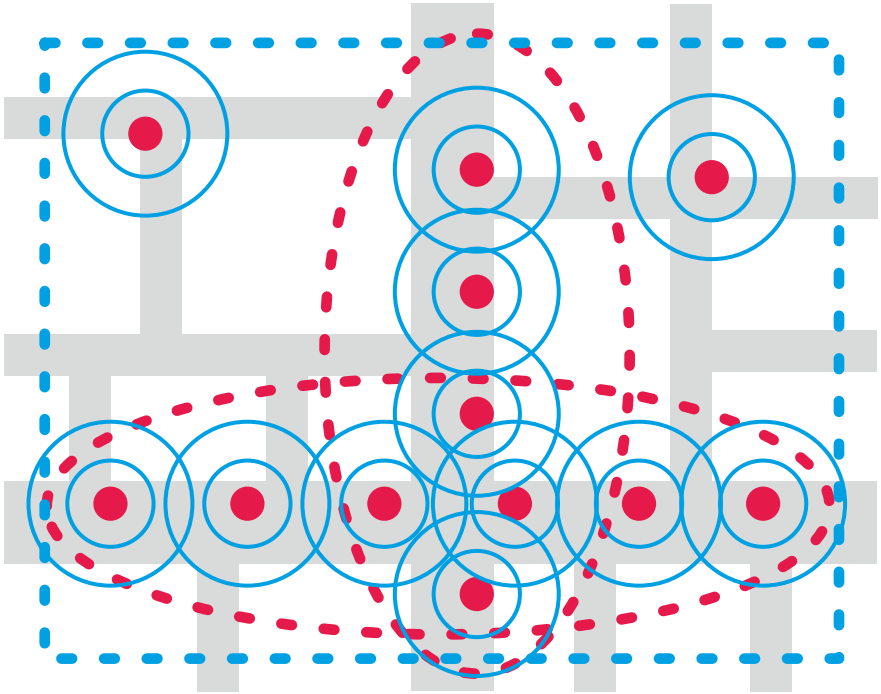


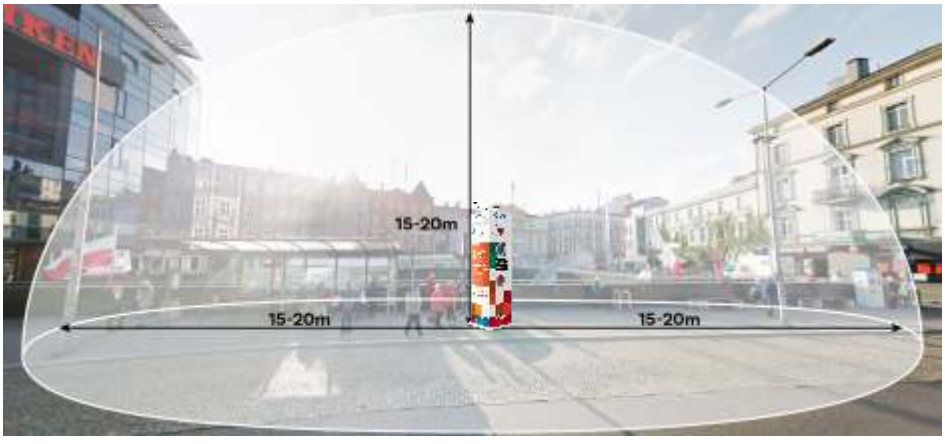
City



Scheme of this created clean zone aerated by 2 air curtains in the axis of perpendicular streets:
Blue cylinders are individual devices in which the inner circle is the filtration area of 80–90 % of the air mass with a diameter of 15–20 m. The larger circle is the area of II degree filtration, i. e. 70–80 % of the air mass. Red ellipses are air curtains which, through the exchange of air masses, form a blue "cloud"area of clean air; smog-free with a height of up to 30 m and an area of up to 5 km2.

Operating distance:

It depends on several factors, e.g., wind strength or lack thereof, selected power of the device, or location.
Understandably, the filtration efficiency varies depending on the distance from the device. We like the wind. It helps us extend the purified air zone.



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Wide application:

streets, including roundabouts and motorways
entrance and exit roads
airports
bus stations
squares, parks, and relaxation areas
outdoor gyms
kindergartens, schools, and playgrounds
leisure areas
health resort and guest houses
holiday and rehabilitation centres
amongst factories as well as heat and power stations
the concentration of emitters; for example detached houses

ATANOX TECHNOLOGY sp. z o.o

Agencja Wspierania Ochrony Środowiska

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