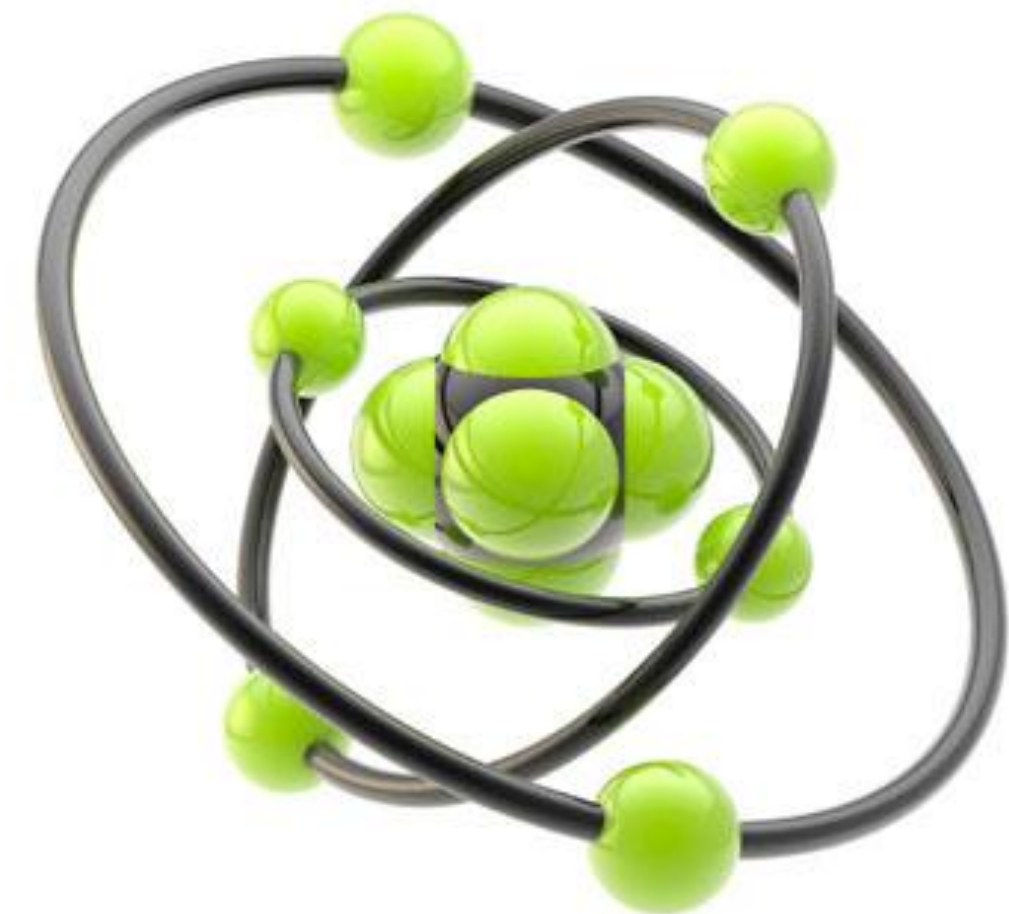


Eco-ventilation- application of nanotechnology



Prepared by:
M.Eng. Ewa Gawin
Vent Trade Sp. Z o.o.

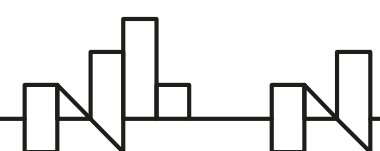


„There's plenty of room at the bottom”

Richard Feynman

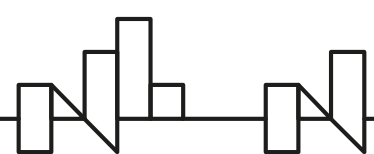
Application of nanotechnology in industry:

- Electronics / Electro-optics
- Power engineering
- Cosmetics
- Medicine
- Civil engineering



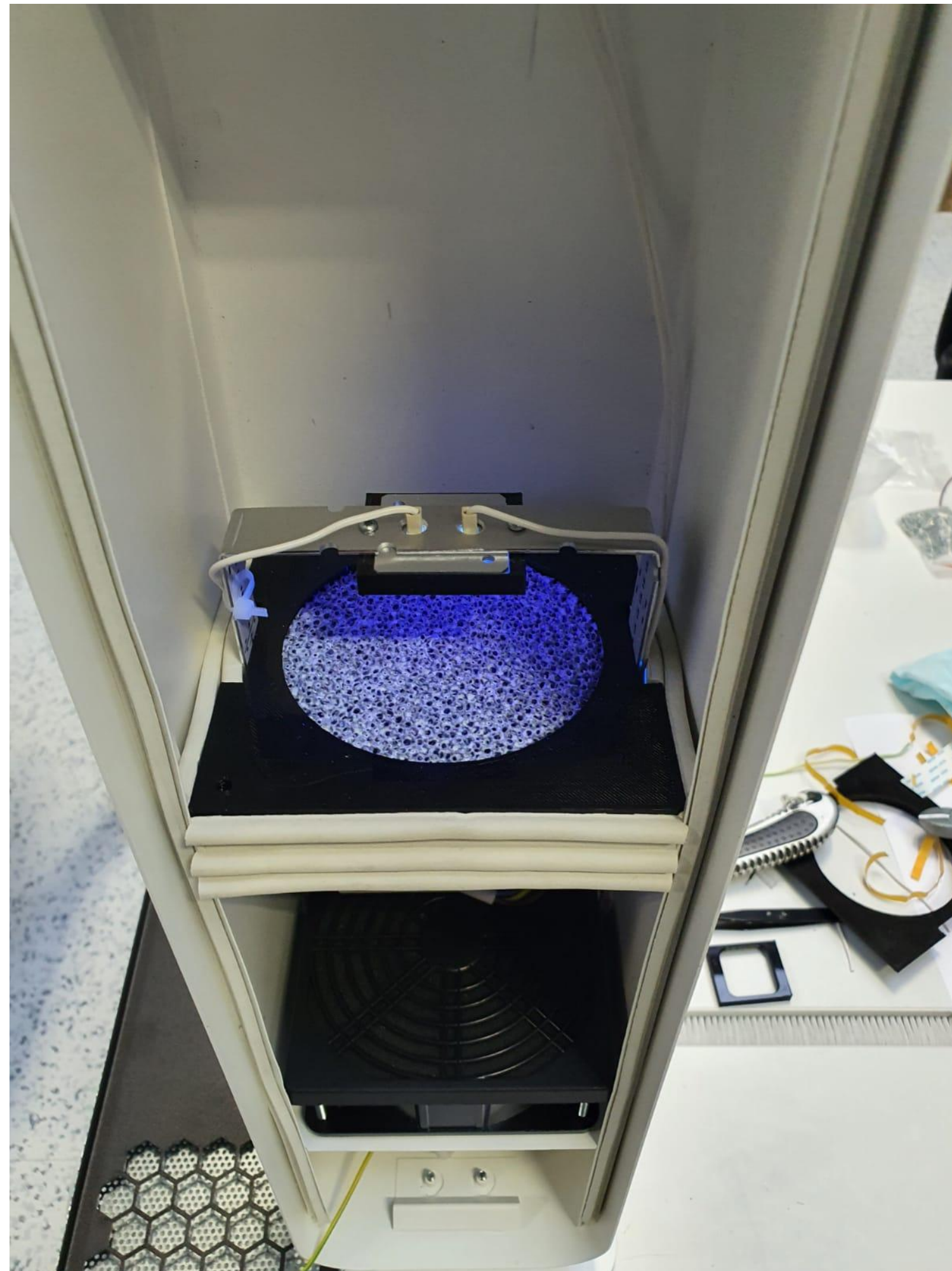
Nanotechnology in Ventilation

Nanosilver for PE Ventilation pipes

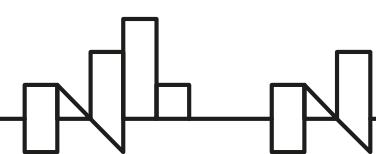


Nanotechnology in Ventilation

Photocatalytic filter- application

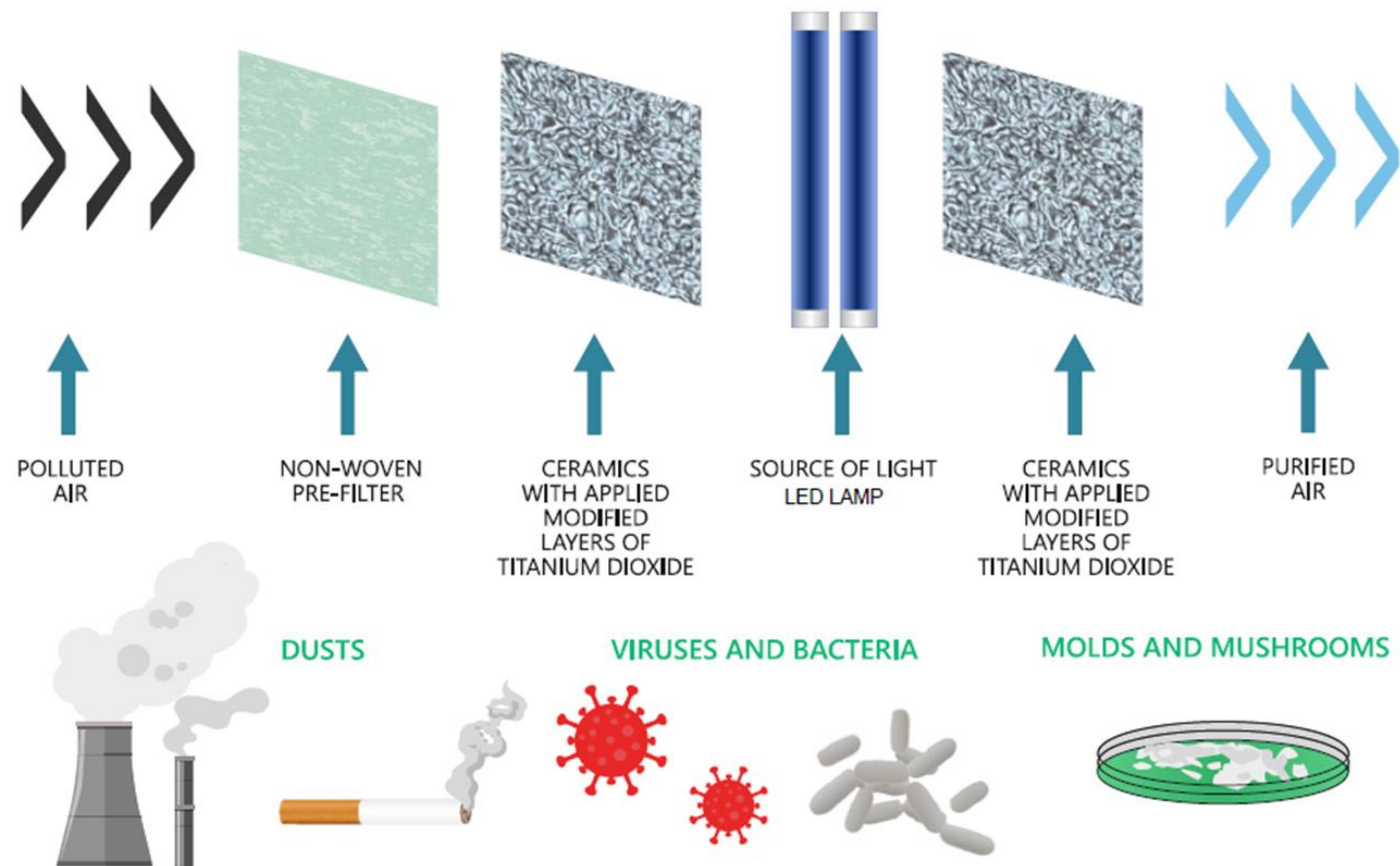


Prototype with implemented filter

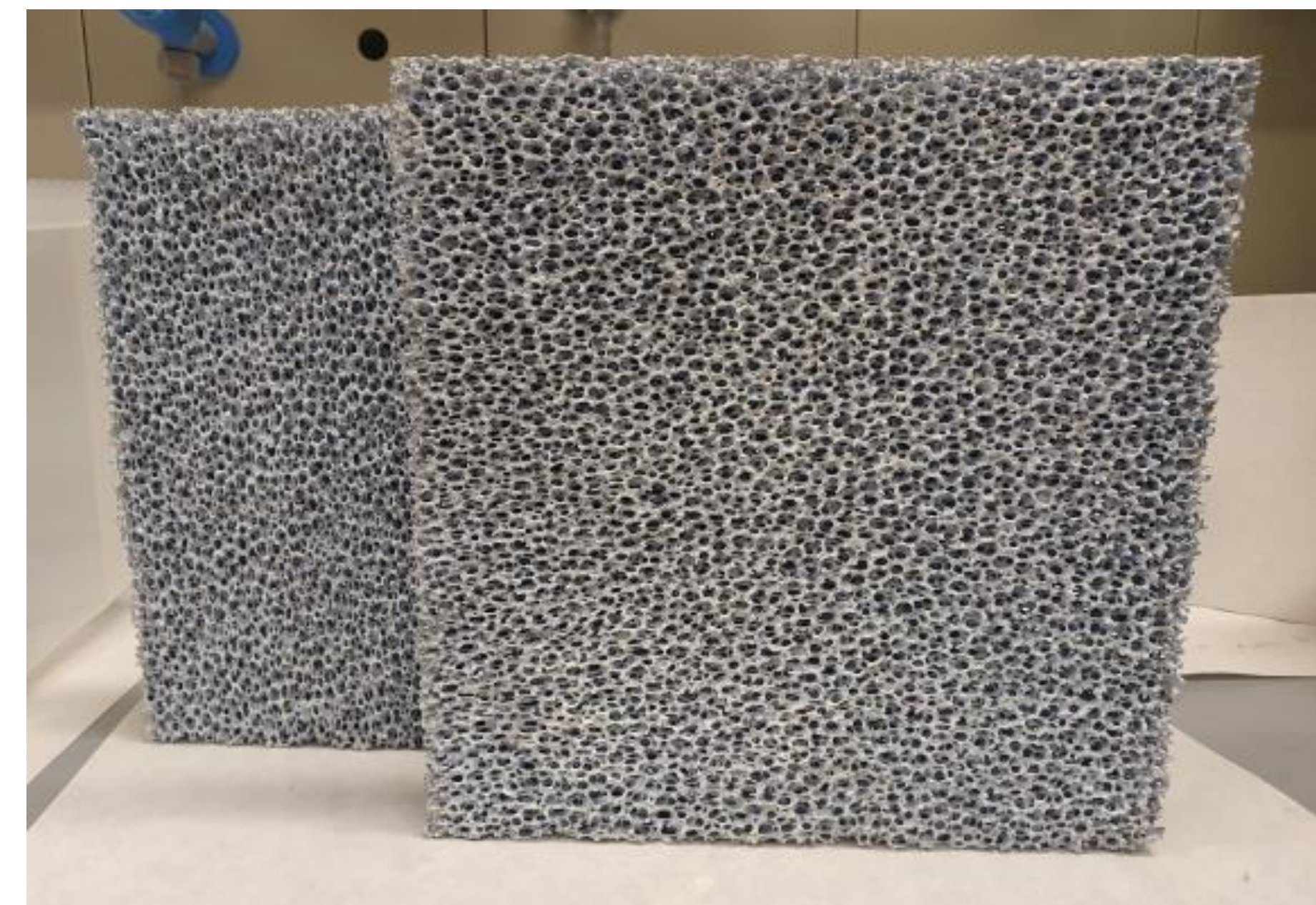


Nanotechnology in Ventilation

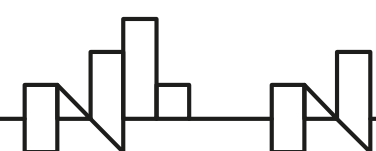
Photocatalytic filter- how it works?



Operating scheme

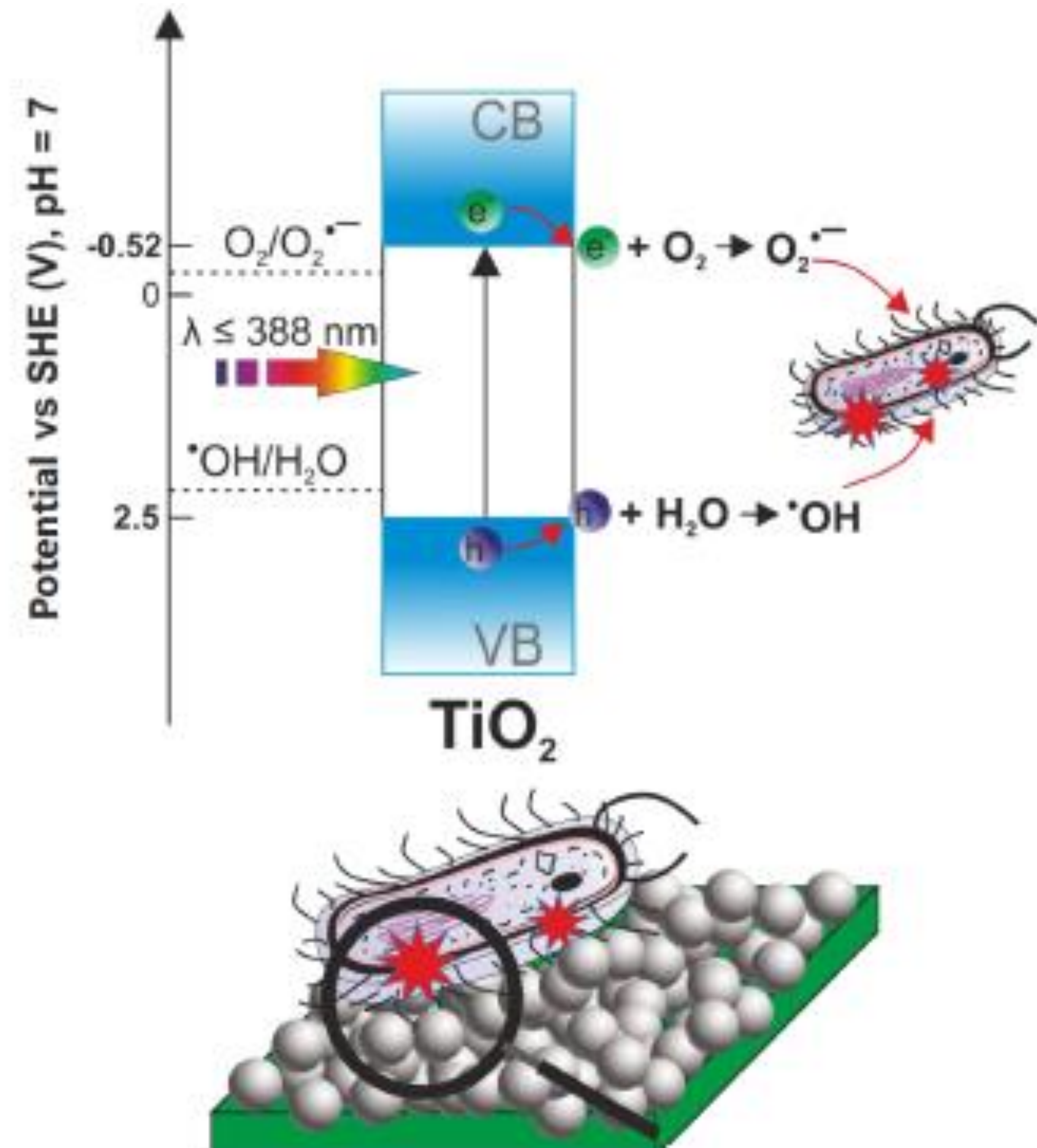


Photocatalytic coated ceramic nanolayer

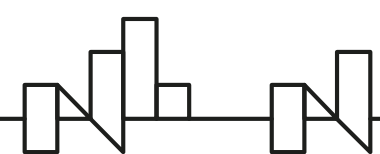


Nanotechnology in Ventilation

Photocatalytic filter- how it works?



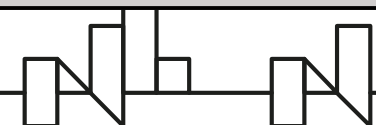
Pic 2. Photocatalytic effect explained



Nanotechnology in Ventilation

Photocatalytic filter- comparison to other solutions

	Photocatalysis (PCO)	UVC radiation chambers	Bipolar Ionization/ Needlepoint Ionization and Other Ion or Reactive Oxygen Air Cleaners	Mechanical filtration
Principle of operation	Light-mediated, redox reaction of gases and biological particles adsorbed on the surface of a solid pure or doped metal oxide semiconductor material or photocatalyst.[1]	Ultraviolet (UV-C) disinfection (also called ultraviolet germicidal irradiation [UVGI]) is used to degrade organic material and inactivate microorganisms. The system is not a filter; thus, inactive particles remain in the airstream.[1]	Technologies utilize various methods to create reactive ions in air that react with airborne contaminants, including viruses. The design of the systems can be modified to create mixtures of reactive oxygen species (ROS), ozone, hydroxyl radicals and superoxide anions. Systems are reported to range from ineffective to very effective in reducing airborne particulates and acute health symptoms. Convincing scientifically-rigorous, peer-reviewed studies do not currently exist on this emerging technology; manufacturer data should be carefully considered.	Mechanical filters use media with porous structures that contain fibers or stretched membrane material in a variety of fiber sizes, densities, and media extension configurations to remove particles from airstreams.[1]
Pressure drop	low (around 19 Pa per layer)	NA	NA	high
Power consumption	very low (photocatalytic engine has 8 times lower energy consumption than comparable device using UVC tubes)	high	very low	very low (generated pressure drop needs additional energy)
Ozone generation	No	Yes	Yes	No
Lifetime	30 000 hours	9 000 hours	30 000 hours	About 3 monts (3000 hours)
Cost of device	Low	Very low	Very high	Very low

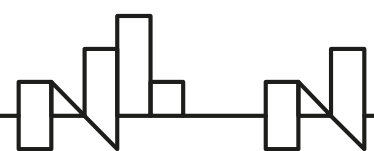


Nanotechnology in Ventilation

Standard material using for vent application

Key parameters for Ventilation:

- Fire resistance
- Corrosion protection
- Easy processing of the material due to the large number of possible cross-sections
- Mechanical strength
- Easy to assemble



Nanotechnology in Ventilation

Standard material using for vent application



Mild steel coated



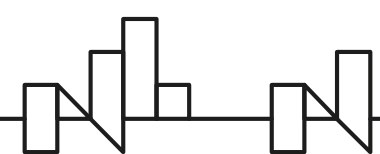
Aluzinc



Galvanized steel



Stainless steel



Nanotechnology in Ventilation

Duct coated with NANO surface

Properties of elements covered with a nano protective layer:

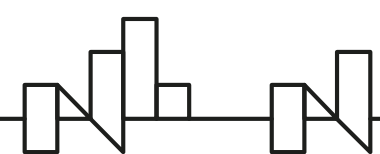
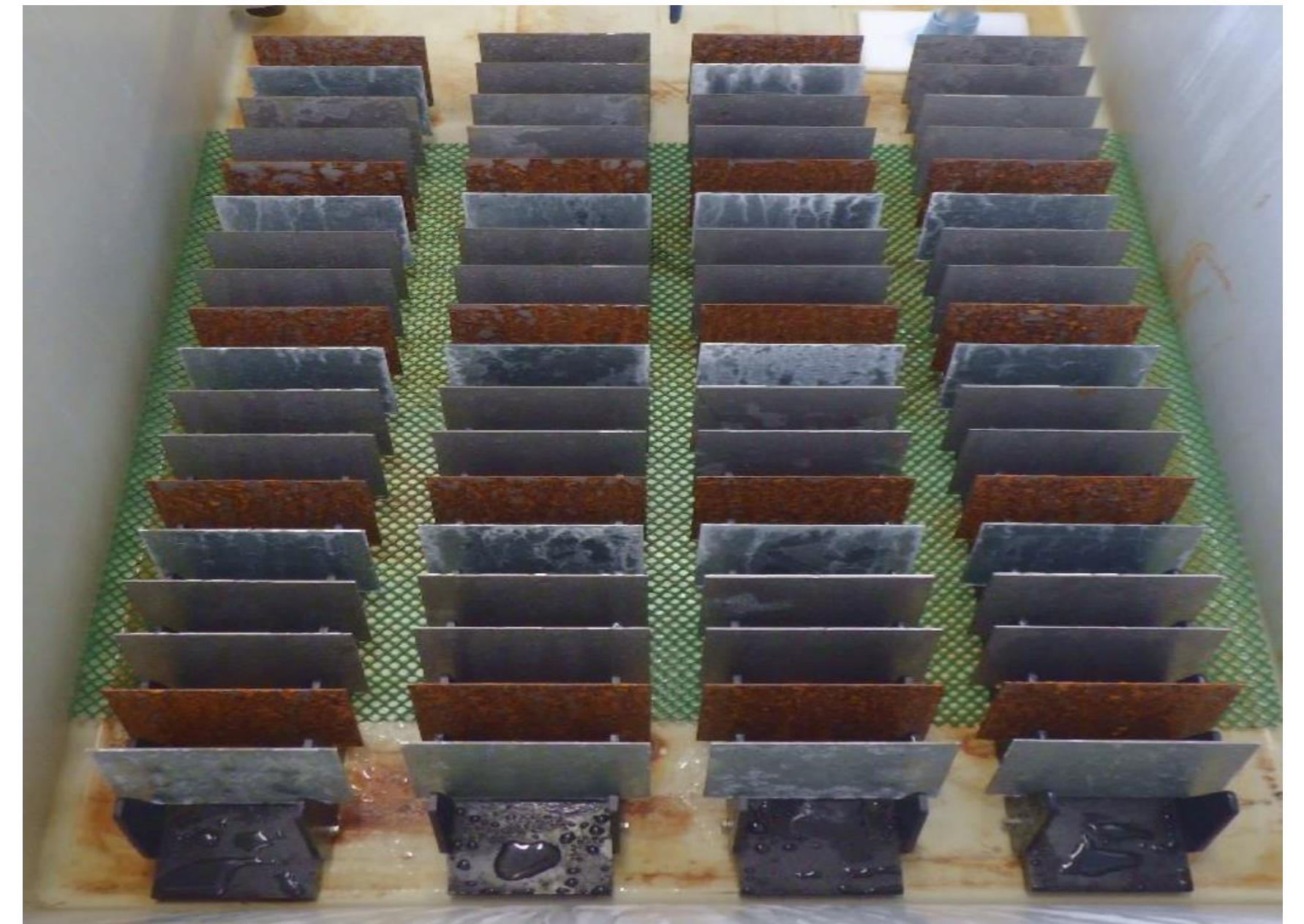
- Anticorrosive properties
- Oleophobicity/ Hydrophobicity
- Antibacterial

Environmental impact:

- Reduction of toxic substances in the production process



NANO DUCT®

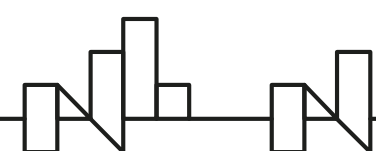


Nanotechnology in Ventilation

Duct coated with NANO Surface- comparison with other solutions

	NANO DUCT	Galvanized steel DX51DZ275MAC	Stainless steel 1.4404	Mild steel DC01 painted
Price	1,2	1	4,2	3
Anticorrosive class*	C5 (coating thickness 100micron)	C3	C5	C5 (coating thickness 200 micron)
Bactericidal properties	Yes	No	No	No
Hydrophobic / oleophobic properties	Yes	No	No	No

* Corrosive class of environment according to PN-EN ISO 12944-2: 2001, where C1-very low; C5 - very high



Polish – Norwegian partnership

key to problem diagnosis and respond to

the market

POL-NOR Cooperation

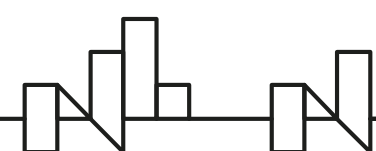
Executed Projects – convention center



Oslofjord Convention Center

Project executed in 2018/2019 in collaboration with Norwegian company

- Supply of ductwork for hotels, convention center, sports hall
- High hygienic requirements
- Ducts with diameter 1600mm



POL-NOR Cooperation

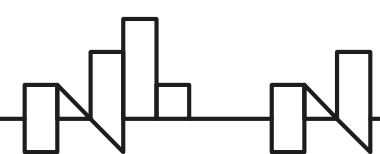
Executed Projects – Offshore (oil rig)

Project executed in 2018 in collaboration with Norwegian company

- 160 class A parts, stainless steel 316L
- 500 class C, E, F parts
- 20 special parts class A
- Inspections and audits during fabrication
- Project fully assembled in one assembly line

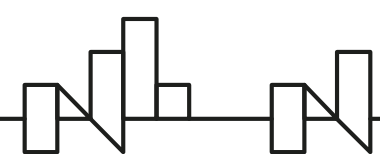
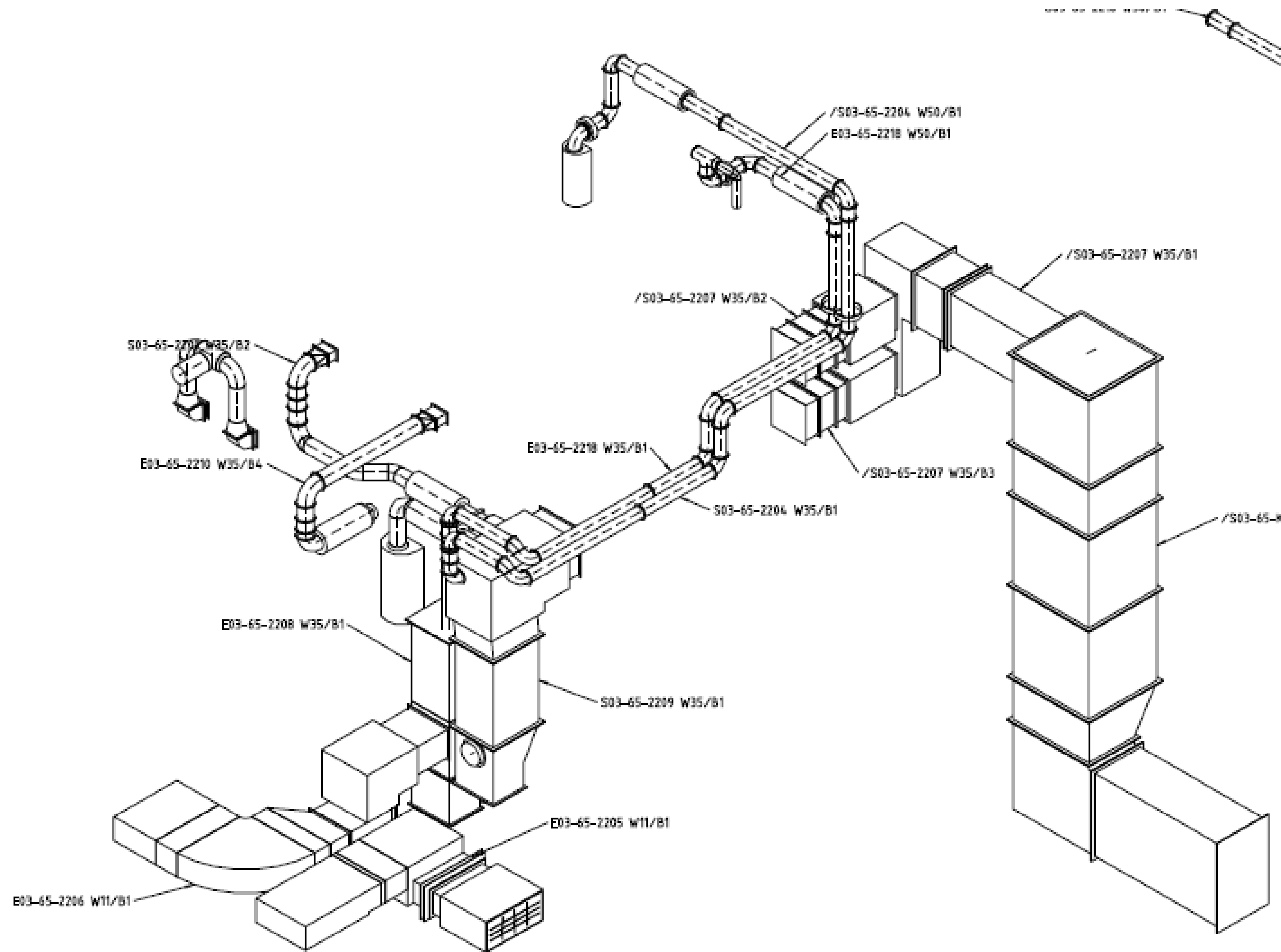


VALHALL



POL-NOR Cooperation

Executed Projects – Offshore (oil rig)



Thank you for attention!



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