

**Bringing nature's balance indoors**

**nanoe™ X, technology with the benefits of hydroxyl radicals**

## Bringing nature's balance indoors

The well-being benefits of nature are well known – but do you know the power of hydroxyl radicals?

Abundant in nature, hydroxyl radicals (also known as OH radicals) have the capacity to inhibit pollutants, viruses, and bacteria to clean and deodorise. nanoe™ X technology can bring these incredible benefits indoors so that hard surfaces, soft furnishings, and the indoor environment can be a cleaner and pleasant place to be, whether at home, at work, or visiting hotels, shops, restaurants etc.

In today's health-conscious world, we care about taking exercise, we care about what we eat and what we touch, we also care about what we breathe – and technology exists to bring good outdoor air, indoors.

The nanoe™ X performance varies depending on the room size, environment and usage and it may take several hours to reach the full effect (see test result table for more detail in page 4). nanoe™ X is not medical device, local regulations on building design and sanitary recommendations must be followed.

WATER  
1.2Kg  
A PERSON  
A DAY

FOOD  
1.3Kg  
A PERSON  
A DAY

WE BREATHE IN  
**18Kg**  
OF AIR A PERSON  
A DAY





Hydroxyl radicals contained in water

## A naturally occurring process

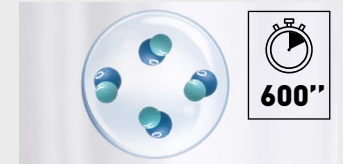
Hydroxyl radicals are unstable molecules looking to react with other elements like hydrogen, capturing it. Thanks to this reaction, hydroxyl radicals have the potential to inhibit the growth of pollutants such as bacteria, viruses, moulds, and odours, breaking them down and neutralising the unpleasant effects. This naturally occurring process has major benefits to improve indoor environments.

### Panasonic's nanoe™ X technology takes this a step further and brings nature's detergent – hydroxyl radicals – indoors to help create an ideal environment

By creating hydroxyl radicals contained in water, nanoe™ X technology significantly boosts their effectiveness, increasing hydroxyl radicals lifetime from less than a second in nature, to more than 600 seconds – 10 minutes so that nanoe™ X can spread easily around the room.

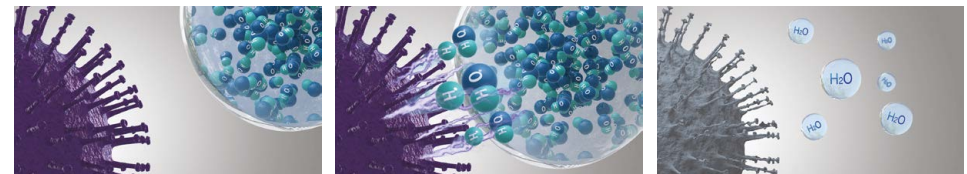


Hydroxyl radicals in nature



Hydroxyl radicals contained in water

Thanks to the nanoe™ X properties, several types of pollutants can be inhibited such as certain types of bacteria, viruses, mould, allergens, pollen and certain hazardous substances.



1 | nanoe™ X reliably reaches pollutants.

2 | Hydroxyl radicals denature pollutants' proteins.

3 | Pollutants activity is inhibited.

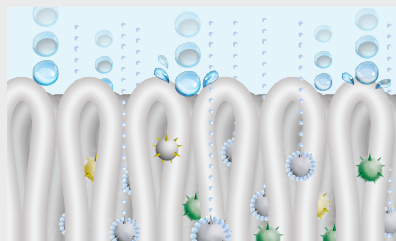
Lifespan of hydroxyl radicals contained in water is around 10 minutes, during this time they have the capacity to act against the pollutants. It may require longer to inhibit pollutants effectively, see the tests on effectiveness on nanoe™ X on airborne and adhesive pollutants.

## What is unique about nanoe™ X?



Hydroxyl radicals inhibit pollutants, certain types of viruses, and bacteria to clean and deodorise. Thanks to this advanced technology, even tightly woven fabrics can be treated using this solution, meaning that curtains, blinds, carpets and furniture can all benefit from this technology to inhibit hazardous substances – including on hard surfaces and, of course, the air that we breathe.

Effective on fabrics and surfaces.



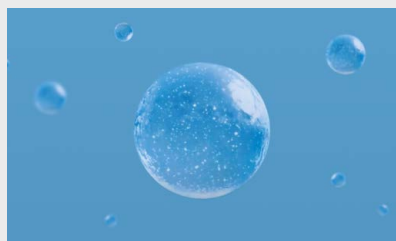
1 | At one billionth of a metre, nanoe™ X is much smaller than steam and can deeply penetrate cloth fabrics to deodorise.

Longer lifespan.



2 | Contained in tiny water particles, nanoe™ X has a longer lifespan to spread easily around the room.

Huge quantity.



3 | nanoe X Generator Mark 2 produces 9.6 trillion hydroxyl radicals per second. Greater amounts of hydroxyl radicals contained in nanoe™ X lead to higher performance on inhibition of pollutants.

Maintenance-free.



4 | No maintenance, no replacement required. nanoe™ X is a filter free solution that does not require maintenance, as its atomisation electrode is enveloped with water during its generation process and it is made with Titanium.



### 7 effects of nanoe™ X – Panasonic unique technology

#### Deodorises



Odours

#### Capacity to inhibit 5 types of pollutants



Bacteria and viruses



Mould



Allergens



Pollen



Hazardous substances

#### Moisturises



Skin and hair

\* The image shows nanoe™ X Generator Mark 2

\* Refer to <https://aircon.panasonic.eu> for more details and validation data.

## nanoe™ X, internationally-validated technology in testing facilities

The effectiveness of nanoe™ X technology has been tested by 3rd party laboratories in Germany, France, Denmark, Malaysia and Japan.

**99,9 %\***  
OF CERTAIN  
BACTERIA  
INHIBITED

### The effectiveness of nanoe™ X

	Tested contents	Result	Capacity	Time	Testing organisation	Report No.	
AIRBORNE	<b>Virus</b>	Bacteriophage ΦX174	99,7 % inhibited	Approx. 25 m³	6 h	Kitasato Research Center for Environmental Science	24_0300_1
	<b>Bacteria</b>	Staphylococcus aureus	99,9 % inhibited	Approx. 25 m³	4 h	Kitasato Research Center for Environmental Science	2016_0279
ADHERED	<b>Virus</b>	SARS-CoV-2	91,4 % inhibited	6,7 m³	8 h	Texcell (France)	1140-01 C3
		SARS-CoV-2	99,9 % inhibited	45 L	2 h	Texcell (France)	1140-01 A1
	<b>Virus</b>	Feline Coronavirus	99,3 % inhibited	45 L	2 h	Yamaguchi University Faculty of Agriculture	
		Xenotropic murine leukemia virus	99,999 % inhibited	45 L	6 h	Charles River Biopharmaceutical Services GmbH	
		Influenza (H1N1 subtype)	99,9 % inhibited	1 m³	2 h	Kitasato Research Center for Environmental Science	21_0084_1
		Bacteriophage	99,80% inhibited	25 m³	8 h	Japan Food Research Laboratories	13001265005-01
	<b>Bacteria</b>	Staphylococcus aureus	99,9 % inhibited	20 m³	8 h	Danish Technological Institute	868988
	<b>Pollen</b>	Ambrosia pollen	99,4 % inhibited	20 m³	8 h	Danish Technological Institute	868988
		Cedar	97 % inhibited	Approx. 23 m³	8 h	Panasonic Product Analysis Center	4AA33-151001-F01
	<b>Odours</b>	Cigarette smoke odour	Odour intensity reduced by 2,4 levels	Approx. 23 m³	0,2 h	Panasonic Product Analysis Center	4AA33-160615-N04

Test results conducted under controlled laboratory conditions. Performance of nanoe™ X might differ in real life environment.

The latest nanoe™ X device uses a “multi-leader discharge” system that focuses the discharge to 4 needle-shaped electrodes, greatly expanding the hydroxyl radicals.



### How nanoe™ X is generated

- 1 | Atomised electrode produces condensation.
- 2 | Electrical discharge is applied to the water
- 3 | nanoe™ X particles are generated

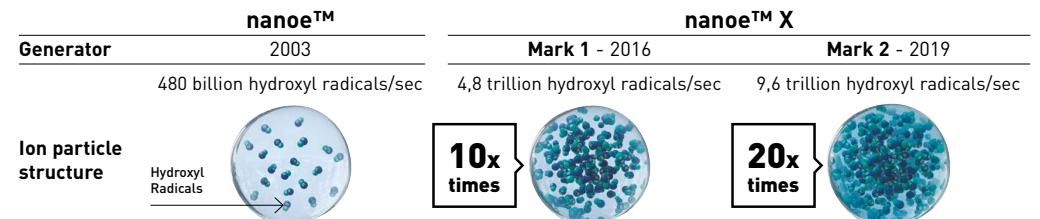
The image shows nanoe X Generator Mark 1



Panasonic heat pump with nanoe™ X technology verified against SARS-CoV-2

Virus SARS-CoV-2: 91,4 % inhibited. Test conducted by TEXCELL (France), using a gauze saturated with SARS-CoV-2 virus solution exposed to Panasonic heat pump with nanoe™ X in a space of 6,7 m³ over 8 hours. Test report: 1140-01 C3. Performance of nanoe™ X might differ in real life environment.

First nanoe™ device was developed by Panasonic in 2003. After years R&D investments, the technology has been improved with launch of nanoe™ X.



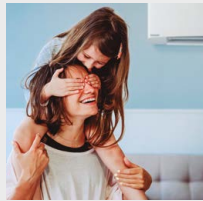
\* Reduction of 99,9% of Staphylococcus aureus after 8 hours of exposure. Texting organisation: Danish Technological Institute. Report no. 868988.

## Where is nanoe™ X technology used?

Since 2003, nanoe™ has become a part of people's lives in Japan and other regions.

Such technology can be found in diverse applications for cleaning air and surfaces, inside trains, elevators, cars, home appliances and personal beauty ... as well as in air conditioning.

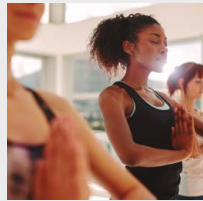
Panasonic Heating & Cooling Solutions is incorporating nanoe™ technology in a wide range of equipment for residential applications as well as for commercial spaces and, it is a solution that does not require filters or maintenance and can work independently from heating or cooling.



Home



Shop



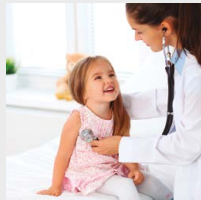
Gym



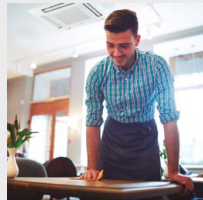
Hotel



Office



Clinic



Restaurant



Hospital

It has been adopted in people's homes as well as in public facilities where improved air quality is desired, such as offices, hospitals, healthcare centres and hotels etc.

The nanoe™ X alleged effect and performance is only expected in the same room as where the unit is placed and will vary depending on the room size, room floor plan/layout, environment and usage.

nanoe™ X has the potential to increase the indoor environment quality but is not a Medical Device. Local regulations on building design and sanitary recommendations must be followed.

## nanoe™ X: improving protection 24/7



### HOME

#### Split and Multi Split. Built-in nanoe X Generator Mark 1



**Wall-mounted Etherea Z.**  
CS-(M)Z\*\*XKE. 7 capacities: 1,6 - 7,1 kW.



**Wall-mounted Etherea XZ.**  
CS-XZ\*\*XKE. 4 capacities: 2,0 - 5,0 kW.



**Floor console.**  
CS-Z\*\*UFEAW. 3 capacities: 2,5 - 5,0 kW.

#### Split. Built-in nanoe



**Wall-mounted Heatcharge VZ.**  
CS-VZ\*\*SKE. 2 capacities: 2,5 - 3,5 kW.

### COMMERCIAL

#### PACi. Built-in or accessory nanoe X Generator Mark 1



**4 Way 90x90 cassette.**  
S-\*\*\*\*PU3E. 7 capacities: 3,6 - 14,0 kW.

#### PACi. Built-in nanoe X Generator Mark 2



**Adaptive ducted unit.**  
S-\*\*\*\*PF3E. 7 capacities: 3,6 - 14,0 kW.



**Wall-mounted.**  
S-\*\*\*\*PK3E. 5 capacities: 3,6 - 10,0 kW.



**Ceiling.**  
S-\*\*\*\*PT3E. 7 capacities 3,6 - 14,0 kW.

#### VRF. Built-in nanoe™ X.



**nanoe X Generator Mark 1. U2 Type 4 way 90x90 cassette.**  
S-\*\*\*MU3.  
11 capacities: 2,2 - 16,0 kW.



**nanoe X Generator Mark 2. F3 Type adaptive duct.**  
S-\*\*\*MF3.  
12 capacities: 1,5 - 16,0 kW.



**nanoe X Generator Mark 1. G1 Type floor console.**  
S-\*\*\*MG1E5N.  
5 capacities: 2,2 - 5,6 kW.

Panasonic Heating & Cooling Solutions is incorporating nanoe™ technology in a wide range of equipment

\*Availability depends on country

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## More about Panasonic Heating & Cooling Solutions

[www.aircon.panasonic.eu](http://www.aircon.panasonic.eu)

**Panasonic**  
heating & cooling solutions