Panasonic

nanoe™ X

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 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.

WE BREATHE IN

18 Kg

OF AIR A PERSON A DAY

WATER

1,2 Kg

A PERSON A DAY

FOOD

1,3 Kg

A PERSON A DAY

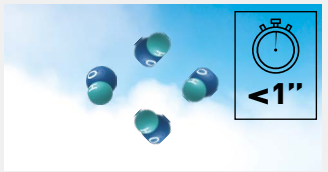
1 — nanoe™ X, technology with the benefits of hydroxyl radicals

A naturally occurring process

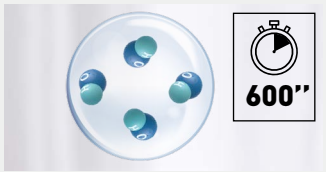
Hydroxyl radicals are unstable molecules looking to react with other elements like hydrogen, capturing it. Thanks to this reaction, hydroxyl radicals have the potential to inhibit the growth of pollutants such as bacteria, viruses, moulds, and odours, breaking them down and neutralising the unpleasant 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.

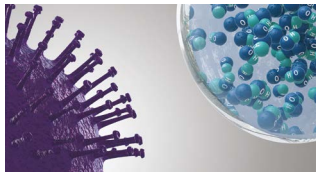


Hydroxyl radicals in nature.

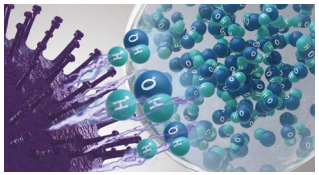


Hydroxyl radicals contained in water.

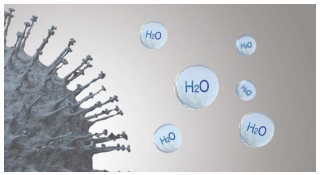
Thanks to the nanoe™ X properties, several types of pollutants can be inhibited such as certain types of bacteria, viruses, mould, allergens, pollen and certain hazardous substances.



1 | nanoe™ X reliably reaches pollutants.



2 | Hydroxyl radicals denature pollutants' proteins.



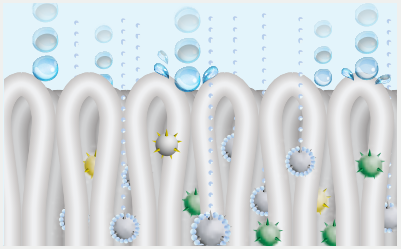
3 | Pollutants activity is inhibited.

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.

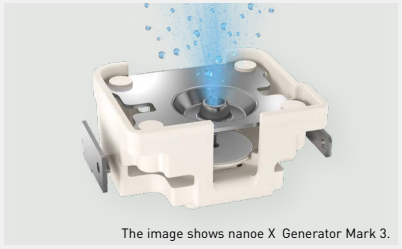
Longer lifespan.

2 | Contained in tiny water particles, nanoe™ X has a long lifespan, which is about 600 seconds, to spread easily around the room.

Huge quantity.

3 | nanoe X Generator Mark 3 produces 48 trillion hydroxyl radicals per second. Greater amounts of hydroxyl radicals contained in nanoe™ X lead to higher performance on inhibition of pollutants.

Maintenance-free.



The image shows nanoe X Generator Mark 3.

4 | No service and maintenance 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 Titatium.

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

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

nanoe™ X, internationally-validated technology in testing facilities

99,9%* of certain bacteria inhibited

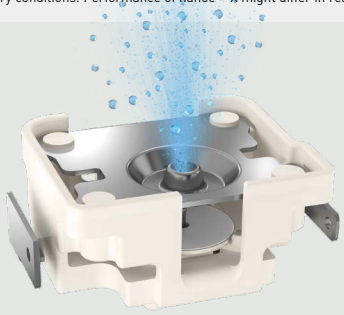
The effectiveness of nanoe™ X technology has been tested by 3rd party laboratories in Germany, France, Denmark, Japan and China.

The effectiveness of nanoe™ X

	Tested contents		Generator	Result	Capacity	Time	Testing organisation	Report No.
Airborne	Virus	Influenza (H1N1)	Mark 2	98,3% inhibited	30 m³	1,5 h	China Electronic Product Reliability and Environmental Testing Research Institute	J2003WT8888-00889
		Bacteriophage ΦX174	Mark 1	99,2% inhibited	Approx. 25 m³	6 h	Kitasato Research Center for Environmental Science	24_0300_1
	Bacteria	Staphylococcus aureus	Mark 1	99,7% inhibited	Approx. 25 m³	4 h	Kitasato Research Center for Environmental Science	24_0301_1
Adhering	Virus	SARS-CoV-2	Mark 1	91,4% inhibited	6,7 m³	8 h	Texcell (France)	1140-01 C3
		SARS-CoV-2	Mark 1	99,9% inhibited	45 L	2 h	Texcell (France)	1140-01 A1
		Bacteriophage ΦX174	Mark 1	99,8% inhibited	Approx. 25 m³	8 h	Japan Food Research Laboratories	13001265005-01
		Xenotropic murine leukemia virus	Mark 1	99,999% inhibited	45 L	6 h	Charles River Biopharmaceutical Services GmbH	—
		Coxsackie virus (CA16)	Mark 2	99,9%inhibited	30 m³	4 h	China Electronic Product Reliability and Environmental Testing Research Institute	J2002WT8888-00439
		Bacteriophage	**Mark 3**	98,81% inhibited	Approx. 139,3 m³	4 h	SGS Inc	SHES210901902584
		MS2 Phage Virus	**Mark 3**	99,99% inhibited	Approx. 25 m³	2 h	Shokukanken, Inc.	227131N
	Bacteria	Staphylococcus aureus	Mark 1	99,9% inhibited	20 m³	8 h	Danish Technological Institute	868988
	Pollen	Cedar pollen	**Mark 3**	99%inhibited	Approx. 24 m³	12 h	Panasonic Product Analysis Center	H21YA017-1
		Ambrosia pollen	Mark 1	99,4% inhibited	20 m³	8 h	Danish Technological Institute	868988
	Odours	Cigarette smoke odour	Mark 1	Odour intensity reduced by 2,4 levels	Approx. 23 m³	0,2 h	Panasonic Product Analysis Center	4AA33-160615-N04
			Mark 3	Odour intensity reduced 1,7 levels	Approx. 139,3 m³	0,5 h	SGS Inc	SHES210901902478

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

The latest nanoe™ X device uses a "Circular discharge" system greatly expanding the hydroxyl radicals.



The image shows nanoe X Generator Mark 3.

How nanoe™ X is generated.

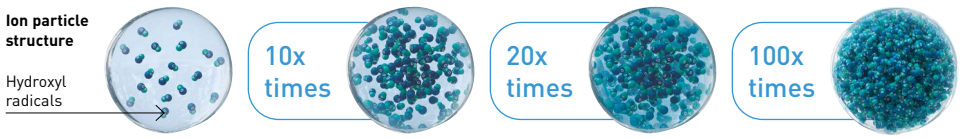
1 | Atomised electrode produces condensation
2 | Electrical discharge is applied to the water
3 | nanoe™ X particles are generated

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.

Generator: nanoe™	Generator: nanoe™ X		
2003	**Mark 1** - 2016	**Mark 2** - 2019	**NEW Mark 3** - 2022
480 billion hydroxyl radicals/sec	4,8 trillion hydroxyl radicals/sec	9,6 trillion hydroxyl radicals/sec	48 trillion hydroxyl radicals/sec



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 incorporates 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.

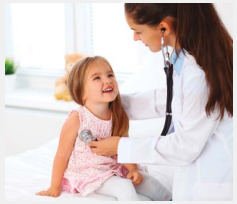

Home

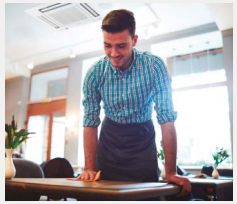

Shop


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.

Built-in nanoe X Generator Mark 3.

Wall-mounted Etherea.
CS-XZ**ZKEW-H.
4 capacities: 2,0 - 4,2 kW.
CS-XZ**ZKEW.
4 capacities: 2,0 - 5,0 kW.
CS-(M)Z**ZKE(W).
7 capacities: 1,6 - 7,1 kW.

Built-in nanoe X Generator Mark 2.

Aquarea EcoFleX ducted unit.
S-71WF3E.

Built-in nanoe X Generator Mark 1.

Wall-mounted TZ super-compact.
CS-(M)TZ**ZKE(W).
8 capacities: 1,6 - 7,1 kW.

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

Commercial.

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

Wall-mounted - PK3.
S-****PK3E.
5 capacities: 3,6 - 10,0 kW.

4 way 60x60 cassette - PY3.
S-**PY3E.
4 capacities: 2,5 - 6,0 kW.

Ceiling - PT3.
S-****PT3E.
7 capacities: 3,6 - 14,0 kW.

Adaptive ducted unit - PF3.
S-****PF3E.
7 capacities: 3,6 - 14,0 kW.

PACi NX. Built-in nanoe X Generator Mark 1.

4 way 90x90 cassette - PU3.
S-****PU3E.
7 capacities: 3,6 - 14,0 kW.

VRF. Built-in nanoe X Generator Mark 3.

U2 type 4 way 90x90 cassette.
S-***MU2E5BN (Mark 3).
S-***MU2E5B (Mark 2).
11 capacities: 2,2 - 16,0 kW.

Y3 type 4 way 60x60 cassette.
S-**MY3E.
6 capacities: 1,5 - 5,6 kW.

F3 type adaptive duct.
S-***MF3E5BN / AN (Mark 3).
S-***MF3E5B / A (Mark 2).
12 capacities: 1,5 - 16,0 kW.

VRF. Built-in nanoe X Generator Mark 1.

G1 type floor console.
S-**MG1E5N.
5 capacities: 2,2 - 5,6 kW.

Ventilation. Built-in nanoe X Generator Mark 1.

Ceiling mounted air-e.
FV-15CSD1G.
1 capacitie.

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

More about Panasonic Heating & Cooling Solutions

www.aircon.panasonic.eu

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heating & cooling solutions