

Introduction for



Multifunctional Hygiene Coating
with durable effect

Manufacturer: **NASC NANO TECHNOLOGY CO.,LTD.**

Distributor:  **Venture Chemical Ltd.**

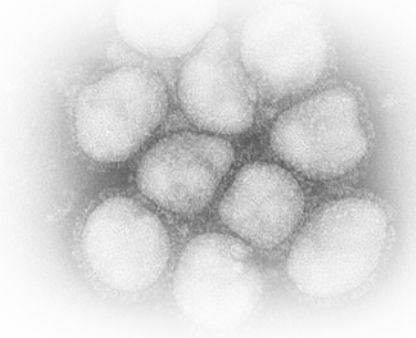
The Medical Nanocoat may kill 99.99% of virus & bacteria.



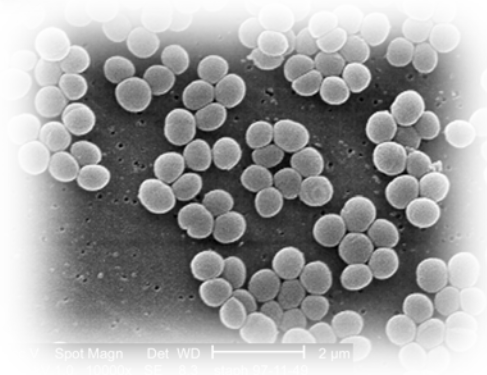
Escherichia coli



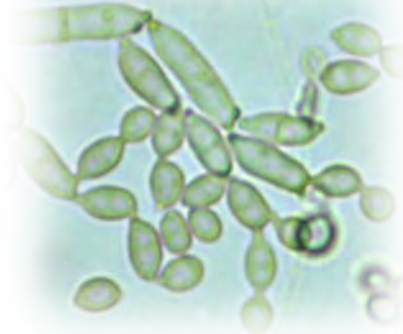
Klebsiella pneumoniae



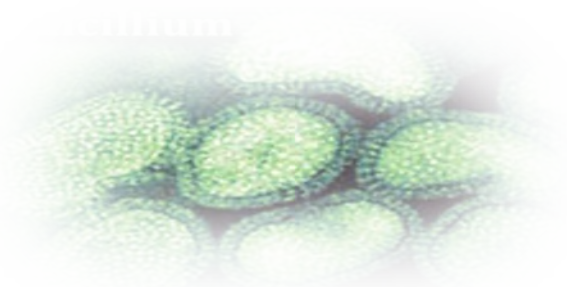
Flu virus



Staphylococcus aureus



Black mold (Cladosporium)



Green mold (Penicillium)

About Medical Nanocoat (1)

- Special solution spray on everywhere where we may touch in daily life.
- The solution is composed of nano-sized particles of amorphous tungsten oxide that offers photocatalytic activity with visible light.



Components:

amorphous tungsten oxide, platinum, silicon dioxide, tin dioxide, molybdenum, selenium, graphite, ammonia, and purified water

- The solution can be sprayed with adequate technique.

About Medical Nanocoat (2)

The technology has been introduced by Investment and Technology Promotion Office managed by United Nation Industrial Development Organization.

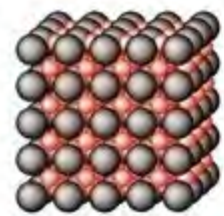
URL http://www.unido.or.jp/en/technology_db/2468/



The screenshot shows the UNIDO website interface. At the top left is the UNIDO logo and the text "UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION". Below it, it says "Investment and Technology Promotion Office, Tokyo". A navigation menu is visible with "日本語" selected. The breadcrumb trail reads: "UNIDO / Activities / Technology Transfer / Sustainable Technology Promotion Platform (STePP) / Multifunctional Nano-coating Technology". There are "Prev", "List", and "Next" buttons. The main heading is "Multifunctional Nano-coating Technology". Below that, a blue bar contains "NascNano Technology Co., Ltd.". The main text reads: "MEDICAL NANOCOAT: Multifunctional Hygienic Coating Delivered by Nanotechnology". To the right of this text are two icons: a yellow one labeled "7 AFFORDABLE AND CLEAN ENERGY" and an orange one labeled "9 INDUSTRY, INNOVATION AND INFRASTRUCTURE".



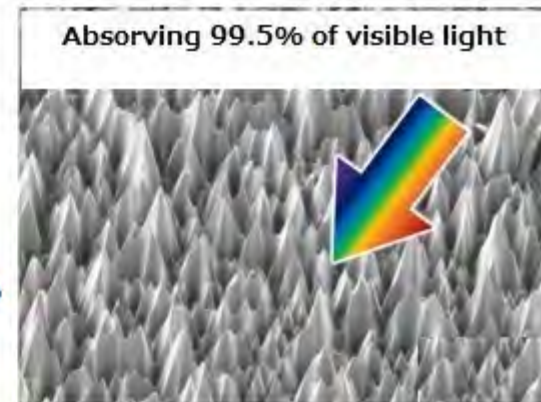
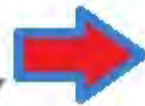
Feature (1) Amorphous structure



Crystal



Amorphous
(Uncrystallized)



Seeing the following schematic image of crystalline and amorphous structure, you can imagine that crystal has flat and even surface that may reflect light linearly (so called “regular reflection”), but particles with amorphous structure have uneven surface that may reflect light irregularly (irregular reflection). That is, light exposure surface area of amorphous structure is larger than crystalline structure. Photocatalytic reaction is, therefore, largely promoted with this amorphous structure.

Feature (2) 24-hr catalytic reaction



Photocatalytic reaction with room light where no sunlight (UV rays) reach.

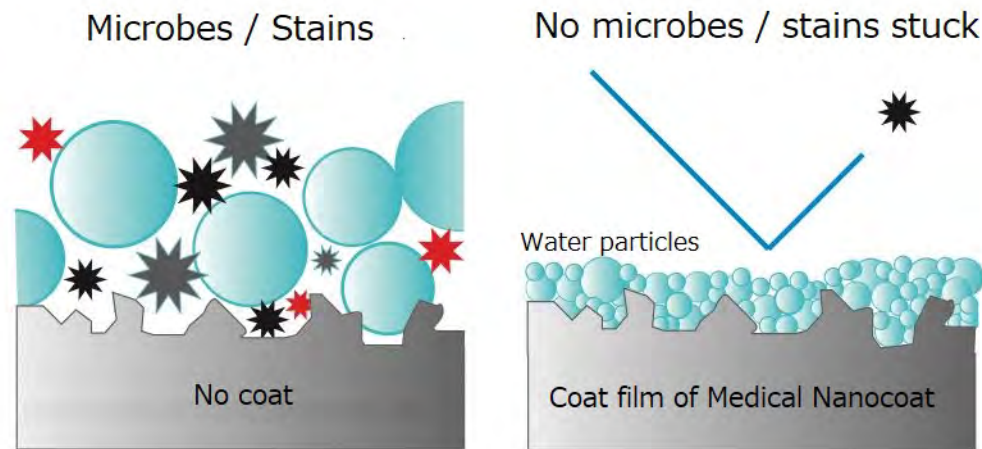


Catalytic reaction of active components in the night without room light.

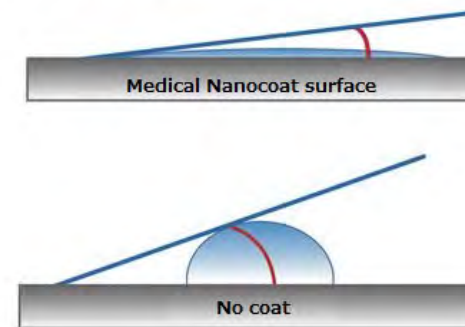
Feature (3) Super hydrophilicity

Coat film is super hydrophilic where water film may be produced. The water film may inhibit microbes and stains to be stuck on the surface, and may give antistatic property.

As water film may be produced on the coat surface, no water drop happen and the film may be easily dried.



Contact angle: 3 - 5°

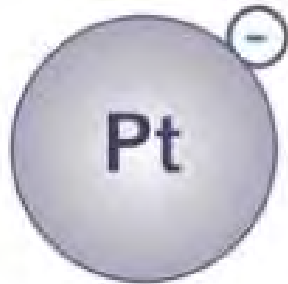


Mirror half of where Medical Nanocoat was applied (left side)

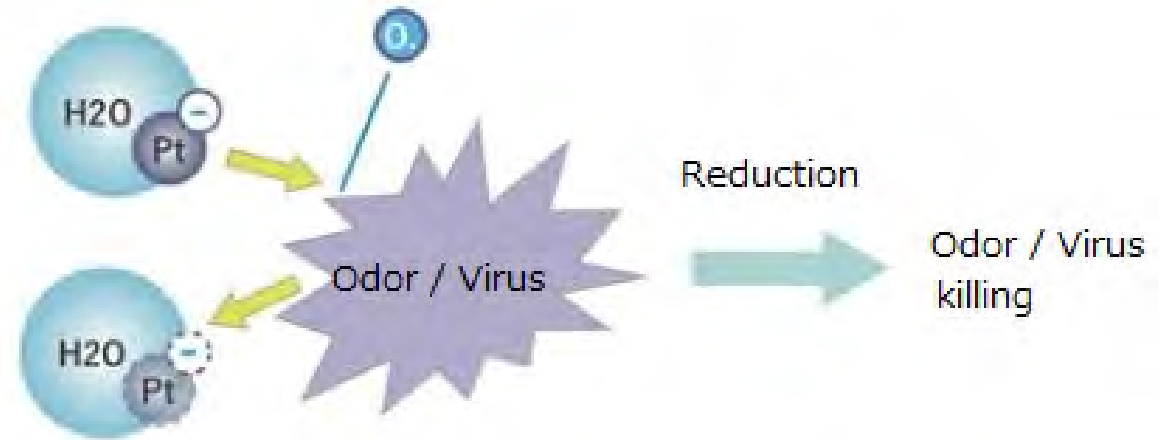


Feature (4) Platinum's performance

Platinum particle with 2nm diameter

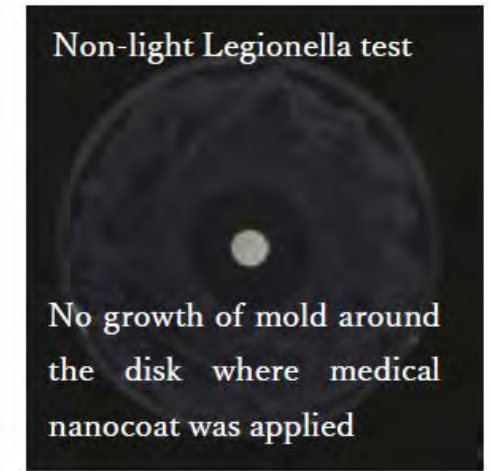
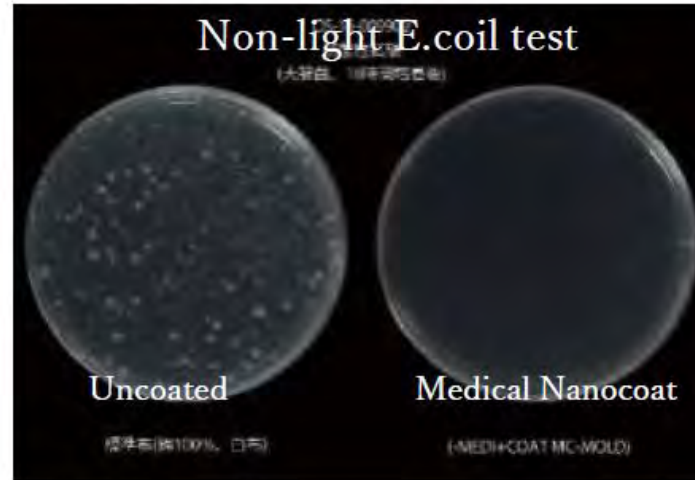
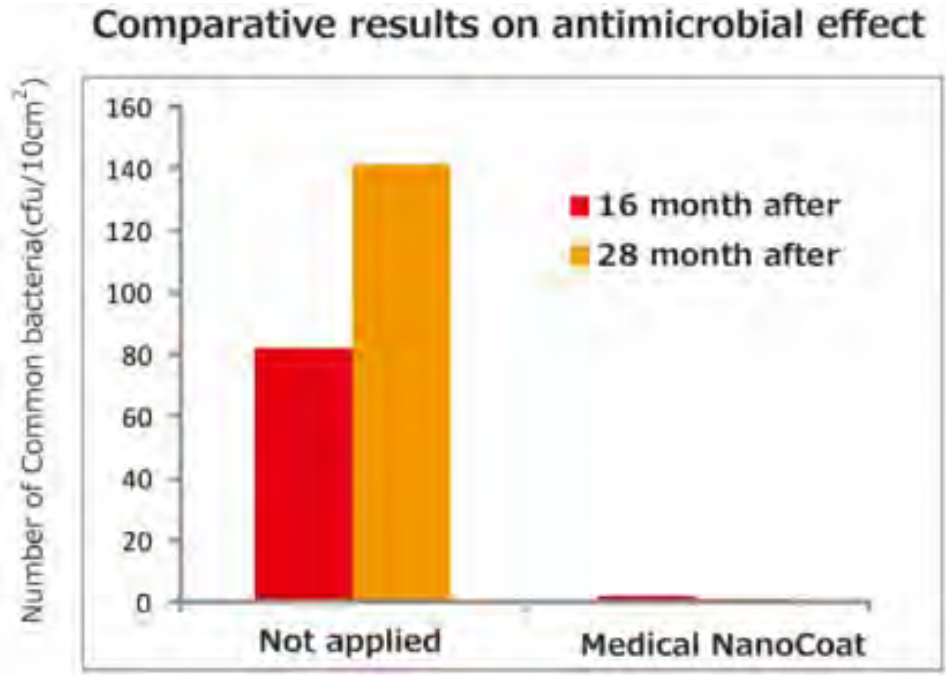


Nano-sized particles of platinum may be negatively charge.



Nano-sized platinum particles offers strong reduction by which oxygen is taken from virus and odorous particles. Moreover, they offers catalytic reaction without being ionized.

Performance – antimicrobial property



Antimicrobial effect to staphylococcus aureus klebsiella pneumoniae and E.coli was recognized under the condition without light.

After coating various surfaces in a major international airport in Japan, the MEDICAL NANO COAT treated surfaces had a significantly reduced bacterial load in comparison with non-treated surfaces even after 28 months from initial application. (third party testing carried out by the Department of Environmental Sciences, University of Shizuoka, Japan).

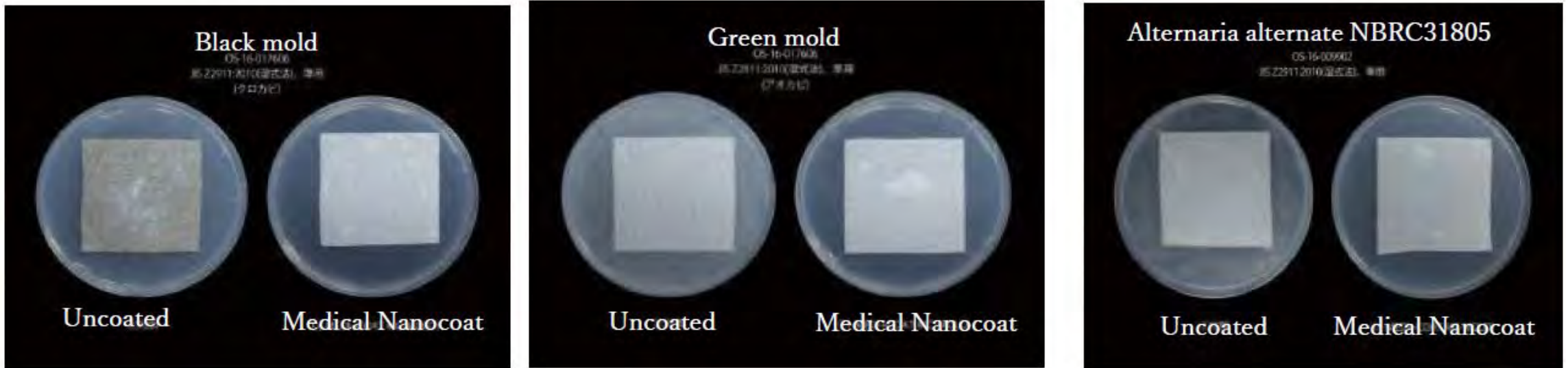
Performance – antiviral property

Target	Test time / Point	
	15 sec. / 5 min.	
Medical Nanocoat	99.99%	99.99%
Physiological salt solution	0.00%	43.77%

It was recognized 99.99% influenza virus was inactivated (neutralize) by setting to react with it for more than 15 sec., while physiological salt solution as control couldn't do the same.

[Third party testing carried out by Shokukanken Laboratory]

Performance – antifungus property



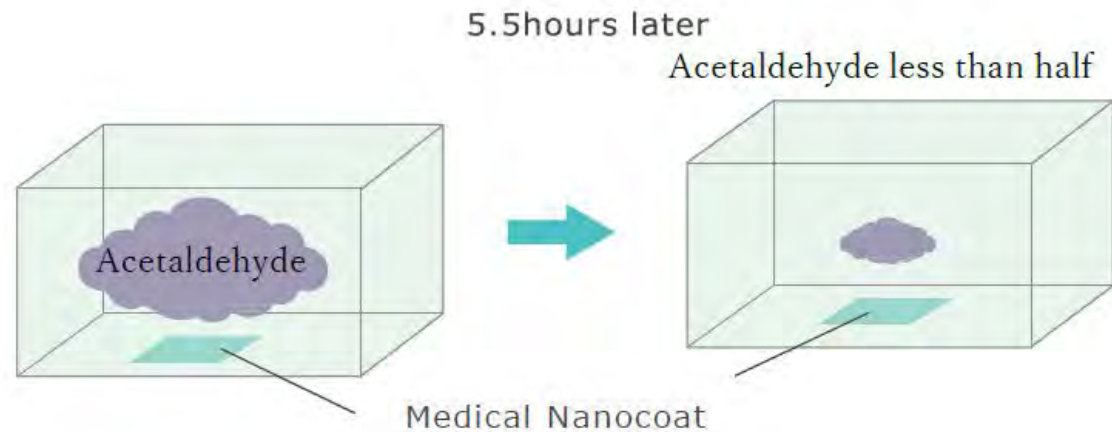
In Mold resistance test (black mold, green mold, *Alternaria alternate* NBRC 31805), fungal growth was not found at the samples or test pieces where medical nanocoat contacted. Efficiency of medical nanocoat was recognized in controlling mold growth under the condition without light. (on the contrary, mold growth was recognized at the uncoated parts.) [third party testing carried out by KAKEN TEST CENTER(General Incorporated Foundation)]

Performance – odor killing property

A 5L container is filled with acetaldehyde of initial concentration 30ppm and the glass plate with Medical Nanocoat 0.1g is set inside. Irradiates illuminance 1000Lx light onto the glass plate by UV-cut fluorescent lamp.

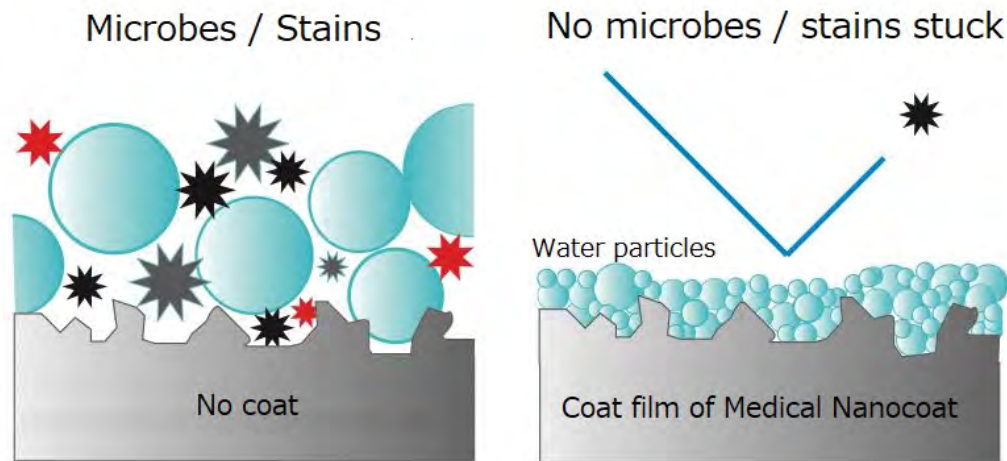
And inspected the amount of odor components. As a result, hardly change the smell of blank plate, however the plate with Medical Nanocoat reduced the rate by more than half.

Acetaldehyde	Blank	Medical Nanocoat
Initial (ppm)	30.6	30.6
5.5 hours later (ppm)	30.4	14.3



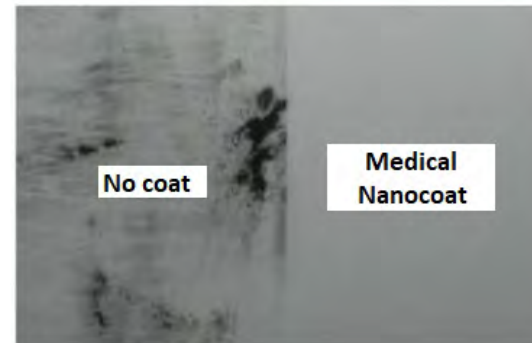
Performance – antistatic & soil release property

Coat film is super hydrophilic where water film may be produced. The water film may inhibit microbes and stains to be stuck on the surface, and may give antistatic property.



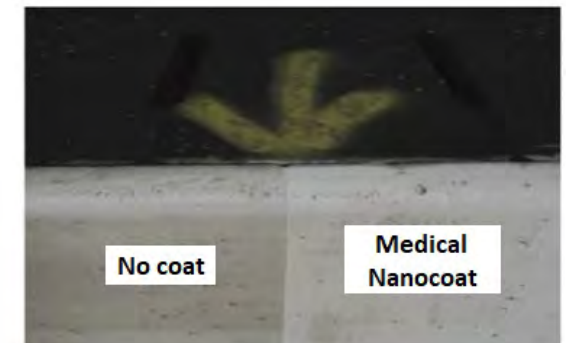
Experiment(1):

Carbon powders were sprinkled over plastic plates without coat and Medical Nanocoat. Powders were stuck on no coat, but not on Medical Nanocoat.



Experiment(2):

Medical Nanocoat was applied to the concrete wall of a tunnel. 1 year later, compare the degree of stain to the part without coat.

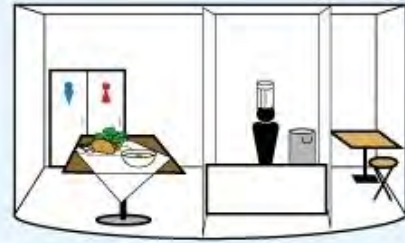


Area of application



Hotel

Reception/Lobby/Elevator/Toilet
Bath room/Refrigerator/Remote, etc



Restaurant

Table/Kitchen/Toilet/Staff room,
etc.



Clinic/Hospital

Reception/Pharmacy/Elevator
Toilet/Lobby/Bed/Chair/Handrail, etc



Airport

Counter/Baggage cart/Elevator
Toilet/Clinic/Nursing room, etc.



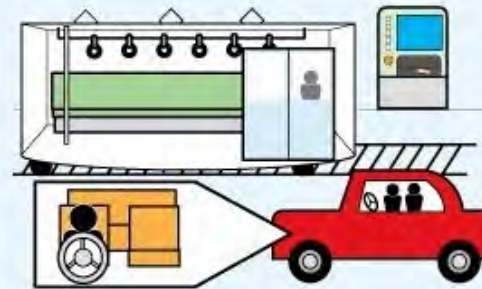
Theater

Ticket counter/Elevator/Toilet
Seats, etc.



School/Kindergarten

Wash stand/Shelf/Desk/Chair
Toys/Floor/Bed/Matress, etc.



Train station/Car interior

Strap/Handrail/Seat/Door
Ticket MC/Car interiors, etc.



Office building

Reception/Lobby/Elevator/Toilet
Meeting room/Dining room, etc.

Application method



Wipe the target surface.
Use alkali electrolytic water or neutral detergent.
Particularly, fatty, oily, tar stains must be removed.
Residual detergent must be wiped up completely.



Pour the final diluted solution into spray gun canister.



Spray it onto the target surface from a distance of 20 – 30 cm, and let dry for more or less 5 minutes.
Repeat spraying once again.

Notes)

Ideal coat amount is 100 cc/m².

Spray it as thin as possible not to make a drip.



Optionally, bacterial quantification kit to examine bacterial load on coated/uncoated surfaces.

Introduction for bacterial quantification kit

Lumitester Smart with LuciPac A3 developed by Kikkoman Biochemifa Co. is the most precise tool to detect ATP (adenosine triphosphate), ADP (adenosine diphosphate), and AMP (adenosine monophosphate).



LuciPac A3 -ATP+ADP+AMP Hygiene Monitoring

https://youtu.be/_6x_q3FZanc

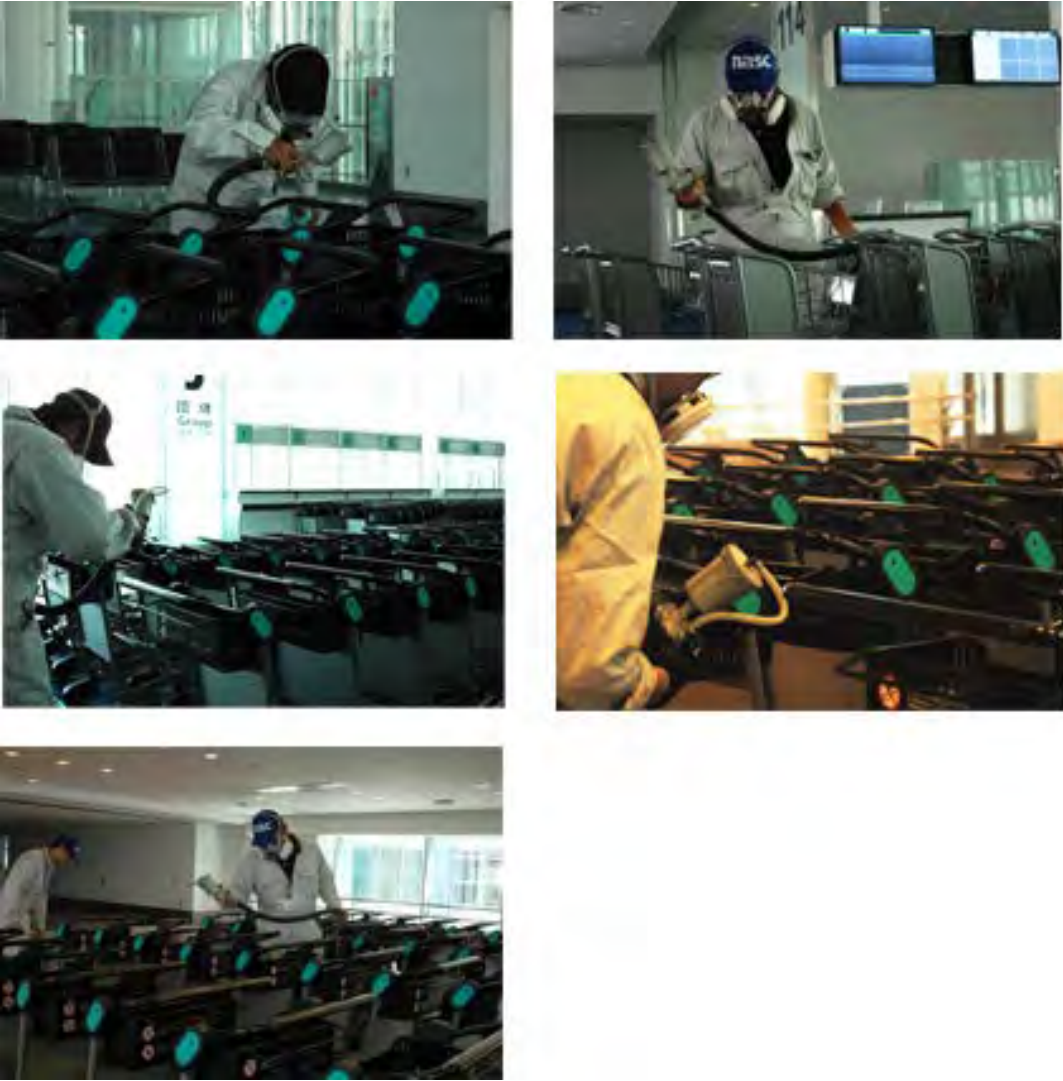


Lumitester Smart Quick Start Guide

https://youtu.be/nDx_QS48Ofk

Scenes of application (1)

Haneda Airport (Tokyo, Japan)

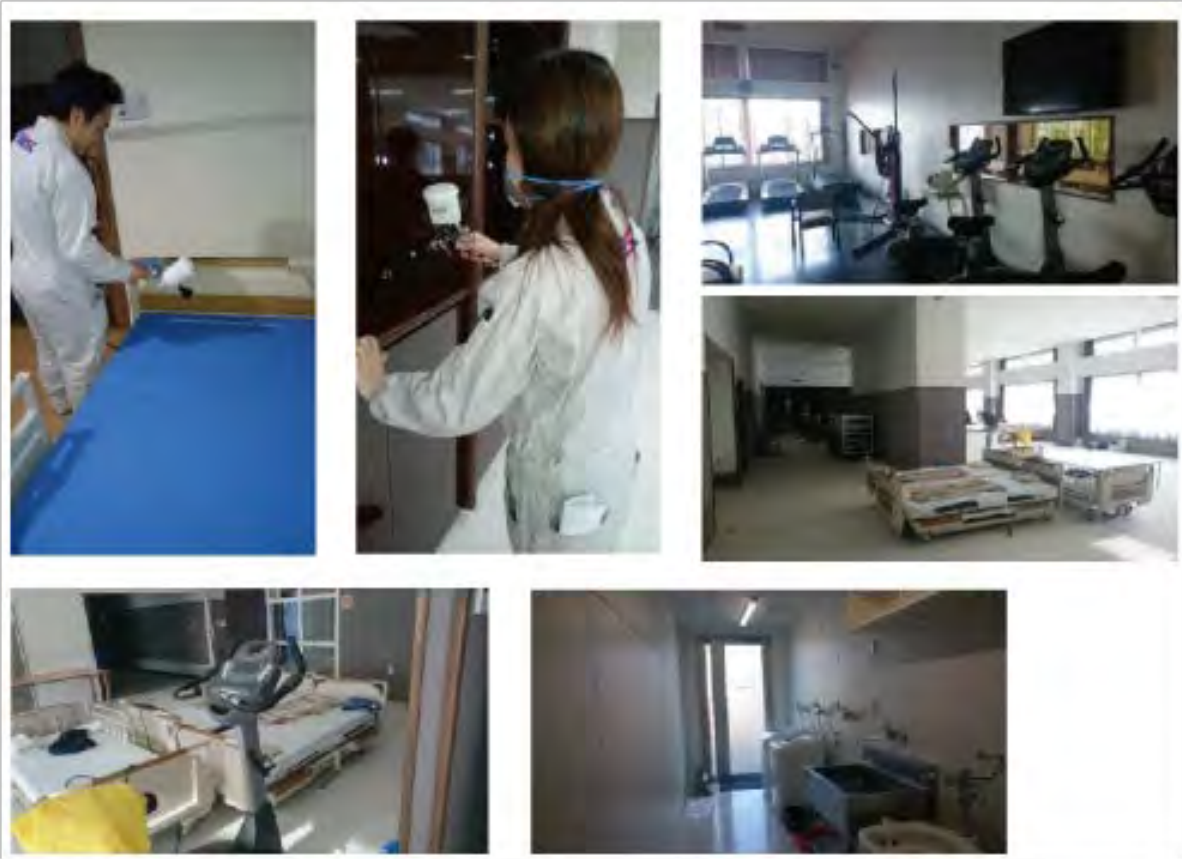


KIX Int'l Airport (Osaka, Japan)



Scenes of application (2)

Elderly nursing home (Aomori, Japan)



Nursing room of the city hall (Chiba, Japan)



Scenes of application (3)

Apa Hotel (Tokyo, Japan)



Backyard of Hotel Nikko KIX (Osaka, Japan)



Scenes of application (4)

Teijin office building (Osaka, Japan)



A Clinic (Tokyo, Japan)

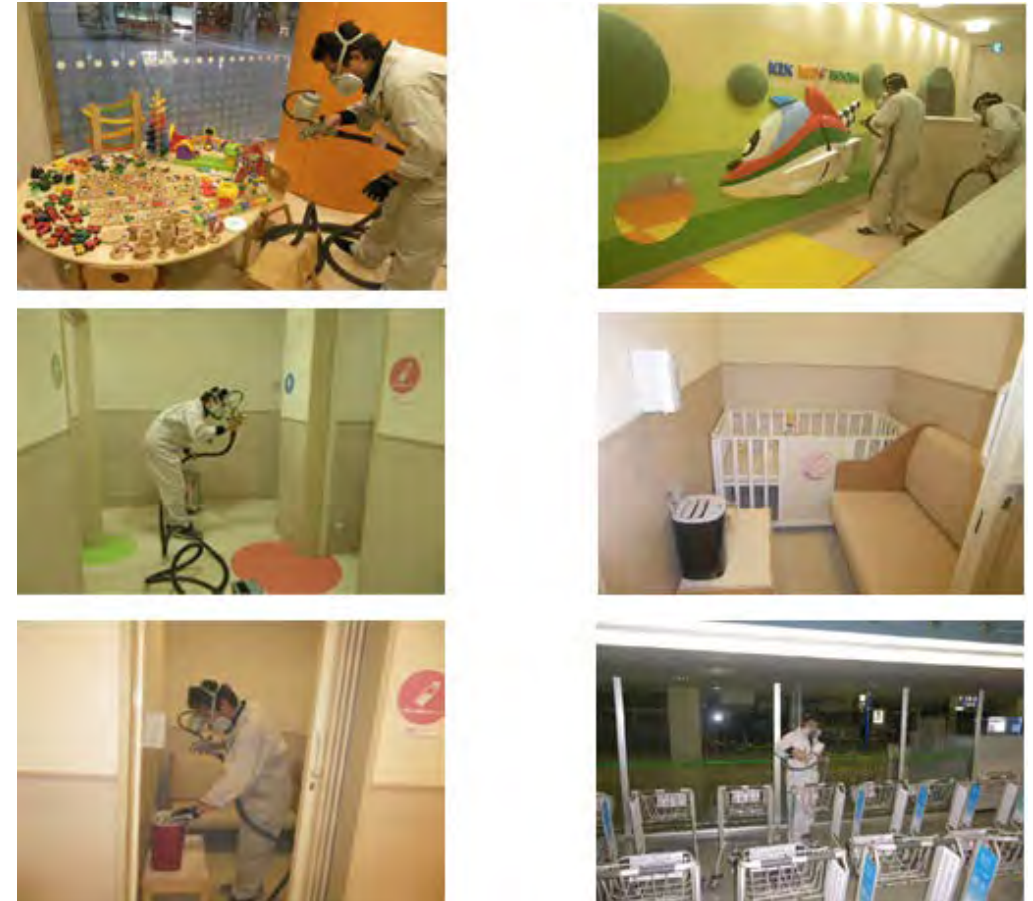


Scenes of application (5)

Amano factory office (Hiroshima, Japan)



Kids space of KIX Int'l Airport (Osaka, Japan)



Medical Nanocoat has been applied in many more spaces!!

Efficacy to microbes/viruses

The efficacy to the following microbes/viruses has been approved by the Verification tests carried out by third party institutes:

Microbes/Viruses	Third party laboratory insitutes
Flu virus	Inactivation test by Shokukanken Laboratory.
Staphylococcus aureus Klebsiellapneumoniae E.coli	Mold resistance test by Kaken Test Center
Molds (black mold, green mold, Alternaria alternate NBRC 31805)	Non-light bacterial test by Kaken Test Center
Bacteiria / Virus Inactivation test (JIS 1702 film contact method)	Environmental Science Laboratory of Shizuoka Prefectural University

Physical properties

- Chemical resistance

The solution was resistant to etching test for 5 minutes with 30% hydrochloric acid solution and 30% sodium hydroxide solution.

- Tensile strength – **30 Mpa or more /cm²**
- Light resistance – **No change by Super UV Meter 200 hrs.**
- Weatherability – **No change by Sunshine Weather Meter 5,000 hrs.**

Safety

- Closed patch test (apply adhesive to skin for 24hours)

Disk which had been dipped into [Medical Nanocoat](#) was applied 24 hours to the skin of 22 subjects. After removing, all of the subjects showed the skin irritation index 0, which shows its safety.

- Food Sanitation Law/standard and criteria for food and additive. Toy or its material. Toy coating

[Medical Nanocoat](#) meets the criteria described in Food Sanitation Law and can be used to coat toys (materials mainly polyvinyl) which a child may chew.

Disclaimer

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