Elementary & **E**fficient **S**mart **S**ales **S**olutions

部门

European **E**nergy **S**aving **S**olution **S**ystem

项目

sanisim®

INDEX

1. Introduction

Talking about disinfection it mean to define a whole of operations direct to neutralizing existing pathogenic microorganisms outside human body, animal, etc... and to pursue, consequently, total destruction. To give a definition of "disinfection is set of measures to destroy pathogenic contaminants in an external environment, that is, sites on inanimate objects."

Target of disinfection is to interrupt the development of "microbism", a term that indicates the pollution of rooms and confined atmosphere from harmful or parasitic elements, especially viruses, molds, skizomycetes, etc.

Cleaning, disinfection and sterilization are key actions to prevent diffusion of infections.

Nevertheless, in many healthcare facilities one or other of these basic interventions for prevention and control of infections, is lacking or staff does not receive sufficient training on this.

Disinfection of environment is an activity that in the recent years has become necessary in case of biological contamination very important, in case of pandemics events. It was very useful a few years ago for SARS.

We believe it should be used not only for current event but also and above all as prevention activities to combat nosocomial infections and in high-frequency environments or in production of foodstuffs and pharmaceuticals.

Environmental Sanitation is an activity to protect, considering that it is:

bactericide | *fungicide* | *sporocide* | *virucide*

1. Where and why be present

Public and private places, companies and various kinds of communities and not only, they are environments subject to this type of action because they have to follow very strict hygiene standards in respect of your health and that of other people. The rooms must first be clean and hygienically uncontaminated.

Particularly in public and private health facilities where hospital infections represent a major problem in ethical profile, of security and economic. Just think that infections develop inside hospital structures caused a number of deaths per year higher than that caused by road accidents. In fact, on inert environmental surfaces, infection-causing microorganisms (bacteria such as Enterococcus, Escherichia, Klebsiella, Pseudomonas, Acinetobacter, Staphylococcus) can survive by feeding the infection chain: environment-operator-patient.

To answer at growing concern for nosocomial infections and influenza viruses, the Working Group coordinated by Dimension Service proposes to companies and hospitality facilities also a Environmental Disinfection Service.

2. Italian Regulations and Guidelines

Regulations on health and safety at work (Legislative Decree 81/2008) impose at place managers to carry out periodic checks to verify hygiene conditions of environments and to intervene to remove substances that are harmful to human health (Annex IV, Section 1.9.1.4.-1.9.1.5), personally responding to any negligence in this regard (Article 68, paragraph 15).

INAIL's guidelines, "Microbiological Monitoring in Workplaces, Sampling and Analysis," Edition 2010, provide that for biological agents, difficulty to evaluate entity of exposure makes the measurement of environmental contamination a decisive factor in assessing existence of biological risk. Also, different from chemical substances, in case of biological agents, they have not been defined limits of contamination as threshold values; so, there aren't objective references to managing results of environmental monitoring.

3. The chemical process of Environmental Sanitation

Environmental Disinfection designed by Dimension Service is of guaranteed efficacy, requires reduced time of action, no risk of damage to electronic equipment and no danger for people. Of course, environments under treatment should not contain people or patients.

Environmental Disinfection method breaks down bacterial, viral and mycotic charge on all

surfaces, objects, and everything is in the room; Dry vapor spreads generated homogeneously throughout volume of environment, even below and around the furnishings and medical devices.

Safe, fast, effective: a preventive method action against danger of biological contamination of a different origin. Environmental Disinfection System revolutionises disinfection sector, extending to a large number of users opportunity to benefit from an extremely effective, fast and cost-effective service.

In this context, SANISIM automatic disinfection system has been integrated, utilizing a dry spraying technology of SANISIM SOLUTION disinfectant product (self-product) and can

achieve high effective and efficiency in disinfection processes and ensure high safety and ease to use. Traditional cleaning methods also have many limitations in terms of:

- ✓ **Effective and efficiency:** Not all surfaces are easily accessible, especially hidden ones that become a reservoir of microorganisms; systems used mostly are based on wet misting of disinfectant products, which has a certain environmental impact, leaving treated surfaces wet; also require that rooms being reclaimed are sealed, preventing their immediate use (long post-disinfection times);
- ✓ **safety:** cleaning processes are operator-dependent, exposing them to risk of inhalation of toxic products and skin irritation.

Active principle, based on stabilized hydrogen peroxide, thanks to a special high-pressure dispenser is atomized into environment in dry form and goes in contact with each surface by breaking down microbial and bacterial load. Every point reached by air is also reached by active principle, whatever it is quality, nature or composition, resulting in a global disinfection of environment and it is contents, including furnishings and objects. Atomization process used does not produce humidity or any kind of residue and its degradation (greater than 99%) occurs within a few minutes form supply.

This process allows to a complete disinfection of simple and complex environments, leaving a completely disinfected space and immediately usable without further intervention.

Atomized hydrogen peroxide does not produce any corrosive effect on surfaces and equipment treated environment since it generates a "dry fog", therefore, computers and powered equipment can have only a benefit from such a process that does not exclude them, as is often in this case be done by a traditional disinfection process.

Association between speed rate and temperature of product dispensed, define degradation of hydrogen peroxide in free radicals which are particularly oxidizing and short-lived. In microorganisms, by hydrophilic characteristic, there is an attraction effect between water molecule present in solution that is fixed on bacterial membrane, creating formation of liquid peroxide crystals.

Our Hydrogen Peroxide, diluted in specific concentrations for various uses, is particularly stable compared to what market proposes through other competitors; this causes on surfaces of treated environment an inhibitory effect of microorganisms growth that will subsequently deposit.

Effective of described process qualifies Environmental Disinfection as a preventative remedy to infection contain.

4. Sanitization products

Microbiological agents present in air are aerosolized in form of bioaerosol, related to dust, liquid particles or other contaminants naturally present (oily emulsions, dust of wood, etc.), with a risk of exposure for workers, in contact with contaminated surfaces and objects or by ingestion.

According to as written above, research has shown that hospital environment has a heavy impact on contracted hospital infection rates. Disinfection methods currently available on market are not sufficiently efficient and cannot be used to spread and apply disinfectant products in all areas and surfaces, including medical devices and equipment. Consequently, infectious agents can quickly recontamination all the area.

Factors that determine effectiveness of environmental sanitation treatment are:

- ✓ Environment Volume
- ✓ Sanisim Solution diffusion time
- ✓ Contact time
- ✓ Decay time
- ✓ Intended of use of environments subject to be treated
- ✓ Periodicity of treatment
- ✓ Human encounters of the environment
- ✓ Objective of treatment

In summary, three large households have been designed for environmental sanitation systems:

- The PORTABLE SYSTEM: SANISIM
- The FIXED system: SANISIM FIXED e CLOSET SANISIM
- The mini portable system: SANISIMini

4.1 SANISIM mobile system

Italian company that is our partner, has developed a device called SANISIM, which is a new technology for eradicating nosocomial pathologies in hospital environment.

Automatic Disinfection System SANISIM uses a dry spraying technology of disinfectant product SANISIM SOLUTION and can achieve high efficiency and efficiency in disinfection processes and ensure high security and ease of use.

SANISIM device operates by generating a high kinetic energy cloud, using a spray technique that produces very thin drops of disinfectant product suitable for environment to be sanitized. Cloud is made up of droplets with a diameter between 6 µm and 08 µm Gauss. Intent of this technology was to evaluate effectiveness of SANISIM process in Department of Hygiene in University of Bari in real conditions of use. Research test was based, according to NF EN 1040 standard norm, a series of surface samples distributed in test room of about 48m³ has thus measured effectiveness of SANISIM process comparing "before/after" process.

Testing has therefore been repeated several times in different environments and nations in order to validate efficacy of treatment under different conditions and for different contaminants; besides, they were performed both on site and laboratory. The results confirmed effectiveness of environmental sanitation in almost all cases.

The mechanisms of action are as follows:

oxidative action of hydrogen peroxide: hydrogen peroxide is an oxidizing agent that can eliminate pathogens with which it gets in touch through free radicals' hydrolysis. It is active against a wide range of microorganisms (bacteria, fungi, viruses, spores) and is considered to be an effective and safe disinfectant.

Hydrogen peroxide generates:

- oxidation of lipid membrane structures;
- an alteration of ribosomes and nucleic acids.

silver ion action: Silver ions act as a catalyst and complete bactericidal action by inactivating pathogens by inhibiting protein synthesis while ensuring prolongation of biocidal activity over time, avoiding proliferation.

Silver ions generate:

- an inversion of polarity of membrane resulting in alteration;
- an inhibition of protein synthesis.

SANISIM-SANISIM SOLUTION combined system is:

✓ SANISIM is device CE marked, a fully programmable device that delivers in environment from 3 (preventive) to 6 (complete) ml/m3 (with possibility to modifying these values to adapt to more resistant bacteria), through particle nebulization with a diameter of between 6 µm and 9 µm in average Gauss. Application is integrated into an electronic control system and features include volume control used and residual product of disinfectant. System implements automatic and permanent data recording. User has possibility to extract, with the help PC all recorded data and print them;

✓ SANISIM Solution Sanitizing Liquid, a sanitizing solution composed of hydrogen peroxide in concentration of <6% and silver ions. During dispensing, SANISIM SOLUTION is transformed into a dry mist consisting of billions of droplets filled with hydrogen peroxide molecules and silver positive ions distributed evenly over every cm3 of the environment;

SANISIM *in action with the disinfectant product spray mist*

SANISIM device is a fully programmable device. The application is integrated into an electronic control system and features include control of environmental volume to be treated and the residue of the sanitizing product in the tank.

Types of sanitizing treatment with the SANISIM process:

- ✓ COMPLETE nebulization with a concentration of 6 ml/m3 (if necessary it's programmable)
- ✓ Sanitization of MAINTENANCE spraying with a concentration of 3 ml/m3 (if necessary it's programmable)

The parameters to be recorded for each room to be disinfected are:

- ✓ Level of disinfection;
- ✓ Amount of product to be sprayed;
- ✓ Time required for the operation;
- ✓ Volume of the room;
- ✓ Date of the operation;
- ✓ Place and other useful data.

Has security features that are obtained by typing on touch screen, before disinfection, data input about disinfectant product parameters and then recording LOT data into device, thus ensuring traceability of product used.

A set of sensors, connected to control system, allows the user to measure and adapt dry cloud output stream and compare it with a built-in calculation program with predefined fixed parameters that have been set. This system allows tool to automatically disable device if amount of product in relation a number cycles performed is no longer sufficient for further disinfection, requiring operator to fill other product of same code and equal to chemical composition.

SANSIM system has ability to be remotely controlled via a Wi-Fi connection directly to a PC with a wireless card. Just launch a web browser with updated JAVA software and you will be able to enter the data you need to print a final sanitization report.

4.1.1 SANISIM Features

Device is fully programmable to satisfy all disinfection needs and is equipped with an easy-to-use electronic control system.

- ✓ Control amount of product in internal tank.
- ✓ Control during of spraying to level and volume of room setted.
- ✓ Check amount of product to be used according to volume and level setted.
- ✓ Automatic registration of all parameters work.
- ✓ Extraction of processing parameters made through data socket for connection to a PC and then printing all the information.

The electronic system provided ability to device to implements and store other safety and traceability parameters such as:

- ✓ Date and time,
- ✓ Indication of body where disinfection is performed,
- ✓ Name of Department,
- ✓ Indication of Room,
- ✓ Name of product used,
- ✓ Lot number of product used,
- ✓ Expiry of product used,
- ✓ Name of technician who starts disinfection,
- ✓ Body/company to which technician belongs,
- ✓ Name of department responsible for disinfection.

In addition, device can self-calibrate for quantity of product to be sprayed according to predetermined parameters and according to different volumes.

4.1.2 Procedure for a disinfection cycle.

- ✓ Turning on device.
- ✓ Waiting for automatic software appear on touch screen.
- ✓ Setting parameters.
- ✓ Product level control according to parameters entered.
- ✓ Add any product, through dedicated orifice, to same lot number as that in internal tank.
- ✓ Activating system.
- ✓ Wait 20 sec (programmable) to live the room.
- ✓ Spraying starts.
- ✓ Spray according to time set by previously entered parameters.
- ✓ End spraying.
- ✓ Automatic reset of device to initial conditions.

All cycle is possible control from outside room by a PC connected to the Wi-Fi generated by SANISIM

4.1.3 Maintenance:

Maintenance simply provides:

- ✓ Accurate external cleaning of device with a wet cloth, if necessary use a common non-aggressive neutral detergent before and after each activity;
- ✓ Exhaust condensation discharged during process by operating valve on bottom of device.
- ✓ In case of anomalies in operation, contact manufacturer.

4.2 SANISIM FIXED

For environments where preventive activity must be carried out very frequently, our Group offers remote monitoring systems that automatically, traceable and equally safe. These systems are programmable and can be activated automatically or manually with the intervention of a licensed and authorized subject.

4.3 CLOSET SANISIM

CLOST SANISIM sanitizer consists of a device made of stainless steel which encloses inside various parts or components.

Proposed system was primarily designed to sanitize pulmonary ventilators and C.P.A.P. (Continue Pressure Air Positive) inside a 1600X500x2000mm stainless steel cabinet with 3 or 5 internal nebulizes.

Inside each floor, a hydrogen peroxide-based sanitizing product is sprayed to completely break down entire bacterial charge inside devices.

On front 600X500X2000 mm compartment there is a user interface (touch screen monitor), while SANISIM SOLUTION bottle solution is positioned inside, on side there is an attack for external compressed air supply while in 1000X500X2000 mm compartment there are also disposable nebulizers called FOGGER, for dispensing disinfectant solution and power supply sockets. Connecting to machine features also via Wi-Fi by connecting directly to Wi-Fi self-generated from device.

nebulizer

4.4 SANISIMini

For smaller environments where preventive activity should be carried out frequently and in small spaces, our Group proposes small mobile installations that guarantee this process automatically, traceable and equally safe. These systems are programmable and can be activated manually with and licensed and authorized user. SANISIMini is a device that allows to significantly reduce biological contamination of objects and surfaces, even unavailable, through a spraying process of disinfectant products distributed in a homogeneous manner in the sanitizing environment.

SANISIMini is smallest device, suitable for small environments, particularly for white rooms, for laminar flow hoods, for small laboratories, hotel rooms, etc. Among main features we can point to:

- ✓ Spray system consisting of 2 nebulizers (also called vaporizer, atomiser, spry or foggier) capable of dispensing about 22 ml/min of SANISIM SOLUTION;
- ✓ Example of Diffusion time for complete sanitation in environment of 30 m3 volume in 8 minutes. With this time is guaranteed 6 ml/m3 and 180 ml of solution delivered;
- ✓ Weight that allows easy travel with small trolley;
- ✓ SANISIM SOLUTION bottle capacity of 1 liter, capable of sanitizing up to 160 m3 volume;
- ✓ Compressed air is produced by compressor, or powered by an external fixed system;
- ✓ Complete software for
    - o Enter customer / department / room data;
    - o Insert no. lot SANISIM SOLUTION;
    - o Activity data entry;
    - o Possibility to retrieve historical data of individual activities
    - o Checking benefits provided;
- ✓ Safety for operators, visitors, environments, furnishings and devices in the environment.

SANISIMini Sanitizer is a device made of stainless steel that encloses various parts or components inside it. On top there is a user interface (Display Programming Touch Screen for environments up to 160m3), a transport handle, frontally consists of housing for placing a bottle of disinfectant solution (SANISIM SOLUTION) and one or two nebulizers also called FOGGER depending on from model, dispensing disinfectant solution in environments concerned. On rear are disposed power supply sockets, on/off switch, external compressed air supply. The device can operate autonomously with compressed air generated by an

appropriately dimensioned internal compressor and with technical air receiving from the outside with a minimum pressure of 4 bar, through the dedicated back socket.

SANSIMini also has the ability to be remotely controlled via a Wi-Fi connection directly to a PC with a wireless card. Just launch a web browser with updated JAVA software and you will be able to enter data you need to print a final sanitization report.

5. Example of performance of disinfection process

Sample before treatment

Sample after treatment

Coliforms

Sample before treatment

Sample after treatment

Yeast/mold

6. Example of use frequency

Following pages show a proposal for use of product for sanitation of various hospital areas divided into three sectors (and others under sectors) according to infectious risk: HIGH - MEDIUM - LOW.

Proper use of SANISIM Solution disinfectant product can significantly prevent onset and spread of nosocomial infections that represent a true health emergency (given the high morbidity and mortality rate) and an additional economic commitment for day-care and diagnostic and therapeutic interventions necessary to tackle it.

Health facilities are most exposed to risk of cross-infection because of conditions that favour proliferation and diffusion of often multi-resistant pathogenic microorganisms.

SANISIM Solution can be used for any kind of disinfection and sterilization as it is very effective on all pathogenic germs, even most resistant ones and their spores; it is safe both during use for operators and for end users leaving no residue.

7. Frequency of treatments in individual nosocomial environments

1 - HIGH RISK AREAS	
Description Environment	Recommended frequency
Operator Blocks	
Operator Rooms * and Salt Departures	daily
Preparation and awakening **	daily
Rooms adjacent to the Operations Hall	every other day
Locali attigui alle Sape Parto	every other day
Hospital stay Areas:	
U.O. Infectious diseases**	weekly
U.O. Pneumology **	weekly
DEA (Emergency room) **	every other day
Hemodialysis Room	every other day
Resuscitation / hemodynamic **	weekly
U.T.I.C. ** - Intensive Therapy - Resuscitation - Hemodynamics	weekly
NEST **	weekly
Service areas	
High risk surgeries ** (endoscopy, dentistry, septic surgery and outpatient)	daily
Veterinary operating room **	daily
Laboratory analysis **	every two weeks
Transfusion center **	daily
Corridor at risk	weekly
Locale decontaminazione strumenti** ***	daily
Local preparation drugs / galenic **	every other day

2 – MEDIUM RISK AREAS	
Description Environment	Recommended frequency
Areas of hospitalization and toilet	
Inpatient room °	every two weeks
Corridor in hospital	every two weeks
Medical center's Department **	daily
Room waste	weekly
Department kitchen	every two weeks
Dining room	every two weeks
Inpatient toilets °	weekly
Other departmental toilets	weekly
Deposit for dirty sheets, pillowcases, gowns etc.	weekly
Other departmental rooms (studies, local nurse, etc.)	every two weeks
Outpatient areas and services	
Surgeries	every other day
Medicaments of the clinics **	daily
Local rehabilitation / physiotherapy	every two weeks
Gym	monthly
Radiology	weekly
Morgue	every two weeks
Autopsy Room °° **	weekly
Plaster room	every two weeks
2.3 - Kitchen area	
Canteen	every two weeks
Central Kitchen	every two weeks
2 – LOW RISK AREAS	
Description Environment	Recommended frequency
3.1 - Common areas of high and frequent travel	
Common parts (Corridors, atriums,waits, decommitments, stairs ... .etc)	monthly
Elevators	every two weeks
Church	monthly
Receptions	monthly
3.2 - Administrative and service areas	
Classrooms	occasional
Library	occasional
Meeting room	occasional
Depot medication and principals	monthly
cloakroom	occasional
Locker rooms	every two weeks
Medical Study	every two weeks
Administrative office	occasional
Archive °°°	occasional
Garage	occasional
General warehouse	occasional
Scrap deposit	occasional
Officine	occasional
Utility room	occasional

Obviously, for specific needs, extraordinary sanitization can be applied in any area at discretion of Health Department.

A 30 min contact time is sufficient for sanitation of rooms. for sterilization leave to act 45 - 60 min.

good Company

一个好的公司

有任何问题请联系

Dr. Venanzio Bielli 比埃里 维南兹奥

的总统

E2S3 Srl

+39.329-4527646

venanzio.bielli@e2s3.it

Skype vb_e2s3

LinkedIn https://www.linkedin.com/in/venanzio-bielli-336b9830

WeChat vbielli-e2s3

WhatsApp +39.329.4527646

意大利总部

E2S3 Srl

通过 Volta n° 3

20028 莱尼亚诺（米兰）

意大利

快来了

E2S3 LTD

伦敦

英国

中国分公司

E2S3 co, Ltd

大连市中山区友好路 227 号悦泰城里 412，

Ms 孙妍丽 Sun YanLi +86139.42853997

1959824930@qq.com