AQUAOX™

Infection

CONTROL SYSTEMS

WELCOME TO THE NEXT GENERATION OF INFECTION CONTROL

AQUAOX is a Cleantech Process Engineering company specializing in the development and use of Electro-Chemically Activated fluids. Our proprietary Infection Control System for Healthcare facilities effectively and efficiently cleans and disinfects surfaces with EPA-registered, non-toxic, biodegradable, safe to use, fast-acting solutions utilizing smart applicators to reduce labor and human error.

OUR MISSION:

AQUAOX believes in challenging the status quo on cleaning, sanitizing and disinfecting facilities by generating on-site, remotely monitored, stabilized, and environmentally responsible solutions and applying them using proprietary techniques to safely and efficiently sterilize entire rooms – including floors, walls, drapes, mattresses, chairs and other surfaces.

17355, Hamlin BLVD, Loxahatchee, FL 33470, USA.
www.aquaox.com | +1 (800) 790.7520

AQUAOX™

Our Vision

No other issue is as important or personal as good health. Clean, safe, healthy environments are essential to the health & safety of patients, guests, workers, employees “living” in enclosed environments such as hospitals, schools, hotels and offices. The market requires a more proactive, cost effective, balanced solution whereby human error is reduced and delivery mechanisms optimized. Our engineered systems and solutions dramatically improves cleanliness, reduces infections, increases safety and is environmentally sustainable.

Our Markets

Aquaox optimizes cleaning and disinfection practices through a portfolio of sustainable fluids and hygiene technologies over an extensive range of environments.

- Building & Facilities
- Food & Beverage Processing
- Industrial
- Food Service
- Retail
- Dental
- Healthcare
- Manufacturing
- Transportation
- Hospitality
- Medical
- Veterinary

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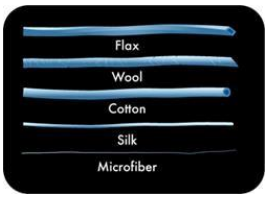
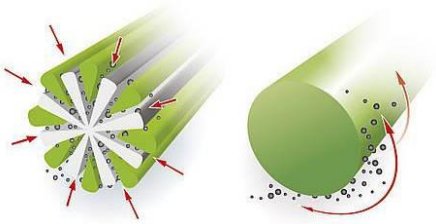
ICS-Greenspeed Microfiber

Microfiber consists of very fine threads of polyester and polyamide (nylon) that combine to form a single thread. Microfibers are so thin (100 times thinner than a single strand of human hair) that when they are woven together they create a surface area 40 times greater that a regular fiber.





The ICS Greenspeed® microfiber is split so that an elaborate system of hollow tubes is created. These hollow tubes have two major advantages:

- When the product is wet, the water attracts dust and dirt into the hollow tubes.
- High absorbency capacity.

A damp Greenspeed® product removes attached dirt quickly and effectively, leaving no soap residue. Dry, the Greenspeed® products are ideal for use as a dust remover. The microfiber is naturally, positive-static charged, and thus able to remove and hold dust and light contamination.

- Can be laundered a minimal 500 times
- Thicker material while light in weight
- Unique pattern enables effective removal of dirt

May, 2012 Greenspeed was awarded a Nordic Ecolabel license. The Nordic Ecolabel means that the products meet the stringent environmental, quality and health requirements of the Nordic Ecolabelling Programme enables.

This guarantees an ecologically responsible production of cradle-to- grave, the highest product quality and functionality guaranteed in practice. Even the packaging is taken into account, with a low burden on the environment. In short, a clean environment, a perfect cleaning result and a proven longevity.

NORDIC ECOLABEL
383 019

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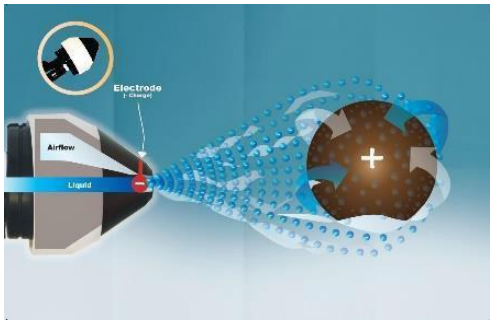
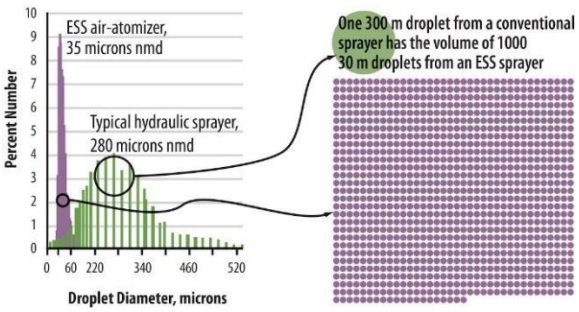
Air-Assisted Electrostatic Sprayer

Spray-n-Wipe protocols fall short of achieving the designed effectiveness of most disinfectants.

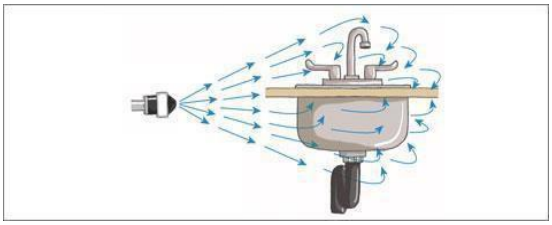
The AQUAOX Infection Control System utilizes an Air-Assisted Electrostatic Spray system to apply its EPA-registered AX275 and AX525 disinfecting solutions to quickly decontaminate and disinfect large areas, difficult to reach spaces and high-traffic areas that require frequent treatment.





Electrostatic spraying provides superior spray coverage by more effectively dispensing solutions than conventional sprayers. Tests have demonstrated up to 10 times better coverage resulting in reduced manpower costs and reducing the threat of disease-causing microorganisms.

The AQUAOX ICS air-assisted electrostatic sprayer produces highly charged spray droplets using a unique embedded induction electrode design.



This induction charging results in spray droplets that have a force of attraction of 75 times that of gravity. This means droplets will reverse direction and move upwards, against gravity, to coat hidden surfaces, and wrap around objects resulting in complete, even coverage of the target.

HYPOCHLOROUS EFFICACY

The Aquaox Advantage

HYPOCHLOROUS EFFICACY

Chlorine is one of the most commonly used disinfectants for water disinfection. It is used to deactivate most microorganisms and it is relatively inexpensive. Chlorine is commercially available as gaseous chlorine (CL2) and sodium hypochlorite (NaOCL) is commercially available in liquid or powder. Both chlorine (CL2) and sodium hypochlorite (NaOCL) have very limited disinfecting properties, but the formation of chlorine by-products such as hypochlorous acid (HOCL), hypochlorite ion (OCL-), hydrochloric acid (HCL) and oxygen atom exhibit strong disinfecting properties.

Hypochlorous Acid

Hypochlorous Acid
When gaseous chlorine (CL2) is added to water (H2O) the following hydrolysis reaction takes place:
Cl2 + H2O = H+ + Cl- + HOCl.

Sodium Hypochlorite

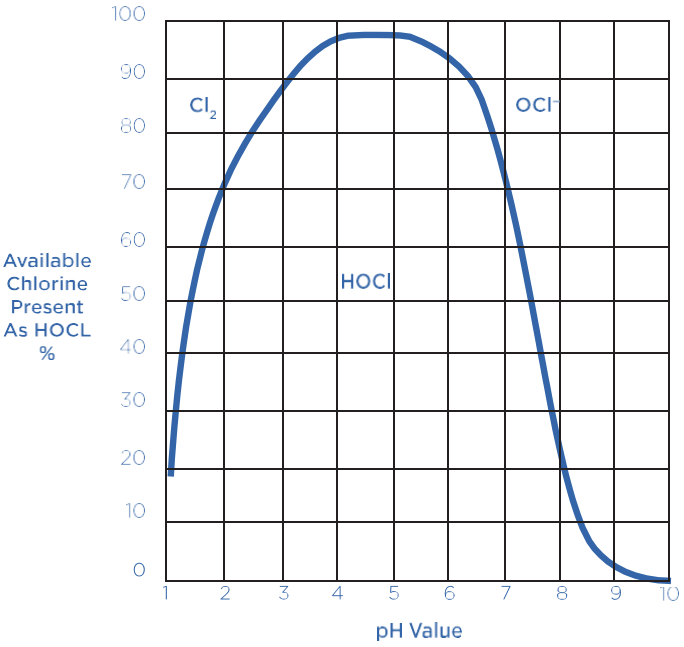
Sodium hypochlorite is better known as bleach (NaOCL) and it cannot be combined with acids. When (NaOCL) comes in contact with acids the hypochlorite becomes unstable, causing poisonous gaseous chlorine (CL2) to escape.
Sodium hypochlorite (NaOCL) is produced by adding gaseous chlorine (CL2) to caustic soda (NaOH). When this is done, sodium hypochlorite (NaOCL), water (H2O) and salt (NaCl) are produced according to the following reaction:
Cl2 + 2NaOH + → NaOCL + NaCl + H2O.

Hypochlorite Ion

Sodium hypochlorite (NaOCL) reacts with water (H2O) to form hypochlorous acid (HOCl) and hypochlorite ions (OCl-):
NaOCl + H2O → HOCl + OCl-.
Hypochlorite ion breaks down to chlorine and oxygen atoms:
OCl- -> Cl- + O
Depending on the pH value, the concentration of hypochlorous acid (HOCL) is related to the concentration of hypochlorite ions (OCL-):
HOCl + H2O -> H3O+ + OCl-

Disinfection Efficacy is Determined by the pH.

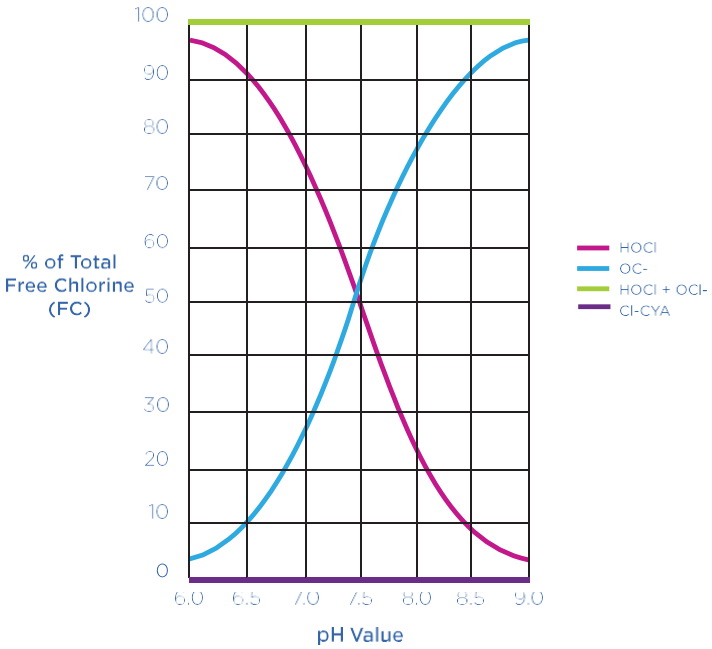
Disinfection will take place ideally when the pH is between 5 and 7, as then an optimal level of hypochlorous acid (HOCL) is present.



The maximum level of hypochlorous acid (HOCL) is between 4 to 5.5 pH. Hypochlorous acid (HOCL) decreases when the pH is below 4 and above 5.5

Free Available Chlorine

Free Available Chlorine (FAC) is chlorine that is present in the form of hypochlorous Acid (HOCL), hypochlorite ions (OCl-) or as dissolved elemental chlorine. FAC includes all chlorine species that are not combined with ammonia (or other nitrogenous compounds) to form chloramines. It is 'free' in the sense that it has not yet reacted with anything, and "available" in the sense that it can and will react if needed.



A pH value of 6 to 7 is the most effective and the safest pH-range, due to absence of chlorine gas. Therefore when Free Available Chlorine (FAC) is mentioned, it is assumed that Free Available Chlorine (FAC) solely consists of hypochlorous acid (HOCL) and hypochlorite ion (OCL-)

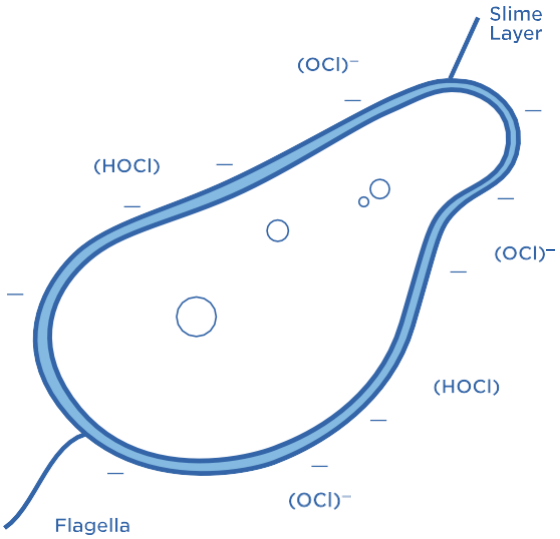
Free Available Chlorine compounds with regard to pH. Hypochlorous acid (pink) and hypochlorite ion (blue).

Superiority of Hypochlorous Acid (HOCL) Compared to Hypochlorite Ion (OCL-)

Hypochlorous acid (HOCL) is 80-100 times more effective and kills microorganisms faster than hypochlorite ions (OCl-).

Hypochlorous acid (HOCl) which is electrically neutral and hypochlorite ions (OCl-) which is electrically negative will form Free Available Chlorine (FAC). This results in disinfection, but both substances have very distinct behaviors.

The cell wall of a pathogenic microorganisms is negatively charged by nature. The negative charge of the hypochlorite ion (OCL –) will be repulsed by the negative charge of the pathogenic microorganism cell wall making it a weak disinfectant. The neutral hypochlorous acid (HOCL) molecule can penetrate the cell wall of the pathogenic microorganism very easily, thus making it a very effective disinfectant.
Hypochlorous acid (HOCL) can also penetrate slime layers, cell walls and protective layers of microorganisms and effectively kills pathogens as a result. The microorganisms will either die or suffer from reproductive failures.



The pH neutral hypochlorous acid (HOCL) can penetrate cell walls of pathogenic microorganisms whereas the negatively charged hypochlorite ion (OCL-) cannot penetrate cell walls.

Besides the neutrality of hypochlorous acid (HOCL), it is also a much more reactive and stronger disinfectant than hypochlorite ion (OCL-), as hypochlorous acid (HOCL) is split into hydrochloric acid (HCl) oxygen atom which in itself is a powerful disinfectant.

Hypochlorous Acid (HOCL) Guarantees Optimal Disinfecting

The disinfecting properties of chlorine (CL2) in water (H2O) are based on the formation and oxidizing power of oxygen and hypochlorous acid (HOCL). These conditions occur when the pH is between 6 and 7.

Hypochlorous acid (HOCL) produced onsite from the AQUAOX™ EAS-330-V1.1 and EAS-330-V3.2 systems has a pH of 6.5. At this pH, more than 90% of the Free Available Chlorine (FAC) is hypochlorous acid (HOCL), less than 10% hypochlorite ion (OCL-) and no chlorine (CL2) are formed.

COMPARISON TO BLEACH

AQUAOX™ Disinfectant 275 < compared to > Commercially available bleach

The strength of Free Available Chlorine (FAC) in “Disinfectant 275” is pre-set to 275 ppm FAC. In order to make a solution with 275 ppm FAC from commercially available bleach (NaOCL), it must be diluted in water (H2O). But, the problem with diluting bleach in water is twofold.
The volume to dilute bleach is very small. The fact that water has naturally different pH levels can cause the addition of the same volume of bleach to have a different pH which in turn will affect the concentration properties of the hypochlorous acid (HOCL). So, although bleach can be diluted to a 275 ppm FAC level, the pH of the mixture and consequently the amount of active compounds of hypochlorous acid (HOCL) and hypochlorite ion (OCL-) may vary considerably.
Therefore, disinfecting properties using bleach vary whereas the disinfecting properties of hypochlorous acid (HOCL) are kept stable. As a result hypochlorous acid (HOCL) may exceed the disinfecting properties of bleach by **300** times.

Hypochlorous acid (HOCL) does not evaporate and does not cause severe corrosion like chlorine. Chlorine exposed in air can be very explosive and evaporation should be avoided. For this reason, the ideal pH is between 6 and 7, as no chlorine is present.

Safety
When producing hypochlorous acid (HOCL) by acidifying sodium hypochlorite (NaOCL), relatively high prices and the possibility of adverse reactions limit the use of weak organic acids; use of cheaper inorganic acids provokes gaseous chlorine discharge and a raise of toxicity level. Because of this, the method above is only used for water treatment, where residual chlorine concentration values do not exceed 0.5-5mg/l.

Dilution of gaseous chlorine in water (H2O) to produce hypochlorous acid (HOCL) demands special safety measures and is only used for disinfecting large volumes of water where active chlorine concentration is below 10-15mg/l. Companies that once manufactured gaseous chlorine have stopped production and moved exclusively to manufacturing sodium hypochlorite (NaOCL) because of safety considerations.

Sodium hypochlorite (NaOCL) solutions tend to have a high pH, but the AQUAOX™ Systems is a unique method of non-reagent synthesis of hypochlorous acid (HOCL) at a pH range of 6 to7.

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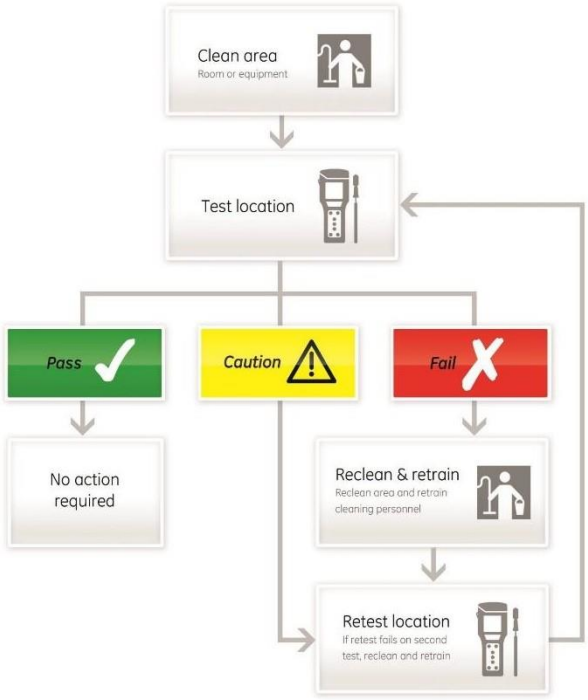
AQUAOX Infection CONTROL SYSTEMS

Evaluation of Aquaox ICS Environmental Cleaning & Disinfecting with ATP Testing

As part of a Level II environmental monitoring program, the Centers for Disease Control and Prevention (CDC) recommends monitoring cleaning thoroughness with an objective measurement tool, such as an ATP Cleaning Verification System.

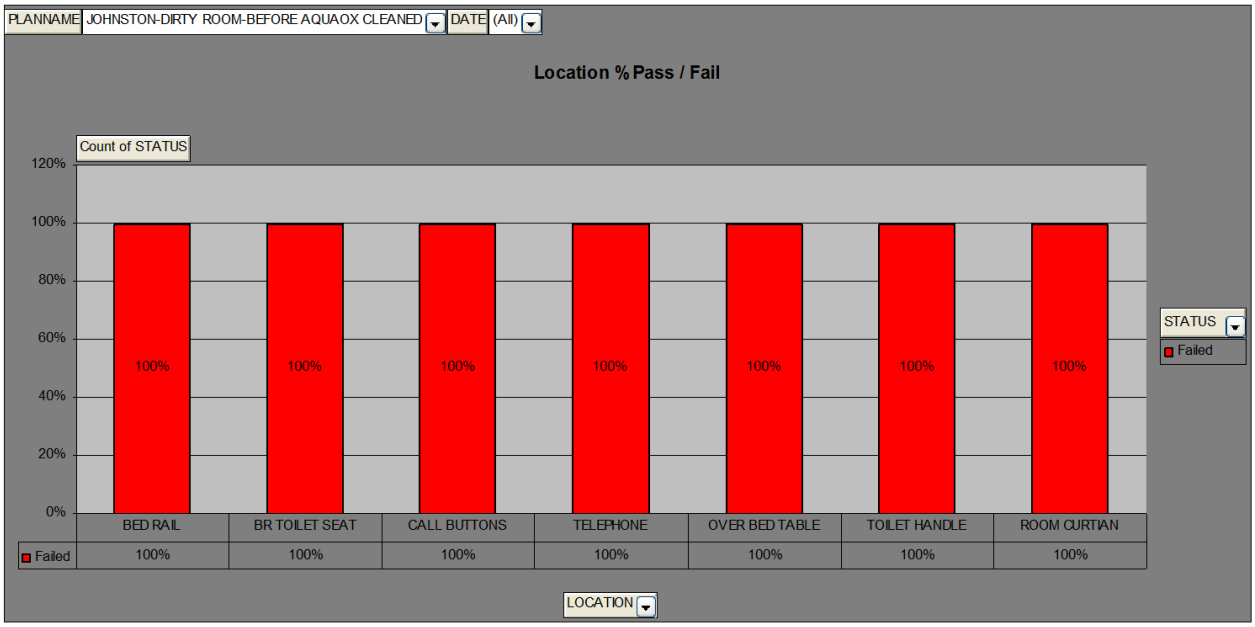


The ATP Cleaning Verification Tester is a handheld device that tests for contamination on surfaces. Unlike other types of tests, ATP tests do not look for a specific contaminant. They test for all kinds of contamination by identifying whether or not ATP is present.

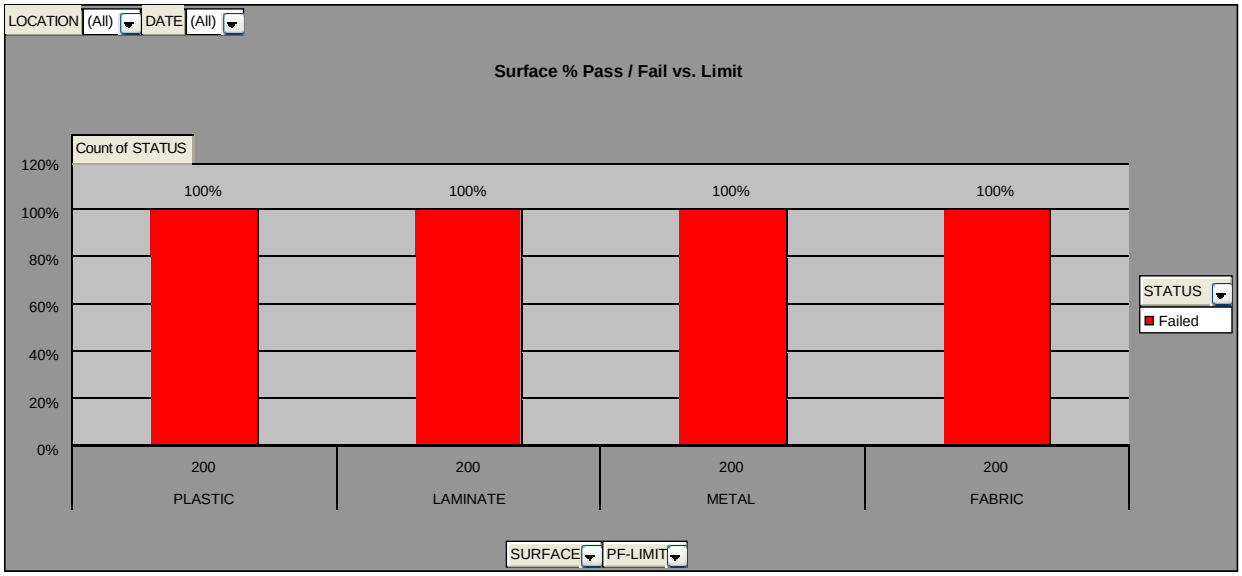
What is ATP? ATP Adenosine Triphosphate--is a molecule only found in and around living cells, making it a perfect indicator when trying to determine if a surface is clean or not. If ATP is present on a surface that has been cleaned, the surface is still contaminated.

The following Aquaox ICS efficacy study was conducted by one of the largest community healthcare facilities in North Carolina using ATP testing.

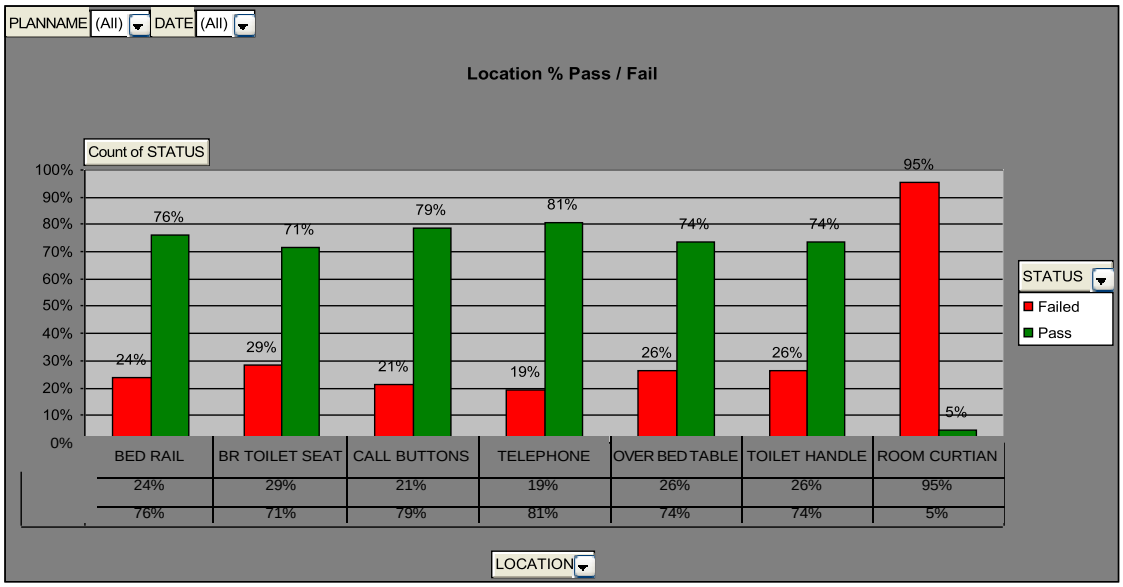
Check
Prior to Cleaning or Disinfecting



Check
Prior to Cleaning / Disinfecting



Check
Current Cleaning & Disinfecting Process



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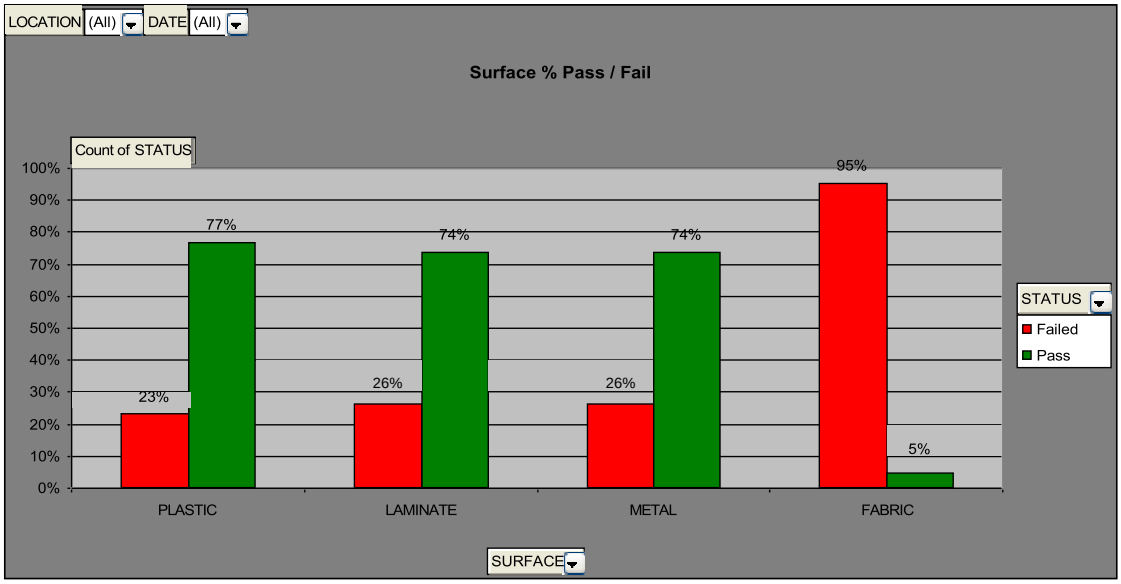
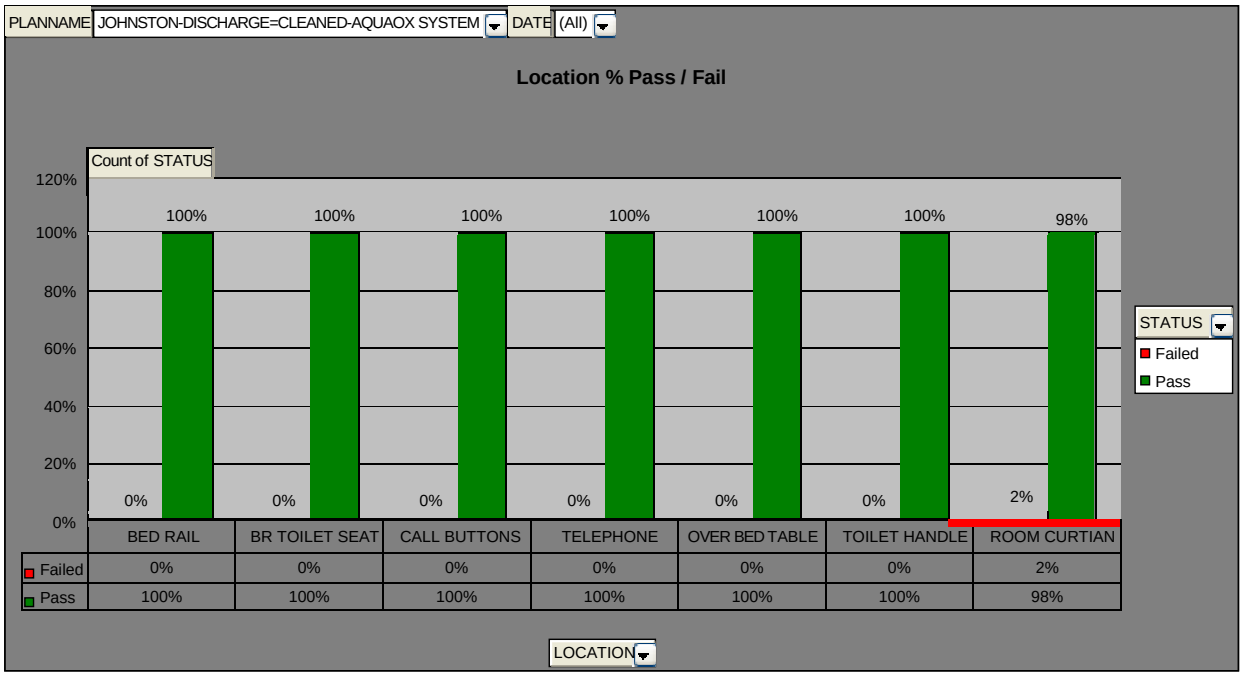
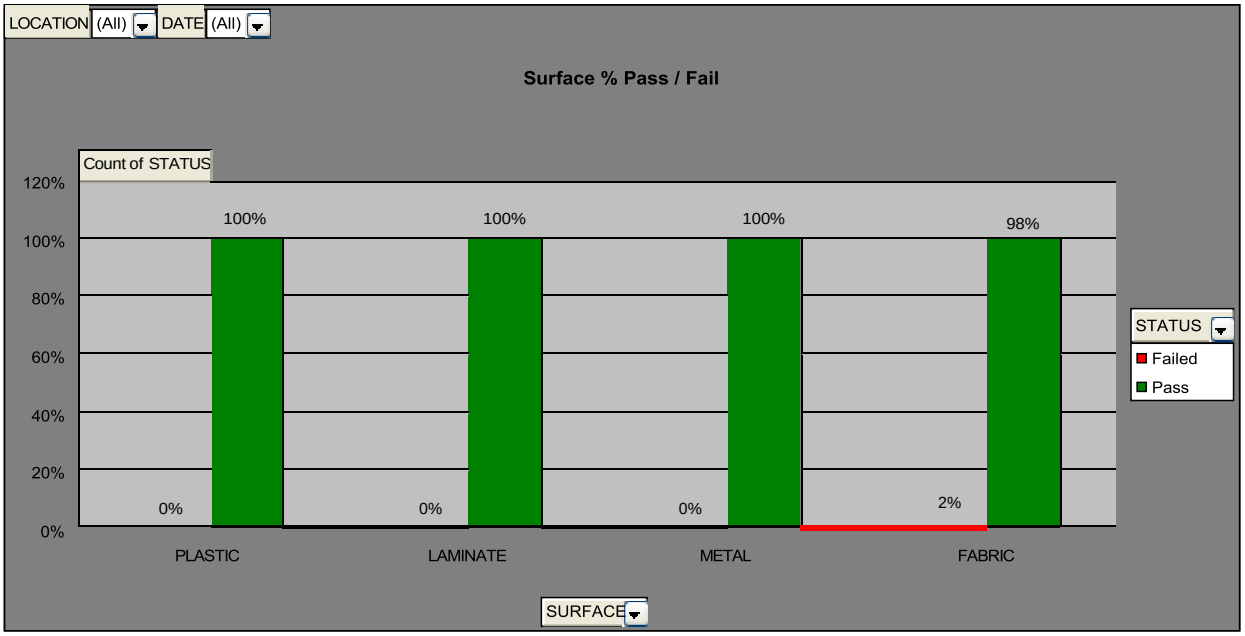


Check
Cleaning & Disinfecting with Aquaox ICS



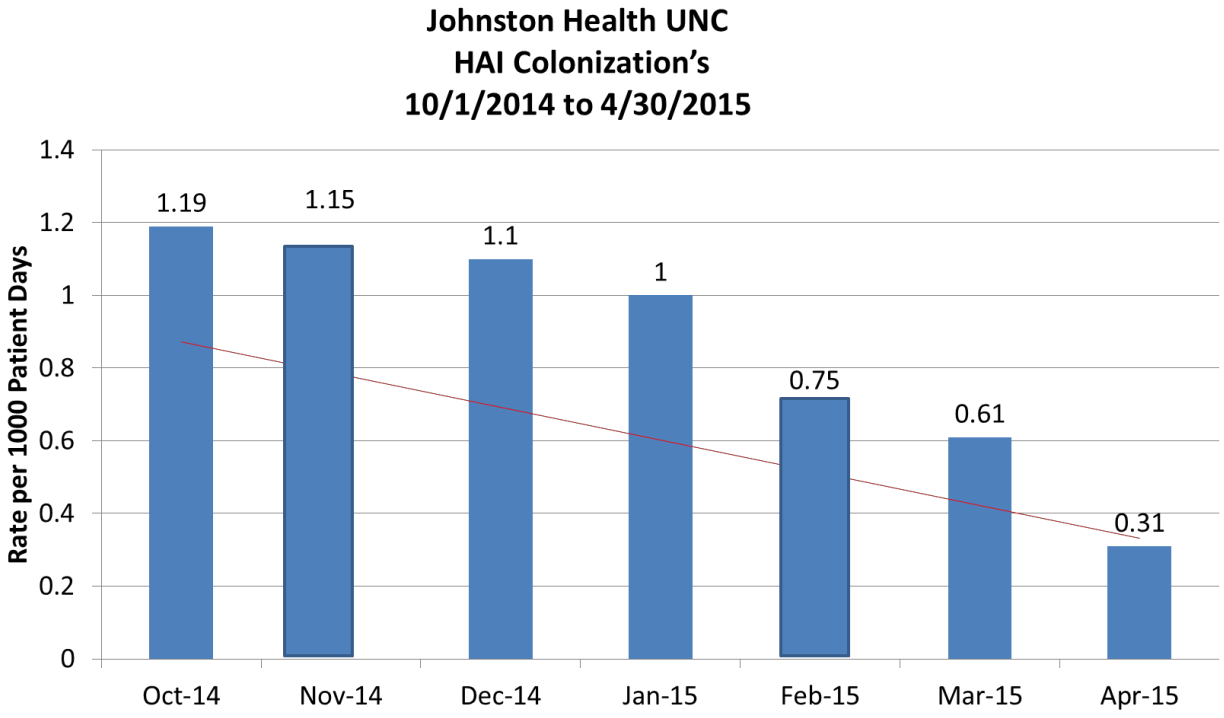
Check
Cleaning & Disinfecting with Aquaox ICS



AQUAOX Infection CONTROL SYSTEMS

June 1, 2015

The following are HAI Colonization Rates at Johnston Health UNC since implementing the AQUAOX ICS program. These numbers were achieved without Johnston adding any stewardship programs, or increasing any hand washing visual protocols.



I know now that this new Aquaox Infection Control System allows facilities to provide the very best possible method of cleaning and disinfection of environmental surfaces.

Ronnie Syverson BS, BSN, RN, CIC
Infection Preventionist
Johnston Health, UNC

JOHNSTON
UNC HEALTH CARE

August 14, 2014

To whom it may concern:

The Aquaox Infection Control System has been used in our hospital for over a year now. In order to validate its continued success for disinfection and to assess for any collateral effects, Darryl Patterson (Aquaox Rep) and I conducted an assessment of ten, clean, ready for admission patient rooms, to note these rooms had been cleaned using the AIC system. We collected 5 samples with ATP swabs in each room with focus on highly touched items. We established a pass/*failure value of 200 RLU (Relative Light Units). The results were as impressive as the initial results when starting to evaluate the AIC System more than a year ago.*

We had only one failure noted, yielding a 98% passing rate. The one failure was collected on the arm of chair that had actually gotten pushed behind the hanging curtain in the room. This chair was immediately cleaned and a new process for cleaning this particular room was quickly implemented in order to prevent similar results in the future. Upon investigation, this room was slightly different than the other rooms as it had a hanging patient lift over the bed requiring the curtain to be placed in a different position, compared to the other rooms. Also, it was worthy to note that the housekeeper had been summonsed out of the room several times during the cleaning process.

In addition to ATP monitoring, we also inspected the surfaces of the rooms for the presence of buildup or degradation of surfaces. There was no noted buildup of any kind nor were any of the surfaces noted to be degraded. The windows, mirrors and TV screens and monitors were clean, clear and without streaks or film. There was no discoloration of wall paint, curtains or upholstery.

Points of Importance:
98% Passing Rate for ATP Meter Testing
No Degradation of Environmental Surfaces
Room Appearance – Clean and Fresh

Sincerely,

Ronnie Syverson, RN, CIC

Ronnie Syverson, BS, BSN, RN, CIC
Infection Prevention Practitioner