

Disinfection for a Healthy Building

Effective Use of Quat Disinfectants

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The industry has moved away from cleaning (for the sake of aesthetics), to disinfection to help ensure a safe workplace. New COVID-19 standards include highly visible disinfection practices that help assure building occupants their workplace is a safe environment for them to return to - physically, emotionally and psychologically.

Effective disinfection is a science. This article reviews an often misunderstood subject, namely "Quat Binding." This is a unique characteristic in the application of Quaternary Ammonium Chloride compounds, the chemical most commonly referred to in the facilities maintenance industry as "Quat," and used widely as a disinfecting agent on high touch surfaces.

Quats are popular because of their effectiveness against germs: bacteria and viruses. Their relatively low toxicity at proper dilution, along with low cost, low odor and long shelf life, make them a popular product.

It is important therefore to ensure that Quats are used properly. If Quat Binding does occur, active ingredient concentration levels drop, resulting in a very ineffective product, with a cleaning outcome that does not disinfect.

What is Quat Binding and how does it happen?

Quat Binding is a process whereby the Quat chemistry binds or sticks to fabrics such as cotton cloths, terry cloths, towels, other natural materials and some microfiber cloths. The law of physics is at play where positive and negative attraction applies.

Binding occurs because the Quat molecule carries a positive charge and many fibers carry a negative charge. This traps 50% or more of the Quat on natural textile materials, resulting in a lower level of freely available disinfectant below the manufacturer tested level of efficacy.

Simply put, when binding occurs, a substantial portion of the active ingredient being applied to kill the germs does not end up on the surface intended to be disinfected.

We cannot visibly see Quat Binding, and untrained associates will continue their tasks unaware they have increased the risk of pathogen spread and pathogen resistance to disinfectant.

How to mitigate against Quat Binding.

1 Stop using cotton cloths, cotton mops or other natural fiber materials. *Even better, get rid of them.*

If you must use cotton, switch to an improved hydrogen peroxide or a sodium hypochlorite chemistry. EPA's *List N: Disinfectants for Use Against SARS-CoV-2* is a great source of information on US registered and approved disinfection products active against SARS-CoV-2, and when looked up by the EPA-registration the chemical category of the disinfectant is presented.

2 Use only microfiber or micro denier cloths, or disposable wipes manufactured and tested for use with Quats. Some microfiber cloths will bind like cotton cloths, some will have a delayed binding (if soaked over a period of time) and others will not bind. Much of this variability depends on the microfiber construction.

3 Check chemical dispensers. Rates of dilution can vary considerably when mixing. Facility water pressure can also impact the accuracy of concentration (Boyce 2016).

Carry out regular Quat testing using Quat test strips. Test kits are inexpensive and readily available.

If no concentrate dispensers are installed, we recommend buying Quats in ready-to-use containers.

4 If Quats are the most appropriate choice of disinfectant to be used, be sure to pick the right method of application.

a). **Direct Spray and Wipe** – this method reduces Quat Binding because the disinfectant is applied directly to the surface to be disinfected.

For proper disinfection (always after cleaning), staff should be trained to apply directly to high touch surface, ensuring spray droplets are above 100 micron* and allowing for dwell time, or wet contact time, as specified by disinfectant manufacturer.** Tested microfiber cloths should be used to spread the disinfectant.

b.) **Disposable Wipes** - Use EPA-approved, pre-wetted, disposable disinfectant wipes. These wipes, if using a Quat based chemistry, would have been determined to have no Quat Binding. If using a dry, wettable wipe (adding a diluted solution to a dry wipe), one must confirm that the wipe is made for disinfectants, as some dry wipes may bind Quats (Boyce 2016).

c). **Dip and Wipe** - a cloth is dipped in the disinfectant for a few seconds and then used. This method can reduce the Quat activity in both the disinfectant and on the cloth.

Some users may feel the need to add additional Quat concentrate to the mix to compensate for Quat Binding, however this is not recommended, as it infers that the user is a “chemist” and assumes responsibility for use off-label, this is a violation of FIFRA.***

Using your Quat test kit, test each method with your cloth to determine if there is instant Quat Binding, a slow, gradual binding of the Quat, or no Quat Binding for that method.

In Conclusion

When used correctly, Quats are an effective disinfectant for high touch surfaces in the workplace. They are environmentally safe, do not stain, have minimal odor and have relatively low toxicity at

proper dilution. Managers should ensure that their teams are properly trained on the approved methods of Quat application, along with regular Quat testing.

It goes without saying that cotton textiles should be eliminated and replaced with carefully tested microfiber textiles, or materials produced specifically for use with Quat disinfectants.

*Electrostatic sprayers are set between 40 and 80 micron. Only chemicals certified to be applied by electrostatic sprayer must be used.

**Dwell times vary by disinfectant. Manufacturer specifications must be understood and adhered to for effective disinfection.

***FIFRA: Federal Insecticide, Fungicide, and Rodenticide Act

References

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