

Superstorm Sandy: Frontline Advice

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Treatment for Mold

(Thanks to Elise Rousseau and her post to the CIPP list, David Goist, Mary-Lou Florian, Hilary Kaplan, Jane Bassett, Rustin Levinson and Marc Williams for their thoughts and contributions.)

Permission received by David Goist from Chris Stavroudis to edit the original document to distribute at the 2017 NCPC Annual Conference. Use at your own risk.

For surfaces that can be exposed to a small amount of bleach, eg., the reverse of paintings, stretchers, frames, etc.

47 ml 100% isopropanol
23 ml 100% ethanol
7 ml 3% hydrogen peroxide
23 ml distilled water

The same recipe can be made from materials available from any well stocked pharmacy as follows:

44 ml 91% isopropanol rubbing alcohol
30 ml 70% ethyl alcohol rubbing alcohol
7 ml 3% hydrogen peroxide
19 ml distilled water

I think this should be the go-to solution to use, along with HEPA vacuuming, unless you feel that exposure to 0.2% hydrogen peroxide is a risk to the artwork. Hopefully, as we gain experience with this formulation, we will get a better sense of under what circumstances it poses a risk to an artwork.

For surfaces that can be exposed to alcohol/water solutions but there are concerns about the bleach, use:

70% isopropanol
or
70% ethanol
or, to parallel the above recipe,
3 parts 70% isopropanol to 2 parts 70% ethanol

With any of these solutions, the surface must become wet -- only very slightly wet or well dampened -- but a mist that doesn't really touch the surface will not be effective.

Remember that these solutions should kill mold to which they are exposed. They are not 100% effective but seem to be the best that can be used around artwork. Multiple

applications are more effective than a single spray, so multiple applications interspersed with HEPA vacuuming will be most effective.

The dead mold still poses a health risk, so its removal by HEPA vacuuming remains critical. [Obviously, you must wait to vacuum until after the solution has evaporated completely.]

The general recommendation is to HEPA vacuum first, then spray, possibly multiple times, and then vacuum again. [My inclination would be to spray first, HEPA, spray, and HEPA again at a minimum.]

After spraying and vacuuming, soot sponges (eg., Absorene) and Groom/stick can be used to remove more difficult to get at mold residues. Remember that the sponges and Groom/stick will be contaminated with the fungal bodies and spores, so handle and dispose of them properly.

For non-art surfaces that are porous, or porous artwork that are not attacked by an oxidizing bleach, a much more aggressive solution can be made by substituting 30% hydrogen peroxide for the 3% in the above recipe. This gives a final concentration of 2.1% hydrogen peroxide.

The provenance of these recipes are:

The recommendation of 70% isopropanol or 70% ethanol is from Mary-Lou Florian. Higher and lower concentrations of alcohol are less effective than 70%. See her book **Fungal Facts: Solving fungal problems in heritage collections**. Archetype Publications: London. 2002.

The other recipe is a slightly modified version posted to the CIPPNEWS list by Elise Rousseau (Art Conservation de Rigueur et Anoxia Abatement Solutions, Conservator Textiles & Historic Objects, San Francisco) in late November in relation to Superstorm Sandy response. [My modification was to increase the total alcohol content in the solution she listed from 60% to 70% based on Mary-Lou Florian's research.]

Elise Rousseau's original post on the CIPPNEWS list was (slightly edited):

"Last year I participated in a course being offered by the Page and William Post-Graduate School at Mount Sinai School of Medicine in conjunction with the 6th International Scientific Conference on Bioaerosols, Fungi, Bacteria, Mycotoxins in Indoor & Outdoor Environments & Human Health. Nearly all of the current scientific and medical research shows that fungicides are ineffective in killing mold, or branching mycelium. It only appears to kill the mold topically, however, while the blooms may shrivel or be vacuumed from the surfaces, the mycelium branches are actually shocked into an accelerated reproduction phase. This is why when people use mildew stain removers or bleach in their showers at home--it returns two weeks later. Just as we have created super bacteria with

antibacterial soaps, and hand sanitizers, we have done the same with supposed anti-fungal agents. Please refrain from using Thymol, Dimethyl Ammonium Chloride, Borate, and bleach--and UV exposure is really only good for your own bed sheets.

"The solution I have found most effective in treating active mold growth is the same as what is now the accepted formula used in hospital surgical rooms that must be kept as close to sterile as is possible. After the initial hepa-vacuuming of all surfaces in a quarantined and isolated space... Of course it is not intended for painted surfaces, but this formula can be used on some non-colorfast textiles or other cellulose materials.

"recipe for pressurized air pump spray bottle: set spray volume to very small aerated mist, smooth into surface with a soft disposable brush.

3 oz. 91% isopropanol

2 oz. ethanol

0.5 oz. hydrogen peroxide (3% if bleaching is a consideration, 33% if deep wood penetration, unfinished, is the objective)

1.5 oz. distilled h2O

"After the surface has evaporated, repeat treatment, perhaps up to 3x. Once completely dry repeat Hepa-vacuuming, clean all of the vacuum tools with this solution, including the long hose which should also be flushed with very hot water, blow out with a hair dryer and flush again with pure 91% isopropyl alcohol."

[You will notice that the above recipe appears to be 70% alcohol, but it doesn't account for the water present in the isopropanol and ethanol. My assumption is that the hospital folk were shooting for 70% but got it wrong. Their formula is actually 60% alcohol. I would strongly recommend the 7% recipes above.]

The question of shellac for wood surfaces such as stretchers:

My further recommendation is to apply dilute shellac to non-art, wooden surfaces. (I have used commercial bleached shellac solution (Zinsser) cut 1:6 with denatured alcohol.)

The additional application of alcohol will help kill any mold (and certainly will not activate it as would a water-based sealant). The solution will penetrate relatively deep into the wood (as opposed to water-based materials or low polarity polymers in solvent solution).