

Chapter 32a. Microfiber Cleaning Cloths

Microfiber cleaning cloths are made of ultrafine fibers that are much smaller than found in typical fabric. They are a mixture of polyester and nylon. The microfibers used in cleaning cloths are further split to form bundles of fibrils which in cross section under a microscope look like miniature asterisks. The space between the fibrils in each fiber is small enough for mold spores and fungal fragments to be collected and held within the fiber bundles. Larger particles are collected much like conventional cleaning cloths and are held by the spaces between the fibers. What this means is that microfiber cleaning cloths provide much better cleaning and capturing of the small contamination particles present in moldy homes.

If you have ever baked cookies or a cake and have spilled some flour on the floor in your kitchen, you know that using a dry paper or cloth towel can only pick up a certain amount of the fine flour particles. Once the towel has reached its maximum capacity, it begins to push or smear the remaining flour around and leaves a residue of flour on the floor. Using a new paper towel can pick up some additional flour. Even so, if you rub your finger over the floor after cleaning up as much flour as you can with the dry paper towel you will find that the finely divided ridges and the pores of your skin do a better job collecting the really fine particles than the towel. This is partially due to a molecular force (Van der Waals force) between the surfaces. The flour sticks to the surface that is more finely divided. Since the ridges and pores of your skin are more finely divided than the texture of the paper towel, the Van der Waals forces exerted by your finger is able to pick up more flour. Gecko lizards and many insects have an even more very finely divided surface on their feet that has strong enough molecular forces to allow them to stick to and easily walk upside down on a sheet of glass. Microfiber cleaning cloth fibers are so finely divided that you can feel the clingy force when you rub it on your hand. The microscopic forces of the cleaning cloth are stronger than the forces that hold dirt and mold contaminants on the surfaces present in our homes. The microscopic mold spores and fungal fragments are attracted to the microfibers and transfer from the floor or item to the spaces between the fibrils on the microfiber cloth.

Chapter 32a. Microfiber Cleaning Cloths

Traditional mops or absorbent cleaning cloths are useful for soaking up and removing water spills, but they tend to spread spores and fungal fragments from one place to another by smearing them around. Microfiber mops and cleaning cloths are different. They do a great job of collecting and holding tiny particles. This makes the microfibers much more effective at cleaning up mold spores and fungal fragments.

Essentials

The "Essentials" - Information Boxes provide quick practical guidance for important information with a minimum amount of technical explanations.

Essentials - Cleaning with Microfiber Cleaning Cloths

Microfiber cleaning cloths do a great job cleaning up mold spores and fungal fragments from hard surfaces. The following tips will help you use them to clean effectively.

1. Chlorine bleach and acids like vinegar can damage the effectiveness of the microfibers fibers. Avoid using bleach and vinegar in the cleaning solution.
2. To help clean grease or oils from surfaces, moisten the microfiber cloths with soapy water. The microfiber cloths do a decent job picking up grease without wetting, but the small amount of soap or detergent makes them even better. Add approximately 3-5 drops of dish detergent to a quart of water
3. Using small amounts of soap in the water makes them better for cleaning mycotoxins as some mycotoxins are fat-soluble and are picked up with the oils.
4. Microfiber cleaning cloths are effectively used dry or damp. They should never be saturated with water. The excess water fills the fibril spaces making them unavailable for cleaning and holding particles. When saturated with water the microfiber cloth will still cleans but more like a cotton cleaning cloth without the additional special properties.
5. To use microfiber cloths damp, dip them in a bucket of water, squeeze out the excess water and start cleaning.
6. The wiped surface should be dry within a few seconds to minutes after cleaning.
7. If cleaning by hand the cloths can be folded into quarters. As each quarter of the cloth becomes dirty, flip or fold the cloth to use a clean side of the cloth. When you have used the front and back of all four quarters, switch to a clean cloth.
8. Some microfiber cloths have a grain. If you rub them with your hand, you will note that some directions feel like they are dragging against your skin. This is the most effective direction for picking up and holding the greatest amount of particulate. Directional microfiber cloths should always be used by wiping in a serpentine motion to retain more mold spores and fragments.

Chapter 32a. Microfiber Cleaning Cloths

Effective cleaning steps should be performed in order so each step prepares the surface for the next step. This not only makes cleaning more effective but quicker and easier.

1. Pick up any loose debris or large objects that might clog the vacuum cleaner.
2. Use cross ventilation to move particles that become airborne out of your home.
3. HEPA vacuum to remove the loose fine dust and dirt from the surfaces you are cleaning.
4. Use the finely divided fibrils and fibers in the microfiber cleaning cloth to break the Van der Waals forces and pick up the tiny particles.
5. Use a small amount of water to dampen, but not wet, the microfiber cloth. This helps clean by dissolving water-soluble dirt and mycotoxins. It is important to only dampen and not saturate the microfiber cloth so the water doesn't fill the spaces between the fibrils and leaves them available for holding the tiny particles.
6. Add 3-5 drops of soap or detergent per quart of water to dissolve and remove the fats, oils and grease that can absorb and hold fat-soluble mycotoxins.
7. Work carefully to prevent tracking dirt into the areas you have already cleaned.

Microfiber cleaning cloths are available in disposable and reusable forms. The disposables provide convenience and an assurance that the cloth is clean and ready to use. Disposable cloths help avoid cross contamination because they are used only once and thrown away.

The Pig Pen Effect

Cartoonist Charles M. Schultz's character Pig Pen illustrates the fact that each of us has a personal cloud of particles that tends to engulf us. As we move around, we tend to stir up settled particles that will surround us at higher concentrations than would be found at locations where we are not moving around. One important consideration when cleaning up mold is the sensitivity of the person doing the cleaning. Even when vacuuming with a HEPA type vacuum cleaner a higher amount of particles would be stirred up and released into the air at higher quantities than would otherwise be present. It is commonly reported by mold sensitive people that they get sicker when they clean their home. This can create a vicious cycle since a mold contaminated home that is not effectively cleaned will have higher quantities of contaminants remain.

Essentials - Reusable Microfiber Cleaning Cloths

Reusable microfiber cleaning cloths do a great job when they are new, but require more diligence to be able to be used effectively repeatedly. When properly laundered and handled, they can maintain their superior cleaning abilities for 100 to 500 washes.

1. A properly functioning microfiber cleaning cloth has a clingy feel when you rub it with your hand. By learning how reusable microfiber cloths feel when they are new, you will be able to judge when laundering a microfiber cleaning cloth is unable to return it to an acceptable condition for collecting small spores and fungal fragments.
2. Use a safe, non-toxic laundry detergent according to the label directions.
3. NEVER launder Microfiber cleaning cloths with chlorine bleach or acids like vinegar.
4. Only launder them together with other microfiber cloths. The lint from other types of cloth will clog the microfibers and reduce their cleaning ability.
5. Hot water is necessary for laundering microfiber cloths. Ideally, the wash temperature will be between 160 and 180°F (71 to 85°C).
6. Never boil microfiber cleaning cloths. If the temperature get above 200°F (93°C) the fibers will be damaged and be less effective.
7. Laundering microfiber cleaning cloths at the correct temperature allows the fibers to relax and release the dirt they have collected.
8. Air dry or machine dry on a cool setting. As they cool, the fibers regain their twisted form and regain their superior cleaning ability.
9. Never use fabric softeners or dryer sheets as these can coat the microfibers and make them less effective.
10. There is evidence that fibers from microfiber clothing and materials are being shed in the laundry and are not completely removed by wastewater treatment plants. These microfibers are believed to be traveling to oceans and waterways finding their way into fish and other water life. Reusable microfiber cleaning cloths are likely doing the same when they are laundered. This is an area where additional research needs to be done.
11. Disposable microfiber cloths create more trash for the landfill, but they don't shed fibers into our water ways during laundering or require the high temperatures needed for proper laundering. The extra space they take up in landfills is far less space than if hard surfaced personal possessions are discarded instead of cleaned.

Chapter 32a. Microfiber Cleaning Cloths

Guidelines for Laundering Reusable Microfiber sheets.

The company Microfiber Wholesale has published the following "Washing Microfiber Guidelines":

Operation	Time	Water Temperature	Water Level
Flush	2 minutes	120°F	High
Flush	2 minutes	140°F	High
Suds	25 minutes	160°F	Low
Rinse/Extract	3 minutes	140°F	High
Rinse/Extract	2 minutes	80°F	High
Rinse	2 minutes	80°F	High
Extract	6 minutes	---	

Unless you have a specialty commercial washing machine with a microfiber laundering setting and filters that collect the microfiber lint before discharging the water, it is probably more effective with less environmental impact to use the disposable microfiber wipes. Some specialty microfiber design shapes are also available for cleaning fan blades and venetian blinds. General-purpose microfiber dusters may be adapted for cleaning ductwork. These specialty microfiber cleaning methods will be discussed further in the chapters on cleaning personal possessions and heating ventilation and air conditioning systems.

Chapter 32a. Microfiber Cleaning Cloths

References

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- 2) *How to Wash Microfiber*, MicroFiber Wholesale - Knowledge Base, June 11, 2017, <http://www.microfiberwholesale.com/info/knowledgebase/washingmicrofiber/>

John Banta is a Certified Industrial Hygienist with approximately 30 years experience with healthy homes. He specializes in water damage and mold problems in buildings. John is a Coauthor for the book Prescriptions for a Healthy House: A Practical Guide for Architects, Builders and Homeowners.

This section on microfiber cleaning cloths has been excerpted from John's new book that focuses on mold problems in the home. The book's working title is "Mold Controlled, A Practical Guide to Find, Avoid, and Fix Problems in Water Damaged Buildings. The book is scheduled for Publication March 2019. If you don't want to wait for full publication John is making draft chapters available when they are ready - as perks for contributors to his crowd-funding campaign to conduct research to help answer additional questions about mold that still remain unclear.

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