If dehumidifiers need fans to mix the air in a room to dry the room, why don't remediation or asbestos abatement companies do the same for HEPA filtered air scrubbers?

I have started this discussion on another forum of contractors. Industrial hygienists are often times put in the position of project design or whatever terminology you want to use for removing airborne particles subject to diffusion with toxic or irritant effects. Remediation contractors are having a fit about fans even though they (insurance restoration companies) know they must use them to move aerodynamic water molecules in the air to find the dehumidifier. Let's hear from the professional crowd on this important topic.

12 days ago

Are you saying that the contractors are not professionals?

The S520 addresses this issue in Sections 12.1.2 Pressure Differentials, 12.1.3 Air Flow and Exchange Rates, and 12.1.4 Air Filtration Devices.

I have always believed strongly in the use of smoke testing the contained work area to identify the areas of air infiltration, direction of air flow in the work area, as well as identifying any uncirculated and stagnant areas. These areas are all important for the remediator to identify prior to beginning.

Once the air flow and negative air pressures are established the remediation and cleaning can begin.
I also want there to be “PM Settle Out” time between the physical cleaning steps or HEPA sandwich. HEPA vac, time for PM settle out, damp wipe, time for PM settle out, final HEPA vac, time for PM settle out. (PM particulate matter)

The air movement or flow, that Greg is speaking of, combined with the HEPA sandwich or the physical cleaning with time for settle out between each step is what I believe is the best approach I have used.

The current exception would be an ongoing study of an applied product to expedite the airborne PM from the air between the HEPA sandwich steps to make the clean up faster by reducing the “Settle Out” time between the HEPA sandwich steps. This is also being tested as a onetime application prior to any physical cleaning or HEPA sandwich steps.

Good negative air pressure, (to protect adjoining spaces), directional air flow (clean to dirty and out via HEPA), good physical cleaning practices (HEPA sandwich) may very well be improved by the quick removal of airborne PM from the air.

Just gotta wait for the final results.

12 days ago • Unlike • Like

Greg Weatherman • Contractors are contractors who contract, John. IHs, PEs and other consultants are generally held to be professionals. This is the reason they get "professional" insurance.

12 days ago • Unlike • Like

John P. Lapotaire, CIEC • Mold remediation contractors in Florida and several other states are State Licensed and Insured Professionals

12 days ago • Unlike • Like
Greg Weatherman • I would like to stay on point rather than argue semantics. This may encourage others to jump-in rather than fear another drive-by that obscures the discussion. I am keeping this brief since space looks better with substance.

11 days ago • Unlike • Like

Luke Garard • I believe that this is a bad analogy. Calling a water molecule aerodynamic is like calling a nitrogen molecule aerodynamic. What you are attempting to do is compare water vapor to particulate matter suspended in a gas. The comparison is not valid. The two constituents have differing properties. Additionally, a dehumidifier and an air filtration device (AFD) operate on different principles.

A dehumidifier uses a fan to move air across a cool coil to condense the water out of the air. The fan does not have to move water molecules around a room to accomplish this task. The partial pressure differences created will move water vapor without air currents present. This is the same principle that forces us to install vapor barriers in buildings at different locations depending upon where geographically the buildings are located.

An AFD uses mechanical filtration rather than condensation to remove particulate matter from the air stream. A good understanding of AFD principles can be gleaned from ACGIH's Industrial Ventilation. An AFD set to recirculate air is not an acceptable substitution to an AFD set to exhaust air creating a pressurization differential. The former is typically referred to as an "air scrubber" even though the amount of particulate matter moving through a recirculating AFD is substantially less than an AFD creating a negative pressure.

I still don't know what a HEPA sandwich is though...

10 days ago • Unlike • Like


A "HEPA sandwich" is an asbestos abatement term also used in mold remediation where surfaces are HEPA vacuumed, damp wiped and HEPA vacuumed again. My issue with HEPA vacuuming as the final step is based on the pull of the HEPA vacuum may not be sufficient for overcoming electrostatic energy or van der Waals forces but, mechanical or vibration forces may liberate those particles at a later date. That could be a totally separate discussion. It does explain the need for waiting to post test and using the total surface dust sample suggested by Phil Morey in the AIHA Green Book.

For the main point of this discussion, I will refer you to "Aerosol Technology" written by Professor William C Hinds. He is an AIHA Fellow and teaches at the Department of
Environmental Health Sciences, Center for Occupational and Environmental Health at UCLA. You can see his education and professional biography here:

http://portal.ctrl.ucla.edu/sph/institution/personnel?personnel_id=45441

I would also further point to the chapter concerning "Straight-Line Acceleration and Curvilinear Particle Motion". Specifically, look at "Section 5.4 Curvilinear Motion and Stokes Number" starting on page 119. The book will cost you about $100.00. It is priceless since math does not get muddied by committees which may have some members who just don't know critical facts. I'm not saying committees are bad. I'm saying committees make mistakes due to changing science or unforeseen information. This is why they all have legal disclaimers at the front of publications. This is the driving force to revise standards and guidelines. Word to the insurance underwriters.

I think many of us have seen the basement rooms where no air ducting was installed that had mold growing on surfaces when other rooms with ducting did not have mold growth. The mold growth was localized due to poor mixing of air. Joe Lstiburek, PhD Engineer, gave a presentation at the IAQA yearly meeting/expo and explained this problem in great detail.

The issue with "curvilinear motion" raises questions about mold remediation, asbestos abatement and doing health risk assessments based on air sampling. This is a solid reason for the high variability in spore trap air samples. This makes the number of sampling locations in a given room important. Can you imagine the affects on submicron particles that are not spherical in shape and more subject to diffusion than gravity? What happens on humid days with a low pressure weather system versus a dry day with a high pressure weather system? Are there localized humid areas in corners? This becomes very important for particles which can absorb moisture.

My simple mind just keep asking questions. The more I read, the more I question industry practices. IHs and PEs are often relied upon to write a scope of work. That is a huge liability burden much like an architect. Does crude testing data support risk assessments when there are physics principles proven with math formulas to argue those professional perceptions?

Thankfully, I did learn the term, epistemology, in my college philosophy class. I wonder what a materials scientist would say about common test methods to verify common air cleaning methods? My failure has been a great learning experience.

10 days ago • Unlike • Like

Caoimhín P. Connell • Good morning, Luke –

You probably aren’t familiar with Mr. Weatherman. In the same fashion that Mr. W. likes to cite authors and documents he has never read, he also likes to try and use words and phrases that he thinks sound “scientific” and will impart some degree of credibility. Unfortunately, Mr. W. rarely comprehends the underlying concepts of such words and phrases beyond the copy-and-paste function.
Which leads me to the Greg Weatherman “Gem-O-The-Day”

“Most viruses are measured in nanometers which means they are too small to be captured by HEPA filtration (sic).” – Greg Weatherman

The above not only underscores Mr. W lack of knowledge about airborne particles (and filtration) but is just one of an amazing multitude of comments which underscore Mr. W’s historical and complete lack of knowledge in this field (see http://www.forensic-applications.com/moulds/weathermanontween.pdf). That’s why when you attempt to answer one of his posts, it generally leads to confusion, and Mr. W will always entirely fail to provide clarification or straight answers, since he has invented his own meanings, and his own science using these words.

I hope that helps.

Cheers!

Caoimhin P. Connell
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AMDG

10 days ago

Greg Weatherman • Caoimhin,

A book is due to be released in a few weeks to rebut your "Gem-O-The-Day" citing physics research from 1957. Why don't you stay on point instead of your usual obfuscation of facts.

You are the shining example why Aristotle coined the term "logic" to counter "sophists" which became a root word for another word. You are really doing decent people a disservice to put it mildly. Argue the discussion, please!

10 days ago • Unlike • Like
Blaine Parry • "Remediation contractors are having a fit about fans even though they (insurance restoration companies) know they must use them to move aerodynamic water molecules in the air to find the dehumidifier. Let's hear from the professional crowd on this important topic."

Well Greg - I am a remediation contractor as well as work for a restoration company and I can say that I have never heard of any like me (Restoration contractor) having a fit about fans. Home owners use fans, we use air movers. Your analogy about moving aerodynamic water molecules in the air to find the dehumidifier is also a ridiculous theory. As a matter of fact, how many structures have you dried in your career and why do you continue to try and relate everything to HEPA filtering or clean rooms?

10 days ago • Unlike • Like

John P. Lapotaire, CIEC. • I was just curious Greg as to the training and/or certification you have in structural drying, mold remediation and asbestos abatement.

In structural drying the fans aren’t there to mix and move the air to the dehumidifier, although that does take place. The air mover’s primary use is to help extract the bound water from the building materials through evaporation. S500 Chapter 6 Psychrometry and the Science of Drying and S500 Chapter 7 Water Damage Restoration Drying Equipment and Tools.

9 days ago • Unlike • Like

Greg Weatherman • Avoiding the question with a red herring does not make the question go away. Let's stay on point. I will just say I think it is amazing people have been trained for "decades" to use fans to move moist air to dehumidifiers since "diffusion takes too long" but the think air scrubbers or negative air machines will magically do the trick alone.

Cleanrooms clean the air so surfaces can be cleaned. Cleanrooms also pay attention to basic physics principles. This effects anyone who write the scope of work for remediation plan. I heard the complaint I was using science beyond a remediator's level so I thought I would bring it here. I have given references for reason to question common industry methods. Argue the methods. I'm just the messenger.

9 days ago • Unlike • Like
Trey Manning • How can the air movers move the water molecules towards the Dehumidifier if they are all positioned around the room and possible one in the center pointing down on the floor?

They are there to accelerate the drying process.

I could see the potential for a fan inside the containment to circulate the air around the room towards the Air scrubber.

What are your thoughts on this John and Blaine?

9 days ago• Unlike• Like

Blaine Parry • Avoiding the question Greg? Your question is: "If dehumidifiers need fans to mix the air in a room to dry the room, why don't remediation or asbestos abatement companies do the same for HEPA filtered air scrubbers?"

I need you to explain to me Greg how dehumidifiers need the mixed air in order to dry a room. Are you saying a dehumidifier(s) in a room with no air movement will not dry? Would you also state that a room without a dehumidifier will not dry if only air movers (not fans) are used?

Honestly - even if you were able to "aim your air movers at a dehu", do you think this would be really beneficial to your drying strategy Greg? How much better would your dehumidifier perform if you aimed air at it? What about the other sides of the dehumidifier that do not have an intake area? Would we need four dehus in a room to collect the aerodynamic water from all sides? GOD FORBID you have a dehu with the intake on the top - you would need to set air movers suspended from the ceiling I suppose?

Airflow to corners is a valid observation - for sure. I do not argue about that or the fact that these areas can be easily overlooked. However, a HEPA vacuuming of all surfaces - as in the HEPA Sandwich analogy - will produce the same results, if not better, won't it?

I just don't get what you are trying to say Greg. You do have some good points within your cryptic posts but to be honest - most of what you say is not really practical or realistic.

Clean rooms - is that the goal we should all strive for when drying a structure or remediating a mold situation? Is it really practical to assume that this is even possible in a crawl space, commercial building or even a bedroom of a home?

The constant reference to a clean room or a person that MIGHT have a medical issue with mold is just not applicable in all situations yet you keep harping on this clean room thing as if we were going in to open heart surgery in the middle of a mold remediation... I just don't get you man...

Merry Christmas, Happy Holidays and Happy New Year to the rest of you folks - I hope you all have a great one!
Greg Weatherman • I think I have pointed to the issue of the unreliability of data for small particles if you don't test for small particles which means your remediation methods may not address small particles which means you may be making the situation worse not better. Please read the basis for nanomedicine and nanotoxicology. Cleanrooms control small airborne particles.

Fan and filter position are critical. It may take several passes to find the filter. It may take a long time but not as long as waiting for diffusion.

Approximately 25% of the population has the HLA-DR genotypes identified by Dr. Ritchie Shoemaker for sensitivity to mold from chronic water damaged materials. This does not include asthma, COPD or RADS. Whoever designs the remediation methods has the liability and/or name recognition in market. Bad remediation is not a good business card.

Read "Cleanroom Technology" by William Whyte at the University of Glasgow if you want to learn why turbulent air currents are not as effective as laminar air flow. You will also see another source for using anemometer to measure air current wind speed to find airborne contamination. Cleaning to temporary cleanroom levels is the only way you can be sure you have removed most of the elements creating health complaints. Surface cleaning will not address the issue until the air is clean.

I don't know if insurance carriers are going to pay to follow minimal equipment needs for known air cleaning techniques. That is a decision of anyone doing the remediation plan or following it. Lawyers don't care about insurance budgets or contractor/consultant excuses.

Greg Weatherman • Blaine:

Mechanical engineers design ducting and/or jump ducts with fans to move air since you will get pockets of moist air if you fail to move the air due to thermal gradients. A dehumidifier will work by itself after a really long time that may not prevent fungal growth by controlling water activity. Even the outdoor air is subject to the same behaviour since cold air masses colliding with warmer, humid air masses are the driving force behind rain and thunderstorms. (My last name is "Weatherman" by the strangest occurrence of luck.)

Fine (less than a micrometer) and ultrafine (less than 0.1 micrometer) particles have some similar characteristics that include the ability to stay airborne for long periods to time.
Joe Tudor, MPH, CIH, CSP • Okay - so I think I see what you are saying, Greg. Your premise is based on the idea that water vapor in the air acts (and is acted upon) in the same manner as fine/ultrafine/nano particles. Is that correct?

Greg Weatherman • Joe,

You are correct with my assumption microbial particles have a similar manner but with more tumbling action. This is a big deal for nanotechnology production that might leak. These articles can be downloaded free from American Society of Microbiology:

RL Gorny, University of Cincinnati:

http://aem.asm.org/content/68/7/3522.short

TL Basel, Texas Tech University:

http://aem.asm.org/content/71/1/114.abstract

Spore trap air samples will not show you this problem due to magnification sensitivity. It would take many air samples for analysis by electron microscopy methods to see it. You could take past pollution control knowledge and get a real picture without all the sampling.

This will also lead to why surface sampling is better if you can get a large enough sample not in a walkway.

Blaine Parry • Greg, will warm air hold more water than cold air?

Blaine Parry • Greg, will warm air hold more water than cold air?
Greg Weatherman • Yes. This is basic psychrometrics information. Does a 20 degree temperature differential matter if you have warm, moist air hitting a cool band board or rim joist in a basement?

Pollution is worse in Los Angeles than Seattle for a reason if you understand the philosophy of temperature and RH with airborne fine and ultra-fine particulates. Low RH or high temperatures make small particles stay suspended in the air longer. I think most mold negative air pressure containment meet these temperature and RH features. Maybe the industry way is actually making things worse. Physics is not a bad thing to pay attention. Actually, Arizona is a nightmare if you understand the associations. It also dries your upper respiratory system mucous membranes so particles do not get stuck like fly paper and pass right on through. That Mexican Swine flu was a real eye opener. The humid and mixed humid regions escaped the wrath of the swine flu for a reason based on simple rules of physics.

7 days ago • Unlike • Like

Blaine Parry • Greg, air does not hold water... THIS my friend is science. The junk science that says air holds water is exactly that - junk...

Low RH or high temperatures: What are you talking about? Which is it? Your way off base here man. Low RH or high temperatures are completely different...

To answer your question: "Does a 20 degree temperature differential matter if you have warm, moist air hitting a cool band board or rim joist in a basement?"

The number of 20 degrees has no bearing without other critical data to determine if 20 degrees differential is a potential threat. The warm moist air is not descriptive enough - How warm, how moist? Much missing from the scenario - more info needed in order to properly asses the potential dangers...It would depend on many things but the main thing would be dew point temperatures and the temperature of the cool surfaces. Fix the moisture problem that is creating the elevated humidity, remove the excess water vapor from the environment and raise the temperature of the cold materials so dew point is no longer an issue... exhaust and evaporate.

7 days ago • Unlike • Like
Caoimhín P. Connell • Good morning, Blaine –

The irony here is that your post has brought up an unexpected “Greg Weatherman Gem-O-the-Day.”

M. W loves to use phrases, the technical meanings of which are entirely unknown to him. His inability to properly answer your obvious trap in this thread not only, yet once again, demonstrates that Mr. W entirely lacks even the most rudimentary grasp of the subject matter at hand but also results in the unexpected “Gem-O-The-Day.”

For not only are you correct that air doesn’t “hold water” at any temperature, and Mr. W failed to correctly answer a question that was obviously designed to test his technical ability, but on July 19, 2005 he attempted to expound his superior (albeit completely wrong) knowledge on this subject and criticized legitimate experts in the field when he complained:

Greg Weatherman Gem-O-The-Day:
“i think the ideal gas law has applications that have been largely overlooked by microbiologists/mycologists/biochemists similar to the IH crowd overlooking building science.”

If Mr. W understood the Ideal Gas Law himself, he would not have fallen prey to your question.

Thanks for the fun and laughs – the more Mr. Weatherman speaks, the funnier and funnier he is. And think of all the future “Gems-O-The-Day” he is providing!

Cheers!

Caoimhín P. Connell
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AMDG

5 days ago

Trey Manning • New question that is somewhat related to the topic at hand.

Should Inspectors mix the air in a room with a fan prior to taking air samples?

5 days ago• Unlike• Like
Caoimhín P. Connell • Hello Trey –

I can’t think of any particular reason why one would be taking air samples.

If you are thinking of taking air samples for moulds, that practice would not be based on good science or standard industry practices. If one is following the recommendations of the US EPA, the US Centers for Disease Control the Health Departments of Colorado, New York, New Jersey, California, Illinois, Nevada, the National Institutes of Occupational Safety and Health, the World Health Organization, Health Canada, the AIHA and virtually every other authoritative organization, one would definitely NOT be collecting air samples.

For details, take a look at my sampling discussion here:

http://forensic-applications.com/moulds/sampling.html

and here

http://www.forensic-applications.com/moulds/mvue.html

If you want to be like Greg Weatherman, on the otherhand, then you would take air samples. If you had something else in mind, perhaps you could give some details.

Cheers!

Caoimhín P. Connell
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AMDG

5 days ago

Greg Weatherman • Caoimhin or Irish Kevin,
The trap is your usual game of arguing semantics. This time, you sent the material to Blaine so you could comment from the side. I will give you credit for devising complex chess games. However, you and Blaine have inadvertently shown why small airborne particles are important for the "solute" that adsorbs or absorbs (depending on particle composition) water vapors in the air of an environment. Thank you for arguing and agreeing at the same time.

The ideal gas law is a start added with Bernoulli's law of pressure which leads and engineer to see a negative air pressure containment along external walls can lead to trouble unless the duration is very short. I wonder how many spore trap results have detected elevated Penicillium/Aspergillus like organisms that originated around the lower corner of windows during long remediation with high outdoor RH?

My wording may be awkward at times but, I try to help industrial hygienists see another aspect. You say everything is fine which means you don't think industrial hygienists need to investigate. I will start another discussion about "negative air pressure containment failure" in your honor.

I see you have been on one of more AIHA Committees. I wonder what they would think about you calling the US EPA to complain to the superiors of Dr. H K (Ken) Hudnell, PhD Neurotoxicologist formerly at EPA RTP. It seems you did not like his ability to argue mold and toxicology on another public forum approximately a decade ago. You tried to impact his ability to hold a government research job. We can thank Dr. Hudnell for work ranging from beryllium to dry cleaning solvents to ciguatera seafood poisoning. It is interesting the largest complaints were centered on Dr. Hudnell's work with Dr. Ritchie Shoemaker. Apparently, you and others thought a government scientist working for the EPA could be made to stop working with a private MD during off hours at private expense.

I'm sure some of your colleagues with the AIHA might want to contact Dr. Hudnell for verification. Dr. Hudnell is actually cited for research for microbial toxicology material in the ACGIH book, "Bioaerosols: Assessment and Control" (1999). Dr. Hudnell is an actual "international expert" if you look at his research and chairing international conferences. Is this the kind of behaviour the AIHA wants their organization to be associated?

Do you have anything of substance to add?

Who really pays your gas bill, Caoimhim (Kevin)?

20 hours ago • Unlike • Like

Blaine Parry • Greg, what material are you talking about that Caoimhin supposedly sent to me? I have no idea what you are talking about...

I want to be clear - I have no interest in fighting with anyone - ever. There is a lot of information out there - some good, some not good, some completely wrong.

It is our job...our responsibility to gather the factual data and come to a reasonable conclusion...
based on science and fact.

That is my only agenda Greg - not to fight.

I do want to wish you all a Happy New Year though - yes, even you Greg :)

12 hours ago** Unlike**  Like