Whole home air purification is now more important than ever. There have always been dangerous pathogens in the air, but COVID-19 has taken it to another level. With more people now working from home, they want to know that their indoor environment is as safe as possible. Businesses and schools also want to reopen safely. Senior living and healthcare facilities, which house the most vulnerable among us, want to feel reassured that everything possible is being done to make the air that they’re breathing safe. HVAC contractors are in a perfect position to lead the way in improving indoor air quality for a large and very motivated clientele.

While there is no cure-all product to completely eradicate these viruses, bacteria, etc., we can do things to help alleviate some of the problems that exist in the air that we breath. There are several studies that suggest that clean air plays a vital role in preventing the spread of viruses like COVID-19. While the respiratory droplets that we exhale are considered the primary transmission route, experts strongly suspect some form of aerosol transmission may be occurring. That being said, if we can “deactivate” some of these airborne viruses, we may be able to help to mitigate their spread.

Biological particles such as bacteria, fungi, pollen and viruses that are present in the air are referred to as bioaerosols. That includes things like influenza viruses, severe acute respiratory syndrome (SARS), bacteria, mold spores, smoke, odors, volatile organic compounds (VOC’s), pet dander and dust. If we could neutralize these bioaerosols we could help to improve our overall health and potentially slow the spread of some diseases.

PlasmaPURE offers air purification solutions for residential and light commercial applications. PlasmaPURE bipolar ionization technology replicates nature’s process for cleaning the air by producing an equal amount of positive and negative oxygen ions. It produces millions of these charged oxygen ions. They travel through the duct system and into the occupied space, neutralizing pollutants. Bipolar ionization outperforms PCO, UV and HEPA filters for odor, particulate, viruses, bacteria and VOC’s with no harmful byproducts, a lower pressure drop, less energy usage and at a competitive price.

Due to the small size of viruses, many filtration technologies are unable to trap viral particles. Bipolar ionization is non-selective. The size of the particle is irrelevant. The positive and negative oxygen ions attach themselves to the viral particle, deactivating it.

We are currently stocking the PA#602. It is a 24volt unit that uses less than 1 watt. It has a magnet on the back and mounts easily onto the blower housing. The PA#602 is rated for up to 6 tons (2400 CFM). There is no expensive maintenance that needs to be done to the PA#602. There are no annual bulb or filter replacements.

You can visit their website at www.plasma-air.com.

This video explains the process nicely.

This is also a good article on how the PlasmaPure works.
GETTING TO KNOW YOU

Gretchen McDonald

Meet Jabari Jackson, a member of our warehouse team at the Menomonee Falls branch of Monroe Equipment. Jabari comes from a large family of creatives, whose interests include photography and graphic design. Home improvement has been Jabari’s main line of work since a young age and before working at Monroe Equipment, he specialized in roofing. He even travelled to Nigeria and Liberia for his previous construction positions.

Jabari joined us last October and currently resides in the Greenfield area. He is a sports fan and loves spending time with his five year old daughter, whose favorite activities include ballet classes and singing. An avid adventurer, Jabari enjoys travelling the world and has been sky diving 8 times! He hopes to someday go on a jungle safari with his girlfriend, who also loves to travel.

When asked what Jabari likes most about working at Monroe Equipment, he spoke of the camaraderie of his coworkers who make the day fun and the fact that coming here is like coming to see family. There’s never a dull moment and he enjoys being able to laugh a lot with his team.

We love having Jabari’s outgoing and fun personality at Monroe Equipment!

NEW MRF FORMS

Aixa Stelter

Beginning July 1st we will be implementing our new MRF forms for Warranty and New & Unused parts and equipment. The new MRF forms will take the place of any older MRF forms. We will also still offer the online submission form for ALLIED PARTS ONLY. The new MRF forms can be found at each of our branches and on our website.

We want to ensure that the transition to these new forms goes as smooth as possible so we ask that you discard all previous forms used. The warranty department will honor the old forms until July 31st. Any old forms used after that date will be returned and will delay the claim process. You will notice that the warranty form is set-up a little different than the previous. Each part will have its own box where all information pertaining to that part or piece of equipment will be recorded.

As we have asked in the past, please make sure that all information is filled in properly so as to not delay the claim process. Unfortunately manufacturers are getting more strict with their returns so we must provide them with the most accurate information to insure your claim is approved.

If you would like the forms mailed to you please let me know. If you have any questions regarding the new forms, or any questions about the warranty process, please feel free to call or email me directly.
Most contractors and technicians continuously overlook static pressure readings for a plethora of reasons:

- Time (Get the job done and on to the next, we need to make money)
- Cost (For customer and contractor)
- Lack of Knowledge (The system works - what difference will it make)
- Training (No one ever showed me how or why)

These are all valid reasons and need to be addressed. Adequate training is significant to the technician on the job. If a system is not setup properly, it will, in the future, cause frustration for all parties from a perspective of time and cost.

A technician’s approach to static pressure testing should be from a scientific perspective, applying only observed data to form a conclusion that will help determine a corrective action. This may seem intimidating, but with some knowledge and application, it can become second nature. Let’s take a look at what static pressure is, how and where we measure it, and of course what we know and can do with the data.

Static pressure is defined as “The pressure exerted in all directions and is considered opposition to airflow or CFM.” Often it is easiest to visualize this as a balloon and the pressure pushing on it to get out. This pressure offers resistance to air flowing through a duct.

Velocity pressure is defined as, “Pressure of the air as it is being forced through the ductwork. This pressure is only in one direction.” Velocity pressure is a function of air density and velocity (or speed).

**Total Pressure = Static Pressure + Velocity Pressure**

Mathematically speaking, if a blower motor can handle only so much total pressure and we use almost all of it on static pressure, there will not be enough leftover for velocity pressure. Without enough velocity pressure, we will not be able to move air. The blower motor just cannot handle it. Thus, the motor may run for a short time but it will fail prematurely.

With an understanding of what static pressure is, let’s examine how and where we should take our measurements. You will need a manometer and static pressure probes (pitot tubes). You will also need a drill and ideally a unibit. The unibit works better because you are less likely to drill into something on the other side of the sheet metal, for example the evaporator coil.

With the proper tools in hand, you will be drilling four holes. They will be located after the evaporator coil, after the blower, before the blower and before the filter (see photo). When you insert the static pressure probe you want the bullet point facing towards the airflow.

“IT’S ALL ABOUT THAT ESP” Continued on page 4
Below is an example I personally did in our training lab at Monroe Equipment. The furnace (A97USMV070B12S) used in this sample should have a total external static pressure or ESP$_T$ of .8” w.c. (water column) or less, per the installation manual. Since you cannot see them in the picture, this lab model set up has an extremely short and restricted return, with some very short supplies. Additionally, I closed two of the six supply dampers for a second test.

<table>
<thead>
<tr>
<th></th>
<th>Dampers Open</th>
<th>Dampers Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>After the Coil</td>
<td>0.07</td>
<td>0.23</td>
</tr>
<tr>
<td>After the Blower</td>
<td>0.16</td>
<td>0.34</td>
</tr>
<tr>
<td>Before the Blower</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Before the Filter</td>
<td>0.27</td>
<td>0.27</td>
</tr>
</tbody>
</table>

*It should be noted that your pressures before the blower will show as negative on the manometer, since it is a negative pressure we are reading. Just use the number as a positive.

So, what do our measurements tell us? Without some context these numbers would likely be meaningless to a technician. There are numerous things we will calculate with our data. They are overall ESP$_T$ (which we know needs to be .8” w.c. or less), coil pressure drop, filter pressure drop, supply duct pressure drop and return duct pressure drop. The basic formula for each is below:

\[
\text{ESP}_T = \text{Before the blower} (.4) + \text{After the blower} (.16)
\]
\[
\text{Coil Pressure Drop} = \text{After the Blower} (.16) - \text{After the coil} (.07)
\]
\[
\text{Filter Pressure Drop} = \text{Before the blower} (.4) - \text{Before the filter} (.27)
\]
\[
\text{Supply Pressure Drop} = \text{After the coil} (.07)
\]
\[
\text{Return Pressure Drop} = \text{Before the filter} (.27)
\]

Below are the results of our calculations for both scenarios (dampers open and dampers closed.)

<table>
<thead>
<tr>
<th></th>
<th>Dampers Open</th>
<th>Dampers Closed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coil Pressure Drop</td>
<td>0.09</td>
<td>0.11</td>
</tr>
<tr>
<td>TESP</td>
<td>0.56</td>
<td>0.74</td>
</tr>
<tr>
<td>Filter Pressure Drop</td>
<td>0.13</td>
<td>0.13</td>
</tr>
</tbody>
</table>

Looking at our results for ESP$_T$, we are in good shape. However, look at how much closing off two dampers had on the over ESP$_T$. This is something to note for future reference. It increased by .18” w.c., which is a lot. The ESP$_T$ number will tell us if the system is good for the long haul, meaning we will not destroy the motor and need to replace it in the near term. While this furnace is good up to .8” w.c. many manufactures have different numbers, so always consult the manufactures data.

Let’s say our ESP$_T$ was too high for this system. We know we have a problem but where is it located. If we look at the supply and return side separately, we will get a good idea. Typically, duct work alone is design around .1” w.c. or less for both the supply and return sides. Our supply side (this is that reading after the coil) is .07” w.c. and our return side (this is the reading before the filter) is .27” w.c. It is clear we would need to further investigate the return side to see what is the cause of the higher static pressure.

There are two more items to consider, next up is the Filter Pressure Drop, with .13” w.c., which is a typical number. Many filters will be around .1” w.c., however you can always consult with the manufactures data. If the filter was dirty or anything blocking the airflow you would see an increase in your static pressure reading. In addition, notice the pressure drop did not change with the closing of the two dampers on the supply side. The reason for this is that we did not do anything on the return side.
“IT’S ALL ABOUT THAT ESP” Continued from page 4

Lastly, our Coil Pressure Drop was .09 and .11” w.c., which is a little low. Typically, you will see around .15 to .3” w.c. on a system, but again consult the manufactures data. Just like with the filter, if the coil is dirty or blocked or even wet your static pressure number will increase.

Effective marketing from many filter manufacturers intended at promoting high priced, high efficiency filters, has left inexpensive looking filters as inadequate and unable to provide proper filtration to keep the equipment clean. In truth, many of the fans used in residential HVAC systems today can only afford a low efficiency filter due to the resistance to airflow that higher efficient filters typically cause on a system. This is especially true if the duct design is also restrictive.

If an environment needs to have higher filtration there are some options available. You could adjust the filter surface area. There are a number of ways to do this. One example would be to installing two filters in the return duct near the equipment in “V” formation. This “V” formation will provide additional surface area and allow you to lower the static pressure. You could also install additional filters throughout the system in the form of return air filter grilles.

The best option in my humble opinion, is a HEPA filter systems that comes complete with its own fan and is installed in a bypass duct so the filter exerts no pressure drop on the system. Pictured to the right is a Premier One HP500, for example

I would like to wrap things up by letting you know that once you are comfortable with doing a static pressure test and the math, it should only take five to ten minutes. As a thank you for taking the time to educate yourself and raising the bar for our industry, I have placed a link here, that will give you a video version of what you just read. Enjoy!