COVID-19 and the HVACR Industry
Health & Safety

Not since the days of tuberculosis and polio have we had such a country wide scare as we are experiencing now with COVID-19, Coronavirus. Even though it is now at the pandemic level, the general population and the media are acting like the apocalypse of the zombies is upon us. Please don’t take me wrong, this is serious business and we will try to keep our information and attitude that way; however, dealing with this “crisis” does require some return to normalcy in our thinking.

We need to talk about how this involves your customers and the techs in our industry. We will start with “Thoughts for Running a Service Call”. Also, these are not suggestions or recommendations unless indicated in the reference. They are merely thoughts for you to consider. Some of the thoughts may not be possible due to shortages of product. Some you can easily do. You may consider some of the thoughts to be ridiculous. Perhaps you are right. We are living during a challenging time. We have labored to study the available material and to present it to you in a factual manner. If you have suggestions or corrections, please feel free to contact us.

Technicians are in several homes every day. Each home is another opportunity to be exposed to coronavirus, the regular flu, a cold, whatever happens to be the malady of the household. Since COVID–19 is super contagious, we need to think about what a tech should do to protect himself as well as the homeowner.
Thoughts for running a service call:

1. **Take your temperature.** Begin each day with a quick temperature scan of every tech. You can use a simple non-contact forehead thermometer. They return the temperature in a second or less. Taking a temperature can be a way to identify the health of the tech and perhaps send them home. It is also another way to give peace of mind to your homeowner; i.e., “Mrs. Customer, we take a temperature scan of our techs each morning as a step to ensure their health. Nothing is fail-safe but during this COVID-19 crisis, we’re doing all we can to protect you and your family.” There are some things to note about using the forehead scanner. First, the temperature may be ½ to 1 degree lower than a temperature taken in the mouth. [29] If your initial scan reads normal, it may be advisable to also take an oral reading as the tech may have a slight fever. If you use an oral thermometer, be sure to follow proper sterilization procedures. According to the US National Library of Medicine, “Disinfecting the Clinical Thermometer, “...clinical thermometers should be thoroughly wiped after use and then immersed in a suitable disinfectant for a period of several minutes. In general practice where this is impracticable, the thermometer should be thoroughly wiped after use with cotton-wool soaked in disinfectant.” [30] Also remember that each person’s body temperature may vary. It is inadvisable to use strips as they measure skin temperature rather than body temperature. [29] Finally, even manufacturers of forehead thermometers caution, “This is not a replacement for a clinical thermometer - always use a clinical thermometer when high accuracy body temperature measurements are required.” [31] The temperature readings should be recorded and kept in the central office.

2. **Call & Ask before you go.** It is OK to ask your customer if everyone in the house is healthy. This is also a good time to inform your customer as to the safety procedures that your technician will be taking; i.e., mask, gloves, safety glasses, uses of disinfectants, not shaking hands, etc. It can provide confidence for your customer as to the professionalism of your company. The CDC offers the following advice for medical professionals. “When scheduling appointments for routine medical care (e.g., annual physical, elective surgery), instruct patients to call ahead and discuss the need to reschedule their appointment if they develop symptoms of a respiratory infection (e.g., cough, sore throat, fever[1]) on the day they are scheduled to be seen.” While this may be directed at the medical profession, it provides good direction to the HVAC company and technician. Now is a good time to re-evaluate the need to provide normal maintenance service calls. They can wait. On the other hand, you need to get started and good protective procedures may keep both your tech and the customer safe. Of course, “equipment down” is different and heating and air conditioning is a health and safety issue, even if there is an infected person in the home.
3. **Handling a call when the occupant has been diagnosed with COVID-19**

This is difficult. Our industry is service and customer oriented. We care about our customers. We are also, MEN. Sorry, I did not mean to be politically incorrect or sexist; however, the vast majority of our techs are men and most are quintessential MEN. Meaning, we think nothing can happen to us and, if it does, we’ll MAN-UP. I think you get the point. While we are positive about our ability to handle anything, this is not one of those things where we can allow our testosterone get the best of us. Again, ladies, you know what I mean and hopefully you’ll connect to this even better than men. After all, you have to live with us.

What if your company gets a call and the customer reveals that an occupant has been diagnosed with COVID-19 or are self-isolating because they were around someone with COVID-19?

First, a regular maintenance call should be out of the question. There is absolutely no need to put techs or the next homeowner at risk. That maintenance call can wait.

Second, we are moving into a season where it is relatively mild and whole house mechanical air conditioning (cooling) is not absolutely necessary. If windows can be raised, that is an option in lieu of mechanical air conditioning. The homeowner can use ceiling fans or box fans. If they do not have box fans, you can pick one up at WalMart and take it to them. Leave it on the porch. The down side is this is also the season for allergies. Opening windows can bring in pollen which could aggravate their symptoms. It is a catch 22.

Third, heating is a greater concern; however, whole house heating may not be necessary. Occupants with COVID-19 are encouraged to self-isolate in their bedroom to reduce spreading it to other members. [11] So, small electric heaters for that bedroom are an option. If they don’t have a safe electric heater, you can go to WalMart and pick up a couple. Make sure the heaters are not open and will turn off if turned over. Safety is paramount. Additional heaters can be used as may be desirable to the homeowner. Again, safety is paramount. The homeowner should be aware that their electric bill may skyrocket. If a single heater at 1,500 watts is used 24 hours a day for 30 days at $0.10 (10 cents) per kWh, the bill can be as much as $108.00. Multiple that times the number of electric heaters and you can see a shock. Fortunately, it is unlikely that moving into April we’d have a 24/7 heating need. The elderly and newborns could be an exception.

Fourth, REMEMBER THAT NOT ALL SNIFFFLES, COUGHS, AND SNEEZES ARE COVID-19—especially this time of the year. We’re around folks with allergies and colds all the time and never think about it. We should not automatically assume the person is COVID-19 infected and we should not go into a panic. The vast majority of our customers with a cough are not COVID-19 infected. Further, we should treat our service call like a doctor would invoke the HIPAA rule. In other words, keep it to ourselves and within our company. There is no need to assume that the homeowner is infected, tell others, and then have gossip spread. We are not doctors. We do not know how to diagnosis COVID-19. Keep it within your company.
Lastly, if you get a call to provide service for a home with an infected or having been exposed occupant, the company must evaluate the risk to the tech as well as the next homeowner the tech will see. A tech making that call first thing in the morning and having 6 more calls during the day could spread the disease by a factor of 6. If those people see 3 more people during the day, the number of potential infected persons is now 18 times the number of people in their family. Not trying to be an alarmist. Just trying to point out that COVID-19 spreads easily and we cannot allow our testosterone driven “we’re scared of nothing” make our decisions. There are many others that can be affected by our actions. The owner of the business must also be fully transparent with the tech. The tech must be informed and be given the opportunity to TURN DOWN the tech call.

4. **Put on your booties.** Even though we usually think about wearing booties to prevent tracking in mud, now you can consider them as a way to prevent picking up a virus on your shoes. Droplets and mists containing the coronavirus can live up to three hours in the air and for three days on surfaces according to researchers at Princeton and UCLA. [1] On the other hand, transmission of novel coronavirus to persons from surfaces contaminated with the virus has not been documented. [2] Whether or not a virus is lurking on the floor, wearing booties just makes sense as a service to the customer and a way of conveying the professionalism of your company. If it also helps the tech. That is an extra not previously considered. One last note, throw out the booties after each service call. Should the booties pick up a nasty sickness, you do not want to track it into the next home. Wash your hands after throwing them out—you touched them.

5. **If wearing a mask,** arrive without the mask and then tell the customer that you’ll be wearing a mask just as a precaution for their benefit. WEARING A MASK IS NOT NECESSARY AS IT IS NOT RECOMMENDED BY THE CDC. This is just a thought as to handling masks if you think they are prudent. Remember to throw the mask away after each service call. We see pictures of general populations wearing a mask, especially in Asian countries. Not sure why; however, there are some things that are definitely recommended by the WHO, World Health Organization.

   First you should wear a mask if you have COVID-19.

   Second, you should wear a mask if you are in a room with an infected person.

   The WHO provides a video, which can be watched at the following link, about proper use of a face mask. [3]

The CDC, Centers for Disease Control, “...does NOT currently recommend the general public use of facemasks.[4] If you are going to wear a mask, it should be a N95. On the other hand, “Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings--Updated PPE recommendations for the care of patients with known or suspected COVID-19” clearly states that N95 facemasks are preferred but that “facemasks are an acceptable alternative when the supply chain of respirators cannot meet the demand.[5]

It should be noted that many of the recommendations and references in this article reference HCP, Health Care Professionals, assuming that they will be in close contact with persons affected or persons having been exposed to COVID-19. Since I have been unable to find articles specifically referencing technicians in a home with a resident who has been exposed or affected by COVID-19, we’re having to take caution from those for the HCP. After all, when you are in a home, you could easily be exposed. CDC also says that “Close contacts of persons with COVID-19 also are at elevated risk of exposure.”[6] That sounds like a possible HVAC technician.

The CDC says that “Close contacts of persons with COVID-19 also are at elevated risk of exposure.”

Close contact is defined as:

a) being within approximately 6 feet (2 meters) of a COVID-19 case for a prolonged period of time; close contact can occur while caring for, living with, visiting, or sharing a healthcare waiting area or room with a COVID-19 case

– or –

b) having direct contact with infectious secretions of a COVID-19 case (e.g., being coughed on) [7]

Just as an aside, the American Lung Association says, “A cough can travel as fast as 50 mph and expel almost 3,000 droplets in just one go. Sneezes win though—they can travel up to 100 mph and create upwards of 100,000 droplets.”[23] Looks like we live in a wind tunnel of germs even in normal times. Maybe a facemask is not such a bad idea.

6. **Wear protective glasses.** When a sick person coughs or talks, virus particles can spray from their mouth or nose into another person’s face. You’re most likely to inhale these droplets through your mouth or nose, but they can
also enter through your eyes. [24] The recommendations for eye care are for the Health Care Professional; however, the facts and applications can apply to anyone. If you are near a person that is infected with Coronavirus 19 or may not even be showing signs of infection, the spray in the air can still enter the eyes of a HVAC technician.

7. Wear Gloves. Wearing disposable gloves can be an important method to reduce your contact with the virus on surfaces. Remember to remove, dispose, and then wash your hands. The CDC recommends “Wear disposable gloves when cleaning and disinfecting surfaces. Gloves should be discarded after each cleaning. If reusable gloves are used, those gloves should be dedicated for cleaning and disinfection of surfaces for COVID-19 and should not be used for other purposes. Consult the manufacturer’s instructions for cleaning and disinfection products used. Clean hands immediately after gloves are removed.” [9] If you are a HCP or if you were in the room with an infected person, “Remove and discard gloves when leaving the patient room or care area, and immediately perform hand hygiene.” [8] Once again, this could apply to a HVACR technician.

8. Clean the surface of the return air filter grill with a disinfectant. The CDC recommends cleaning and disinfecting frequently touched services using a bleach or alcohol solution. [12] The filter grill is not touched frequently by hands but it is in constant contact with air in the home which can contain the suspended virus. [13]

9. Remove the filter. Place it in a plastic bag and throw it in the customers outside trash. While COVID-19 is smaller than most filters can stop, it only makes sense that some might stick on the fibers as they would travel through.

10. Replace filter with a regular filter. Do not upgrade to a high MERV (13) unless you also test the duct and blower to see if the system can handle the pressure drop across the filter. COVID-19 and other corona viruses are from .005 to .3 microns. [16] One reports lists them as 0.004 to 0.1 microns in size, which is about 100 times smaller than bacteria. [15] A HEPA filter is rated at 99.97% efficiency down to about .3. [18] While it may catch some viruses, it cannot stop them all. To install a HEPA filter with a common 0.25 to .65 IWC pressure drop [19] can increase return air leakage, reduce air flow, and create system problems—especially true as we transition to air conditioning. You can reduce the pressure drop but you’ll need to increase the filter grill to as much as 3 sq. ft. per ton. [20] This is a good time to discuss filtration with the customer and returning in the future to install an appropriate filter to meet the customer’s concerns.
11. **Maintain recommended “social space”**. [21] While it is impossible to maintain the recommended 6’ between you and the customer at all times, you can at least reduce your time in the “social space” by being conscious of the need. This is a good time to re-evaluate the space you create between you and the customer. Some folks get right in a person’s face and it is uncomfortable for them, even when there is no threat of illness. A person’s personal space has been defined as around 3 feet or less. [22] In other words, keep a little space so the customer doesn’t feel you are too aggressive. From a health and safety perspective, it prevents people from spraying you when they cough, sneeze, or even talk. We’ve all known an unintentional spitter.

12. **Wash your hands.** Wash your hands often with soap and water for at least 20 seconds, especially after blowing your nose, coughing, or sneezing, or having been in a public place. [10] Wash your hands after touching surfaces in public places. [10] Washing your hands seems to be the most commonly issued directive in preventing the spread of COVID-19. Where should you wash them? You could ask for permission as you enter and leave the home. That may be a bit too much as some folks have an aversion to strangers using their bathroom. There is also the question of how would you dry them. Definitely do not use their hand towel. That is a step too far so you might want to have your own disposable rag—like the one you’ll use to disinfect their return air grill. Don’t dry them on your pants. Remember to wash your hands a minimum of 20 seconds. [10]

13. **Use a hand sanitizer.** Sometimes you can’t get to a bathroom to wash your hands, so, use a hand sanitizer. Problem is, the shelves are empty. The following is a recipe for making your own.

**The Better (Spray) Recipe** [25]

- Isopropyl alcohol
- Glycerol
- Hydrogen peroxide
- Distilled water
- Spray bottle

Here’s a recipe that’s less sticky than using aloe and more potent, based on the mix recommended by the WHO. [26]

Mix 1 ⅔ cups alcohol with 2 teaspoons of glycerol. You can buy jugs of glycerol online, and it’s an important ingredient because it keeps the alcohol from drying out your hands. If you can’t find glycerol, proceed with the rest of the recipe anyway and just remember to moisturize your hands after applying the sanitizer.

Mix in 1 tablespoon of hydrogen peroxide, then another ¼ cup of distilled or boiled (then cooled) water. (If you’re working with a lower-concentration
solution of rubbing alcohol, use far less water; remember, at least \( \frac{2}{3} \) of your final mixture has to be alcohol.)

Load the solution into spray bottles—this isn't a gel, it's a spray. You can wet a paper towel with it as well and use that as a wipe.

If you must, you can add in a splash of essential oil to your concoction to make it smell nice. Just don't use lavender. Everyone else uses lavender, and your sanitizer is superior.

14. **Proper Disposal.** Remember that you are disposing masks, gloves, filters, etc. because of the potential spread of COVID-19. DO NOT just throw them in the truck or van. Place them in a trash bag and put them in your company's trash bin. Also remember to wash and/or disinfect your hands after handling the trash items.

15. **Provide a survey link.** This is another opportunity to ask how you did. Something we should do all the time; however, this time you can add questions about the health and safety practices of the tech, how comfortable was the customer while the tech was in the home, etc.

Should the tech or others in their home get sick, highlights of recommendations from the CDC follow. There is much more information available at the full website, “Getting Your Home Ready”.

**Getting Your Home Ready [11]**

**Stay home if you are sick.** Stay home if you have COVID-19 symptoms. If a member of your household is sick, stay home from school and work to avoid spreading COVID-19 to others.

- If your children are in the care of others, urge caregivers to watch for COVID-19 symptoms.

**Continue practicing everyday preventive actions.** Cover coughs and sneezes with a tissue and wash your hands often with soap and water for at least 20 seconds. If soap and water are not available, use a hand sanitizer that contains 60% alcohol. Clean frequently touched surfaces and objects daily using a regular household detergent and water.

**Use the separate room and bathroom you prepared for sick household members (if possible).** Learn how to care for someone with COVID-19 at home. Avoid sharing personal items like food and drinks. Provide your sick household member with clean disposable facemasks to wear at home, if
available, to help prevent spreading COVID-19 to others. Clean the sick room and bathroom, as needed, to avoid unnecessary contact with the sick person.

- If surfaces are dirty, they should be cleaned using a detergent and water prior to disinfection. For disinfection, a list of products with EPA-approved emerging viral pathogens claims, maintained by the CBC, is available at Novel Coronavirus (COVID-19) Fighting Productspdf iconexternal icon. Always follow the manufacturer’s instructions for all cleaning and disinfection products.

If you have additional questions about COVID-19, the CDC and Osmosis.org provide this link to a Youtube that is a thorough, yet simple explanation. Some of the statistics are out of date as the infection rate is changing daily; however, the explanation of how COVID-19 came to be are accurate and very interesting. [27] https://www.youtube.com/watch?v=JKpVMivbTfg

If you would like information from the CDC for employers, use the following link, “Interim Guidance for Businesses and Employers”[28]

Products and Services for Your Homeowners

1. The HVACR Industry plays a role. The ASHRAE Position Document on Airborne Infectious Diseases, reaffirmed February 5, 2020, states, “Because small particles remain airborne for some period of time, the design and operation of HVAC systems that move air can affect disease transmission in several ways, such as by the following: [32]

- supplying clean air to susceptible occupants
- containing contaminated air and/or exhausting it to the outdoors
- diluting the air in a space with cleaner air from outdoors and/or by filtering the air
- cleaning the air within the room

2. Filtration. It must be strongly advised that most residential HVAC systems are not designed for high MERV rated filters. Regretfully, most residential systems have significantly restricted return air filters which was the size allowed by the builder and homeowner. It is; therefore, important that any recommendation for highly rated filters be coupled with a.) measurement of pressure drop across coil b.) available static pressure, c.) existing return air grill, and d.) structural opportunities for increasing the return air grill and or grills.
It is unlikely that any residential system is capable of using a HEPA filter and even a HEPA filter will not remove 100% of COVID-19. So, filtration is an excellent option for the customer but it requires much more than retrofitting a high MERV rated filter. We must be careful to use this as an opportunity to educate rather than sell. Pushy, commission-based sales could result in a bad reputation for the HVAC company and a missed opportunity to help the homeowner.

3. **UVGI lights.** UVGI lights have been in use since the early 1900s. In 1903, Niels Fensen received a Nobel Prize for his use of ultraviolet light to combat tuberculosis.[34] According to the ASHRAE position paper previously quoted, UVGI lights can inactivate some disease-transmitting organisms and it can also affect disease transmission rates. [32] We have all seen the bluish light in a box near the ceiling in a medical facility. That is probably UV lighting. Due to the current nature of the COVID-19 virus, there are no studies as to the use of UVGI lights; however, one can feel confident that a properly installed in duct system will help inactivate some diseases. We cannot guarantee the absolute health and safety of a home with UVGI lighting but we know that it will help in many situations. I repeat the warning issued above. We must be careful to use this as an opportunity to educate rather than sell. Pushy, commission-based sales could result in a bad reputation for the HVAC company and a missed opportunity to help the homeowner.

4. **Humidity & Temperature Control.** ASHRAE reported one study which concluded that influenza retains maximum infectivity at a low humidity level of 23%. [32] The infectivity dropped dramatically at 43%. While there are even more opportune settings for dropping infectivity, above 86/50, the comfort level in the home would be undesirable. [32] So, it would appear that humidification and de-humidification are valid strategies for designing a healthy home.

5. **Proper Ventilation.** ASHRAE also discusses the need for proper ventilation. It makes sense that, especially in a tight home, the air can become increasingly polluted with a disease organism. The Arkansas Mechanical Code requires a minimum natural air change rate of 0.35 per hour. [33] New construction now mandates the use of mechanical ventilation. As we push even harder for tighter homes for energy savings, we must remember that fresh air is critical to the health and safety of homes and all occupied structures. Pre 2018 homes are not likely to have mechanical ventilation, yet homes built after 2015 may not meet the minimum ventilation requirement. Providing a mechanical or even an ERV could be an option. Not to belabor the point, use this opportunity to provide education to the homeowner. Do not get yourself in a situation to be accused of taking advantage of the present crisis.
References:


[14] ASHRAE Position Document Airborne Infectious Diseases, pg 8,


[33] Arkansas Mechanical Code, Table 403.3, pg. 31