



Stallion Air, Incorporated

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To: Stallion distributors, customers and users

Re: Questions Regarding Using Air Systems During the COVID-19 Pandemic

I have recently received inquiries from several fire departments who have been, or may be potentially be, affected by COVID-19. The questions pertain to the safety of the air produced by and stored in Stallion breathing air systems possibly exposed to Coronavirus aerosol droplets.

Attempting to answer these questions, I have reached out to personnel at the Centers for Disease Control and Prevention (CDC) as well as medical staff at Wake Forest Baptist Medical Center for assistance. Unfortunately, since we are dealing with a novel Coronavirus, definite answers are not readily available since definitive data is only now being determined. I will tell you what I have been able to determine based on information available.

We do not yet know exactly how long Coronavirus aerosol droplets can linger in the air. There are several academic studies that suggest differing times. In any case, I will address this issue under the assumption that aerosol viral droplets are present at the intake of the compressor.

Several elements of the breathing air system offer some protection should Coronavirus aerosol droplets be present at the intake of the compressor. First, the intake air filter may remove some of the droplets. The intake filter media is not fine enough to trap particles the size of a virus, but some will likely be captured in coalesced droplets.

Second, and likely most important, is the heat generated during compression. Experts are now saying that COVID-19 is most closely akin to SARS-CoV-2 (SARS) for which there is data. Based on that data, the virus will begin to die at temperatures above 56°C (133°F). A typical, multi-stage, reciprocating, breathing air compressor will achieve temperatures within the compression stages of 110°C (230°F) or more.

The CDC also stated that higher humidity is not conducive to the survival of viruses. The air within the compressed air stream will be at 100% humidity (complete saturation) until it reaches the purification system. The inter-stage traps and the final mechanical separator coalesce moisture and aerosol oil droplets into liquid and remove it from the air stream. In all likelihood, a good portion of viral aerosols will be coalesced along with the moisture during this process.

The high pressure involved with a breathing air system may also have an impact on the survival of a virus. I cannot find any data to support this and experts were unable to provide any insights to this unique question. So, at this point it remains unknown.

The chemical filtration system may be able to remove some virus droplets, however that is completely unknown. There is no data available to state if, or to what extent, this would occur. All purifier cartridges

manufactured by Stallion Air have a 1 micron final filter. Again, 1 micron filter media may not be able to trap something as small as a virus but they may trap at least some coalesced viral aerosols should they still exist at this point in the process. We cannot attest to the performance of aftermarket chemical cartridges since we cannot verify their components or construction.

In short, given the amount of information that is not known at this point, there is no way we can say with 100% certainty that viral droplets ingested by the compressor will be completely removed or destroyed.

Since there is no official guidance for this, using CDC and WHO social guidance may be useful when producing breathing air. It probably would not be a bad idea to limit the number of personnel around the breathing air system if practical. It may also be prudent to have system operators wear N95 masks around a breathing air compressor to minimize droplet spread, especially when it is running. Since the highest likelihood of introducing a viral contaminant will probably be from surface contact, frequent cleaning of surfaces directly involved with the transfer of air into cylinders would be helpful. Specifically, clean the tips of charging connectors in the fill station. I doubt wearing protective gloves would have much benefit when using the compressor, but that is your discretion. We do recommend wearing gloves when filter cartridges are changed during compressor service.

One ancillary item that may provide some benefit would be the use of ultraviolet (UV) sterilization lights in the area around the breathing air compressor. Virus levels are greatly reduced, sometimes even eliminated, by doing this. Hospitals employ this technique frequently for this very purpose. I do not know which specific wavelength of UV light is most effective, but I would imagine something in the 385nm to 405nm range of the spectrum would be sufficient. Since every installation is unique, I cannot recommend a quantity or intensity of UV lighting needed to be effective. Smaller rooms can use less lighting. Larger rooms would obviously require more UV lighting.

I hope this provides a little help. Please stay safe out there. Call us if you have questions or need assistance. We're here for you.

Regards,

A handwritten signature in black ink, appearing to read "William Johnson". The signature is fluid and cursive, with a long horizontal stroke at the end.

William Johnson, Product Design

Stallion Air, Inc.